University of Minnesota

Office of Information Technology

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Information Technology Newsletter

Students Look Ahead

University of Minnesota Students Design Libraries and Virtual Communities of the Future

By the year 2000 you may be able to walk into a library, turn on a device that resembles a walkman, and hear audio instructions that will lead you to the location of any library material you wish to browse, even if you have a visual impairment.

Your children may be able to use a computerized "magnifying glass" to detect clues and solve a library "mystery" that teaches them how to find information on rhinos or other subjects; or they may be able to select, hear, write, and publish their own texts using a public library computer.

Your retired friends and relations may be able to read the novels of Jane Austen on their own laptop-type computers, then plug their laptops into a circular table in a community room and together view text, audio, and video materials about the author and her work and discuss and record their thoughts electronically.

You may be able to use a computer device to sit in a circle and talk with other members of your multiple sclerosis support group–even though you are laid up in bed hundreds of miles away. Or you may be able to share personal stories with other Minnesotans, individuals with similar disabilities, your neighbors, or other students using other digital devices.

What do these devices have in common? They have all been designed, prototyped, and tested by University of Minnesota students who participated in the Apple Design Project '96 and '97 <http://design.research.apple.com/>.

Undergraduate and graduate students from the Architecture, Computer Science, Studio Arts, Rhetoric, and Design, Housing and Apparel departments worked with Rhetoric and Architecture faculty, Digital Media Center team members, a liaison from Apple Computer, Inc., and actual users to solve real problems faced by particular groups of people using information technology available by the year 2000.

Project Goals

Each year since 1992, Apple Research Labs has selected seven to ten universities from around the world to participate in its annual international student design project. According to Harry Saddler of Apple's User Experience Research Group, the project is designed

> to inculcate the philosophy of user-centered design into university-level design and engineering curricula, and immerse students in the practice of multidisciplinary, team-based interaction design.

Each year Apple also chooses a different class of users and identifies key design issues and technology constraints. Interested faculty submit proposals to Apple. If they are accepted, they then set up three to eight interdisciplinary teams of students that each find and articulate "real and tractable" design problems faced by these users.

Over the course of one or two terms, the student teams design and test prototype solutions and then present their final results to faculty from their school and local industry experts. These evaluators choose the team whose solution best meets the design criteria to travel to a four-day conference at Apple in Cupertino, California. At the conference each school's team publicly presents its project to leading Silicon Valley industry and educational design experts. University of Minnesota faculty from the Rhetoric and Architecture departments and the Digital Media Center have submitted proposals that allowed University students to participate in the project for the past two years, the maximum allowed by Apple.

1996: Community and Technology

In 1996 participating teams were asked to:

> reflect on the possibilities and problems of community, and the ways in which computational and communications technologies might support community. How might technology be integrated into a place so as to better support the formation, maintenance, and functioning of the community within it? And how might a digital network serve as an infrastructure within which a non-co-located community of interest can grow?

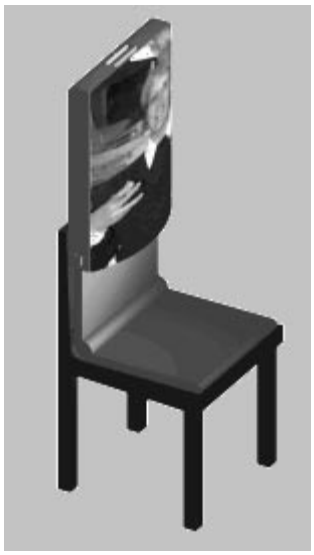
The University Teams

Twenty-one students from the University of Minnesota worked in five teams to solve real problems faced by the following user groups: people with multiple sclerosis in advanced stages or those who live in rural Minnesota and cannot attend support groups; residents of the Valentine Hills neighborhood in the Twin Cities; individuals with mental and physical disabilities; "the community of the state of Minnesota;" and Native American University of Minnesota students. The students worked with faculty members Lee Anderson and Lars Peterssen, Department of Architecture; Ann Hill Duin, Laura Gurak and Billie Walhstrom, Department of Rhetoric; and Linda Jorn, Acting Director of the Digital Media Center.

The In-Person

Judges from different campus departments and the local architecture, design and computer industries selected the team working with multiple sclerosis support groups to represent the University. The team designed and prototyped a communications system the size of a laptop computer called the "In Person" (Figure 1) that can be unfolded and placed on a chair during support group

Figure 1: In-Person and Chair



sessions. A group member who cannot attend a session due to illness or distance can sit at their computer at home and send a digital image of themselves to the In-Person, which displays their image to the group on a curved screen. All members can see the image as they sit in a circle. The group member can also see an image of the entire group on his or her own monitor, zoom in on individual members, and hear and participate in group discussions.

More In-Person information is available at <http://dmc-1.tc.umn.edu/cafe/goldfish/>.

During three tests with two user groups, the team found that users preferred seeing a life-sized image of the remote participant projected on to a unit that sits on a chair, much like a real person, rather than a typical monitor-sized head shot.

Since group members used touch and facial expressions to express support for one another, the team also originally designed a hand-held device that allowed remote participants to send emotional icons ("emoticons" such as hearts or smile icons) to group members and vice versa. During testing, however, the team found that sending emoticons disrupted the conversation and were seen as "crosstalk."

The design team thus modified the prototype. The modification lets group members express physical support to the remote participant. At the end of the meeting the group could hold hands as they normally did, but now the two members next to the display device can put their free hand on the display screen, so an image of their hands can be transmitted to the remote participant, who could then put his or her hands over the image and complete the circle.

During the summer of 1996, the design team attended the project conference in Cupertino and their project was selected the best of the entries. The University's design team was made up of David DeBonis (Department of Rhetoric), Lynn Selene and Kim Johnson (Department of Architecture), and T. J. Fowler (Department of Studio Arts). For more information about the project, you can visit this Digital Media Center web site: <http://www-dmc.tc.umn.edu/cafe/appledesign96.html>.

Other student design teams were also present, representing the California Institute of Arts (USA), Domus Academy (Italy), Keen State College (USA), National Institute of Design (India), Rietveld Academic (Holland), Rhode Island School of Design (USA), Ohio State University (USA), University of Siena (Italy), and the University of Westminster (UK).

1997: The Future of Libraries

In 1997 the Apple Design Project participants were asked to answer the question:

> How will changes brought about by the digital revolution in the creation, modification, retrieval, use, and organization of information combine with the traditional (and newly emerging) roles of libraries as social places? How will people perceive, understand, and use libraries in all their permutations, today and in decades to come?

The University Teams

Fourteen University of Minnesota students worked in four teams to solve real problems faced by the following users groups: a first and a third-grade class; Minneapolis pubic library users with vision impairments; at-risk children who used a local public library; and residents of Rarig Campus, a retirement community in St. Paul. The students worked with faculty members Mary Guzowski and Lars Peterssen, Department of Architecture; Deborah Balzhiser-Morton, Department of Rhetoric; and Linda Jorn, Acting Director of the Digital Media Center.

Time Gate

At the final presentation session in June, faculty members from different University departments and local architects, computer designers, and librarians chose the design team working with at-risk children in a local public library to represent the University at the 1997 conference in Cupertino: <http://design.research.apple.com/design97/uminn.html>.

The team modified a printed library tutorial called "Time Gate" developed by two children's librarians at Hennepin County's Brookdale public library. That tutorial invited children to solve a mystery by following clues leading to information about rhinos. The team decided to use digital technology to introduce the children to both the library's existing print materials and new digital resources and to improve group participation in the game and its ending.

The team designed and tested five prototypes that allow the children to view a video orientation projected from a "Time Machine" onto a mat on the floor. The children then work in pairs to find materials in the library and win a piece to a larger puzzle. Each pair follows clues presented on a computer handset, called the "Magnifying Glass," and then uses the device to scan the barcodes of the materials they find.

Once they have completed their piece of the puzzle, each pair loads it onto the Time Machine. When the puzzle is complete, an image and animation of a rhino appears and the librarians lead the children to accompanying library materials.

The librarians who designed the print tutorial were pleased with the product and plan to use some of the design team's ideas in the future.

The design teams was made up of Connie Lindor and Ernesto Ruiz (Department of Architecture); Adam Lund (Department of Rhetoric); and Peter Hsu (Department of Computer Science). For more information about the project, you can visit this Digital Media Center web site: <http://www.umn.edu/dmc/adp/appledesign_97.html>.

Outcomes

Saddler (Apple User Experience Research Group) recently asked liaisons, students, faculty, and evaluators who participated in the 1992-96 projects to identify the impact the project had on students, schools, and Apple itself and reported his results <http://www.umn.edu/dmc/adp/appledesign_97.html>.

Student Perspectives

The students reported that they gained valuable experience working in multidisciplinary teams with real users on real problems rather in their usual discipline-specific teams on academic and highly theoretical problems. This helped them understand what it is like to work in industry on projects with real-world constraints, such as tight deadlines, budgets, and technological resources and with stakeholders following different agendas. As a result, some students chose different career paths; some decided to explore related areas in additional fields; some found their "life's work;" and all gained showpieces for their portfolios and valuable career contacts. One student told Saddler the project "changed his life."

Connie Lindor, an architecture graduate student who was part of the team that presented at the conference in 1997, was also enthusiastic about the project.

> It was a great experience working that closely with our user group and students from other disciplines because it was so different from how architecture classes usually work. The conference was particularly helpful to me as an architect because we usually don't give such polished presentations, and I was astounded by the graphics in the presentations of the other groups that had graphic and industrial designers on their teams.

Faculty Perspectives

Faculty reported that the project helped them, too. It helped bridge departmental boundaries and initiate programs in multidisciplinary interaction design at their institutions by providing contact with other interested faculty and sending a message that information technology industries need students trained in such programs.

In the 1997 University of Minnesota project proposal, Linda Jorn, Acting Director of the Digital Media Center; Deborah Balzhiser Morton, Ph.D. candidate in the Department of Rhetoric; and Lars Peterssen, Adjunct Assistant Professor in the Department of Architecture, reported that the collaboration of their departments during the 1996 project "was very successful for both the students and for their departments." The rhetoric students and faculty contributed expertise in usability design methods, and the architecture students and faculty provided expertise in the studio teaching model based on extensive critiques and the use of physical prototypes.

Lars Peterssen, one of the project instructors from the Department of Architecture, recently commented:

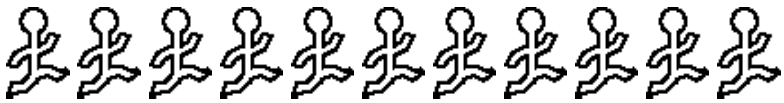
Both years it took several hours for the evaluators to choose only one team to travel to Apple because all the final presentations were exceptional.

The students had put a tremendous amount of energy into working with their user groups and had developed considerable empathy for them. They produced work that would have been unthinkable without the skills of different disciplines being brought to the collaboration, and the faculty members involved would have been proud to have any of the projects represent the University of Minnesota at the Apple conference.

Apple's Perspective

Apple Computer benefited too. Project liaisons reported that they were exposed to fresh ideas from students who are not constrained by real-world experience; were offered an opportunity to reflect on their design process, integrate it into their practice, and teach it; and were given access to the best students in the field. And yes, according to Saddler, some of the students involved in the project have gone on to intern and work for Apple.

Christina L. Goodland, Digital Media Center



JMP: Statistical Software

Academic and Distributed Computing Services has obtained a distribution license for JMP Statistical Discovery Software for Microsoft Windows, Apple Macintosh, and Apple Power Macintosh.

SAS Institute, the creator of JMP software, gives the following description:

> JMP presents statistics in an easily understood, graphical environment. Data tables are presented clearly in spreadsheet form and are dynamically linked to related graphs and tables.
>
> JMP offers six statistical analysis platforms including a 3-D spin plot, as well as capabilities for performing univariate statistics, analysis of variance and multiple regression, nonlinear fitting, multivariate analysis, and nonparametric tests.
>
> JMP also features integrated capabilities for quality improvement and design of experiments, offering five types of classical designs for estimating the effect of one or more factors on a dependent variable. The software also provides a variety of graphical tools designed for quality control including Shewhart control charts and Pareto charts.

License Fees

License fees for the initial year will be $150 per computer. Renewal year fees are expected to be less. More information about licensing JMP software, including the necessary application form in PDF format, is available on-line at: <http://www.umn.edu/adcs/help/stat/>.

JMP software may be installed via network (Windows via Netware, Macs via AppleTalk), and is also available on diskettes.

Questions

If you have questions or want more information about JMP software, please contact our Statistical Software Help Line at 624-3330 or send e-mail to <sas-help@boombox.micro.umn.edu>.

More information about JMP software is also available from SAS Institute's web site: <http://www.sas.com/jmp>.

Curt Squires, Academic and Distributed Computing Services (The JMP guy image is from <http://www.sas.com/otherprods/jmp/jmpguy.gif>.)

Data Warehouse News

Exciting Things Are Happening

We recently purchased a new web publishing tool that can take Microsoft Word and Excel documents and convert them to HTML and GIF files. We used the tool to convert the current data dictionaries to a new and improved format.

You can check it out at this URL: <http://notes.ais.umn.edu>. Then click on the *Information* button and scroll down the page until you get to the data dictionaries section, as shown in Figure 1 (note: four of the data dictionaries are still being worked on but will be available on the web soon.)

Notice there are two Data Dictionary entries for each Database on IDEA. One entry is the old Data Dictionary format and the other is the new format.

For example, click on the ***New!* Online CUFSRDB Data Dictionary** (Figure 2) or ***New!* Online CLRDB Data Dictionary** (Figure 3) and see how easy it is to navigate through the dictionaries.

A FAQ is Coming

We are also putting a FAQ page on the web. This will be a page of questions we have received from customers and want to share with everyone who may have had similar questions. Look for this soon on the IDEA home page!

Teri West, Data Warehouse

http://notes.ais.umn.edu

Figure 1: Data Dictionaries Section of http://notes.ais.umn.edu

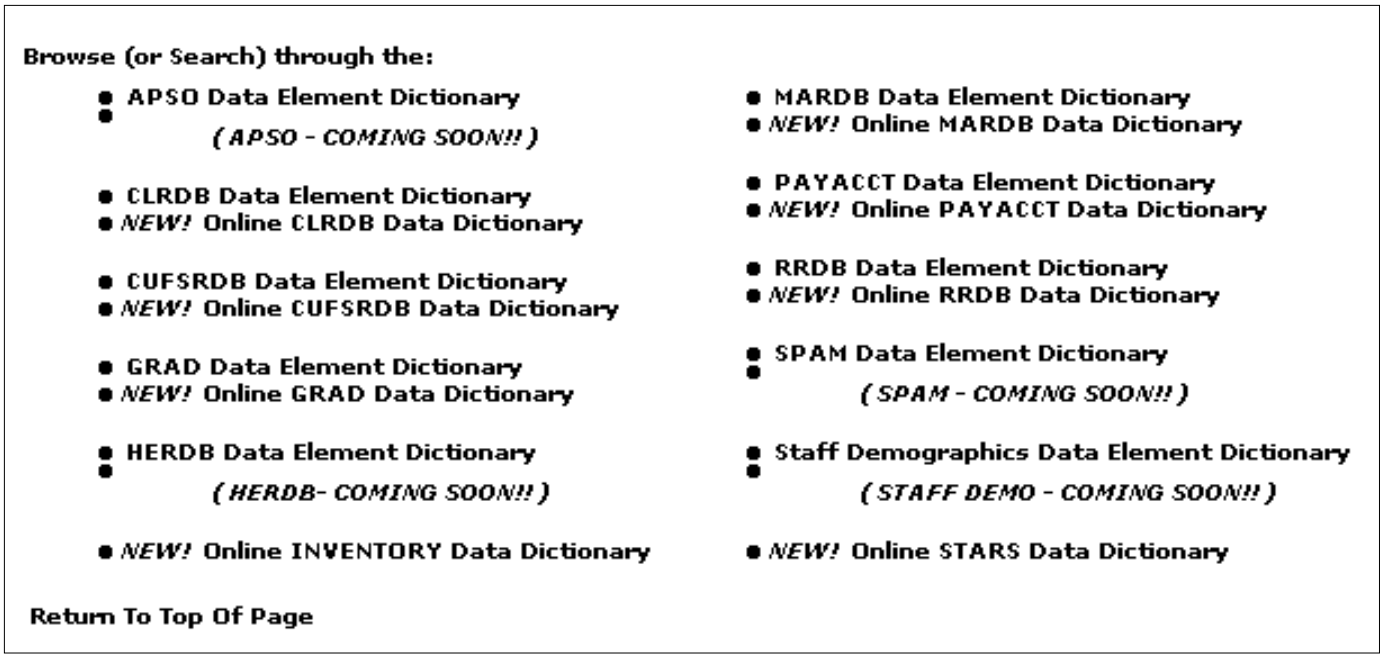
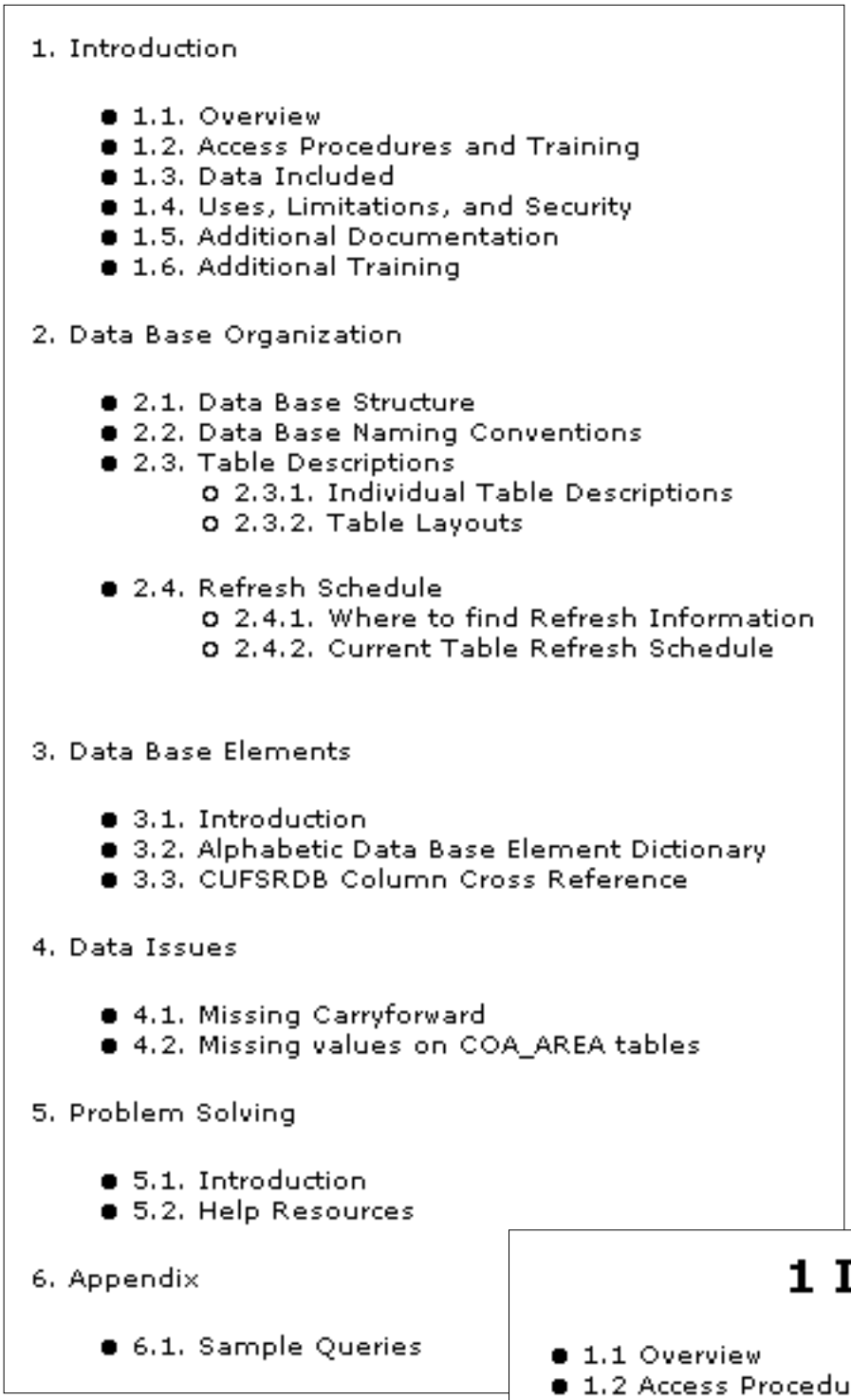


Figure 2: Online CUFSRDB Data Dictionary



News Brief

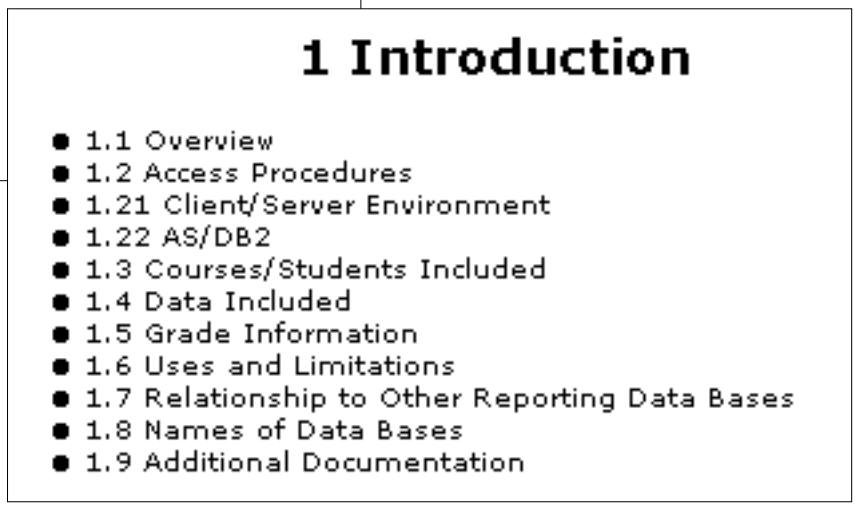
British Library's On-line Catalogue

The British Library's on-line catalogue is now available on the World-Wide Web at <http://opac97.bl.uk/>. You can search the site for books and periodicals in a variety of ways. There's also plenty of information about the collections. You can order photocopies of periodical articles on-line, but you will have to pay.

Portico <http://portico.bl.uk/>, the British Library's information server, gives lots of information about the British Library, its collections, services etc. Gabriel <http://portico.bl.uk/gabriel/en/welcome.html> gives access to Europe's national libraries.

Nancy Herther, University Libraries

Figure 3: "Introduction," CLRDB Data Dictionary



BioMedSearch: Databases With An Impact

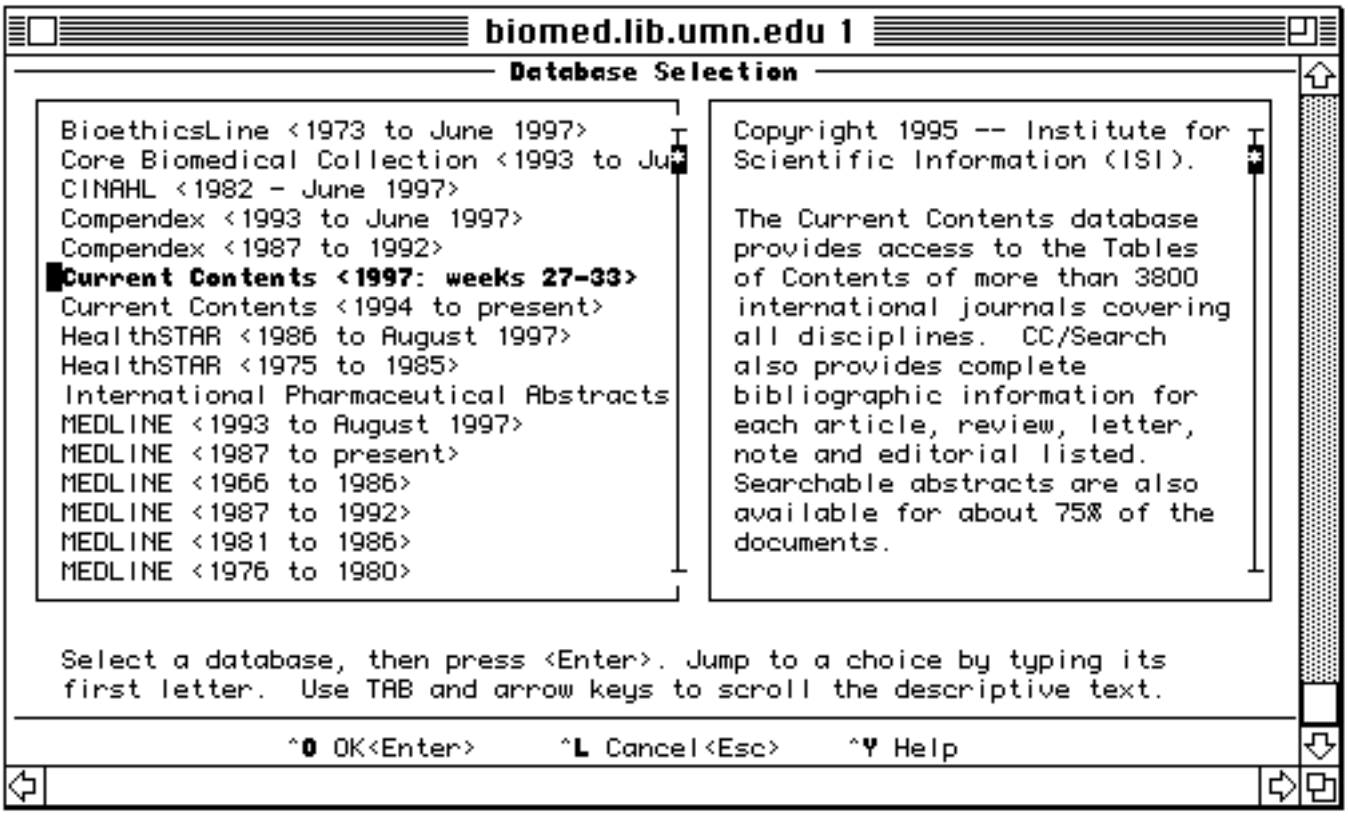
Cindy A. Henriksen, Bio-Medical Library, University Libraries

Students, staff, and faculty in the health sciences, engineering/technology and a variety of other academic subject areas now have access to an indexing and abstracting service with updated and complete citations. Known as BioMedSearch, this compilation of databases serves as the focal point for a large quantity of journal information. Most importantly it meets the needs of users on many different levels. Whether using Current Contents, MEDLINE, or another database, there is a vast amount of material available on a broad variety of subjects. In addition, the BioMedSearch databases are extremely user-friendly with context-sensitive definitions and help features.

What's it all About?

The BioMedSearch databases cover a variety of subjects. These include international health science literature from MEDLINE, Current Contents which covers all disciplines, Compendex for engineering and technology fields, HealthSTAR for health sciences services and administration, CINAHL for nursing and allied health, International Pharmaceutical Abstracts for pharmacy and drug therapies, and BioethicsLine for the interdisciplinary area of bioethics.

Figure 1: BioMedSearch Screen with Listing of Databases.



All told, there are several thousand journals indexed and abstracted in the BioMedSearch databases. These databases contain the most complete citations available, and they serve as the basis for extensive literature searches in their respective fields.

BioMedSearch's simple and yet thorough search methodology allows users to find literature using a variety of functions. Searches may be refined in several ways that are unique to the database, regardless of whether your initial search is done by subject heading, textword, journal, author, or institution. In addition, there are help screens available at every step of your search. But let's back up a minute…

Who Has Access?

In order to use the BioMedSearch databases you need only to step up to any LUMINA terminal, or in the case of the Bio-Medical Library, additional designated computers, to access the desired database. Students, faculty, and staff have the added benefit of access to the BioMedSearch databases from home by telnetting to this host: **biomed.lib.umn.edu**

How to Access biomed.lib.umn.edu

At the login prompt type

umn

then you must enter your Internet username (for example guru0014) and password.

By simply following the instructions on the screen, you are guided to the BioMedSearch template (Figure 1).

After selecting a database, you can instantly begin your search. In several of the databases —such as MEDLINE, CINAHL, and HealthSTAR— you may use subject headings to quickly identify and search for information. Other search methods using textword, title, author, institution, etc. are also available.

University Libraries

Please note: web access will be available soon. Watch for announcements.

How to Search, Hints, Browsing the Right Way

Mapping

Once you access the initial BioMedSearch screen and choose the database best suited for your search, you can begin your quest for citations and other information.

Your searches are **mapped** from your own vocabulary in almost all of the health sciences databases. You may ask what is this? Well, in order to achieve the best results, it is preferable to search many of these databases by using subject headings (standardized vocabularies developed for use with databases).

Many of the health sciences databases use an annotated thesaurus established by the National Library of Medicine. When you type your search term, the database will recognize and "map" it to one or more relevant headings in the thesaurus. Should the terms you use not be recognized, the database will send a message informing you that there is no subject heading linked with your term. However this is infrequent. There are many types of search terms you may enter, but by and large you will not tap the vast quantity of information which is available at your fingertips unless you use subject headings! (See Figure 2: Line 1, subject heading versus Line 4, textword search.)

Free Text Searching

Free text is a method of searching which looks for exact words or phrases in a particular part of an article. This method is the primary means of searching in databases which do not have the mapping feature, such as: Core Biomedical Collection, Compendex, and Current Contents.

In this scenario the default for free text searching is set upon entering the database. You need only begin typing your selected terms to obtain citations. As with most keyword searching, you may occasionally come across terms which do not exist and/or give no results. Should this happen, you may need to re-think your search, consult a thesaurus related to your subject, or obtain assistance from a reference librarian.

Narrowing Your Results

As with many searches you may receive more information than you are prepared to sift through. Because of this, there are several methods of limiting which you can apply to your search. Though they vary by database, limits perform the same basic functions allowing you to streamline the citations you have already found by eliminating those which serve no purpose.

As shown in Figure 2, you may limit by focus of the article, subheadings, date, type of article, etc. By using the Ctrl-L keys, you may pick and choose the limits that would benefit you the most and focus on the citations best suited for your information needs.

Some Conclusions

The BioMedSearch databases have a vast quantity of information that is literally and figuratively available at your fingertips. With time and exploration you, too, may tap many of the resources through the databases and our libraries.

Each quarter there are classes available to students, faculty, and staff through the Bio-Medical Library <http://www.biomed.lib.umn.edu>. In addition, one-on-one instruction and answers to questions may be made by simply seeking assistance from one of our reference librarians throughout the libraries.

Please keep your eyes open for Part II: The Core Biomedical Collection (Full-Text) and "A Snapshot of the Future: BioMedSearch, the Web Interface."

Questions?

For comments or questions about this article, contact Cindy A. Henriksen, Assistant Librarian, Bio-Medical Library, 303 Diehl Hall, 626-3936, e-mail <henri013@tc.umn.edu>. For general comments or questions about the library column, contact Nancy K. Herther, Education/Psychology Reference Service, 110 Walter Library, 624-2020, e-mail <n-hert@tc.umn.edu>.

Figure 2: *Emergency Medical Services* Search Performed on MEDLINE.

```
 ^F File  ^E Edit  ^A Search  ^L Limit  ^V View  ^T Tools  ^O Options  ^Y Help

   1   exp emergency medical services/                          6064
   2   exp *emergency medical services/                         3916
   3   exp emergency medical services/hi,mt,st,td               1025
   4   emergency medical services.tw.                            247
   5   limit 1 to human                                         5810
   6   limit 5 to english language                              5011
   7   limit 6 to review articles                                441
   8   limit 7 to abstracts                                      361

                  Ovid - MEDLINE <1993 to August 1997>

   [To select option hold Ctrl and letter indicated.  Press ^Y for Help.]
   Enter subject, then press <Enter>
   _:

   ^U Author      ^J Journal     ^G Limit Set   ^N Combine     ^B Save
   ^R Textword    ^D Database    ^K View Set    ^P Print Set   ^X Exit
```

Results of all searches are in the right column

- **Line 1: exploding subject heading**
- **Line 2: subject heading as focus of article**
- **Line 3: selected subheadings to narrow the search [hi=history, mt=method, st=standards; td=trends]**
- **Line 4: textword**
- **Lines 5-8: various limits applied to line 1**

Network Upgrade Design Plans

Why Should the University Upgrade?

Robustness

To build a round-the-clock (sometimes called 7/24) enterprise University network requires that it seldom fail, either partly or entirely.

Minimizing failure means: dual connections (separate paths between connected points to avoid the dreaded backhoe, the drowned manhole, and other physical disruptions); electrical power backup (uninterrupted power source connections to carry equipment over short power outages); on-site spares (even those $75K routers) of every network device; and knowledgeable personnel available at any hour (pagers continue to win friends).

In large networks failure happens in several ways, such as: human error by Networking and Telecommunications Services (NTS) personnel or others; by acts of nature; by hardware and software failures; and by overloads and vandalism. (See "Sources of Failure in the Public Switched Telephone Network" by D. Richard Kuhn, IEEE Computer, April 1997.)

Thus the fiber portion of this upgrade will provide additional, separate paths to the four campus areas. Taking these precautions allows major portions of the University to continue doing "what needs to be done" even if one area has a complete outage.

Security

There is information on the University network that must be safeguarded. Examples are: your access validation (passwords, authentication, etc.) or personal and student records and sensitive information.

NTS has a responsibility to provide a network that curtails individual actions that impede teaching or research, that hinder the functioning of the University, that violate a license or contract, or that damage community relations or relations with a sister institution.

Network Bandwidth

In D. Richard Kuhn's article: overloads were 44% of the downtime in customer minutes; human errors 28%; acts of nature 18%; and hardware and software 9%.

While the telephone network plans for overloads because of technical and economic constraints, current data networks are more easily managed and robust when excess bandwidth is available. This allows for: easy doubling of traffic each year (true for the last 6 years at the University—a factor of 8 increase over the three year life of a network device); or a temporary order of magnitude increase. This is why NTS looks for technology upgrades that give at least an order of magnitude (10 times) improvement at affordable cost. The planned upgrade with single mode fiber connections, Fast Ethernet building connections, and EtherSwitch hubs all provide at least a factor of 10 bandwidth improvement.

What are the Plans?

The following sections describe our network upgrade plans: a plan for fiber meshing; an asynchronous transfer mode (ATM) backbone upgrade; buildings linked via Fast Ethernet by replacing routers with switches; and replacing shared Ethernet hubs with EtherSwitches having a Fast Ethernet uplink.

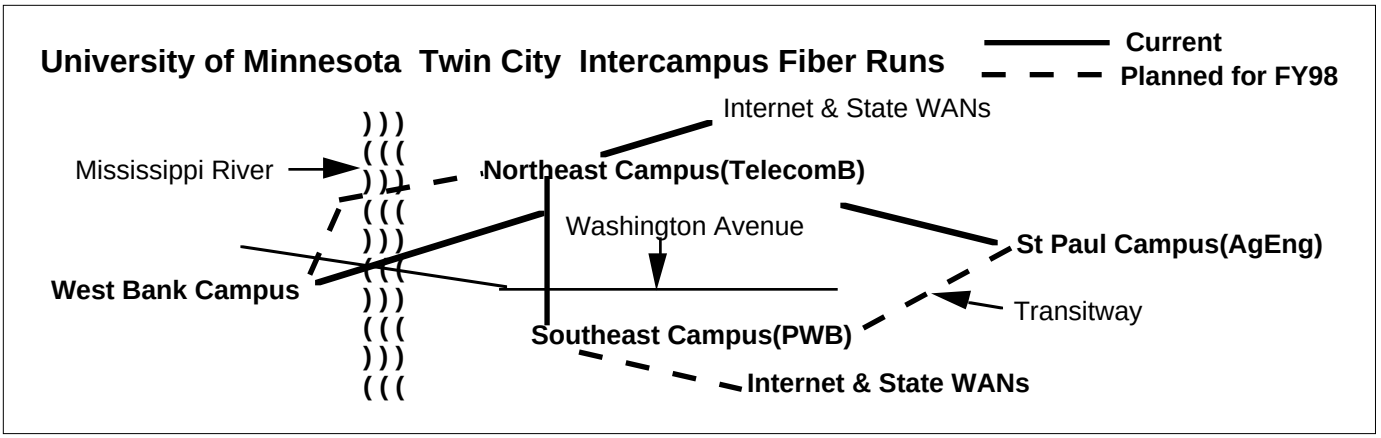
Fiber Meshing the Twin City Campuses: 5 Year Plan

The Fiber Plant is interconnecting, multiple strands of communication fiber glass (Figure 1). The current Fiber Plant arrangement is based on the 22 distributed Interface Multiplexer (IM) locations installed in 1985-86 for the digital InteCom phone switches.

Fiber runs from the IMs go back to TelecomB (the primary PBX at 90 Church Street) or to secondary PBXs in the Phillips-Wangensteen and AgEng buildings. Now if the fiber run from a major area to TelecomB is disrupted (single point of failure), most of our communications with that area would be lost.

Think of the Twin City Campus as currently divided into four campus areas —West Bank, Northeast,

Figure 1: Intercampus Fiber Runs



Southeast, and St. Paul— with single intercampus fiber runs.

First NTS proposes to have diverse fiber runs—at least two to each area—so a single area failure does not prevent the other three areas from functioning.

This means adding fiber runs that cross another bridge over the Mississippi to the West Bank and using the transitway to connect St. Paul with the Southeast area by single mode fiber. In the Southeast area, to insure continued phone, data and video access outside the University, secondary connections to the Internet and State WANs (Wide Area Networks) will be from an equivalent TelecomB site.

These improvements are also needed for University PeopleSoft (client/server systems for Student Systems and Human Relations departments), on-line registration, and enterprise reliability. The distribution of the original 22 IMs was due to the maximum 2,200 feet twisted pair wiring distance allowed for the digital phone sets. This allowed 4 to 9 buildings to be served by each IM. These IMs were then connected with 50 micron multimode fiber to our three InteCom switches.

Our telephony (another word for phone system) 50 micron multimode fiber has 750K Bandwidth/Meter which would only allow OC-12 transmissions at 622 Mbps to be a few hundred meters long. The new fiber runs will have single mode fiber with a 20,000K Bandwidth/Meter. This will allow even the long 6.7K meter St. Paul fiber run to connect at a future SONET OC-48 rate of 2,488 Mbps.

Current NTS ATM interconnections are at the OC-3 rate of 155.5 Mbps, which allow up to almost 5,000 meter connections on multimode fiber. To accommodate foreseen OC-12 transmissions we installed single mode 8.7 micron fiber in the current, longer fiber runs connecting campus areas.

ATM Backbone Core Expansion

The Twin City campus is like a Wide Area Network, that is, 6.7 kilometers to St. Paul and over 2 kilometers to the West Bank.

The 2K distance limit over fiber for Fast Ethernet and the current FDDI backbone means an ATM backbone is required to scale to the needed University bandwidth. (Note: 100 meters is the limit for twisted-pair Category 5 copper runs for FastEthernet or FDDI.) ATM gives additional benefits in quality of service and will have combined voice, data and video in the future.

The Phillips-Wangensteen Building (PWB Southeast area) will be the first ATM site upgraded.

NTS will hold off as long as possible in doing other upgrading because standards are evolving. To achieve ATM speed, vendors must design in silicon rather then software. Buying ATM switches too soon will mean getting ATM switches with last-year-feature of LANE (LAN Emulation) finally in quality production silicon; but this-year-feature of MPOA (Multi Protocol Over ATM) still evolving via new silicon designs. In addition, some of our ATM links will need OC-12 622 Mbps speed later this year, which requires four OC-3 ports on our ATM switches. These OC-12 backbone links have a factor of 6 more bandwidth than last year's main FDDI 100 Mbps backbone connection.

Router Replacement Using Switches with FastEthernet Links to Buildings

There is enough central funding this year to replace all AGS routers (a five year old technology) at the IM leaf sites.

The replacement technology will be frame switches where layer 2 (of the ISO protocol stack) fast-bridging can be used. For policy or security reasons router servers will still be needed for layer 3 at the edges of the University's campus network. Therefore, Catalyst 5000s and 5500s will be used to provide multiple FastEthernet 100 Mbps ports at individual IM locations supplying 4 to 9 buildings with networking connections to the University backbone. These will be frame, not cell, based.

Figuring out the logistics and ordering means a Fall installation will be hard to meet. Although funding will ensure that cabling from the IM based Catalyst switches to a connected building will be fiber, that funding does not cover the network infrastructure inside a building.

Large Variability

There is a large variability in the infrastructure cabling in each University building. For example, the new Basic Sciences and Biological Engineering have Category 5 twisted-pair wiring and fiber to each station. Morrill Hall, by contrast, is mostly Category 3 twisted-pair wiring with some runs longer than the legal 100 meters. This variability will affect how quickly NTS can implement the Fast Ethernet uplinked EtherSwitches within a particular building.

SwitchJack at the Edges (EtherJack Replacement)

NTS plans to replace the 24 port shared Ethernet hubs used in its EtherJack service. The hubs will be replaced with EtherSwitches (ES) that have 24 individually switched ports (our Switch 10 service) and a fiber connected Fast Ethernet uplink to the University backbone.

This is a big change for most users: from up to 60 users per EtherJack LAN (shared Ethernet) to each user having the full 10 Million bits/second Ethernet bandwidth.

One reason for switched Ethernet is outlined in the University Audit of our network. To produce an enterprise network the Audit explicitly requires the security for eavesdrop resistance that switched Ethernet provides. Eavesdrop protection for the current shared Ethernet hubs breaks too easily when configurations are wrong; it only gives 'good citizen' status, not protection to those evoking it.

This change to EtherSwitch hubs provides the University desktop some additional reliability and security for PeopleSoft, on-line registration, and enterprise applications.

In Conclusion

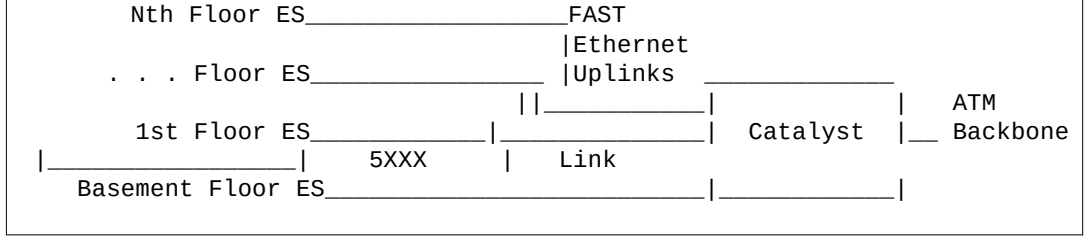
What will these several million dollars of changes get? They'll provide a solid basis and an order of magnitude bandwidth increase for the University's network for the next few years. NTS will continue to seek the larger funding that's needed to upgrade the infrastructure in individual buildings (including separate building wiring closets).

NTS is committed to keeping the charge to the individual EtherJack user for the new Switch 10 service at the low rate of the former. "More Ethernet for the Buck" is the result. At the same time, to provide the bandwidth needed for strategic partnering and worldwide networking interactions, the University is also involved in building Internet2 and University of Minnesota GigaPOP services.

This is an ambitious upgrade. While detailed timelines for individual sections at the University are unfinished, NTS's overall plan is to have these upgrades completed before July 1998.

Lawrence Liddiard <liddiard@nts.umn.edu> and Tom Barron <barron@nts.umn.edu>, Networking and Telecommunication Services (NTS)

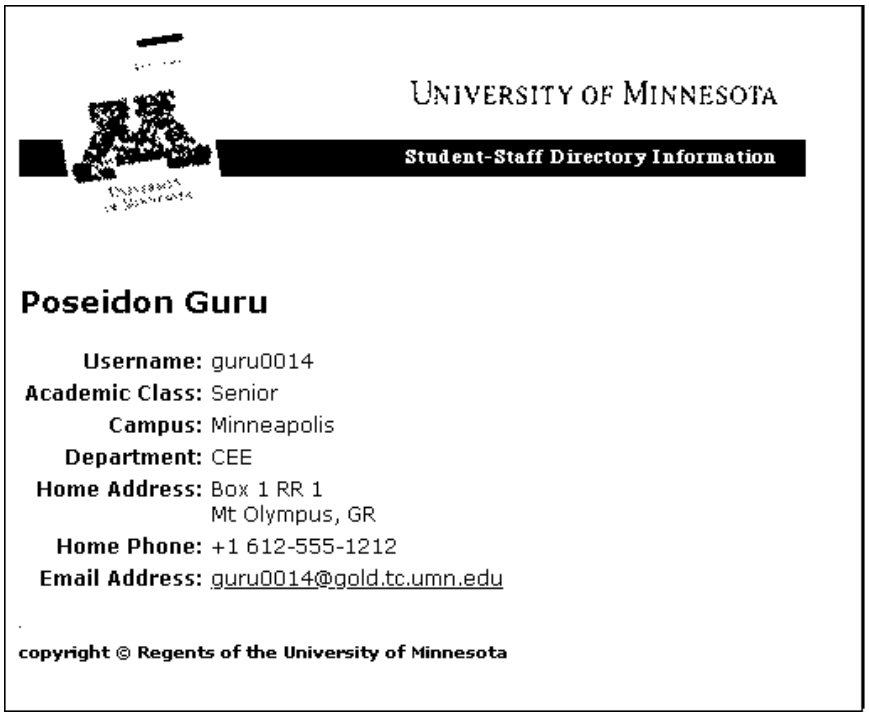
Building IM (Interface Multiplexer) Site



E-mail Tips
Netscape Mail: Servers and Signatures

Since the web's hypertext documents are interactive and give the reader or viewer special control over what they access, web surfers soon become used to clicking on "hot spots" to hop to a topic or perform some action. For example clicking on the highlighted e-mail address shown in Figure 1, can result in being presented with a "mail-to" form.

Figure 1: Results Searching the University' On-line Directory <http://.umn.edu/lookup>



Options/Mail & News Preferences/Server

Although the Netscape 2x and 3x packages include a built-in mail program, before you can use it you must type in some information on the mail module's *Servers* tab (Figure 2). As usual, when you must customize software look for names like **options** and **preferences** and remember to click the OK button when you make changes that you want to save.

The outgoing mail server name shown in Figure 2 is the one you should use for your University Internet account. However, you must replace the example name (guru0005) with your own X500 username in the incoming and POP user ID sections.

Signatures

If you find you're frequently using Netscape Mail, you might want to automatically append a signature to the messages you send. It's considered polite to include your name, e-mail address, and other pertinent information as part of your e-mail message.

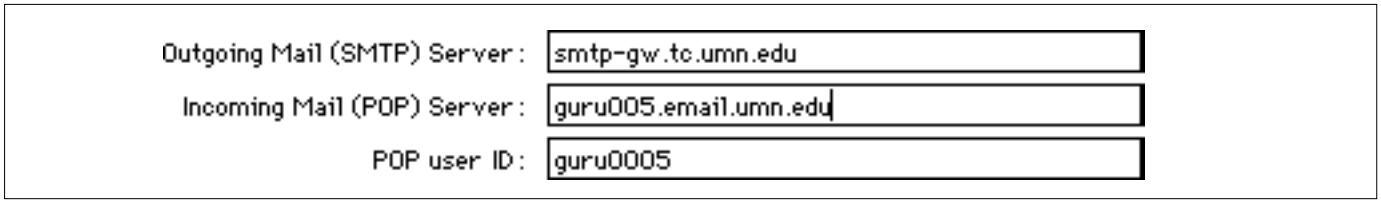
Configuration Information

You'll find SMTP server and other specific University of Minnesota Internet configuration information on this ADCS web page: <http://www.umn.edu/adcs/help/config.html>.

Related Article

For tips about using the POPmail software that's included in our Internet kits, see *Read Your E-mail, Here, There, Anywhere* in our April 1997 issue.

Figure 2: The Servers Tab, an Example



Even though your e-mail address is included in the "header" that is sent with all e-mail, it is displayed in different ways by different software. Including identifying information with your electronic messages makes it easier for the recipient to realize who you are and to contact you.

You can create a signature by using your word processing software. We suggest that you save the document as a plain text (or ASCII) file. To do this you can't save it in the normal manner. Look for a "save as" type option that lets you select different types of documents.

Once you've composed and saved a signature document, you need to tell Netscape how to find it. To do this select the *Identity* tab in Netscape's *Mail and News Preferences* grouping. Look for the *Browse* button that is associated with name "Signature File." It's a typical browse button. You select it to navigate your hard disk until you come to the section that contains your signature document.

Now when you compose a new message, the signature you created will automatically appear in your "to mail" window, where you can review it before you actually send the message. If you see garbage like this — ‹Ïà¡±á— it probably means you did not save the signature as a plain text file. ■ Tips from the Microcomputer HelpLine, Mary Kelleher

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- Internet/E-mail account management/validation
http://www.umn.edu/validate
- Information Technology Newsletter
http://www.umn.edu/oit/newsletter
- LUMINA (Library) – http://www.lib.umn.edu
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