Networking technology links Pennsylvania schools to the future

Kerry Moyer  
Director of Research & Information Technologies  
Pennsylvania's State System of Higher Education

For higher-education institutions, keeping up with the pace of information growth while producing highly skilled students and world-class research has never been more challenging. Higher education has been one of the many victims of state funding cutbacks, a trend that is occurring all over the country as state governments deal with tight budgets. As a result, many state universities and colleges are now limited not only by lack of resources, but also by physical location.

Fortunately, recent technological innovations, such as the merging of computing and telecommunications, have provided a new solution that allows state schools to access a vast amount of information and resources for learning and teaching, despite the obstacles of budget constraints and physical location. A recent example of a state using this technology is Pennsylvania's State System of Higher Education, which completed the final phase of its network in early 1993.

The project, called SSHEnet (State System of Higher Education network), is a private data network that connects sites, including 14 member universities, seven branch campuses and centers, and the Office of the Chancellor—all of which make up Pennsylvania's State System of Higher Education. SSHEnet's main purpose is to allow colleges within the State System to have basic connectivity to all 22 sites, regardless of their geography or resources. The end result is a network that provides collaboration—among faculty and students from schools around the world, businesses, and government.

In addition to linking 22 State System sites into one network, SSHEnet provides access to other national and international telecommunications networks, such as the Internet, which provides access to more than 10,000 networks in 90 countries.

Colorado State implements E911 with PS/ALI

Jim Hebbeln  
Telecom Specialist  
Colorado State University

Enhanced 911 Service, or E911, is a proven telecommunications technology that significantly improves the accuracy and swiftness of police, fire, and ambulance dispatching by routing Emergency 911 calls to the correct Public Safety Answering Point (PSAP) and concurrently providing the emergency services PSAP dispatcher the caller's telephone number and associated name and address.

Despite E911's capabilities to quickly identify calls from individual (POTS) telephones connected directly to the public switched network, calls from PBX extensions still are not providing sufficiently detailed location information to adequately dispatch emergency personnel if the caller can't speak. Addressing this problem, US West Communications recently expanded their E911 Service offering with optional Private Switch/Automatic Location Identification (PS/ALI) to (1) accommodate 911 calls directly from "private switch" PBX customers, (2) route these calls to the correct PSAP, and (3) identify private PBX extension locations (street address, building, floor, room) with the same clarity enjoyed by regular POTS customers.

Colorado State University in Fort Collins serves approximately 21,000 students and employs a faculty and staff of about 3,000. The 850-acre campus links...
### Board Report

**ACUTA proceeds with purchase of building for headquarters in Lexington**

Finalizing the financial and closing arrangements for purchasing the building to house the Lexington staff was the top priority of the ACUTA Board in December. Other items on the agenda were:

- Member needs assessment pilot
- Executive Director search update
- Palm Springs Seminar planning
- 1994 Anaheim Annual Conference Planning

Submitted by Dr. James Cross, Longwood College

**ACUTA Secretary**

#### Don't touch that dial!

Last month Howard Lowell, Colorado State, gave us a list of 800 numbers that deserve a block from your system. Since then, the ACUTA office has been notified of a few discrepancies and new numbers to add to the list.

Doris Stock of Virginia Tech reports that 800/846-2303 is actually Gateway 2000's customer support number. Should be okay. (Sorry, Gateway!) Clancy DeLong at Central Michigan tells us 800/944-9249 apparently transposed two numbers. Block instead 800/944-9294.

Carolyn Klee of Ursinus College identifies these numbers 800/967-4323, 800/666-6749, 800/678-6749 and Jan Laventure, Univ. of North Dakota, adds 809/951-6020 to the list.

Bill Adams at TWU adds 800/436-3660 and 800/938-2866.

To send numbers you determine are toll fraud/telabuse related, call ACUTA at 606/252-5665.

### Nominations sought for Institutional Excellence in Telecommunications Awards

Nominations are being sought for ACUTA's Institutional Excellence in Telecommunications Award for 1994. The awards are presented to member institutions for telecommunications excellence and professionalism. Three awards are given annually.

The selection of winners will be based upon the telecommunications department's contribution and support of the mission of its institution. Nominated institutions must provide specific information describing their telecommunications endeavors, products, and services which demonstrate excellence and professionalism.

The awards will be presented at the 23rd Annual ACUTA Conference in Anaheim, California July 31 – August 4, 1994.

Each member institution is encouraged to apply or make nominations for the 1994 awards.

Applications must be postmarked by March 15, 1994. For more information regarding nominations or applications, contact: ACUTA Institutional Excellence in Telecommunications Awards, Lexington Financial Center, Suite 2420, 250 W. Main St., Lexington, KY 40507.
President's Message

It's hard to believe that 1993 is over and 1994 has begun. It's also hard to believe that I'm already half way through my term as ACUTA president. Between all the projects ACUTA is involved in and all the daily challenges here at Cornell, time seems to be flying by. I'm sure most of you are in the same boat, constantly challenged with the "doing more with less" mentality that has permeated our society. 1994 holds lots of promise with new technologies emerging every week. Keeping up with it can drive you nuts, but we wouldn't be in the business we're in if we didn't thrive on constant churn.

By now you should have received our Call for Presentations for our July conference in Anaheim. I'd like to encourage you to apply to participate in the program. I know the specter of making a presentation can be daunting, but public speaking skills are a necessary part of our jobs. What better place to develop or hone your speaking skills than in front of a friendly and supportive audience? I recently attended the CAUSE conference and was impressed with the quantity and quality of the member presentations in their program. ACUTA should be able to do nearly as well. We're not there yet, but we're making headway. We need speakers for the conference Call for Presentations as well as for some of the upcoming seminar programs so there are several opportunities available for you to explore.

Don't feel you have to have a finely-honed presentation to participate. Our attendees continue to tell us that the member participation elements are critical to our programs, and that personal, real-life perspectives are more important than a speaker reference sheet a mile long. Many of our member presenters have a substantial amount of speaking experience, but several have used their ACUTA speaking experience as one of their early forays into public speaking. Although it's important to be comfortable speaking in front of a group of people, remember they're friends and colleagues who are more interested in what you have to say than how eloquently you say it. The seminar ratings and critiques tell us that the ACUTA members are always highly supportive of other members' efforts.

As a speaker, you will receive a complimentary copy of the audio tape of your presentation. I've used the tapes from my presentations over the years to sharpen my speaking skills and to share information with interested co-workers. I've also had speakers tell me that if it hadn't been for their speaking commitment, they might not have been able to attend an ACUTA event. It's another rather selfish motive for volunteering, but sometimes you have to be creative to get access to an ever-decreasing travel budget. Presenting also gives your institution publicity in the event brochures and the ACUTA News, and that will sometimes help sell your boss on the merits of participation. So... go ahead and take the challenge! I bet you'll be glad you did.

On a totally separate topic, I am pleased to inform you that we are very close to owning our own office building on the outskirts of Lexington, Kentucky. Our lease on the office space in the downtown Lexington Financial Center expires the end of January and the space is inadequate for our needs. One of the reasons why we have built and maintained a healthy financial reserve was to allow us to purchase a piece of property rather than continue leasing office space. The cash flow analysis we performed was favorable and we are now in the process of finalizing all the legal details involved in a commercial real estate transaction. The new building has two stories; we will occupy most of the second floor and the lower floor is leased to a federal government agency. The Board of Directors is pleased to have more appropriate space that's going to be able to meet our current and future needs and, at the same time, yield financial benefits—a tangible example of "doing more with less." The staff will have space that functions much better for them and are thrilled with the idea of being able to park right next to building. The move will probably take place at the end of January and we will do a general membership mailing soon to inform you of the new address as well as new phone and fax numbers.

In closing, I wish you, your families and your stuff a terrific 1994!
The FCC recently proposed regulations designed to aid in preventing and detecting toll fraud, including the unauthorized use of PBXs, payphones, and cellular phones. The proposed regulations also address who should pay the toll fraud costs once the fraud occurs—telephone customers, equipment owners, equipment manufacturers, or the telephone companies.

The FCC has requested that comments on these regulations be formally submitted by Jan. 14, 1994.

**PBX-based fraud**

To attack PBX-based fraud, the FCC suggests prevention and detection.

To help prevent toll fraud, the FCC could require equipment manufacturers to warn customers regarding the potential for toll fraud associated with the use of their equipment.

PBX fraud occurs when a caller obtains unauthorized remote access to a PBX, and uses the PBX to route the call back out to the telephone network to make long distance or international telephone calls. The caller may pay for the call to the PBX (which may be a local or toll-free call), but the PBX owner may be charged for the long distance or international call routed out to the telephone network from the PBX.

These remote access calls may require use of special codes to obtain remote access to the PBX’s services. PBX fraud is often associated with PBXs that have default codes that have never been changed by the PBX owners. The FCC suggests requiring the PBX manufacturers to fully explain these codes, and explain the risks of not modifying the default codes.

To help detect toll fraud, the FCC suggests using PBX toll fraud monitoring services offered by the telephone companies. For example, MCI and AT&T offer equipment-based toll fraud protection programs.

The FCC is requesting comment on whether these programs include sufficient features on customer education, fraud detection equipment, traffic analysis, third party insurance, and real-time monitoring and detection. The FCC also is requesting comment on whether all inter-exchange carriers (IXCs) and local exchange carriers (LECs) should be required to offer customers similar monitoring services that would help protect customers from PBX-based fraud. Should such monitoring services be part of the basic IXC service offering, or be separate?

Furthermore, the FCC asks how the costs of PBX-based toll fraud should be apportioned among PBX owners, PBX manufacturers, and telephone companies, and whether residential customers should bear the burden of business fraud by paying higher rates.

**Payphone fraud**

Earlier this year, Florida adopted regulations that release pay telephone providers from liability for charges resulting from certain types of fraudulent calls if the pay telephone provider purchases call screening services for the line. Call screening services, such as originating line screening and billed number screening, indicate the billing restrictions on lines to which a caller wants to bill the call. Thus, with call screening services available, an operator service provider may be able to determine that a call should not be billed as requested by the caller, and therefore may be able to prevent toll fraud.

**Developing Customer Profiles**

Local exchange carriers may be able to detect spikes in interstate toll calling, and take steps to contact the telephone subscriber to determine whether such increased usage is fraudulent. For example, a LEC may be able to detect calls in a one-day period that greatly exceed a customer’s

Continued on next page
average usage. If such usage is fraudulent, the carrier may be able to assist the customer with stopping the fraudulent usage.

Even more comprehensive toll fraud detection could be possible if IXCs were required to give local exchange carriers information concerning the calling number and called number for interexchange calls involving third party billing, collect calls, or LEC joint use calling cards. With such information, the LECs could develop customer usage profiles and detect possible fraudulent calling that is spread over longer time periods. For example, a LEC may be able to use the additional information from IXCs to detect calls to geographic regions to which the customer does not call, and alert the customer when such calls occur.

Should such additional information be exchanged between IXCs and LECs so that customer profiles could be developed to aid in detecting toll fraud? The FCC is asking how the ability of local exchange carriers to develop such profiles should affect any allocation of toll fraud costs, and whether carriers should be permitted to charge for this service.

Cellular fraud

Cellular fraud includes subscription fraud and stolen phone fraud. Subscription fraud occurs when someone subscribes to cellular service with fraudulent information or false identification and has no intention to pay for the service. Stolen phone fraud occurs when there is unauthorized use of a phone stolen from a legitimate customer before that customer can report the theft.

Are regulations similar to those proposed for PBX fraud applicable to cellular fraud? That is, would manufacturers' warnings and telephone company-provided monitoring services be useful for preventing or detecting cellular fraud?

In a separate proceeding, the FCC already is addressing access fraud, which involves tampering with a cellular phone's electronic serial number or mobile identification. Such tampering allows a cellular phone to be used to make calls without the caller having subscribed to the cellular service.

Opportunity to comment

The FCC's request for comment on the proposed toll fraud regulations represents a unique opportunity for telecommunications administrators to provide input that will help shape the regulations which will govern the steps that may be taken by telephone companies, equipment manufacturers, equipment owners, and telephone customers to prevent and detect toll fraud. It also represents an opportunity to address who should pay for toll fraud costs—telephone companies, equipment manufacturers, equipment owners, or telephone customers.

Kudos for Kenyon's Internet workbook

Scott Siddall
Kenyon College

The library and computing staffs of Kenyon College collaborated in preparing and presenting a week-long information resources institute in the summer of 1993, and along the way, won a national award for the institute's workbook.

The workbook, a training document meant to guide faculty exploration of academic resources such as the Internet, won top honors in the documentation competition sponsored by the Association of Computing Machinery's Special Interest Group in University and College Computing Services. The workbook followed the institute's schedule and included explanations, exercises, and resource lists, and gave the participants something tangible to review and reference after the week-long institute.

Since the institute, people have used the workbook as a self-paced guide to new technologies. With emphasis on the Internet, the workbook includes sections on traditional library resources, multimedia, government documents, and slide collections. Each section is carefully delineated to offset each topic and subtopic, with ample room for marginal comments by the user.

Currently out of print, the 200-page document is now being revised for the 1994 edition of the Institute, sponsored by the Pew Charitable Trusts. This new edition will be available in April or May through Kenyon's campus-wide information system, a gopher called KCInfo (gopher.kenyon.edu).

Cable problem solved

From the TOA Constrictor, SUNY Health Science Center in Syracuse, an installation tip from Linda Bogden-Stubbs, Director of Telecomm.: When new cabling is required, many institutions are pulling two cables to each jack, one for voice and one for data. If multiple cable runs are required, cable can tangle easily and take up a lot of room in the ceiling/raceway/cable tray, etc.

Siamese cable is a new type of cable that can help with some of these problems. Composed of two cables (one voice and one data) in a common sheath or two separate cables that are bonded together, it can be ordered with different wire category combinations; i.e., voice cable category three and data cable category four, or four and four, or four and five, etc.

The cable is easier to pull since there are not as many individual pieces of cable that can get tangled; it takes up less room; and you never have leftover boxes of cable of different lengths.
Continued from page 1

main campus has over 150 buildings, including housing for some 3,500 students. In addition, the Foothills Research Campus of several thousand acres is located three miles west at the base of the Rocky Mountains, and two agronomy farm sites are located on the plains northeast and southeast of Fort Collins.

The CSU Police Department (CSUPD) is responsible for answering emergency calls from CSU lines and providing police services for the campuses. Fire and ambulance emergency calls are logged into the CSUPD Computer Aided Dispatch (CAD) system (shared with and owned by Fort Collins), and are automatically dispatched to Poudre Fire Authority which serves Fort Collins and surrounding rural areas.

The telephone service for the 9,000 working lines on the main campus is provided through an SL-100 PBX manufactured by Northern Telecom and is very similar to the DMS-100 central office. CSU is assigned blocks of 12,200 DID telephone numbers which span portions of two telephone prefixes. In addition, three small AT&T System 75 PBXs are trunked to the SL-100 PBX and serve 500 lines at the Veterinary Teaching Hospital, 200 lines at Facilities Services, and 100 lines at Housing Services—all located on the main campus. Two SL-100 remote switches, located at the Foothills Research Campus, provide service to 600 telephones and are hosted by the main campus PBX so that all three SL-100 sites operate as one integrated system. The southeast agronomy farm receives service directly from US West. The northeast farm receives off-premises extension (OPX) phone service from the main SL-100 PBX via US West circuits. Regardless of the CSU caller’s location—on or off campus, served by the PBX or directly from US West—911 calls are routed and identified so as to provide the most expedient emergency service using US West Public Safety Group’s PS/ALI.

During the summer of 1993, E911 was placed into service in Larimer County with PSAPs located in Fort Collins, Loveland, Estes Park, and Berthoud. The CSU Police Department PSAP was subsequently activated November 1993. (Previous to E911, CSU emergency calls were taken on a key phone at CSUPD to which on-campus 911 calls were routed.)

CSU is the first PS/ALI customer in Colorado, although PS/ALI was already operational in other US West states. The E911 Tandem Switch is centrally located in Colorado at the Denver Capitol Hill 1AES central office 60 miles south, and serves the Denver metro E911 areas as well as our Larimer County area and several others. The ALI database is also located in the Denver area. The CSUPD PSAP equipment is owned by the University. US West installed it and provides ongoing maintenance to all the circuit packs contained within the PSAP cabinets. As all PSAPs in Larimer County including CSUPD are connected to the same E911 Tandem, a pre-arranged alternate PSAP automatically accepts calls for a primary PSAP if all their circuits are busy or out of service.

Several discrete circuits, when combined, are the building blocks upon which E911 operates: In CSU’s case, two trunks are routed over diverse US West T-Carrier systems from the SL-100 PBX to the Denver E911 Tandem. Then, from the E911 Tandem to the CSUPD PSAP three trunks are provisioned. (There is one more trunk in this group as some CSU locations are not served by the PBX.) Two redundant, non-switched, private-line data circuits route from the PSAP to the ALI database for performing ALI queries. In addition, a trunk group “make busy” circuit is provided between the Denver E911 Tandem and the CSUPD PSAP. When this circuit is enabled (loop closure) by the PSAP, calls normally routed to the CSUPD PSAP are redirected to an alternate PSAP located at the Fort Collins Police Department/Poudre Fire Authority dispatch center.

Planning

Colorado State, represented by the Police and Telecommunications Departments, is a member of the Larimer Emergency Telecommunication Authority (LETA) whose membership also consists of the towns of Berthoud, Estes Park, Fort Collins, and Loveland; associated fire and ambulance districts; and the Larimer County Sheriff. LETA members worked closely with US West Public Safety Group to plan and implement E911. The prerequisite street addresses were mostly assigned two decades ago, except on the CSU campus. Therefore, CSU buildings were assigned street addresses. Yet to be completed, however, was verification of the spelling of all street names, and identifying and creating the individual emergency services zones within which all telephone customers are served by a unique but identical set of police, fire, and ambulance jurisdictions. The Master Street Address Guide (MSAG) is the resulting document that determines, based on street and house number, within which emergency zone a telephone is located. Later, the emergency zone is represented by the Emergency Services Number (ESN) employed by the E911 Tandem Switch to route and transfer calls to the correct PSAPs.

ALI Database Input

CSU Telecommunications purchased an Intel 80486-based PC with an MS-DOS Operating System and loaded the PS/ALI database software provided by US West Public Safety Group. The contiguous blocks of 12,200 DID telephone numbers assigned to CSU were entered into the PC ALI database and subsequently each of the
working DID numbers was loaded with its location (street address, building, and room number) by a telecom staff member who also worked on the MSAG. The PC database populating task was performed during the summer of 1993, and was uploaded by dial-up modem connection into the US West E911 database.

**SL-100 PBX Database and Trunking**

In the SL-100 PBX translations tables (database), a Trunk Group named E911 with two trunk members was implemented with Operator Services-type signalling that transmits the called and calling telephone numbers when setting up the connection to the E911 Tandem. In addition, we initially datafiled the PBX’s routing tables so that the digits 211—our test code for E911 pretesting—would route through the new Trunk Group like the digits 911 would eventually route (only the digits 11 are transmitted in either case).

All of the SL-100 trunking is provided through T-Carrier interfaces. To provide adequate route diversity, each E911 trunk was assigned to a different SL-100 Digital Trunk Controller’s (DTC) T-Carrier span and channel. (The T-Carrier systems already existed and their channels were partially assigned as Foreign Exchange lines for Denver- and Greeley-bound calls.) The T-Carrier spans are de-multiplexed and converted from digital to individual analog lines in CSU-owned Northern Telecom DE-4E Channel Banks adjacent to the SL-100 switch. The now analog (2-wire, Loop-Start, Reverse Battery) E911 trunks meet US West at our Demarcation Point of Presence in the switchroom. US West transports the trunks the remaining 60-mile distance to the Denver Capitol Hill E911 Tandem over diverse T-Carrier systems.

In the PSAP direction, US West again transports the trunks from the E911 Tandem to the appropriate PSAP—usually the CSUPD in our case. Two distinctly separate groups of trunks exist: one from the PBX to the E911 Tandem, and one from the Tandem to the PSAP. One trunk is selected from each group and both are connected “in tandem” to provide one talking path between the 911 caller and the PSAP, via the E911 Tandem.

**Pre-Testing**

Once all trunk circuits were installed and individually manually tested, and the PSAP at CSUPD was in place and functioning with datalinks to the ALI database, pre-testing of the entire system end-to-end could commence. Testing was primarily accomplished by CSU police officers on their rounds and telecom technicians repairing customer sets. They simply dialed the test code 211 and insured that the CSUPD PSAP answered and the calling telephone number and ALI were correct.

**Other Issues or Difficulties**

E911 PS/ALI users should ask their LEC to double check that each redundant trunk or data circuit is routed over diverse carrier routes. We found both of our PBX-to-E911 Tandem trunks originally assigned in the same T-Carrier system. If this one T-Carrier were to have failed, CSU would have lost all E911 service.

As a fail-safe plan, if both trunks to the Denver E911 Tandem should be busy or failing, we have prearranged to route 911 calls directly to a phone at the CSUPD. No E911 ANI/ALI or Call Transfer to another PSAP features will be available, but calls will complete to a 911 dispatcher.

The AT&T System 75 PBXs do not provide ANI or Operator Services-type signalling. The only call routes in and out of these PBXs are via the SL-100 PBX over two-way Wink Start/DTMF Trunk Groups on T-1 Carrier lines. These Trunk Groups’ translations in the SL-100 specify a billing telephone number to which incoming calls from the specific System 75 should bill. CSU doesn’t use the Billing Number for Station Message Detail Recording billing. However, the Billing Number is outpulsed over the E911 trunk as the ANI number, and displays at the PSAP as the general location (ALI) of the System 75 PBX.

We also route 9-911 and 8-911 to the PSAP to accommodate those users who mistakenly believe that 911 is an off-campus call.

**Conclusion**

Colorado State University is now providing its telephone users with Enhanced 911 Emergency Service, achieving a level of calling number and location identification previously unobtainable by PBX extensions. In the highly transient population of CSU students and summer conference who may be unaware of their specific location, US West Public Safety Group’s E911 Private Switch/Auto-matic Location Identification service provides a good technical solution to a potentially lethal problem.
SSHEnet is just one of the telecommunications technologies Kutztown University students explore.

countries worldwide. SSHEnet also enhances support of educational and business development partnerships by providing access to the Pennsylvania Research and Economic Partnership Network (PREPnet), which connects businesses and universities throughout Pennsylvania.

The power of such a network cannot be overestimated. Networks like SSHEnet are academic tools—a necessary part of instruction in the 1990s. Partnerships involving schools, colleges, and businesses can't fulfill their potential without state-of-the-art informational infrastructure. SSHEnet, which can link classrooms around the state to a single instructor, may be one of the few ways to maintain educational resources while revenues decline.

Choosing a network partner

Our first challenge was finding a vendor to provide one-stop shopping and a single-point of contact, as well as meet tight budget guidelines. After a rigorous bidding process, we chose a team from Bell Atlantic, consisting of Bell Atlantic Network Integration and Bell of Pennsylvania.

A true partner, they handled every part of the project, including systems analysis to determine each university's readiness to link to SSHEnet; physical design of SSHEnet; wiring and circuit locating; cost analysis and configuration modeling. Through this design and testing process, they developed a robust architecture that provides multimedia connectivity.

Wide area connectivity offers possibilities

By implementing basic connectivity, the State System hoped to motivate each university to build local area networks that would easily connect to SSHEnet. Because of the variety of computing environments at each of the universities and the wide array of applications, Bell Atlantic designed a router-based network solution using TCP/IP as the primary communications protocol.

To provide this basic connection cost effectively while planning for future upgrades, Bell Atlantic based SSHEnet on a combination of T1 and 56 kilobits-per-second services, which runs on the Commonwealth of Pennsylvania's intelligent multiplexer (IMUX) network facilities. The IMUX network is a private line leased by the commonwealth at a discount from Bell of Pennsylvania.

The cost of running SSHEnet on the IMUX network is nominal for each university because they share the expense with other sites. In fact, the State System is actually saving about $33,000 by reducing expenses on multiple circuits and unnecessary duplication of equipment. Each university also saves thousands of dollars by sharing resources with other schools, such as software, instructional material found on the network, and joint network maintenance contracts.

SSHEnet's installation began in November 1991 and was completed and accessible to the universities in early 1993. Today, approximately 48,000 students and 2,500 faculty members in the State System are able to access a variety of services over SSHEnet, and as soon as every university in the system completes their campus LAN connections, all 98,600 students and 5,500 faculty will have access to SSHEnet's services.

Some of the more popular services accessed through SSHEnet include: electronic mail; library services; gateways to other networks, such as the Pennsylvania Higher Education Assistance Agency; connectivity to a variety of external services, such as Compuserve, Lexis, WESTLAW, Dialog, ON-Line Computer Library Center, Prodigy, Internet, and PREPnet; data file transfer; academic support, including conferencing and bulletin board systems. In addition, the university administrators are now able to electronically transfer personnel and payroll data to the central system located at Millersville University of Pennsylvania.

Professors can communicate with colleagues worldwide to keep pace with developments in their fields, or access presentations, math exercises, or any kind of classroom materials quickly and easily. Students can peruse the card catalog or reserve a book at any library in the state system, or electronically transmit a term paper to a professor's office.

Lock Haven University recently completed a campus LAN in all 25 of its buildings. "SSHEnet has allowed us to connect to vast networks like the Internet, which allows us to do extraordinary things, such as receiving e-mail from colleagues in Siberia, accessing books on-line from the Library of Congress or subscribing to electronic academic journals," said Robert Little, computing center director at Lock Haven. "The information available through SSHEnet has added a new dimension to the way we think and work."

Future applications

Future plans for using SSHEnet include distance learning, which would allow students in remote areas to connect with any professor located in the state system. Eventually financial aid information, electronic transcripting, and even entire textbooks will be accessible over SSHEnet.

Ken Patton, a Lock Haven University student, best summarized the impact of SSHEnet in a recent student newsletter. "With telecommunications networks like SSHEnet, the traditional paradigm of 'school' as a physical place is quickly fading. We no longer learn on isolated islands; we swim in an ocean of thought."
Cruising the information superhighway

Rae Stevens
Manager, Telephone Services
Southeast Missouri State University

Bell Atlantic and TCI have merged to make you a "viewer-doer." For the first time, a single company will possess most of the necessary infrastructure, technologies, programs, and skills to develop and deliver interactive video services to homes and businesses.

Bell Laboratories startled the television world last year with the idea that hundreds of cable channels could be created by using sophisticated compression of digital television signals. Bell Atlantic has invested heavily in high capacity fiber and advanced switches to make them one of the most sophisticated of the big regional telephone companies born from the breakup of AT&T. The company began to develop new technology, including the ability to send digitized VCR-quality video on ordinary copper wires.

These capabilities do not exist in any cable company or in any telephone company. The coaxial cables that carry television signals into more than 60 percent of the nation's homes have immense information-carrying capacity, but these systems were never designed to allow a customer to ask for a film or retrieve a piece of information—which is the key requirement of interaction. By contrast, switching is the heart of all telephone companies. Although the backbone of telephone networks is high-capacity optical fiber, the final link to homes and many businesses is still a pair of copper wires, which can transport much less data than either fiber or coaxial lines.

The technical prospect of marrying the phone company's switching abilities to the cable company's big data pipes is the synergy expected from the merger. One reason cable companies and telephone companies are merging is because while cable firms know television, telephone companies are experts on interactivity, or two-way communications services.

What does it all mean for us as we approach the 21st Century? Interactive television lets viewers order movies, shop from televised catalogs, play games with other subscribers, or do research for school papers. Video on demand will be sent by cable, optical fiber, wireless transmission, or copper wires. All kinds of activities that now require someone to go somewhere, make a telephone call, or write a letter can be moved to your screen.

The map is accurate and we're getting good directions, what's going to be on TV once the futuristic, high-tech, interactive, multimedia network construction is completed?

- Alfred Hitchcock's Rear Window, offering you a selection of 14 different windows to peep through.
- A game show where you're the contestant and the host scolds you by name when your response is not a "good answer."
- Music videos that let you stroll into a recording studio, open all the doors and listen to a dozen musicians jamming. Clicking on your mouse, you can mix and match the musicians you want to hear. Or request pictures and sound bites from offbeat international instruments, such as an Egyptian drum.
- An interactive shopping system.
- Pizza delivery without even a phone call.

But watch out—there will be casualties as the superhighway roars through Mayberry. With 500-channel cable TV systems, many of the new features may prove too difficult for many customers. Many Americans already feel isolated. Our neighbors are often strangers, and we have no sense of shared community. We miss the human connection. The new technology is geared to an audience of people who live one-by-one in front of their own separate electronic hearth. So before you get behind the wheel, buckle up!

We may expect governmental restraints to cripple progress. For years, critics in Congress and elsewhere have waited for the day when phone companies might challenge the local cable monopoly, while others have looked to cable entrepreneurs to undercut the Bells' cozy hold on phone service. Now, critics contend, it is as if the two biggest guys in the schoolyard have teamed up rather than fight it out. Will our highway be patrolled by FCC regulators who are looking forward to competition in the '90s, not backward to monopoly '50s style?

The technology is definitely here. Cox Enterprises places the first phone call carried by radio and a cable television network. Bell Atlantic prepares to deliver television over its existing telephone lines. Motorola and Apple join forces to develop wireless, hand-held personal communicators. Direct broadcast satellite will offer wireless cable, replacing microwave radio. Microwave towers are being replaced with fiber-optic glass.

Just as the automobile replaced the horse, so the superhighway will replace televisions and telephones as we know them today. What can you do? Go interactive! Jump on the superhighway to information! Get your red hot movies! Shop till you drop! It's sure to be a driving experience like never before.
Electronic news sources

Forget rustling the pages as you read Communications Week and more than a dozen other business publications including, eventually, the Wall Street Journal. Individual Inc., a Cambridge, Massachusetts-based supplier of information services, announced early in December that CMP Publications Inc. newspapers and magazines will be available over its First! and HeadsUp news services. Beginning next fall, unconfirmed reports say that the Journal will be available in interactive electronic form. At about the same time, Dow Jones is also expected to launch an on-screen service called Personal Journal to deliver selected stories to customers.

Shop at home

TV shopping is barely causing a ripple in the shopping pool. According to a USA Today/Gallup poll, 87% of shoppers say it is not at all likely that they will do their holiday buying via TV this season. 23% avoid TV shopping because you can't touch or try on merchandise.

Enter Apple Computer, who distributed CD-ROMs to 22,000 homes and 8,000 businesses in December. The pilot project, with partners General Motors and Redgate Communications Corp., will allow users to browse through catalogs on screen, ordering—over a single toll-free number—from such catalogers as Lands’ End and Patagonia.

Users may also specify personal preferences, asking the computer to display anything from dinnerware to children’s socks. The computer would then list products available from the various catalogs. “If the CD-ROM shopping service succeeds,” according to Mr. Franzese from Apple, “it will be relatively easy to convert the technology to deliver the service over cable, phone lines, and other media that may become the ‘information highways’ of the future.”

Talked to your computer lately?

If you don’t take Communications Week, or if you missed “Rash’s Judgment” in the Nov. 15 issue, you might be interested in his experience at the IBM continuous-speech lab in Gaithersburg, MD. Sitting in front of a computer, he spoke into a microphone. “Do you have a map of the city?” The machine instantly translated the phrase into Spanish. When he spoke in Spanish, it rendered a perfect translation into English. But there’s more.

“I want to fly from Washington Dulles to Los Angeles on Tuesday,” Rash told the computer. Immediately, the machine showed flights from Dulles to LA for the next Tuesday. “In the morning,” he added. The computer eliminated all the afternoon flights.

“What IBM has done is create an application that anyone can run and will add true speech recognition. With the other tools that IBM is developing, it has the potential of eliminating the keyboard as a barrier to computer use, and syntax as a barrier to learning. In short, IBM has developed a computer that can understand what we say.”

Electronic Yellow Pages

From Investor’s Business Daily via Edupage, we learn that Nynex will put its Yellow Pages on the Prodigy network. Users will be able to scan listings and display ads, receive color photo images and pricing information on products, and check out restaurant menus and decor.

From Radiation to Rays

Couch potatoes and indoor horticulturists, take note: According to Telecommunications Policy Review (12/5/93 p.10) Samsung will begin marketing a “Bio-TV” next year that turns harmful electromagnetic radiation into ultraviolet and infrared rays, capable of making plants bloom and grow.

ACUTA Calendar

- Spring Seminar •
  Baltimore, MD
  April 24-27, 1994
  HOTEL: Hyatt Regency on the Inner Harbor
  TOPICS: Hot Management Topics
  • Campus Cable TV

- Fall Seminar •
  Richmond, VA
  Oct. 16-19, 1994
  HOTEL: Hyatt Richmond
  TOPICS: Network Planning & Management
  • Student Services

- ANNUAL CONFERENCE •
  Anaheim, CA
  July 31–Aug. 4, 1994
  HOTEL: Anaheim Hilton
  TOPICS: Management; Regulatory Issues; Professional Growth; Voice, Data & Video; more

- Winter Seminar •
  Maui, Hawaii
  January 17–21, 1995
  HOTEL: Inter-Continental Resort
  TOPIC: • To be announced
ACUTA staff donates to Mountain of Love

Do we draw names? How much should we spend? Should we get together after office hours? Should we bring our spouses?

We studied the issues (made a list and checked it twice) and failed to get too excited about any of the possibilities. We were all busy. Our spouses were busy. Finding a date convenient to all was impossible.

Then someone—was it Kellie? Lisa?—said, "Why don't we take the money we would spend on a gift for each other and buy groceries for the Mountain of Love?"

It worked! We decided right then to forego the traditional name-drawing gift exchange for something more meaningful and significant. Much more in keeping with the spirit of the season!

So on December 14, we brought in our bags of groceries and set them beneath the tree. At noon, we trekked like good little elves over to Turfland Mall to the Mountain of Love and added tuna, green beans, corn, baby food, and more to the pile of canned and boxed goods already accumulated.

The Mountain of Love is sponsored by local TV station WLEX, Randalls Grocery, and Turfland Mall. For each of the past 20 years the Salvation Army has distributed the goods collected over several weeks to some 2,000 needy families in the Lexington area.

We hope all of you had a wonderful holiday and enjoy a prosperous New Year!

Update your directory

Since publishing the latest edition of the ACUTA membership directory, the office has received a number of corrections to the listings of our members. We will print corrections in the newsletter as space permits. We encourage everyone to check your listing and be sure we have the correct information for your school or company. The back page of the directory is a Change of Information form which you may remove or copy, complete, and send to Kellie Bowman, Membership Services Coordinator.

- Diamonds indicating corporate representatives were omitted from most of the bronze members and all of the copper. Apologies. The first name shown is the official corporate representative.
- For Babson College on pages 18 and 98, replace Marie Fandel's name with Karen Mesmer who is Manager, Telecom Services. On page 50, remove Marie's name and on page 72 add the information for Karen including phone 617/239-4285, fax 617/239-5614, and e-mail mesmer@babson.edu.
- Telco Research Corp. has a new address. On page 32 you'll find 5 names who appear in the individual listing. Change address entries for all five to: 616 Marriott Drive, Suite 500, Nashville, TN 37214. New phone is 600/488-3526 or 615/872-9000. Fax is 615/231-6144.
- Tom Bibbey, Northwest College, has a new e-mail address: tom@adm.nwc.whccn.edu. (pg. 37)
- Keith Frank, Univ. of Oklahoma, has a new address, 5310 E. 31st St., Suite 200, Tulsa 74135-5067 and new fax, 918/838-4706. (pg. 52)

- Drake University (2507 University Ave., Des Moines, IA 50311-4505) is naming two additional representatives: Wendy Hansen, Telecom Specialist, ph. 515/271-4517, e-mail wh6821s@acad.drake.edu; and Valerie Kottke-Cole, Telecom Coordinator, ph. 515/271-4590. Fax for both is 515/271-4800. Add Wendy to page 56 and Valerie to 65.
- Tom Hart is no longer with Wentworth Inst. of Technology. Delete references on pages 57 and 30.
- Mark Henry, Stephen F. Austin State Univ., has a new box. Change 13012 to 6095 on page 58.
- Sheryl House at Metropolitan Community Colleges has a new phone number: 816/759-1122. (pg. 59)
- Sharon Lunsford, No. Carolina Agric. & Tech. State Univ., has a new area code. Change 919 to 910 on page 68.
- Dr. John Lyons is currently Vice President for Planning & Info Mgmt. at Univ. of Alabama, and his address should include AB Rm 420. Change the zip-plus 4 to 35294-0104. (pg. 68)
- From the Univ. of Arizona (pg. 80), Larry Rapagnani's room number should be 204. Phone is 602/621-6666 and fax, 602/621-8668. E-mail address drops dirnet.cct.
- Terry Robb, Univ. of Missouri, adds an e-mail address (pg. 82): mtterry@muccmail.missouri.edu.
- For Jane Tederman, Univ. of Portland (pg. 90): New title, Director of Computing and Telecommunications; new phone, 503/283-7300; new fax 503/283-7345; new e-mail, tederman@uopfor.edu.
- Maurice J. L'italien, Pima Community College, is listed under Individual Listing and Institutional Membership, but should be added to Region 4 on page 113.
Position Available

Product Manager—Education Services
Ameritech

Responsibilities: Develop mkt strategy for Ameritech's higher ed team, identify new product/service opportunities, represent Ameritech with policy-making bodies to influence information system and communications decision making.

Requirements: Min. 10 years exp in applications of info. & communications tech. in higher ed; proven leadership skills; exc. personal communications skills; exp in mkt or sales a plus. PhD or MS in Ed Tech or related fields preferred.

Salary: Competitive salary & top benefits.

Application: Send resume with salary history in confidence to: Education Services, 2000 W. Ameritech Center Dr., #4E270, Hoffman Estates, IL 60196. AA/EOE

Deadline: February 18, 1994

Position Available

Executive Director of Communications Technologies
Delta College

Delta College is seeking a creative, energetic team builder to fill executive level position which reports to the President.

Requirements: Masters Deg. in telecom or related field. Extensive, progressively responsible experience in one of the voice, video, or data areas. Demonstrated leadership in the merging of technologies & people who manage them in a team spirit, providing the organization with a strategic advantage. Demonstrated knowledge of public broadcasting.

Application: Letter of application, resumé, & names, addresses, & phone numbers to: Carl M. Gilmore, Asst. Vice Pres. for Auxiliary Services, SUNY, P.O. Box 6000, Couper Admin. Bldg. AD-614, Binghamton, NY 13902-6000.

Deadline: February 18, 1994

AA/EOE

Position Available

Director of Telecommunications
Binghamton College

Responsibilities: Manages, operates, & maintains 5,000+ lines, Northern Telecom SL1-XL system serving academic/administrative departments & student residences.

Requirements: Bachelor's deg. in business admin., engineering, or related field; 5 yrs. exp. with on-site PBX. Excellent technical, analytical, written, & oral communications skills; leadership & supervisory skills.

Application: Letter of application, resumé, & names, addresses, & phone numbers of 3 refs to: Carl M. Gilmore, Asst. Vice Pres. for Auxiliary Services, SUNY, P.O. Box 6000, Couper Admin. Bldg. AD-614, Binghamton, NY 13902-6000.

Deadline: February 18, 1994

AA/EOE

Position Available

PBX Manager
Middle Tennessee State Univ.

Responsibilities: Wide range of managerial & operational assignments pertaining to NEC NEAX 2400 PBX & Auto Attendant. PBX system supports 3900+ installed lines; PBX Mgr. maintains PBX & installed outside plant wiring.

Requirements: B.A./B.S. in related technical field; 5 yrs. of progressively responsible employment in a telecom position requiring advanced skills & knowledge of digital PBX principles & procedures or any equivalent combination of education & exp.

Application: Interested applicants should file: (1) cover letter. Specify job title & position #619020; (2) current resumé; (3) MTSU application—available by calling (615) 898-2928. Mail to: MTSU Employment Office, Cope Admin. Bldg. 215, Murfreesboro, TN 37132.

Deadline: Review of apps begins Jan. 7, continues until position is filled. AA/EOE