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Tech

Talk

Tech Talk, where University and local experts discuss the digital technology we encounter in our daily lives, finished its third season in April. If you missed episodes or want to see them again, we have good news. Twin Cities Public Television, channel 17, will repeat the Tech Talk series at 9 p.m. on Sunday nights. And if you have a high speed (broadband) internet connection, you can still view video transcripts of seasons 1, 2, and 3 on the web here:

<http://techtalk.umn.edu>

Information Technology

Croquet™ is Coming! Prepare to rethink online learning

DMC Spotlight Issue: Each month, Digital Media Center (DMC) consultants publish information on our web site about a current educational technology issue discussed at sessions of the Technology-Enhanced Learning (TEL) Seminar Series, in our classes, or at our program or project meetings.

I imagine you are an undergraduate student of the future. Your first class takes place in a lush wooded landscape with rolling green hills and a waterfall. You go through a portal to your next class in an underwater world full of fish that undulate around you — some of them are your fellow students. Your last class is in outer space, where Earth and a satellite are revolving around the moon. You can see the gravitational effects of two bodies on a third; if you get in the way of the moon, it will toss you out of the way.

Think this sounds like science fiction set in the year 2305? Think again. Programmers from the University of Minnesota and the University of Wisconsin are developing a multi-user, 3D software environment called “Croquet” that enables students and instructors to move through, create, and collaborate in virtual worlds.

Look and feel of virtual reality game

Croquet looks and feels like a virtual reality game, but in terms of its development and goals is radically different. Mark McCahill — director of the University Technology Development Center on campus and one of Croquet’s authors — explains that while the goal of most games is to hurt, destroy, and dominate, the goal of Croquet is to create and collaborate. Educators have often been attracted by the features of gaming software, which are highly collaborative, interactive, and intrinsically motivating. But these gaming engines aren’t necessarily well suited for teaching and learning because corporations own and control the code and allow users only limited functionality.

Croquet, on the other hand, is open source software, which means that anyone can access the code or the tools and create, extend, or adapt the virtual space to their own ends.

Croquet is also different from many other educational gaming projects in that it is an attempt to overcome the limitations of traditional online learning environments. It enables learners not only to gather, discuss, and analyze information, but also to actively construct it. They can manipulate and annotate and even make 3D objects (admittedly primitive ones), and eventually will be able to attach behaviors to those objects. In its current form making worlds in Croquet requires considerable programming and graphic art skills; but as more people use the program, they will develop a library of shared objects and worlds to which any user will have access. In other words, the more people work with this open source software, the more user-friendly it will be.

Campus projects

A handful of professors on campus are already experimenting with Croquet in their classes and, with the help of their students, are thinking about how it can support teaching and learning. For example, Lee-Ann Kastman Breuch is using it for 3D mind mapping activities; for Bernadette Longo and her students, redesigning online writing centers served as a point of entry into exploring Croquet. More information about their projects will be published on the DMC site at <http://dmc.umn.edu/spotlight/croquet.shtml>.

Bibliography

To access Croquet, see the project site at <http://www.croquetproject.org>. For more information about the development of this technology as well as its potential to transform online learning environments, please see the publications listed below. All are available as portable document files (PDFs) at http://www.croquetproject.org/About_Croquet/whitepapers.html.

Lombardi, J., and M. P. McCahill. "Enabling Social Dimensions of Learning Through a Persistent, Unified, Massively Multi-User, and Self-Organizing Virtual Environment." Croquet™ Project, 2004. [http://www.croquetproject.org/Site PDFs/Enabling Learning 2004.pdf](http://www.croquetproject.org/Site%20PDFs/Enabling%20Learning%202004.pdf).

Lombardi, M. M. "Croquet, Anyone? Designing a More Responsive Online Learning Environment." *Teaching with Technology Today* 10, no. 5 (April 2004). <http://www.uwsa.edu/ttt/articles/lombardi.htm>.

McCahill, M. P., and J. Lombardi. "Design for an Extensible Croquet-Based Framework to Deliver a Persistent, Unified, Massively Multi-User, and Self-Organizing Virtual Environment." Croquet™ Project, 2004. [http://www.croquetproject.org/Site PDFs/Design for MUVLE 2004.pdf](http://www.croquetproject.org/Site%20PDFs/Design%20for%20MUVLE%202004.pdf).

Smith, D. A., A. Kay, A. Raab, and D. P. Reed. "Croquet: A Collaboration System Architecture." Croquet™ Project, 2003. [http://www.croquetproject.org/Site PDFs/Croquet Collab Archi 2003.pdf](http://www.croquetproject.org/Site%20PDFs/Croquet%20Collab%20Archi%202003.pdf).

Smith, D. A., A. Raab, D. P. Reed, and A. Kay. "Croquet: A Menagerie of New User Interfaces." Croquet™ Project, 2004. [http://www.croquetproject.org/Site PDFs/Croquet Menagerie UI 2004.pdf](http://www.croquetproject.org/Site%20PDFs/Croquet%20Menagerie%20UI%202004.pdf).

Campus resources

The following may help you explore how Croquet may be used for educational purposes.

- Attend the Educational Technologists Forum meeting on May 19, 2005, from 3:00 to 4:30 p.m. in 402 Walter Library. Mark McCahill will give an overview of the Croquet project and talk about its future, and Lee-Ann Kastman Breuch and Lauren Marsh will share activities they've developed to introduce students to this environment and get them thinking about teaching and learning in a virtual space.

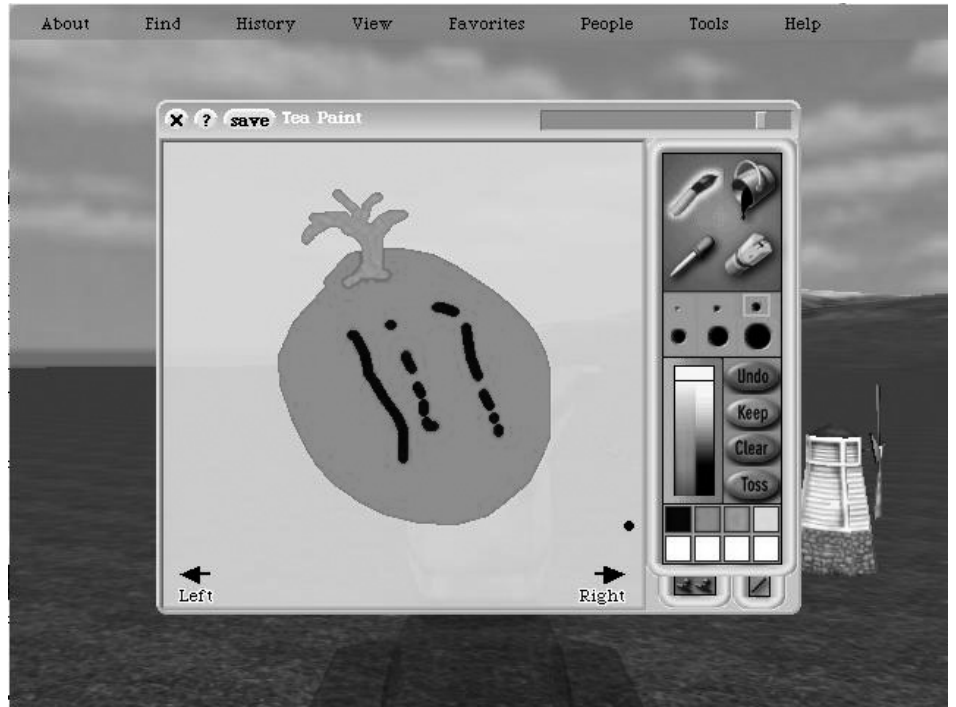
May 19 Educational Technologists Forum meeting

■ Mark McCahill: overview of the Croquet project and talk about its future. ■ Lee-Ann Kastman Breuch and Lauren Marsh: share activities developed to introduce students to this environment and get them thinking about teaching and learning in a virtual space. ■ 3–4:30 p.m., 402 Walter Library

- Meet with one of our consultants to discuss how you might use Croquet for teaching and learning. See <http://dmc.umn.edu/consultations/>.
 - Find out about how others in the campus community are exploring the structure of game and virtual reality environments to advance research and better understand the cultural, communicative, aesthetic, technical, and social implications and opportunities these structures provide on the GRAVEL site at <http://www.inms.umn.edu/gravel/>.
 - Read about how technology-enhanced games and simulations can be used to put course principles and ideas into action within an engaging, interactive context on the DMC site at <http://dmc.umn.edu/strategies/games.shtml>.
- Lauren Marsh, Cristina Lopez, and Christina Goodland, Digital Media Center

Croquet Figure 1

The Painter tool allows users to create simple 3D objects.



Croquet Figure 2

Users move through a virtual environment with an avatar. A shared library of objects (visible along the bottom of the screen) will become a rich resource as more and more users contribute to it.



What is new in the Usability Lab?

Eyetracking

On April 25, 2005 Usability Services, in the Enterprise Applications Systems area of OIT, unveiled the latest equipment for detecting how visitors experience websites and web systems.

Eyetracker

Acquisition of the new Tobii 1750 eye-tracker equipment and software was made possible by a funding partnership between the Office of Information Technology and a Digital Technology Center Initiative Program grant to Professor Joseph Konstan in the Computer Science and Engineering Department.

Until now, eyetracking has meant wearing unwieldy headgear or head immobilization via a chin rest. Neither option has lent itself to a natural web browsing experience. Tobii Technology of Sweden recently developed a system that integrates eyetracking features into a computer monitor.

Gaze point locations

After a brief calibration to verify gaze point locations, the evaluator barely realizes she is using specialized equipment. The ClearView Eye-gaze analysis software allows the usability professional or trained researcher to collect and interpret individual or aggregate data. Gaze plots and “hot spot” maps are directly available within ClearView, or the raw data may be exported in tab-delimited or Excel formats for presentation in additional charts and graphs.

Usability Lab

The installation in the Usability Lab in Walter Library provides the option for observers to watch the evaluator’s screen both with and without an overlay of the eye-gaze results.

As this new capability becomes better understood, Usability Services may revise our usability evaluation

methodology. For some projects, we may utilize post-evaluation interviews and eye-gaze data evaluation as a supplement to or in place of our current think-out-loud protocol for learning the participant’s perspective. This will be an exciting time for those interested in how websites and applications are seen by the audience.

Eyetracking will be one more tool that allows evaluation of design to be based upon objective facts rather than subjective opinions. The University of Minnesota has award-winning web applications largely because of the focus on the user in each development project. This allows an even deeper knowledge of how people experience our designs.

In addition to being employed by Usability Services in usability evaluations during software design, the eyetracker will be used by researchers in the Digital Technology Center, Computer Science, Journalism, Kinesiology, and Rhetoric departments. Several research projects are scheduled to begin this summer, as is the first student capstone project. Eyetracking will provide researchers the opportunity to evaluate perception and response, advertising effectiveness, and aesthetic appreciation, as well as usability.

If you have any questions about the eyetracking technology or the Usability Lab, please contact Alice de la Cova at a-dela@umn.edu.

- Access the Usability Services website at <http://web.umn.edu/Webteam/usability/>.
- More information about Clear View is available here: <http://www.tobii.se/clearView.html>.
- Tobii Technology image, movie demos, and documentation available here: <http://www.tobii.se/>.

■ Kari Branjord, Enterprise Web Development, Usability Services, <http://www.umn.edu/oit/enterprisemanagement/>.

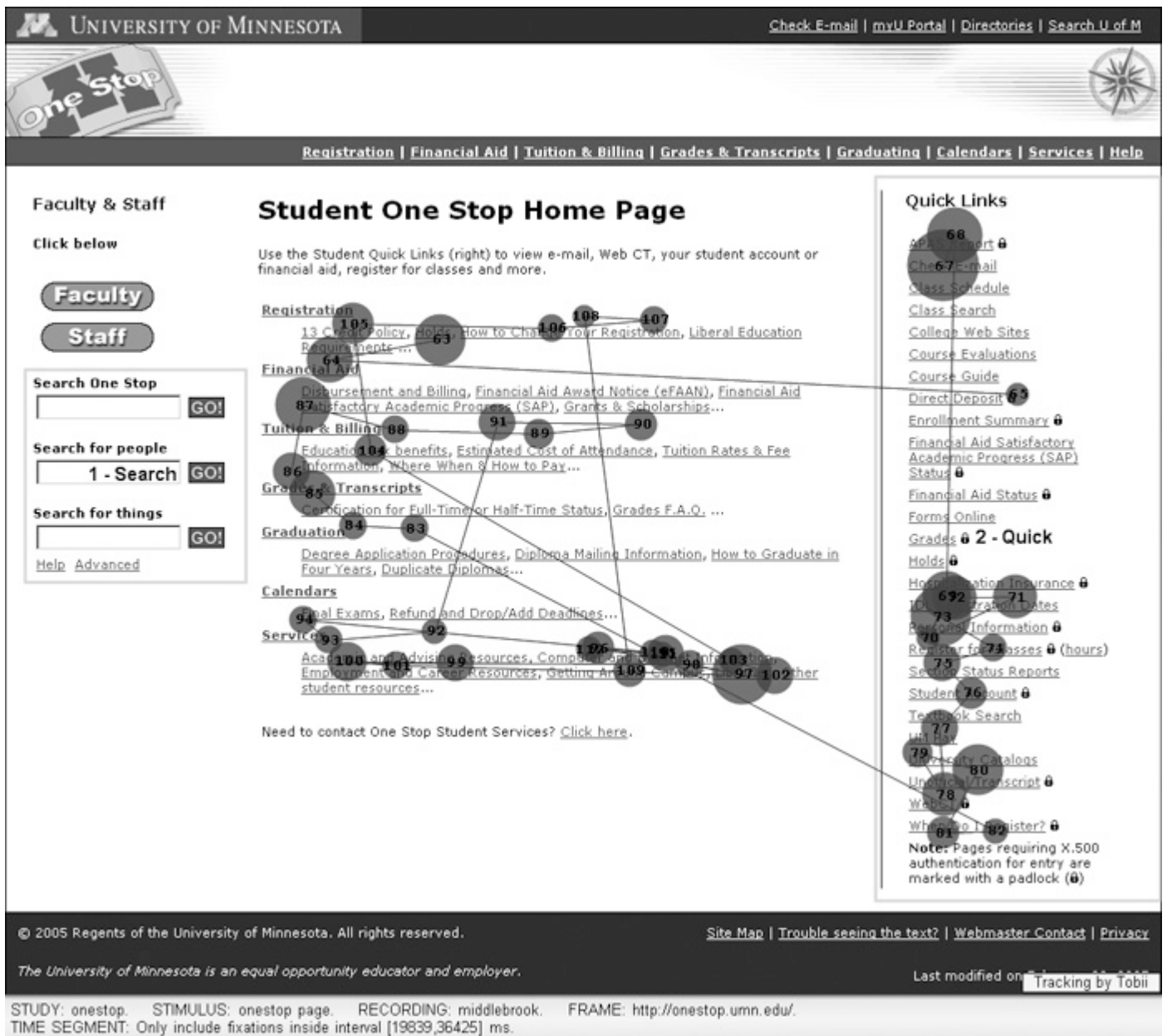
About Figures 1 and 2

The images in Figures 1 and 2 are for the Student One Stop Home Page and are from two different eyetracking sessions.

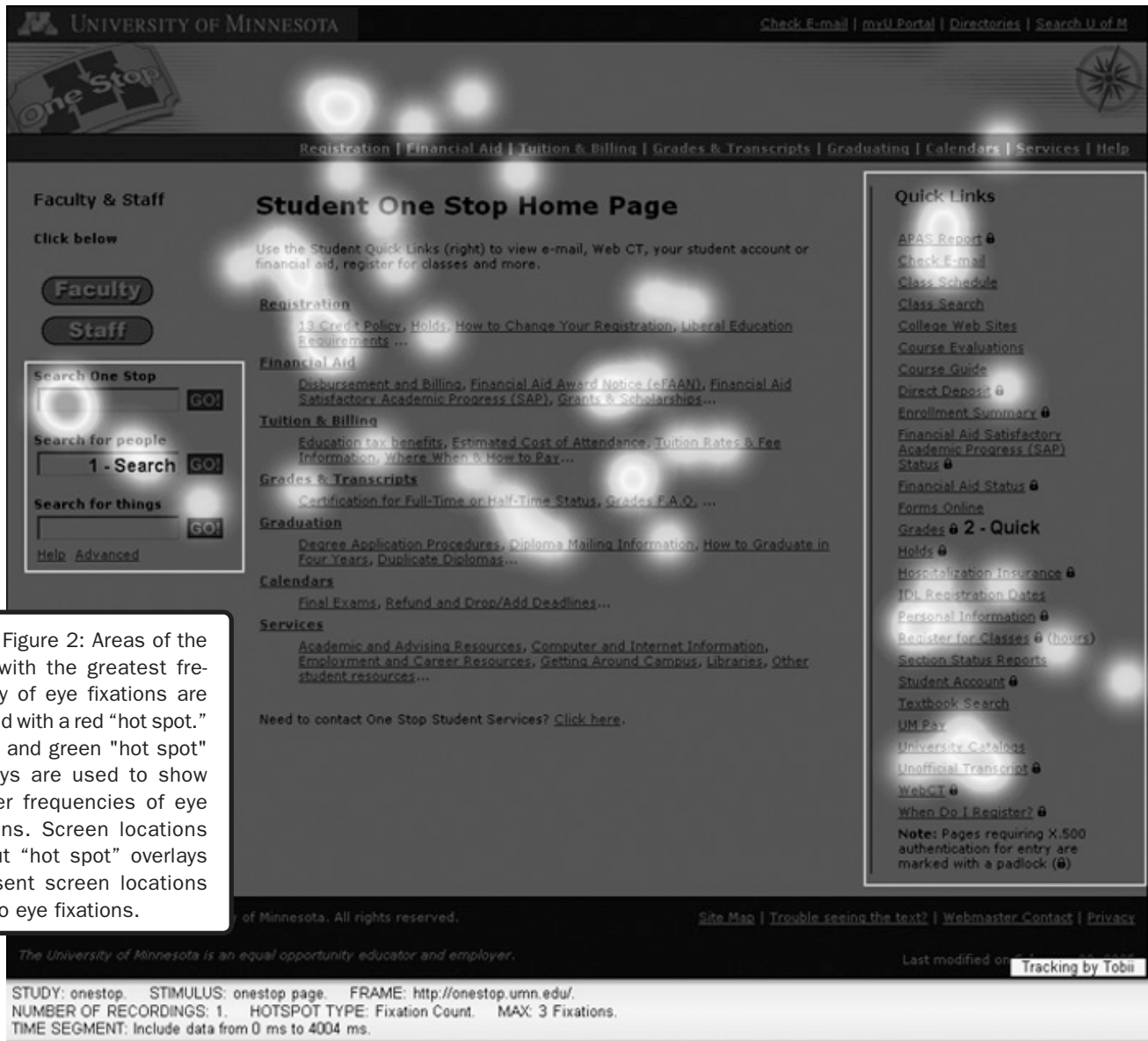
The rectangle around the Search fields and the rectangle around the Quick Links have been defined in the ClearView analysis application as “Areas of Interest” (AOI) on the page. Once AOIs have been defined, the eye-gaze data collected from an eyetracking session can be presented in plots, maps, and charts with respect to them.

Eyetracker Figure 1: Gaze plot (see the online image for exact colors)

In the gaze plot, the numbered circles show the sequence of eye fixations as the participant looked at locations on the Student One Stop Home Page. The length of time the participant looked at a given screen location is represented by the size of the circle overlay at that location.



Eyetracker Figure 2: Hot spot map (see the online image for exact colors)



Voice over Internet Protocol

And the University of Minnesota

Ever since the commercial Internet was in its infancy, people have been looking for a way to use it to make cheap phone calls. As early as 1996, you could buy software that would let you sit at your computer and talk to someone else sitting at a computer — and if early software reviews are to be believed, these products worked pretty well.

However, until fairly recently, sitting at a computer and ringing up someone else on a telephone has eluded common use. Nevertheless, the allure of Voice over Internet Protocol (VoIP) was clear: People want to take advantage of the Internet to call people all over the world for nothing more than the cost of the connection. But to this day, most people pick up a

regular telephone to call across town or across the country.

VoIP has grown

VoIP technology has grown, as has the capacity of the fiber optic networks that constitute the Internet of today. New companies have developed VoIP equipment and services that they say can meet all the voice needs of their customers. Integrating the computer with the phone makes it easier to provide features like voicemail and caller ID. Some users like the idea of taking their VoIP connections everywhere they can take a laptop—connect to the Internet in Berlin and make local calls to Saint Paul.

The 911 drawback

But that mobility can come at a steep price. VoIP doesn't handle 911 calls the way regular phone companies do. If you call 911 from a land line in your home, the location of that phone is tied to the call. This means that the dispatcher can tell where you are, even if you can't talk. But if you call 911 using a VoIP phone, there is no geographic information associated with your number. This makes it difficult just to figure out where your 911 call should go. If you've taken your laptop to Houston on a business trip, your VoIP phone will not only show you as being at home but will actually send the call to a dispatcher in Minneapolis.

Enough people are using VoIP to make these questions much more than academic. Earlier this year, a girl tried to call 911 from a VoIP phone while her parents were being attacked and shot by burglars. The call did not go through,

because her father had not registered his address with the VoIP provider. This is one of the biggest drawbacks that VoIP adopters need to be aware of. Unless users register their locations and keep that information current, 911 will not work properly. (USAToday.com carried the story by Paul Davidson: *Net-based 911 fight puts lives on line*. You can read it here: <http://tinyurl.com/7yreq>.)

Despite horror stories like this, some readers are going to be cringing at their long-distance bill, eyeing the University's new Gopher GigaNet, and wondering if there might not be a place for VoIP here on campus. As it turns out, Network and Telecommunications Services (NTS), the department that designed and is installing the new network, has been asking itself the same question.

NTS is testing VoIP

NTS is testing VoIP services to see how to make them as reliable and cost-effective as possible for the University community. But with a system the size of the University's, several questions need to be resolved. One of these is the 911 compatibility problem discussed above. Related to that are legal issues that need to be considered for the University to move ahead with VoIP on a large scale.

Phone calls also need to be traceable, according to the Communications Assistance for Law Enforcement Act of 1994. For example, the University police force needs to be able to trace threatening phone calls, even if they are made over VoIP equipment.

Another safety consideration is power. Your regular phone gets its electricity from the phone line. That's why corded phones usually keep working even during blackouts. But the data network goes down during power outages, taking any VoIP calls with it. So if the power goes out in an emergency (which is, often enough, just when you need a phone the most), VoIP phones would suddenly become useless.

NTS also needs to consider the sheer size of the University. Any VoIP system used at the University needs to be able to support thousands of users—there are 36,000 phones on campus today. And NTS is investigating quality of service questions and firewall issues, as well as how moving among Etherjack connections and wireless hot spots would affect Voice over IP on campus.

Finally, VoIP equipment faces the same security threats as any other network technology. As more and more customers turn to VoIP, those customers may find themselves the victims of denial of service attacks, man-in-middle attacks, spoofing, and even spam.

VoIP systems will have to deal with viruses, and the voice traffic itself could be susceptible to interception. NTS is working to ensure privacy by protecting this information from prying ears and applications.

For more information about VoIP at the University of Minnesota, submit this VoIP Request Form: <https://www.umn.edu/nts/projects/voip/contact.php>.

■ Josh Welsh, Networking and Telecommunications Services, <http://www.umn.edu/nts>

▼ **Help**

- Computer Misuse or Abuse (also see Procedure 2.8.1.1)
- Emergency Network Help Line 612-625-0006
 - Non-emergency, e.g., spamming abuse@umn.edu

1-HELP 612-301-4357

Dial 1-HELP. Listen to the voice menu list of options.
Press the number of your desired option.

- Technology Help www.umn.edu/adcs/help

▼ **Modem pool for active UM accounts**

Internet/PPP: up to 53kps if v.90 612-627-4250

▼ **Quick Guide**

- Internet/Email account options www.umn.edu/validate
- Office of Information Technology www.umn.edu/oit
- One Stop Services onestop.umn.edu
- Techmart www.techmart.umn.edu
- Computer Accommodation Program cap.umn.edu
- University Computer Services www.umn.edu/ucs
- U Libraries (MNCAT/LUMINA) www.lib.umn.edu
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Twin Cities campus address label trivia: 1st # is record #; 2nd # is your Campus Mail delivery code, http://umn.edu/lookup

May 2005 [pantone 295] featuring GoodDogBonesCool

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