

Information Technology Newsletter

May 1996 from the **Office of Information Technology**
This newsletter is an information resource for the University of Minnesota.

Volume 1
Number 2

Vision and Mission

**Donald R. Riley, Associate Vice President for Academic Affairs
and Acting Director of Information Technology**

In the previous newsletter we presented the vision for the role of information technology in achieving the University's strategic goals under the U2000 vision. It's a vision of the University's need for a world class information technology infrastructure, resources and support services. Much of this vision had been defined and articulated by users and customers throughout the University community. We also provided an overview of the organizational restructuring that has been occurring as we have combined the academic Computer and Information Services, Administrative Information Services, and Telecommunications into a single organization that is more effective, responsive and customer-focused.

As an organization, we have just passed our six-month anniversary. As a young organization, OIT's strategic plans are evolving. Over time we'll refine our short range roles and goals. Here's a look at our current long range vision and the roles of OIT's individual units.

Vision

The University of Minnesota is a recognized leader in the pervasive and effective use of information technology resources to attain mission critical outcomes across all institutional processes: research and discovery, teaching and learning, outreach and service, administration and operations. Information Technology enables the University of Minnesota to achieve and sustain a world-class stature and competitive advantage among major research universities. The Office of Information Technology and its support units are recognized as key enablers.

Mission

The mission of the Office of Information Technology (OIT) is to provide leadership in information technology and resource planning, by deploying enabling information technology infrastructures, by developing effective information systems, and

by partnering to deliver world-class support services.

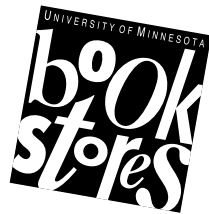
OIT serves by helping to ensure that the information technology resources of the University are applied effectively and efficiently to increase quality and access and to support institutional mission and strategic direction. OIT and its leaders are primary advocates within the University for the contributions information technology should make toward quality, access, and cost effectiveness in teaching and learning, research and discovery, outreach and service, and administrative and business processes.

Leadership is the key characteristic of OIT's role in the design and implementation of infrastructure and systems; partnerships characterize OIT's shared leadership role in the design, deployment, and utilization of systems and applications. User satisfaction is the hallmark of OIT support services. Our stewardship requires that

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Some funds are provided by
the Minnesota Bookstores.



Associate Vice President for Academic Affairs and Acting
Director of Information Technology
Donald R. Riley, Professor..... 626-9816

▼ Help

Monday-Friday

BASIS (AIS), 7am-4:30pm	624-0555
Central Systems, EPX, NVE, UZ, VX, VZ	6-8366
9am-4pm, requires username and password	
Web page: http://www.umn.edu/ccs	
E-mail & Internet, 9am-4pm, UM accounts	6-7676
by e-mail for U of M: help.tc.umn.edu	
Microcomputers, Distributed Systems	
9am-4pm, 152 Shepherd Labs	6-4276
1-4pm, 93 Blegen and 58 BioSci Center	
Web page: http://www.micro.umn.edu	
NTS, Telecom. 24-hour Repair Desk	5-0006
NTS Web pages: http://www.umn.edu/telecomm/telcom.html	
http://www.unet.umn.edu/	
Training Library, ADCS Short Courses	5-1300
Password, Forgot it? Call the Micro helpline	6-4276
Or go, in person, to any Microcomputer helpline.	

▼ General Info & Phone Numbers

Academic & Distributed Computing Serv.	5-1300
Computer Store, Williamson Hall	5-3854
CUFS	4-1617
Digital Media Center	5-5055
Disability & Computing Services voice/tty	6-0365
Engineering Services	5-1595
Data Custodians, Data Warehouse Databases	
Facilities Mgmt, Kris Boike • SPAM	6-7896
Financial Sys Support, Lisa Carlson • CUFSRDB	4-1506
Grad School, Genny Rosing • GSRDB	5-9839
Human Res Info Ser, Gary Ogren • APSO	7-4341
Ofc of the Bursar, Sandy Pearson • STARS	6-8698
Ofc of Human Res, Nancy Highsmith • SDRDB	4-8374
Ofc of Planning & Analysis, John Kellogg	5-3387
• AARDB/MARDB • CLRDB • FARDB • RETDB • RRDB	
Ofc Scholarships&FinAid, PhilMorgan • SCHOL	4-6586
Payroll, Ann Beattie • HERDB	4-3869
NTS, Telecommunications Helpline	6-7800
NTS, University Networking Services	5-8888
Statistical Support, SAS	4-3330
SPSS, BMDP, Minitab (VX/EPX)	6-8366
Workstation Support Group	4-7486

▼ Dial-in Access

SLIP: 2,400-14,400 (V.32)	626-1920
SLIP: 14,400-28,800 (V.34)	627-4250
SLIP: ADI and ITE (with MKO)	3-0291
BASIS SecurID Access	
2400-N81 (no parity/8 data bits/1 stop bit) ...	6-7770
High Speed (V.32) 19200-N81	6-1061

▼ Internet Addresses

LUMINA (Library): admin.ais.umn.edu
BASIS Mainframe Systems: admin.ais.umn.edu
Gopher (public can log in as <code>gopher</code>):
consultant.micro.umn.edu
News Server: newsstand.tc.umn.edu
U of M Web page: http://www.tc.umn.edu
OIT Web page: http://www.umn.edu/oit
Information Technology Newsletter Web page
http://www.umn.edu/oit/newsletter

Last updated May 1996

OIT take primary responsibility for protecting existing information technology infrastructure, systems, and resources and enhancing their value for the total University community, its stakeholders, and the larger society. OIT must add value to every process it provides, manages, or supports; benchmarking against best practices in other institutions and industry must be ongoing.

The leadership role of the Office of Information Technology is undertaken in partnership with campuses, provostal clusters, colleges, departments, and units. OIT's leadership is not by fiat but through respectful consideration of the needs and expectations of its customers. OIT is accountable to customers, other service beneficiaries, and stakeholders and retains its leadership because it produces the desired outcomes and can demonstrate its contributions to meeting the University's Critical Measures.

To accomplish the overall OIT mission, each operational unit within OIT has a distinctive mission; each seeks and enthusiastically pursues opportunities to collaborate with other operational units to maximize benefits and eliminate unnecessary costs. Their missions are spelled out in detail in the plans for each unit but are also briefly noted here.

Business and Student Information Services

Provides leadership and supports the development and delivery of enterprise-wide integrated systems in support of the administrative and business processes of the University by providing infrastructure, systems, and applications that offer excellent service, innovative solutions, and outstanding return on information technology investments.

Academic and Distributed Computing Services

Provides leadership in anticipating information technology needs in the University's academic processes (teaching and learning, research and discovery, and some aspects of outreach and service) and supports its partners (students, faculty and staff) in the use of information technology and responds to them with appropriate infrastructure, applications and services.

Networking and Telecommunications Services

Provides leadership for the design and management of the University's voice, data and video communications infrastructure and supports units in achieving their academic and administrative goals by providing high quality, least cost services. In partnership with academic units, NTS anticipates and develops leading edge networking solutions in support of experimental research and education.

Planning and Architecture

Provides leadership in the development of standards for infrastructure and systems, partners within and outside the University in re-engineering key processes, and supports the University through dissemination of information and decision aids related to the application of information technology.

Guiding Principles

The Office of Information Technology and its operational units are guided by a set of principles (or assumptions). These principles guide our decision making and other activities by providing a clearly stated set of conditions that must continually be achieved in relationships within OIT units, between OIT units and other units of the University, and between OIT and the external world with which it interacts. The primacy of any principle and its application to specific activities is determined in consultation with partners, customers, and stakeholders.

- OIT is accountable — to partners, customers, stakeholders, and the University.
- Customer satisfaction is one important measure of our success.
- OIT has primary leadership responsibility for the design, deployment, and utilization of the University's common information technology resources (infrastructure, systems, services).
- These common resources are preserved and enhanced through OIT's stewardship.
- While University units have the primary responsibility to meet local information technology needs, OIT plays a vital role in helping those units by providing standards and information necessary to support decision making.
- Partnerships within OIT, between OIT and other University units, as well as with external partners, ensure that common as well as particular facilities are both effective and cost-efficient.
- Partners welcome and actively seek OIT's involvement because OIT adds value to the process and contributes to the success of its partners as well as itself.
- Access is fundamental to the provision of high-quality information resources; OIT has a University-wide responsibility to ensure appropriate levels and types of access.
- Our managers change through continuous improvement and selective re-engineering efforts that respect and value the input of users and partners.
- Our managers and staff members determine our success; as essential information resources, their professional development is important; a need for innovation and a commitment to add value demands their flexibility. ■

Announcing PowerBuilder

The 'RAD' Tool for Client/Server Projects

Ed Sigman, Director, BASIS

Rapid Application Development

In response to the growing demand for a University-wide 'standard' RAD (rapid application development) tool for creating client/server applications, an Office of Information Technology (OIT) team led by BASIS recently completed an extensive evaluation of these tools. We're pleased to announce that we've selected and purchased PowerBuilder Enterprise software from Powersoft Corporation as our new standard tool. We are confident that this tool will help us meet our goal of becoming the premier client/server provider within the University, delivering development, support and services to University users. We are 'ramping up' quickly, training an initial 25 staff to be proficient PowerBuilder developers in order to better serve you.

A Flexible, Accepted Standard

PowerBuilder is a comprehensive, flexible tool that meets our goals of low cost, portability, industry-wide acceptance, etc., in accordance with the following recommendations from the evaluation team.

- Increased productivity, reduced development cost, and minimal time-to-market in developing quality desktop-centric client/server applications, through the use of a common RAD tool that supports fast, iterative prototyping;
- Flexibility and cross-platform portability in a graphical user interface generator for Windows, Macintosh, and UNIX Motif client platforms, with capability of being extended to the World Wide Web if needed;
- Flexibility and cross-platform portability in an SQL generator to develop database logic portable across databases;
- An effective RAD tool to develop business logic for applications in which legacy system transactions cannot be reused;
- Cost-effective development software which can integrate with several of the repository/CASE tools being evaluated by the BASIS/OIT Data Administration team, eliminating the need for a separate CASE tool for developers;
- A product which will be inter-operable with business application package solutions currently under consideration;
- A "published standard" at the University for a RAD client/server tool, encouraging a common technological direction across all University units;
- Software from a stable, reliable vendor who has provided proven results over time and identified an appropriate technological direction for the future, ensuring a safe investment for University units purchasing the product;



HRIS Replacement Project Kickoff

Jane Barnard, BASIS Applications Development

The HRIS (Human Resources Information System) replacement project has officially begun. The project director is Miriam Ward, Office of Human Resources, and the project manager is Jane Barnard, BASIS Applications Development. A steering committee has also been convened.

Several exploratory vendor demos will be scheduled soon with major human resources system vendors. This project is an important step in rebuilding the information systems infrastructure for the University of Minnesota. Look for additional information about the project to be published in this newsletter in future months. ■

- A convenient, user-friendly software tool with a short learning curve and for which training and resources are easily obtainable in the Twin Cities metropolitan area;
- An inexpensive product that is affordable in its initial purchase price and in its ongoing support and upgrade costs.

Discounts for University Departments and Units

PowerBuilder provides us with proven and affordable technology at a reasonable cost. We have negotiated favorable terms for additional purchases of the Powersoft products and services by any unit of the University, and BASIS will provide direction, training, and consulting to departmental developers who wish to purchase Powersoft products under this contract.

A Full Service Development Environment

With the adoption of PowerBuilder Enterprise as the preferred client/server development tool throughout OIT, we are putting together a "development machine" — a full-service develop-

ment environment to be comprised of the PowerBuilder development tool, a repository and analysis/design (CASE) tool to be selected, and a relational database management system (RDBMS). We're quickly developing some prototypes of applications, so check this newsletter for information about upcoming demos.

Call Us to Discuss Your Project

Using this rapid, cost-effective approach to client/server development will position the University appropriately to meet the demands for customized applications as we prepare for the challenges of U2000.

If you have a business need for a client/server application, contact one of BASIS' Application Development managers: Cheryl Vollhaber in Student Systems (625-2303), Nick Choban in Financial Systems (626-7201), and Bryant Avey in Small Business and Departmental Services (625-3316).

For more information about the PowerBuilder software or its implementation, contact Alice de la Cova in our Emerging Technology/New Products and Service group (624-9365). ■

Data Warehouse Survey Results

Ruth Volk, Data Warehouse Supervisor, BASIS, r-volk@cafe.tc.umn.edu 626-7206

Thank you to all the Data Warehouse customers who responded to our survey. You've provided us with helpful information that will shape our Data Warehouse to best suit your business needs.

We received a tremendous 27% response. Out of 500 customers surveyed, 137 people responded. The results indicate that almost 80% of those customers believe the Data Warehouse is important for accomplishing their work objectives, and 60% of them serve more than 10 *other* people with the data they retrieve. Clearly many people not only benefit from the reporting data available in the Data Warehouse, but rely on it for their work. This gives the Data Warehouse a high mark in service value to the University community.

We hope to continue to improve the usefulness and ease of access throughout the coming year, and have taken every comment to heart as we develop our action plans for future months. The

survey results were presented to Data Custodians on April 2nd, and we will work with each Data Custodian to recommend improvements to the reporting databases based on your comments.

IDEA Web usage is soaring, so it is no surprise that this is the most frequently used access tool for retrieving Data Warehouse reporting data. Here is the breakdown of access tool usage:

Access Tools and % That Use Them

44	IDEA Web
21	AS
9	MS Access
9	Brio Query
7	FoxQuery
4	FoxPro
3	Paradox
3	Other

As announced in the last newsletter, the student data is now available on IDEA, so we expect the AS usage to decrease and the IDEA Web usage to

increase as more customers migrate to IDEA. Given that the IDEA Web and AS make up the bulk of tool usage, we looked at the satisfaction of those two tools in particular:

	Satisfied	Neutral	Dissatisfied
IDEA Web	74 %	23 %	3 %
AS	43 %	38 %	19 %

Because of the overwhelming customer use and satisfaction of the IDEA Web, we plan to focus most of our access tool support on the IDEA Web versus the other supported tools.

After retrieving the data, many customers use another tool to manipulate and report on the data. Of the customers using another tool to manipulate the data, Excel clearly came out on top. Because so many of our customers use Excel, we plan to add some Excel data manipulation training to our IDEA Training curriculum.

Tools and % of Respondents Who Use Them

61	Excel
10	Foxpro
8	Lotus 123
6	MS Access
4	FileMaker Pro
11	Other tools

Here's a breakdown of desktop operating systems used by customers who responded.

Desktop OS and % That Use Them

46	Windows 3.x
39	MAC
8	Windows 95
5	Windows NT
2	Other

Since we anticipate a growing use of Windows 95 in the coming months, we have ordered a site license for the Windows 95 ODBC driver. Look for more information on that in future newsletters and/or via the IDEA-L listserv.

General Satisfaction Statistics, %

	Satisfied	Neutral	Dissatisfied
Help	61	38	1
Tool	60	30	0
Data	58	22	20
Documentation	43	43	14
IDEA Listserv	40	58	2

The satisfaction rating for the Help function indicates it is working very well. Of the 10% who

were dissatisfied with the tool, 80% of them are using AS. The customers who were dissatisfied with the data consistently stated that they want *more data*, refreshed *more frequently*! We have presented those comments to the Data Custodians and in the near future plan to increase the frequency of refreshes for some of the tables.

Many customers were unaware of the documentation available to them, an explanation for the good number who were neutral or dissatisfied about Data Warehouse documentation. We have increased communications about Data Warehouse and database documentation to assist you in finding what's available on Gopher and the Web. If anyone has suggestions for improving the content or delivery of that documentation, please call or e-mail me.

Similarly, many customers had not heard about the *IDEA-L listserv*. As a result of these findings, we've increased communication about the LISTSERV; we've seen more customers signing up each week. There are currently over 200 people on the LISTSERV.

How Many People Use the Data?

One of the survey questions asked:

"How many people besides yourself benefit from your use of the Data Warehouse (i.e. receive reports you produce, or use the data once you retrieve it)?"

- 46% said: over 20 people benefit!
- 14% said: 10-20 people benefit
- 14% said: 5-10 people benefit
- 22% said: less than 5 people benefit
- 4% said: no one else benefits

Another question asked about the importance of the Data Warehouse in accomplishing your work assignments/objectives:

- 49% Very Important
- 30% Important
- 11% Necessary
- 10% Not Necessary

To stay in touch with your changing business needs and to measure your satisfaction of the Data Warehouse service, we hope to send out the survey annually. Please feel free to provide me with feedback *any time* throughout the year by calling (612) 626-7206 or sending e-mail to <r-volk@cafe.tc.umn.edu>. Thank you again for taking the time to answer the survey questions! ■

14th Avenue Bridge Project

Louis Hammond, Networking and Telecommunications Services

The University Must Reroute Fiber Optic Cables

A Hennepin County project to replace the 14th Avenue bridge has made it necessary for the University to reroute fiber optic communications cables that are suspended on the bridge. As part of this project, NTS has started to place conduit under the railroad tracks to house the new route. The fiber optic cable has already been purchased and will be cut and spliced into the new facilities. The cutover schedule is contingent on the availability of the conduit installation and key setup issues. It is important that NTS finish this work by June 8th since Hennepin County has scheduled complete removal of the bridge by August.

Some Work Scheduled for May 25

On Saturday, May 25, the Lauderdale computing facility will be rerouted and spliced at 00:01. During this process, all IBX type phones will be temporarily out of service. Occupants will need to use brown emergency phones to make calls. Emergency calls to 911 will function throughout this process.

We expect the work to be completed at 08:00 on the morning of the 25th. NTS will ensure that all services are returned to normal once the reroute is complete.

Fiber optic cable that serves St. Paul and Printing and Graphics Arts locations will be cut and rerouted at 23:00 on Saturday, May 25. It is expected that this work will be completed by 08:00 Sunday morning.

Buildings in the immediate area surrounding 2818 Como Avenue will be without IBX phone service for the duration of this work. However, brown Centrex emergency phones will be available for use during the entire outage. Data Services will be out of service during this time as well.

The St. Paul campus has its own telephone system, which will be in operation throughout the cable work. Outside lines will be reduced by 90% with some of these lines reserved for emergency use. All direct lines between the St. Paul campus and the main campuses will be unavailable during this time. Callers will have to dial outside the campus in order to reach the other campuses. Most network data services will remain in operation and running on alternate paths.



Networking and Telecommunications Services will ensure that all services are returned to normal once the reroute is complete. ■



Computing Grants Program

Fiscal Year 1997

The University's Computing Grants Program will continue to provide computing services in support of faculty, staff, and graduate student research for fiscal year 1997 (July 1, 1996 through June 30, 1997). A computing grant provides \$1,000 worth of computing services for an initial \$100 non-refundable application fee. The grants program establishes an account on any of the central research systems managed by Business and Student Information Systems (BASIS), including the VAX/VMS, IBM/VM, CYBER NOS/VE, and CDC EPX (UNIX) systems.

Researchers with current Computing Grants accounts will need to renew their accounts by June 15, 1996. If you have a current account, you will soon receive a memo explaining how to renew or close your account. Accounts will be deactivated on June 30, 1996, if they have not been renewed.

Contact BASIS at 612/626-8041 if you would like additional information or if you have not received a memo about renewing your account by June 1st. ■

Department Internet Access

No More Busy Signals for Modem Users?

Carol Troyer, Networking and Telecommunications Services

If you're frustrated by busy signals when you attempt to access the free modem pool on the Twin Cities' campus, NTS offers a new service for you to consider. Department Internet Access, also called DIA, allows a University of Minnesota department on the Twin Cities' campus to lease one or more modem pool line(s) with one associated direct-dial phone number for "home office" access to the University of Minnesota network.

NTS currently supports V.34, 28.8 kbps access, SLIP and Telnet access; systems engineers are working on support for dial-up ARA, PPP and IPX.

In addition to unlimited network access, the service includes monthly on-line usage reports by username, a secured password for each username, 24-hour support, and MacSLIP or PC SLIP diskettes if requested.

How many modem lines should you order? Although the standard ratio of users per line is 3:1, you can order as many lines as you wish. A department can lease the service on a monthly

basis, adding and deleting usernames and numbers of modem lines as staffing and access needs change.

Charges

Charges include:

- One-time start-up: \$21.00 per modem line
- Monthly recurring: \$66.35 per modem line with unlimited use
- Add or disconnect a modem port: \$21.00 per modem line *
- Add or delete a username: \$21.00 *
- Change user password: \$21.00 *

* You can even combine requests onto one Telecommunications Service Request Form with one charge of \$21.00.

For More Information

For complete ordering information and assistance, please call the NTS User Services Helpline at 626-7800. The DIA information Web page will be available soon. ■

NTS Contact Update Session

Vivian Skordahl, Networking and Telecommunications Services

Contact Update Session

Networking and Telecommunications Services (NTS) sponsored departmental contact update sessions on April 1-2 in the CMU Theater. More than 100 voice, data, and networking contacts attended one of the two 3-hour sessions. A display was available to view the variety of telephone equipment provided by NTS. In addition, a computer was set up to access the new NTS order form on the World Wide Web. Staff members of the newly merged Networking and Telecommunications Services (NTS) department presented a variety of issues and topics.

Will Murray presented an update on the re-engineering process. Fourteen areas (or processes) have been identified by NTS staff. Currently, the operations function and the order process are

under evaluation by two separate teams comprised of NTS personnel. Each team is assisted in their endeavors by a consultant team that coordinates the re-engineering project.

WWW Order Page

Bernie Gulachek gave a presentation on the order process and informed the audience how they can now order NTS products and services via the World Wide Web. The address for this new service is <http://www.umn.edu/telecomm/telecom.html>.

Fiber Connectivity

A number of people expressed interest about fiber connectivity on-campus. Will Murray addressed

Partitioned Voice Mail Boxes

Kate Knapp, Networking and Telecommunications Services

A New NTS Service Offering

University staff members who share a telephone number can now receive private VoiceMail messages without sifting through their office-mate's messages.

On of April 1, 1996, Networking and Telecommunications Services announced a new service offering, Partitioned VoiceMailboxes. This service is an alternative to the Standard VoiceMailbox used throughout the University. The Partitioned VoiceMailbox gives the caller the opportunity to send a message to a specific user of the mailbox. These message are deposited in a private submailbox that only that specific user can access. If the caller does not select a specific user, the message will go to all of the users of the Partitioned VoiceMailbox.

A Variety of Sizes Available

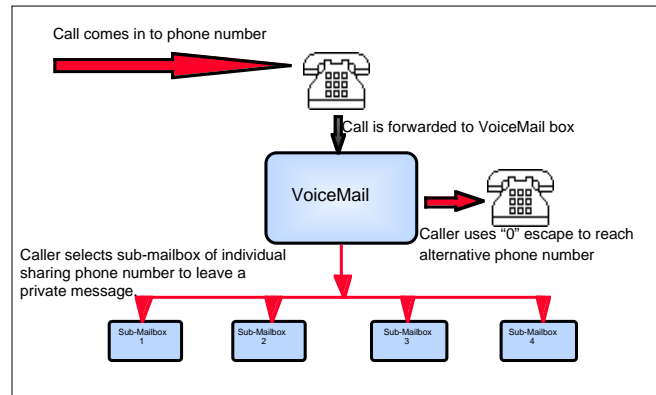
Partitioned VoiceMailboxes come in three sizes, defined by the maximum number of messages in the mailbox at any time. They are available in 50, 100 and 200 message capacities. This identifies the total number of messages in the mailbox. In a 50 message mailbox, if user one has 40 messages,

there will only be 10 left for the rest of the users. All Partitioned VoiceMailboxes will allow up to eight individual users, each with their own passcode, allowing private access.

For More Information

Further information about Partitioned VoiceMailboxes or any other NTS offering can be obtained by calling the Networking and Telecommunications Helpline at 626-7800. ■

Figure 1: Partitioned VoiceMail Box



this topic during his presentation on new construction. He indicated that strategic issues such as funding, level of efficiency, and timing affect the decision to install fiber in a new campus building.

Voice Mail Products

Kate Knapp presented voice mail/call processing products. While partitioned voice mail boxes are a new service offering to the University community, they have been utilized by students residing in residence halls this (school) year.

NTS Products/Services

Other topics presented at the Contact Update Session included data services such as asynchronous transfer mode (ATM), frame relay and integrated services digital network (ISDN).

New products and services such as Department Internet Access (DIA), Bulletin Board VoiceMailboxes, the future auto attendant offering, and the new Information Technology Newsletter were discussed.

Presentations on existing services included automatic call distribution (ACD) by Judith Grittner; trouble ticket process (NTS Repair Desk); and an update on the 14th Avenue bridge project by Louis Hammond.

NTS plans to sponsor two contact update sessions each year to keep the University community informed about both existing and new products and services.

For additional information on any of the topics presented at the Contact Update Sessions, call the NTS Helpline at 626-7800. ■

Frame Relay and the "U"

Thomas Barron, Networking and Telecommunications Services

The Office of Information Technology (OIT) has been charged with creation of an electronic environment, a common space, that invites members of the University community to make use of distributed information technology in realizing our land grant mission. Networking and Telecommunications Services (NTS) will, over the coming year, make increasing use of frame relay technology to pursue this OIT mission even beyond the physical boundaries of the University campuses. In this article we will provide a brief overview of frame relay and how it is being deployed at the University.

The Arboretum Local Area Network

Computers at the Minnesota Landscape Arboretum in Chanhassen have been networked with one another for some time; but until recently, University personnel working at the Arboretum had, at best, only the same kind of dialup connectivity to the University and Internet that individuals have from their homes. While it would have been preferable to connect the Arboretum LAN itself to the University network, such a connection would have to rely on the telephone company infrastructure and the cost of leasing a dedicated line was prohibitive.

Since February, however, the Arboretum LAN has been connected to the University backbone, and from there to the Internet, via a US West 56 kbps frame-relay connection. Like a leased line, the connection is "pegged" — always there — so that there is no contention to get a connection set up when data needs to be delivered, and the connection is available to all users of the Arboretum LAN. But because frame relay shares infrastructure among multiple users, it is a cost-effective way to connect remote LANs to the campus backbone.

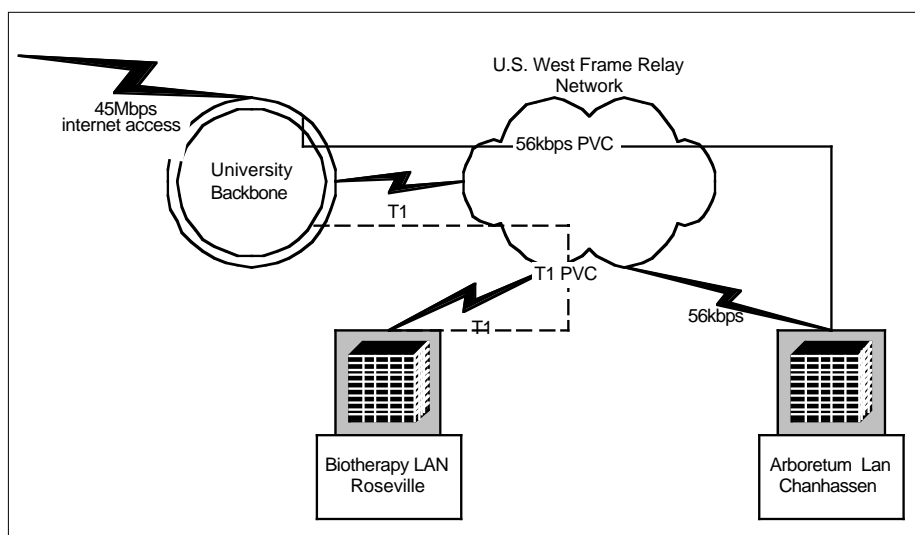
How It Works

Frame relay connects over Permanent Virtual Circuits (PVCs) rather than physical circuits. At each end of a PVC there is a physical circuit; but unlike a leased line, this physical circuit only runs from the customer site to the service provider's frame relay network access point. From that point on, the service provider network is a mesh of physical switches and fiber lines that statistically multiplexes data from multiple PVCs over the same infrastructure, making better use of resources and lowering costs to the customer.

Frame Relay networks deliberately overbook resources. They get away with it because they are designed to handle "bursty" data — bit patterns of the type generated by computers — rather than, say, video or voice traffic bit patterns, which are (at least in their uncompressed form) a much more constant bit rate in nature.

Computer data applications require *lots* of bandwidth for very brief intervals, leaving dedicated lines idle much of the time. Frame relay switches multiplex data on shared lines *asynchronously*. Rather than giving each end user a fixed time-slice of the line, each is allowed to attempt to transmit whenever it needs to, at a burst rate much higher than would be feasible with a synchronous time-slice.

Frame relay switches transfer data packets just as quickly as they can, without correcting any



corrupted data, checking order sequence, or waiting for acknowledgment of packet delivery. In this they are an outgrowth of the demonstrably inherent reliability of digital transmission over glass fiber, on the one hand, and the general recognition, on the other, that since end points must handle data integrity, sequencing, and retransmission anyway, intermediate switching gear can achieve significantly better performance at much lower cost by giving up these functions.

Each PVC has a "burst rate" and a Committed Information Rate (CIR). The CIR represents a service provider commitment: the service provider equipment is supposed to be engineered such that customers can always get at least CIR bandwidth. But typically customers will be able to avail themselves of "bandwidth on demand" in excess of the CIR at no additional cost.

Other Campus Connections

Thus far NTS has connected two remote University LANs to the Minneapolis campus backbone – one with a 56 kbps PVC and one with a T1 PVC.

Our counterparts in Duluth have had several frame-relay connections in place for some time. These sites connect to UMD via frame relay and then over leased lines to the rest of the University system and the Internet. We expect to use frame relay to connect ten to twenty Access Minnesota sites from all over the state into our network by the end of June.

For further information on frame relay in general or this project in particular, including questions about whether it is suitable for connecting your LAN to the University network, you may contact the author at <barron@nts.umn.edu> or 626-1654. ■

ATM: If it's Not a Cash Machine, What is it?

Will Murray and Jon Buerge, Networking and Telecommunications Services

Asynchronous Transfer Mode

ATM is an acronym for Asynchronous Transfer Mode. It is a network technology that has become all the rage within the past two years. ATM competes with Ethernet Switching for headlines in the trade magazines as the next generation of products and protocols to carry data, voice and video of the future. Ethernet Switching is a topic for another time.

Why do we care about this technology at the University of Minnesota?

The amount of traffic on our network has doubled every year for the past four years. Until recently, the growth could be attributed to more users attaching to the campus infrastructure. Now the traffic growth is due to the change in the type of information generated. With the growth of the World Wide Web and video conferencing, expanded network capacity is required to handle the tremendous amount of traffic they generate.

The new services such as the Web take us into a new era of interactivity. "A picture says a thou-

sand words" could be the motto of the Web. A picture is worth a thousand text characters too, figuratively speaking! The amount of traffic that a graphical image produces is far greater than a text generated E-mail message. Because of this phenomenon, the network infrastructure needs to be built up to handle this new type of traffic flow.

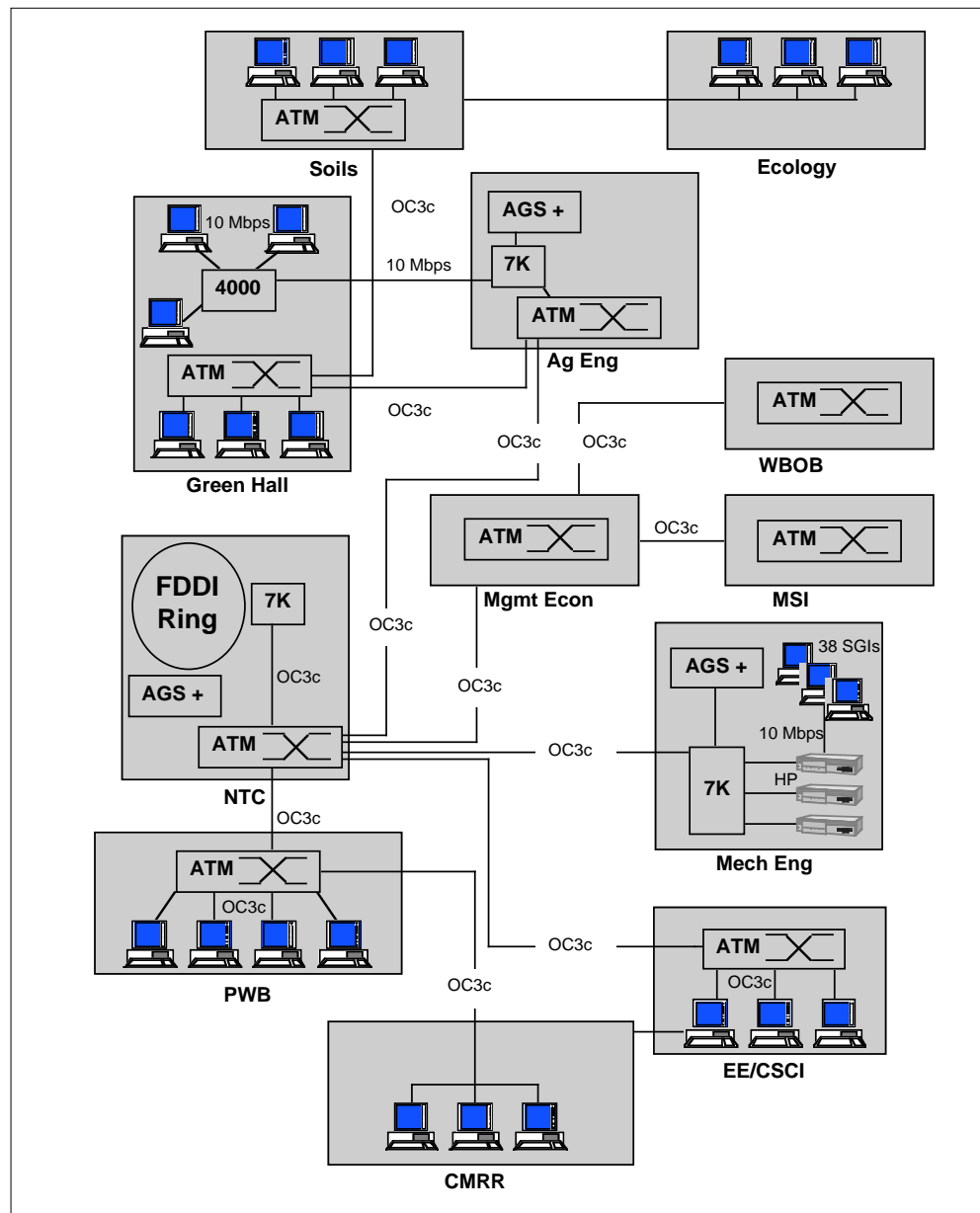
How does ATM apply to this shift in network traffic demands?

There are many ways that ATM can be used to address the explosion of traffic that we are witnessing today. Three of note are: 1) Scalability 2) Timing and 3) One common physical infrastructure.

1. Scalability

The current installed ATM switches have interconnection links via fiber optic cable that run at a theoretical maximum of 155 Mbps (155 million bits per second) (see Figure 1). That is roughly 15 times the bandwidth of existing Ethernet infrastructure for links other than those housed within

**Figure 1:
Current
Installed ATM
Switches**



NTS FAQs: Frequently Asked Questions

Q: How do I change or remove the busy greeting feature on my telephone?

A: Follow these steps:

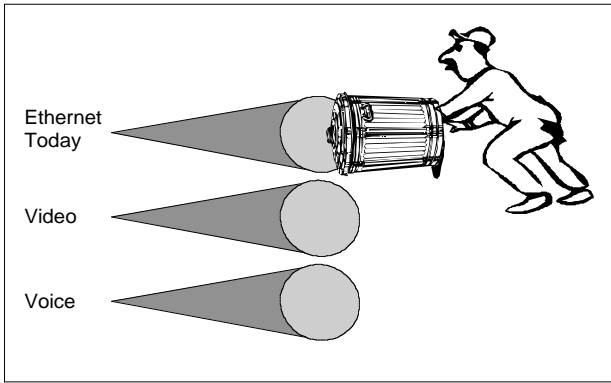
1. Access your voice mail box.
2. From the Main Menu, press 9 for "Mailbox Options."
3. From the Mailbox Options menu, press 1 for "Greetings and Name Announcements."
4. Press 3 to select the "Busy Greeting" option.
5. Press 1 to review your current busy greeting.
6. Press 2 to change the busy greeting.
7. Press 4 to delete your busy greeting.

Q: I can't find my IP address for my computer. What department can I call for assistance?

A: Contact the Networking and Telecommunications Services helpline at 626-7800, Monday through Friday, 9:00 am to noon and 1:00 pm to 4:00 pm. Specialists are available during these hours to assist in locating your IP number.

Information that will assist in this search includes the jack number and telephone number that are in the same location as your computer. Having these numbers in advance saves you and us a lot of time. People who have not gotten this information in advance often must go to another room to get it, delaying assistance on the Helpline. ■

Figure 2: Three Different Technologies



the Telecommunications bunker at 90 Church street.

This 15-fold increase in available bandwidth with ATM will allow the increase in traffic demands to be handled today. For the next waves of traffic growth the ATM modules in the switches can be replaced with those that carry traffic at 622 Mbps. After that it will carry 1.2 Gbps, etc. Thus, ATM technology is designed to allow network electronics to scale ever upward in the need for more bandwidth.

2. Timing

Existing Ethernet based networks like ours at the University of Minnesota do not have the timing and synchronization needed for voice and video traffic. When a TCP/IP, IPX or AppleTalk packet is transported from one computer workstation to another, there is no guarantee that the packet will be delivered within any certain timeframe. One packet might take 2 milliseconds and the next packet might take 50 milliseconds. Although this small amount of time fluctuation might not sound like a lot (after all we are talking about milliseconds), voice and video applications cannot tolerate it.

If you have seen a video application used over Ethernet, you noticed persons on the other end moving in slow motion or having a jittery image. This is because of the non-deterministic timing situation on the network. A video application needs to have the frames delivered within a deterministic timeframe to display the image on the receiving screen without distortion. Voice applications have this same timing need.

ATM has built-in timing synchronization to guarantee that video or voice data arrives at its destination within the time necessary to project them correctly.

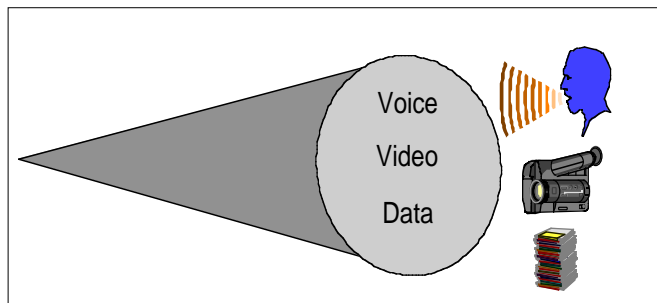
3. One common physical infrastructure
Over time, three different technologies have grown to need three different physical infrastructures (Figure 2).

The voice equipment needs its own cable and fiber to do its job. The video system needs its own cable and fiber to do its job. And, the data network has needed its own cable and fiber to do its job.

Intuitively, this seems like too much overhead. Three different paths are needed over the same type of wire or fiber to satisfy the needs of the different technologies. Wouldn't it be great if the three technologies could use the same physical infrastructure so that we didn't have to put in redundant cable and fiber to each building on campus? What a novel idea.

This is the big hope for ATM. To be able to run all three technologies over one common physical infrastructure (Figure 3). This vision will not happen overnight. The integration of these three different technologies is just beginning to come to fruition within the ATM vendor community. Staying abreast of the changes to support data traffic over ATM is enough to keep us all busy now. We won't wager a guess at this time about when the convergence of the technologies will be feasible on our campus. It looks like there is hope that some day in the near future we will be able use our resources more efficiently.

**Figure 3:
One Common Physical Infrastructure**



We hope that this conceptual introduction has been helpful for you. If you would care to learn more about ATM, please feel free to contact us via e-mail at <nts@nts.umn.edu> or, visit our Web site at <<http://www.nts.umn.edu>>. ■

Help Line Improvements

Academic and Distributed Computing Services (ADCS) is making some changes in the way we provide computer support to the University community. The reorganization of University computing centers under the auspices of the Office of Information Technology (OIT) has provided ADCS with the opportunity to expand our current service offerings and change how we handle some requests for help. Our goal is to provide a faster, more efficient service, particularly in the area of phone help.

Current (and Continuing) Services

Our walk-in and phone help services provide support for microcomputers (PC/compatible, Macintosh, Workstations), operating systems (DOS, Windows 3.1, Windows 95, OS/2, Windows NT, Mac OS, UNIX), many software applications, and E-mail/Internet related questions and problems.

Walk-in Help

Currently, ADCS offers help service at three walk-in locations. **152 Shepherd Labs** on the East Bank is open Monday-Friday from 9 am to 4 pm. This is our main helpline location where you can try out some demonstration computer models or get a hands-on feel for some of the software available for purchase through the Computer Discount Program (operated by the University of Minnesota Bookstores' Computer Store).

Our two satellite locations are **93a Blegen** on the West Bank and **58 Biological Sciences** on the St. Paul campus. Both of these helplines are open Monday-Friday, 1 to 4 pm.

Phone Help

Currently, we have two phone helplines answered at several locations. The Microcomputer HelpLine (626-4276 or MA MICRO) and the E-mail/Internet HelpLine (626-7676). Both are answered Monday-Friday, 9 am to 4 pm.

Changes

Over the last two years, the introduction of E-mail and Internet access for the entire University community has greatly increased the demand for our help services. Although we have increased the number of consultants working our helplines, we have not yet been able to keep up with the

demand. We hope that by making some of the changes listed below, we can better meet this demand.

Call Directory

In response to your comments on surveys and suggestion cards, we are working to improve the phone help service we provide. In May, we will begin using a call directory system that will allow us to better distribute phone queries to the appropriate consultants on duty or to a stock answers for frequently asked questions — for example: "Where can I get software for the Internet?"

Our goal is to reduce the amount of time customers have to wait for service.

On-line Help

Extended on-line help is now available. Our Web site <<http://www.micro.umn.edu>> has a host of links to sites loaded with helpline information and frequently asked questions. If you have an active Internet account, you can have fast and easy access to much of the information our helpline consultants use to answer questions on a daily basis. Here is the Computer Help menu from our Web page:

- Information about the ADCS HelpLine
- Internet Access
- Internet Software
- Tips from the HelpLine
- ADCS Modem Information Database
- Internet Software Updates
- Information from Computer Vendors

New Services and the Future

The new services we are providing include: UNIX support, statistical helpdesk (SPSS and SAS), Internet account management (changing passwords, etc.), hardware repair (Engineering Services), and modem troubleshooting and configuration.

We'll be making changes on an on-going basis and welcome your input and suggestions. All of our helplines have suggestion boxes and forms. Please let us know how we're doing. We'll keep you informed of continuing changes in future issues of this newsletter. ■

Internet Software Updates

With the advent of Netscape Navigator 2.0, many users of the Internet software kits compiled by Academic and Distributed Computing Services (ADCS) have expressed interest in upgrading from *Netscape 1.0*. Most, however, do not want to pick up a new, five-disk Internet kit. Of course, you can always download the latest version of Netscape Navigator from Netscape <<http://www.netscape.com/>>, but connecting to their FTP (file transfer) sites after a new release can be an exercise in frustration. Even after downloading a compressed software package like Netscape from the network, the installation and configuration of that package can be somewhat mysterious.

The Software Update Server

Due to popular demand, ADCS has created a Web server for software updates. Currently, we place updated versions of the packages included in the Internet kits on the server. To access the server, open this URL <<http://sw-updates.micro.umn.edu/>> with your Web browser.

Once connected to the server, you'll see a list of available packages categorized by operating system: Mac OS, Windows 3.1 and Windows 95. Each package listing gives the date the package was placed on the server, the version number, a description of the update and the requirements for installing the package on your system. If you follow the link for a particular package, you'll find detailed instructions for downloading and installing the software.

Before downloading and installing a package, it's useful to *print a copy* of the instructions. Many installation programs require that you quit all applications before installing software. If you're required to quit your Web browser during the installation process, you may lose track of the instructions unless you print them out.

System-Specific Information

Almost all Macintosh software packages come in a compressed, encoded format that is easily handled by the *Stuffit Expander* package. *Stuffit Expander* is

**Due to popular demand,
we created a Web server
for software updates.**

free software and can be downloaded from the software update server. Download and install this application before attempting to download other software.

If you use *Trumpet Winsock* to connect to the University under Windows 95, the 32-bit applications listed in the Windows 95 section of the listing will not work. However, all the programs listed in the Windows 3.1 section are compatible with *Trumpet Winsock* and with Windows 95.

If you want to use 32-bit, Windows 95-native applications, you'll need to use Microsoft's built-in Windows 95 SLIP software. The latest Internet kits from ADCS support this mode of operation.



Other Internet Kit News

Both the Macintosh and Windows kits now include an IBM 3270 terminal emulation program. 3270 emulators work better than "classic" telnet when connecting to some mainframe applications, such as LUMINA (the on-line card catalog) and the Student Access System. The 3270 emulators will soon appear on the software update server. The Macintosh package is called *tn3270*; the Windows application is called *QWS3270*.

The Macintosh Internet kit now includes Netscape Navigator 2.01. We've also added support for Open Transport 1.1 (the network subsystem on the newest Power Macs). To take advantage of Open Transport support, you must have System 7.5.3. You can upgrade any version of System 7.5 to version 7.5.3 by installing the *System 7.5 Update 2.0*, available from Apple and other sources. ■ by Ted Hajek

Note: Apple will waive shipping/handling charges for **System 7.5 Update 2.0** orders placed through their Apple Order Center: 1-800-293-6617 ext. 984. This offer is only good for orders placed between March 11, and **May 31, 1996**. Customers who purchase a new Mac between March 11 and July 31, 1996, may still order the System 7.5 Update 2.0 at no charge until August 15, 1996.

The Digital Spotlight

A Monthly On-line Newsletter

The *Digital Spotlight* is the monthly on-line newsletter of the Digital Media Center (DMC). In each issue we feature timely articles on multimedia development or examples of how faculty at the University of Minnesota are developing multimedia products for use in teaching.

Past issues have focused on the multimedia development process and copyright. Additionally, each issue contains URLs for useful on-line resources, and an update about resources for faculty available at the DMC.

How to Subscribe

To subscribe to the *Digital Spotlight* send a message to <listserv@vm1.spcs.umn.edu> with the subject line blank. In the message body type:
subscribe dmc-umn yourfirstname
yourlastname

The DMC is located in 15 Walter Library. Please stop by, give us a call at 5-5055, E-mail us at <dmc@boombox.micro.umn.edu>, or visit our Web page at <<http://www-dmc.tc.umn.edu/>> to learn more about our mission. ■

Digital Media Center, Summer Multimedia Camp for Faculty

The Digital Media Center will be offering a summer camp to introduce faculty to the process of creating interactive multimedia materials that can be used to enhance student learning.

Hands on Sessions for Faculty

During the camp's seminars and hands-on sessions, faculty will become familiarized with the multimedia development process from start to finish, including:

- planning and designing a multimedia project
- digitizing and editing graphics, sound, and video on a Macintosh
- authoring the final product on a Macintosh

Details on the camp's agenda will be made available through the Digital Media Center's Web site <<http://www-dmc.tc.umn.edu/>>.



5 Days: August 5 to 9

The camp will run Monday through Friday, August 5 through 9, from 9 am to 3 pm. There will be a one-hour break for lunch on your own.

Limited Space

The camp is free to University of Minnesota faculty, but registration is required. To obtain registration information call 625-1300. Space is limited, so register early. ■

Getting Information about Hardware and Software On-line

Nancy K. Herther <nherther@iic.lib.umn.edu>
Manager, Integrated Information Center, University Libraries

Looking for some user tips on Windows 95 or some other new software program? Looking for general information on new CD-ROM titles or reviews of the latest version of your favorite software program? Looking for update information on client/server technologies or C++ applications? Remember to check LUMINA for information. Here's an overview of some of the databases you may find most useful on computers and software.

Applied Science & Technology Index

Available through LUMINA's direct access to OCLC's FirstSearch, this database contains more than 650,000 citations to articles, book reviews, interviews, new product reviews, and selected editorials and letters to the editor in 390 English-language publications in the applied sciences and technology. ASTI covers aeronautics and space science, chemistry, computer science, construction industry, electric and electronics industry, energy resources and research, fire and fire prevention, food industry, geology, machinery, mathematics, mineralogy, metallurgy, oceanography, physics, plastics, textiles, transportation, and the following engineering fields: chemical, civil, electrical, environmental, industrial, mechanical, mining, nuclear, and telecommunications. It corresponds to the printed *Applied Science & Technology Index*. The database covers English-language literature from Canada, Ireland, the Netherlands, Switzerland, the United Kingdom, and the United States and goes back to October 1983. It is updated weekly and averages 5,000 new articles each month.

COMPENDEX

Covering the world's engineering literature from 1987 to the present, COMPENDEX is the on-line version of *Engineering Index* from Engineering Information Inc. The database provides abstracted information from over 2,600 journals as well as selected books and government reports. Subjects covered include: civil, energy, environmental, geological and biological engineering; electrical, automotive, nuclear and aerospace engineering; and computers, robotics, and industrial robots. This database is mounted on the BioMedical Library's BioMedSearch. To use this database, telnet to `biomed.lib.umn.edu`

and at the login prompt type `umn` and follow screen prompts to login with the username and password from your University Internet account. The system is menu-driven and quite easy to use.

General Science Index

Another FirstSearch database, *General Science Index*, contains over 400,000 citations to articles and book reviews in more than 140 English-language periodicals in the general sciences. Most journals are from the US. and the database goes back to May 1984.; it is updated each month. Subjects covered are: general science, including astronomy, atmospheric science, biology, botany, chemistry, earth science, environment and conservation, food and nutrition, genetics, mathematics, medicine and health, microbiology, oceanography, physics, physiology, and zoology.

INSPEC

Produced by the Institution of Electrical Engineers (IEE), INSPEC contains over 4.7 million citations, with abstracts, to the worldwide literature in physics, electronics and electrical engineering, computers and control, and information technology. Primary coverage is of journal articles and papers presented at conferences, although significant books, technical reports, and dissertations are also included.

Topics covered in electronics and electrical engineering include: circuits and components; electron devices and materials; electromagnetics and communication; energy and power systems and applications; instrumentation; and telecommunications. Topics covered in computers and control include: systems and control theory; control technology; computer programming and applications; and computer systems and equipment. Information technology topics include applications of modern communications and computing to the production, transmission, storage, and interpretation of visual, oral, and digitally encoded information. Hardware coverage included microcomputers and related peripherals. It corresponds to these publications: *Physics Abstracts*, *Electrical and Electronics Abstracts*, and *Computer and Control Abstracts*. The database is updated weekly and covers 1969 to the present.

Library Literature

Produced by the H.W. Wilson Company, Library Literature contains more than 130,000 citations to articles and reviews of books, periodicals, and audiovisual materials in the library and information science area. Sources include some 220 library periodicals, general periodicals, books, conference proceedings, pamphlets, microforms, films, and library school theses. It corresponds to the printed index *Library Literature*. The database covers subjects such as: automation, copyright legislation, information science, management, on-line searching and publishing. The database cover 1985 to the present and is updated each month.

Microcomputer Abstracts

Produced by Information Today, Inc., this database contains over 192,500 citations, with abstracts, to reviews and commentaries on the use and applications of microcomputers and software packages. It covers more than 90 traditional and cutting-edge publications on microcomputing in business, industry, education, libraries, and in the home. The database includes summaries of general articles about microcomputers, book reviews, software and hardware reviews, and specifications for individual packets, discussions of applications in various settings, and descriptions of new microcomputer hardware and software products. It also provides the complete text book reviews of computer titles from Computer Book Review. This database corresponds to the quarterly printed index *Microcomputer Abstracts*. Publications included in this database are generally from North America, Britain and Australia. The database goes back to 1989 and gives good coverage to such topics as: the microcomputer industry, including

company profiles, microcomputer systems, hardware, software, new products, applications case studies, games, education, programming, utility programs, local area networks, and retail computer stores.

Other Databases

Depending on your topic - for example if you want to know about how computers are being used in agriculture or medicine - you may want to look at some of the other specialized or general indexes available through LUMINA. Here is a brief list of databases you might want to check out.

- ACAD Academic Index (journals and magazines, some full-text), 1980-date
- BIZZ Business Index (business periodicals, some full-text), 1982-date
- COPR Company Profiles (140,000 private and public companies)
- CCON Current Contents (contents and abstracts of current scholarly journals)
- DSA Dissertation Abstracts (North American doctoral theses), 1861-date
- MAGS..... Magazine Index Plus (popular magazines, some full-text), 1980-date
- MATH MathSci Online (mathematics, statistics, computer science), 1940-date
- NEWAB .. Newspaper Abstracts (25 national and regional newspapers), 1989-date

If you need further assistance or want more information on these or other databases and reference services from the University Libraries, feel free to call or stop in any of our library reference locations or call me. Happy searching! ■

The Grants Management Project

Gary Hornyak, Business and Student Information Systems

The Grants Management Project is reviewing the policies, procedures, systems and training required by department directors and principal investigators to responsibly manage grants at the University of Minnesota. The project aims to improve the processes of inputting transactions into the General Ledger, access to data coming out of the General Ledger, departmental reporting capabilities, and the ability to track and manage grants once they have been awarded.

Grants Management is a project that at first seems deceptively small and manageable. In reality the Grants Management project is similar to the six blind men and the elephant parable. Individuals may describe the Grants Management project quite differently, depending where on the elephant they are located—near the trunk, an ear, or the tail. It is difficult to really know how large and encompassing the Grants Management project is unless you can see the total picture.

To share a sense of the project size, I compiled a few facts about Grants Management:

- Grants Management is comprised of 38 individual sub-projects at some level of activity: either completed, active, or pending.
- So far, the Grants Management Project has or has had more than 130 full- or part-time people involved in the project from almost every college and provostal unit. We will expand this number as the project goes forward.
- As a result of the Front End Prototype sub-project, 515 CUFS Users are now on the Grants e-mail database. This alone shows the high interest level in the project.
- Grants Management is using management and leadership staff from many different departments and schools, making it a true University-wide project.
- The project has its own home page which lists project research we have done at other universities. Soon we will set up a home page to publish progress reports. Our home page address is <http://www.umn.edu/grants/grlinks.html>.
- The interested audiences of Grants Management are so large and diverse that we employ one full-time and one part-time communications staff members to read, review and publish information about Grants Management. These two communications people also coordinate the large number of public presentations the Grants Management Leadership Team is required to give.
- The University of Indiana has asked that we present our technical advancements on Grants Management at its Fall Web convention.

Grants Management is significant in other ways as well:

- Grants Management will be the first major project that will use Office of Information Technology resources instead of either BASIS or ADCS. This is a great step toward making the OIT vision a reality.
- The Grants Management project is using Rapid Application Development techniques, such as prototyping.
- Grants Management uses a "Project Office" for providing, sharing, and centralizing project management information, techniques, and skills.
- This is the first project to encompass a totally new enterprise wide architecture.
- Grants Management will be using true three tier client-server architecture where presenta-

tion is separated from logic, which is separated from data. This produces a truly open architecture that can be leveraged throughout the total enterprise and for many other systems.

- The business and technical accomplishments being made by the Grants Management Project may set the standards for future University projects.
- Grants Management is finding creative ways of accessing mainframe data in a true client-server environment.
- Grants Management uses the Web extensively in both the data entry projects, such as the Front End, and information presentation such as the Reporting, Data Warehouse and Data Warehouse Information Gateway projects.

The 38 sub-projects are grouped into three broadly based areas:

- Controls
- Business Practice Improvements
- Technical and Data Flow

Some examples of Controls projects are:

- General Ledger Entry/Output Controls
- Interdepartmental Billing Issues
- Budgetary Controls
- Security

Examples of Business Practice Improvement Projects are:

- Pre-Encumbrance
- Encumber Payroll/Fringe
- Pre-CUFS Accessibility
- Accounting for Compensated Absences
- Streamline Monthly G/L Close

Some technical and data flow sub-projects are:

- DDE (Direct Document Entry)
- CUFS Batch Interface
- Front End
- Data Warehouse
- Data Warehouse Information Gateway
- Reporting

These are some of the sub-projects being managed by the Grants Management Leadership Team. This is a project whose results will affect virtually every college and provostal unit. The University faces intense competition locally, nationally and internationally in its ability to attract new research talent. To fail would affect the future of the University as a research institution. I am proud to say that by providing leadership, architecture and gateways, the OIT organization is playing a significant role in such an important project. ■

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Information Technology Newsletter

The University of Minnesota is committed to the policy that all persons should have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

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