

Fall 1999

ACUTA Journal of Telecommunications in Higher Education

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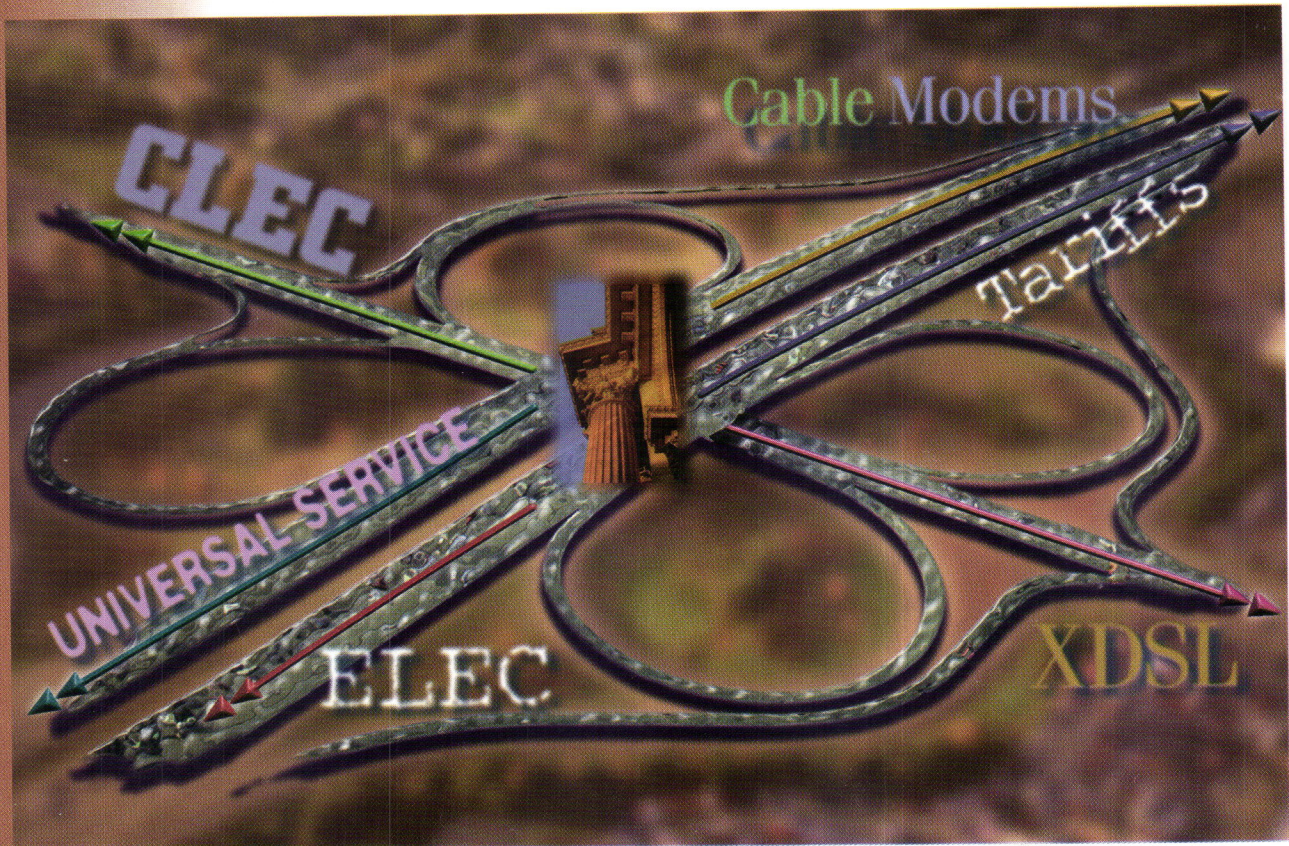


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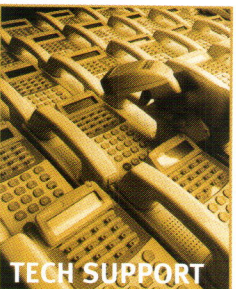
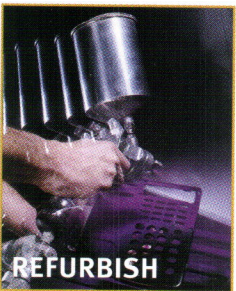
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This Issue: New Opportunities in a Competitive Regulatory Environment



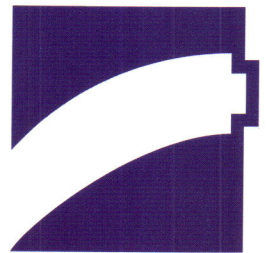
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Marriott City Center

Track I: Customer Service

Track II: New Telecom Technologies

Winter Seminars

January 9–12, 2000

Newport Beach, California

Marriott-Newport Beach

Track I: Legislative and Regulatory Update

Track II: Next Generation Telemangement Issues

Spring Seminars

April 9–12, 2000

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Wyndham Miami Beach Resort

Track I: Wireless and Other Emerging Technologies

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29th Annual Conference

July 30–August 3, 2000

Washington, D.C.

Marriott Wardman Park Hotel

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Where once students revolved around their higher education institution, going from department to department, office to office, class to class to gather their services and curriculum, telecommunications provides the ability to have institutions revolve around their students.

—Marybeth Susman, PhD
Kentucky Commonwealth Virtual University
pg. 24

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152 W. Zandale Dr., Suite 200, Lexington, KY 40503-2486

Phone: 606/278-3338

Fax: 606/278-3268

E-mail: pscott@acuta.org

Publisher, Jeri A. Semer, CAE, ACUTA Executive Director

Editor-in-Chief, Pat Scott, ACUTA Communications Manager

Contributing Editor, Curt Harler

Advertising Sales, L. Kevin Adkins, ACUTA Mgr. of Corp. Relations & Marketing

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contact Kellie Bowman, Membership Development Manager

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FEATURES

8

Points to Ponder When a CLEC Comes Calling

Chris Harrison

Innovative, hungry, and flexible, CLECs present some interesting options for campus telecommunications. But it's a complicated scene, and other players are vying for the roles as well.

15

ELECs, CLECs: New Opportunities for Your Campus?

Perry Eidson

The current legislative and regulatory environment creates new opportunities—and dilemmas—for campus telecommunications. Emory University presents the view from inside the decision-making process.

28

Coping with Unauthorized Charges

The ACUTA Fetzer-Kraus Survey

Last spring, Fetzer-Kraus conducted a survey of ACUTA members regarding the occurrence of unauthorized charges on their monthly bills. Compare your campus to this sample from among our membership.

INTERVIEW

38

Douglas Van Houweling, PhD UCAID

Planners believe that the original Internet backbone will incorporate Internet2 technology and thereby be a much higher performance backbone within the next two to three years. In our recent interview, Doug Van Houweling described the Internet2 project and how it may impact campuses around the world.

20

Washington Writes (and Rewrites) the Rules

Curt Harler

Attendees at ACUTA's 28th Annual Conference speak out about the changing rules for telecom.

32

Cable Management: Control Over Chaos

Larry Foster

With the convergence of voice, video, and data communications technologies, having a coherent implementation, testing, and documentation strategy for the entire communications infrastructure becomes more essential than ever.

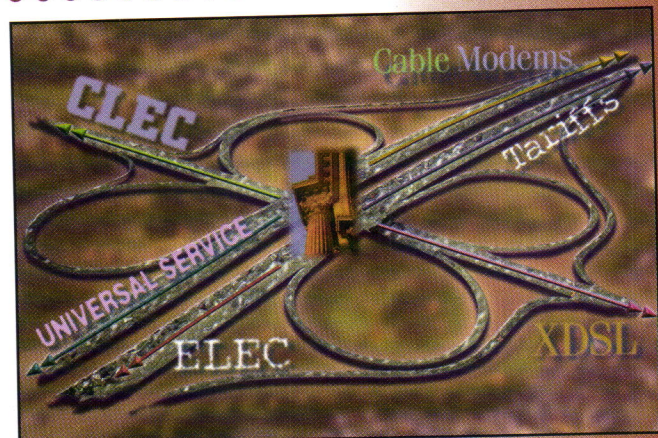
COLUMNS

4

President's Message *Tony Mordosky, Bradley University*

48

From the Executive Director *Jeri A. Semer, CAE*



Focus: New Opportunities in a Competitive Regulatory Environment

24

The Virtual Campus: Reality Check for the 21st Century

Marybeth Susman, PhD

Higher education is in the middle of an orbital shift, and the implications for telecommunications are far-reaching.

43

Institutional Excellence Award: TeleCommunity Center at Central Methodist College

Central Methodist College was honored at ACUTA's 28th Annual Conference for its TeleCommunity Center, a project in which the college partners with Southwestern Bell to provide access to technology for this rural community.



President's Message

Tony Mordosky, Bradley University
ACUTA President 1999-2000

New opportunities in a competitive regulatory environment, voice-over-IP, convergence (of technologies and the organization), a shortage of qualified IT professionals, and innumerable other technological and structural changes confront all of us. These issues and others yet unknown are defining and will continue to define our work environment as telecommunications/IT professionals well into the 21st century. What does this mean to us and our institutions?

The major change for us will be evident in the skill set that is essential for us to do our jobs in

the next millennium. Possibly most important to our career success is that institutions will increasingly emphasize *nontechnical* skills in defining the requirements of our positions.

In an article in *NetworkWorld* (7/26/99) entitled "Your Life in 5 Years," author Julie Bort states, "Thriving in a network job through 2004 and beyond means shifting your skills from mostly technical ones to largely business and strategic ones.... Knowing how to converge services onto a single network and manage bandwidth may make for good conversation, but won't earn you corporate kudos." I contend that this statement is equally true for higher education.

What Are the Critical Skills?

In his presentation at ACUTA's 28th Annual Conference entitled "Critical Challenges of Hiring and Retaining IT Talent," Michael Zastrocky, director of academic strategies for GartnerGroup, made some critical observations and identified some essential skills that we will need in order to survive and thrive in telecommunications/IT within higher education, including the following:

- The current IT shortage is likely to continue well beyond 2003. This shortage will change the way industry and higher education set expectations for and manage their IT resources. One significant result of this shortage will be that "permanent IT staff members will be

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selected for their blend of business and IT management skills," according to Zastrocky.

• In answering the question of what constitutes the ideal IT employee, Zastrocky identified three distinct skill sets: technical, leadership, and business. GartnerGroup suggests that the technical skills are relatively easy to learn compared to the leadership and business skills. Zastrocky observed that progressive IT organizations are already challenging the notion that deep technical knowledge alone characterizes the ideal IT employee.

• The continued shortage of IT talent will change the skill sets that our institutions attempt to maintain in-house. If we look at the typical skills base of the current IT staff in higher education, we should expect a breakdown as follows: 65 percent technical, 20 percent IT management, and 15 percent business management.

GartnerGroup suggests there is an 80 percent probability that by 2003 this breakdown will be: 35 percent technical, 30 percent technology management, and 35 percent business management. Our positions will change from *doers* to *planners*, *consultants*, *managers*, and *middlemen*. We will provide all these functions to our institution's academic and administrative units while we facilitate the acquisition of required IT skills from both internal resources and external suppliers.

Outsourcing and Contracting

One key to how our jobs as IT professionals will change is that our institutions will acquire a significant portion of IT technical skills from external sources. Technical skills needed are constantly changing. Instead of continually retraining in-house technical experts on an ever expanding myriad of hardware and

software, our institutions will expect us to manage external contracts that supply IT technical services on an as-needed basis.

This is not necessarily a radical change from how we operate today. It is common for our institutions to retain consultants for occasional functions/activities (i.e., new network design, software systems implementation). The main change will be that we will handle many more of these functions in this manner. Knowing what are the mission critical functions and identifying how they will be supported now becomes even more essential, especially when that support does not reside on campus.

Shifting the Emphasis

In the shift of emphasis in skills away from the purely technical, GartnerGroup identifies the following management/leadership skills as important: people development, communication, influence, teamwork, and change management. Business assets include industry knowledge, culture, business processes, and knowledge of the institution's customers.

Most of you already have an excellent start on the business skills. To be successful even today, you need to understand the business of higher education, the culture and business processes of your institution, and the needs of your customers. However, too many telecommunications/IT professionals have not developed the leadership skills needed for the 21st century. At the relentlessly accelerating pace of change, leadership skills are becoming your and your institution's most precious asset.

Take a moment to assess your leadership skills. The following abbreviated list includes essential leadership characteristics identified by GartnerGroup and various

publications. How do you rate yourself as a leader?

Sensitivity: Do you recognize and acknowledge the "people needs" of your staff and others?

Integrity: Have you earned the trust of those you manage and others on your campus?

Communication: Can you effectively convey essential information to your staff and campus?

Influence: How effectively do you impact decisions that affect your staff or customers?

Change management: Do you view change as an opportunity or a threat?

Team building: Can you effectively pull together a group of people with a wide variety of interests, abilities, styles, and perspectives to achieve a common objective?

Vision: Can you articulate your vision, a clear goal, for your unit, a project, etc.?

People development: How well do you consistently cultivate the talents and recognize the contributions of your staff?

Listening: Do you encourage free expression of diverse points of view?

Persistence: Are you recognized as an individual who will go the extra mile for an issue you believe is important to your unit or the institution?

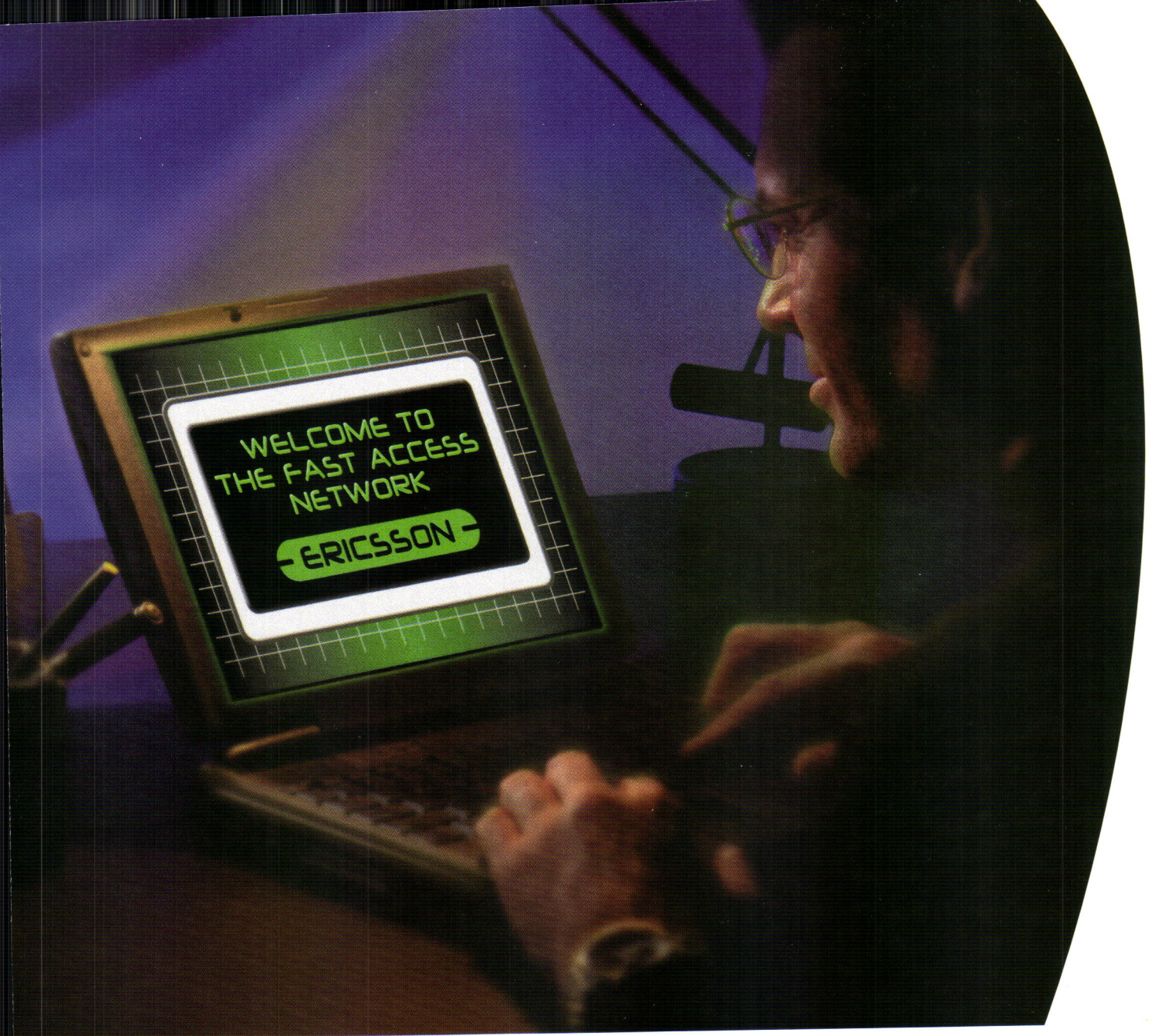
Delegation: Do you turn responsibility for tasks over to others and trust they will succeed?

Leading by example: Do you "walk the talk"?

Courage: Can you make the right decision—even when it is unpopular?

Leadership is what each of us will need to succeed in the 21st century.





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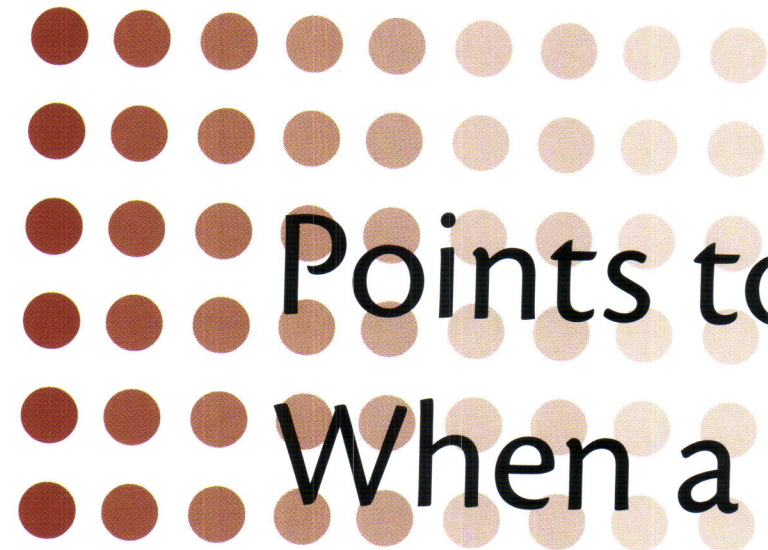
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Points to Ponder When a CLEC Comes Calling

by Chris Harrison

Many ACUTA members hoping to experience the miracle of telecommunications innovation on the carrier side of the telecommunications business look for it to come from CLECs (competitive local exchange carriers). Some who are brave enough to face the regulatory tigers have even considered becoming CLECs themselves.

CLECs—the new kids on the block—have several things going for them as they struggle for a piece of your business. For one, they are hungry. Compared to the former Bell companies and some other long-timers, the CLECs are struggling upstarts. They need to generate traffic to amortize the large investments they have made in plant—which they continue to expand.

Second, CLECs have state-of-the-art equipment in place. The typical CLEC operates almost 100 percent on fiber optics. CLECs usually are free of the imbedded base problem which hampers the incumbent LECs (ILECs) as they strive to upgrade to meet today's needs for voice, data, and video services. The typical CLEC builds its network on IP (Internet protocol), not circuit switching. Given that their infrastructure costs are less, they are able to provide service for less. *This is not your father's phone system.*

The typical CLEC is willing—even eager—to try new things. IXC Communications in Austin, Texas, is testing a new, high-speed, IP-over-cable voice-and-data service in its home area. The project is aimed at providing remote office

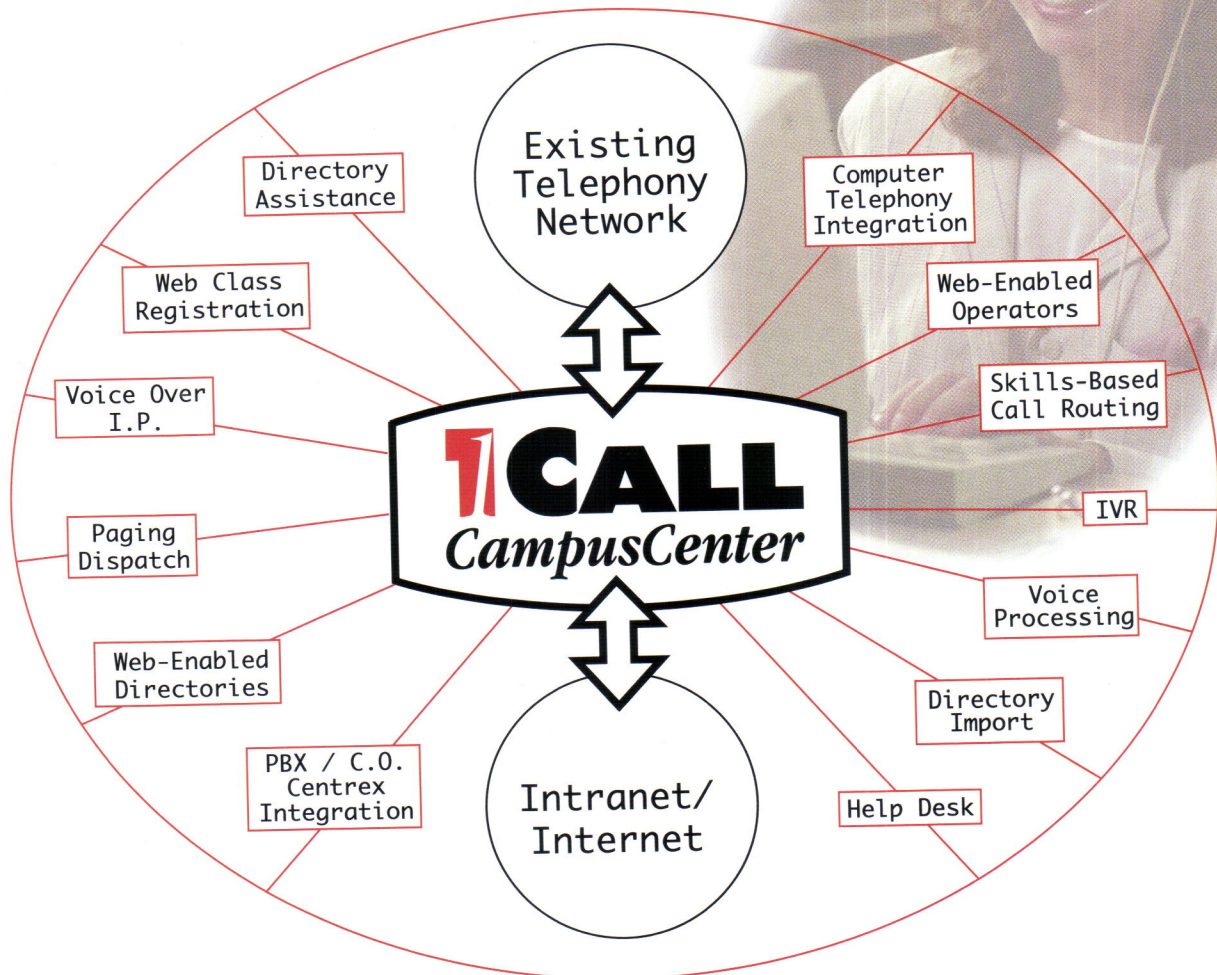
services for virtual private networks. It will give remote workers guaranteed bandwidth for advanced voice and data over a cable modem. But the CLECs need to put some traffic over that fancy IP and fiber-based equipment if they are to show black ink at year's end.

“Our business model allows us to provide quality service at a lower cost,” says David Powers, director of corporate marketing with Level3 in Cambridge, Massachusetts. “We are the low-cost, high-quality provider.” Level3 Communications, headquartered in Louisville, Colorado, is building the first international network optimized for IP technology combining local, long distance, and undersea networks connecting customers end-to-end across the United States and in Europe and Asia. ▶

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Internet technology has clearly emerged as the new standard for moving information. Because it is much more efficient, IP is able to move large amounts of information at much lower cost today, but more importantly, it is improving much faster than traditional telephone technology. IP represents the kind of technological and economic change that occurs only once in a century. As the newly acknowledged communications standard, IP is where entrepreneurs, engineers, and investors worldwide are pouring their energy and capital. In spite of rapid growth of the Internet, data traffic today consumes about 50 percent of the capacity of global networks, but represents only about 10 percent of total telecommunications spending worldwide. Voice traffic still accounts for the remaining 90 percent of spending.

"We believe this economic discontinuity will change over time, but today voice represents most of the revenues," Powers says. Those statistics are simply a result of the fact that a voice "bit" of information is priced at about 15 times a data bit. "Addressing the revenue gap is an important opportunity for our company. And, while IP is now the acknowledged standard for data communications, it is just emerging as the standard for voice," he continues. "That's why so many of our competitors have announced IP-oriented strategies with great fanfare but in reality continue to rely on circuit switching for voice. When you look behind the curtain, they actually have the majority of their people, their revenues, and their energy directed at plain old telephone technology—circuit switching—for voice," Powers says.

Other CLECs see their position much the same way. Quality, in most CLEC corporate offices,

includes high-speed, broadband fiber pipes and a hair-trigger fast reaction to customer inquiries or requests for service. IXC is integrating its nationwide fiber-optic network with high-speed cable modem service from Cablevision of Lake Travis, Texas. It is powered by Softnet's ISP Channel. IXC Communications and ISP Channel are integrating customer cable modems and Cisco Systems IP telephony and router equipment. Trial participants will be able to access corporate e-mail, Internet and intranet traffic, fax, and IP telephony and send or receive data files.

It usually is better to err on the conservative side than to try to balance on the "bleeding edge" of technology.

"The ultimate goal of the field trial is to move remote communications to the next level," says Chris Rothlis, vice president of new product development for IXC Communications. Offering IP telephony service over cable is farsighted but not atypical of CLEC strategy. The company has an OC-48 IP network (called Gemini 2000), and if it is to make a profit, IXC needs to pump up the traffic it carries.

Telco Growth

While they can do little to grab a piece of the on-campus market, the CLECs are more than eager to sell colleges long-haul broadband services, linking locations around a state or on a regional basis. IXCs (interexchange carriers) recorded the largest gains in equipment spending over the past two years. According to figures from the 1999

MultiMedia Telecommunications Market Review and Forecast made by the Telecommunications Industry Association and the MultiMedia Telecommunications Association, spending by IXCs rose from \$2.4 billion in 1996 to \$4.8 billion in 1998, and the IXCs' share increased from 10.1 percent to 16.3 percent. Big budget items included fiber-optic cabling and related equipment like DWDM (dense wave division multiplexers), Sonet/SDH transport equipment, and digital cross-connects. IXCs doubled their spending on ATM and frame relay equipment.

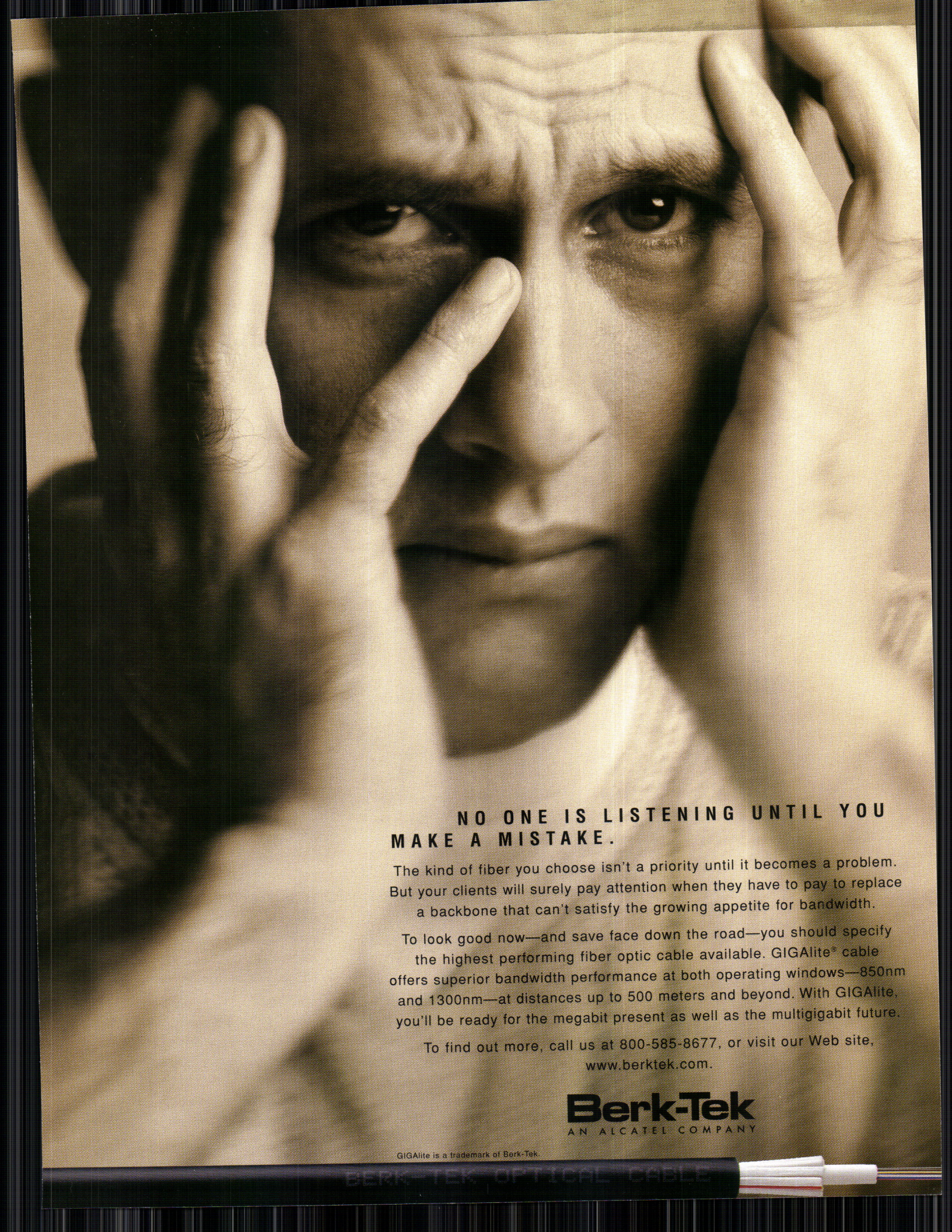
IP Hurdles

Building a network on IP, while great for the data side of the business, presents some major challenges in other areas. People are used to excellent voice quality, and IP still falls short in this area. In fact, there still are some kinks being worked out to assure reliable connectivity to all handsets. One of those challenges is *call setup*. Where a delay of two or three seconds was deemed acceptable a decade or so ago, with the advent of SS7, near-instant call setup has become the norm. People are going to be reluctant to give up that convenience simply to access voice-over-IP (VoIP) services.

There is a need to iron out all of the CLASS (custom local area signaling service) features which people have come to expect. These include caller ID, distinctive ringing, call forwarding, and call waiting features.

On top of that, the network has to provide lifeline services like 911 access and 411 or other directory assistance help. The VoIP networks need to interoperate with the traditional PSTN. This includes T1, E1, PRI, and SS7 access.

None of this is impossible to accomplish. But it does take time, ▶



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money, and equipment. CLECs spent \$3.7 billion on telecom equipment in 1998, representing 12.5 percent of the carrier outlay. Although CLEC spending had jumped 18.6 percent in 1997, it was relatively flat in 1998. The slowdown in spending growth was not indicative of a lack of activity, TIA says. Rather, CLECs were expanding their fiber-optic networks to serve universities, large corporations, and other high-end users. The plunging price of fiber helped to keep spending in check, although the labor costs for actual fiber deployment remain shocking to the uninitiated (splicing is a slow, precise process compared to copper). Termination equipment also is costly. Of the major equipment categories, double-digit gains were recorded for ATM, frame relay, and Sonet equipment.

"These increases reflect the shift in the market toward broadband services and the convergence of voice and data at the enterprise level," TIA says. "We have taken a leadership position in the development of the kind of IP voice service that is indistinguishable from traditional telephone-quality voice service. That means that customers can continue to use their existing telephone equipment and continue to dial telephone numbers as they do today, but their calls will be carried on Level3's IP network," Powers says.

Researchers at Ovum, an independent Burlington, Massachusetts-based research group, agree that strong growth in data communications, fueled by the Internet, is the single most important driver. Other drivers include the development of alternative technologies, regulatory encouragement for access competition, and the increasing importance of mobility.

"The key competitive battleground in telecommunications in

the foreseeable future will be the provision of broadband lines," says Adrian May, a senior analyst at Ovum. "Long gone are the days when operators could differentiate themselves on tariffs alone—today the challenge is to be the first to provide bandwidth at cost-effective prices. This is driving a huge demand for broadband technologies."

Surprisingly modest dollars were invested in VoIP gateways. Only \$100 million was spent in 1998. TIA projects that figure will grow to \$1.3 billion by 2000, and if enterprises like colleges and corporate networks are included, that number could be as much as \$2.5 billion. Look for similar gains in ATM and Sonet investment. Both will grow at double-digit rates through 2002. Carriers are expected to invest \$12.4 billion in Sonet in 2002, twice the \$6.2 billion they spent last year. And ATM equipment spending will more than double, rising from \$1 billion in 1998 to \$2.5 billion by 2002.

Experience Counts

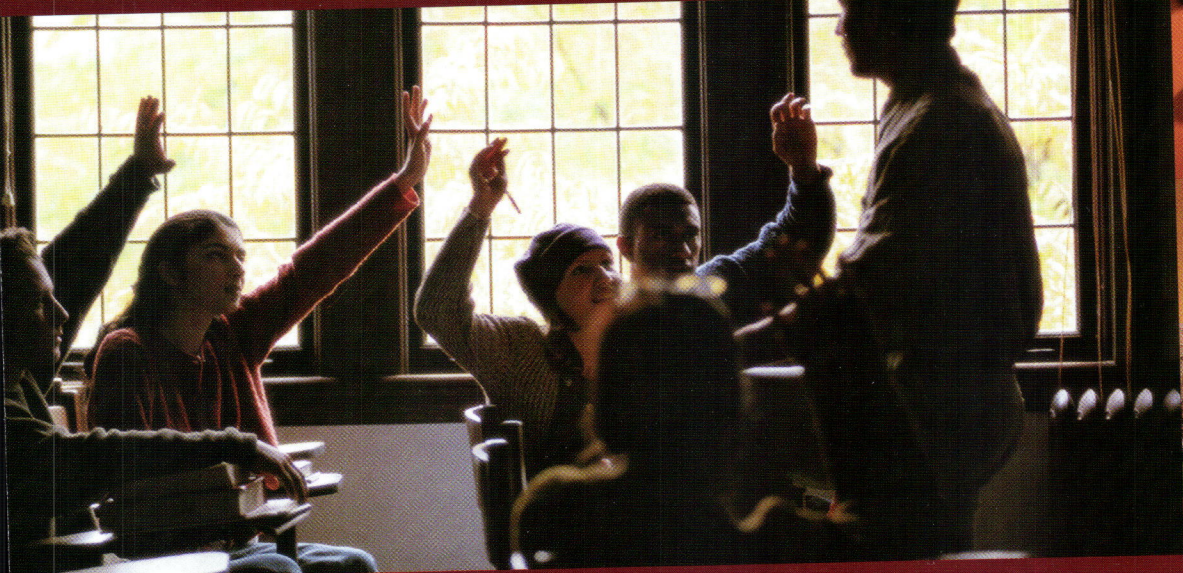
If the successful telecom manager has learned one thing over the decades, it is that it usually is better to err on the conservative side rather than to try to balance on the "bleeding edge" of technology. There is a near-universal fear that the CLECs are operating on "a wing and a prayer," lacking the experience that is required to meet the uptime and bandwidth guarantees that they offer. Whether in a corporate or a university environment, it is much easier to point proudly to delivered 99.9999% uptime, even if it costs a penny or so more a minute, than it is having to rationalize to an irate boss that the telco's penalty adjustment payment will set everything right.

Is that fear unfounded? CLECs do know what they are doing, argues Level3's Powers. "We have said frequently that a major

opportunity—and challenge—for any next-generation communications company such as Level3 is to offer voice service over IP that is of comparable or superior quality to traditional, circuit-switched-based voice services," he says. However, Powers notes, when a company commits to circuit switching, it necessarily buys into an economic structure, a set of skills, and a software infrastructure that is outdated and inefficient. "While we intend to address voice, we do not want to do it by giving up our single biggest advantage, that of basing our business on the economics of the future and not the past," Powers says. "To deal with that issue, we have been working the last 18 months on our IP voice product. Our IP voice service will offer customers voice quality comparable to the traditional telephone network, but with the cost advantages of IP. Our IP voice service is not the kind that is currently offered over Internet networks. All of those services require dialing long strings of numbers, dial-around schemes, and extended setup times, and often result in a call that is of low quality. Our IP voice service will be comparable in quality to that which you now enjoy over the traditional telephone network," he says. That VoIP will be a service that can be used simply by picking up an existing phone and dialing just as you would with any other call. "The key is to connect the signaling and database systems that operate the public telephone system to our IP networks, using what we call softswitch technology," Powers says.

The University of Denver signed up with Denver-based Qwest Communications, one of the biggest CLECs in the country, in the summer of 1998. "Great rates, great customer service, no negative issues whatsoever," Karen Ornelas,

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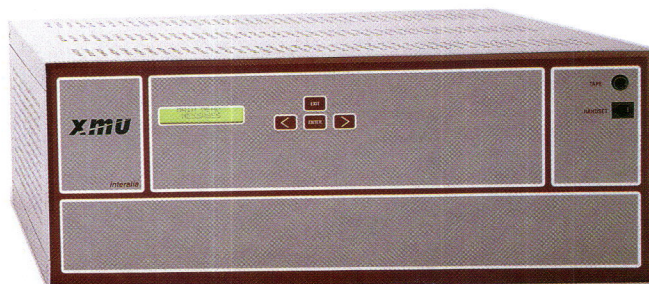
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director of telephone services, posted to the ACUTA listserve. "I highly recommend them."

Perry T. Eidson, telecom technology development specialist at Emory University, was impressed that Qwest was willing to talk to them. "They let us use SS7 to connect to their network, so that proves they are flexible and willing to provide what the customer is interested in," he notes. "Their pricing was very aggressive, and the service seems to be fine," Eidson adds.

More Than a Backbone

Be careful not to think of CLECs as just backbone providers. Many CLECs are not just involved in one phase of the telecom business. ICG Telecom Group in Englewood, Colorado, offers both fiber-optic technologies and satellite services. Its Telecom Group serves as ICG's competitive local exchange carrier and enhanced

services business. It includes CLEC networks in 59 markets, and at last count there were four additional markets under construction. The company's fiber-optic technologies group provides network integration and support services. Satellite services provides maritime telecommunications network and international end-to-end voice and data services, and operates VSAT (very small aperture terminal) private data networks.

Despite the large size of some CLECs, they are still small fry when compared to ILECs. Where CLECs typically deal with tens of thousands of customers, ILECs are used to thinking in terms of tens of millions. Each college has to determine whether the number of customers their CLEC serves presents a problem or an opportunity to be a relatively large fish in a smaller pond.

What Lies Ahead?

In a few years there may be other huge competitive carriers in your future. Germany's Deutsche Telekom and Italy's Telecom Italia recently entered into negotiations for a merger, a deal worth nearly \$65 billion that would have created the world's largest phone company. Although negotiations have apparently ended, other alliances like this could become competitive carriers in the U.S. market.

It seems quite probable that there will be other companies—including some U.S. telcos—which will be the targets of either friendly or hostile takeover attempts by the newly created giant.

In short, don't be surprised if your next proposal for competitive alternative service comes from a European telco. For now, however, the typical college gets its proposals from CLECs with origins here in the States. Those who have inked deals seem happy.

Fred Damkroger, director of telecommunications at Kansas State University, is impressed with the service he gets from his CLEC. "Their prices are great, the bills are timely and in the form we ask for, and they answer e-mail and voicemail messages promptly (almost instantaneously). What more could you ask for?" The answer to that prayer might be: "Grant us the same kind of attention from all of our service providers forever and ever. Amen."

Chris Harrison is a freelance writer and frequent contributor to the ACUTA Journal. He writes for a variety of telecom-related publications and is a frequent speaker on technology issues.

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ELECs, CLECs: New Opportunities for Your Campus?

The current legislative and regulatory environment creates new opportunities—and dilemmas—for campus telecommunications. Emory University presents an inside view of the decision-making process.

by *Perry Eidson*

The Telecom Act of 1996 ushered in a new era characterized by competition among telecommunications service providers. Since passage of the act, anyone is allowed to provide local exchange service. This emphasis on competition has created opportunities for businesses or enterprises to set up a variation of a competitive local exchange carrier (CLEC) known as an enterprise local exchange carrier (ELEC) to provide communications services.

Some significant incentives are encouraging colleges and universities to consider becoming a CLEC or an ELEC. As a CLEC or an ELEC you control your own direction and choose which services you offer. If your institution is willing to make the commitment in resources, there can be significant cost savings and revenue

generation. CLECs and ELECs can purchase network elements at a discounted rate from the incumbent local exchange carrier (ILEC), setting up the potential for cost savings.

Should your organization set up its own ELEC, or are there other alternatives that could result in savings for your institution? Because each business or institution is different and the local telecommunications environments vary, there are no easy answers; however, listed here are eight questions which must be considered universally.

1. *What is your reason for considering this path?* Each institution has different business drivers. For some, the cost savings alone can be a compelling reason for becoming an ELEC. For others, the

opportunity to both lower the cost and generate additional revenue may be sufficient to warrant consideration. Marketing services to off-campus students or alumni enables the institution to maintain contact and enhance developmental revenue opportunities. As an ELEC, the institution might encounter opportunities for community service which could enhance the image and perception of the institution. Many telecommunications departments are operated as an auxiliary enterprise and are expected to generate their own operating funds. Leveraging the existing—and often large—investment in communications can have a positive effect on the bottom line.

2. *Are you prepared to meet the regulatory requirements?* There are

multiple regulatory issues to consider. The process is regulated at the state and federal levels by the state public service commission (PSC) or public utilities commission (PUC) and the FCC. At the state level, the PSC or PUC regulates local carriers. They are very interested in the organization's qualifications to provide local service. The application includes requests for information on the financial capabilities of the organization, and if the organization is capitalized at less than \$1 million, the financial status of the principal officers and shareholders is required.

3. Are you qualified and capable?

Questions will be asked about the technical experience and capabilities of the management team. The PSC is interested in this information because it is interested in the service provided. It wants to make sure that any entrant is qualified and capable of providing services comparable to the incumbent provider. Your institution will be held to the same standards as the ILEC.

4. What will be the impact on other local carriers? Consideration will be given to the impact of your entry as a competitor on the incumbent carrier. If you are located in a major city served by a major RBOC or large independent company, the impact of the institution becoming a CLEC/ELEC will be minimal. If, however, you are located in a small college town served by a small independent operating company, the impact may be much larger.

5. Are you prepared for USF and interconnection issues? Important regulatory impacts include contributions to the Universal Service

Fund (USF) and interconnection agreements. Many colleges and universities are not currently contributing to the USF. By registering as a CLEC/ELEC, your institution will be required to participate. Revenue levels may be low enough that the financial impact will be small, but it is a requirement that must be met. Interconnection agreements must be signed with each and every carrier with which you will be exchanging traffic. This includes any other LEC or CLEC in your area as well as interexchange carriers (IXCs).

It is one thing to hold oneself to the standards of an operating company in terms of reliability and responsiveness, but it is something else to be held to that standard by outside regulatory agencies.

Interconnection arrangements to the local and interexchange carriers may require a change in your trunking. Instead of tandeming through the closest central office, you may be required to connect to each office in town and/or the local tandem. You may be required to change the type of trunks you use. Everything will depend on the LEC's interconnection standards.

6. Have you considered local number portability issues? If an outside entity orders service from your organization and then wishes to relocate, you may be required to let them take the number with them. Even though your primary and, in fact, only targeted customers are the "captive" customers within your organization, there are others who will request service. Groups such as software/hardware vendors that need a dial-up modem line or an outsourced housekeeping company that is replaced may want to take the number with them when they leave, if they have published it. Operator services must be provided, either in-house or contracted out. Directory listings for customers outside the enterprise must be accommodated.

7. Can you manage the reporting? Chances are good you will have to upgrade your telemanagement system to provide automated interfaces for local number portability, E911, automated message accounting for billing interfaces to the carriers, etc. Certain PSC/PUC/FCC reporting requirements are required. Reports on the number of lines in service, dial-tone delays, service outages, and more will have to be reported to these agencies.

8. Are you ready to meet government accounting/pricing requirements? You may have to resell service to the LEC or other CLECs at a discount. If your institution receives federal funding, as many do, there are A21 guideline issues to examine. Among other things, these guidelines require that service paid for by federal funds receive the lowest cost. If you have to sell

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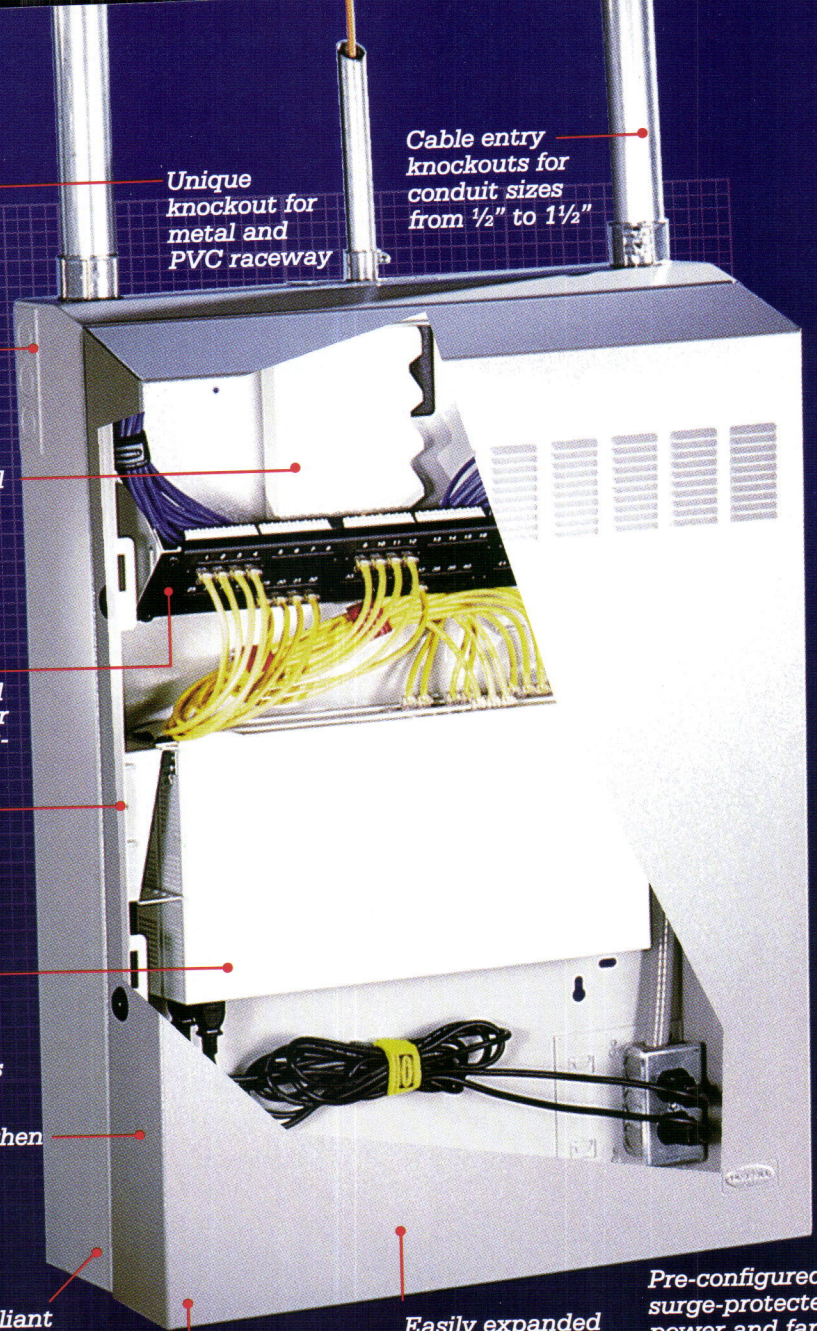
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service to a LEC or CLEC at a discount, will this impact the way you charge grants and contracts for their service?

All of these are factors to consider. The only way to decide if this is the right course for you is to look at your particular situation. If the business drivers are right, all of these issues can be dealt with. Some of those who have entered the field report 15–20 percent cost savings in addition to increased revenue—a substantial improvement on the bottom line.

The Case at Emory University

Emory University, in Atlanta, Georgia, has an enrollment of approximately 11,500 undergraduate and graduate students. Faculty and staff number in excess of 15,000, making Emory one of the top five private employers in the metropolitan area. As a major research institution with a large health sciences center, the university has many varied communications needs.

The university owns and operates a 17,000-line Nortel MSL-100 in addition to 8,000 lines in Lucent Definity G3s. The MSL-100 uses SS7 connections and trunks and connects to six different central offices in Atlanta, including one of the local access tandem switches. (See <http://www.emory.edu/ITD/TELECOM/SYS/sld001.gif> for a current network map and <http://www.emory.edu/ITD/TELECOM/telecom.html> for additional information about Emory Telecom.) Since the MSL-100 is a member of the DMS family of central offices, it would be very easy for the university to meet many of the technical requirements to become a CLEC/ELEC.

After carefully considering the issues surrounding CLEC status, we concluded that while we were capable of meeting the funding and technical issues, creating a CLEC was not the right way to support the university at this time. Even though Emory Telecom is structured like a telephone company and operates as the university's communications provider, we did not feel that the return on investment was high enough. It is one thing to hold oneself to the standards of an operating company in terms of reliability and responsiveness, but it is something else to be held to that standard by outside regulatory agencies.

Instead, we chose to negotiate volume and term agreements that provided for discounted rates on the local services we had already deployed. Additionally, we took advantage of volume discounts from interexchange carriers. We also participate in the private college and university groups in Georgia, which has enabled us to negotiate discounts that provide approximately one-half of the discounts available to CLECs without the effort or scrutiny required to become a CLEC.

This does not mean that we will never consider CLEC/ELEC status. We are constantly looking for the best means to provide cost-effective and reliable service to our customers. As our environment changes, we must remain flexible and aware of the business drivers challenging our customers.

Conclusion

There are many benefits to becoming a CLEC/ELEC. The ability to control your own direction and choose which services you

offer is a strong incentive. If your institution is willing to make the commitment in resources, there can be significant costs savings and revenue generation. Alternatives to full CLEC status do exist. Competition can and has driven down pricing and has made many traditional telephone-company-only features, services, and capabilities available to those who wish to take advantage of them. Obvious competition in major population areas has made the incumbent LECs much more willing to listen and provide services that have been unheard of previously. In those areas with a single provider, the prospect of CLEC/ELEC competition may be sufficient to generate cost-saving proposals without expending the effort to become the competition.

The Telecom Act of 1996 has had an unexpected impact on higher education in the form of additional fees. The encouragement of competition engendered by the act has also created new opportunities for decreasing costs that are well worth examining. Determining if it is right for your institution depends on your institutional and business drivers, the local environment, and the cost/benefit risk analysis.

For additional information, read about the Telecom Act or view the full text at <http://www.fcc.gov/telecom.html>. Another useful reference is <ftp://www.psc.state.ga.us/Telecom/Electronic%20CLEC.pdf>

Perry Eidson is a telecom technology specialist at Emory University. Reach Perry at phopte@telecom.emory.edu.



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Washington Writes (and Rewrites) the Rules

Conference attendees take a look at the changing rules for telecom

by *Curt Harler*
Contributing Editor

A whole flock of new regulatory and legislative issues have gathered at the national and state levels. Even though it can be a pain to track them all, ACUTA members should rest assured they will be acted upon by lawmakers across the country—and eventually may come back to haunt the unwary.

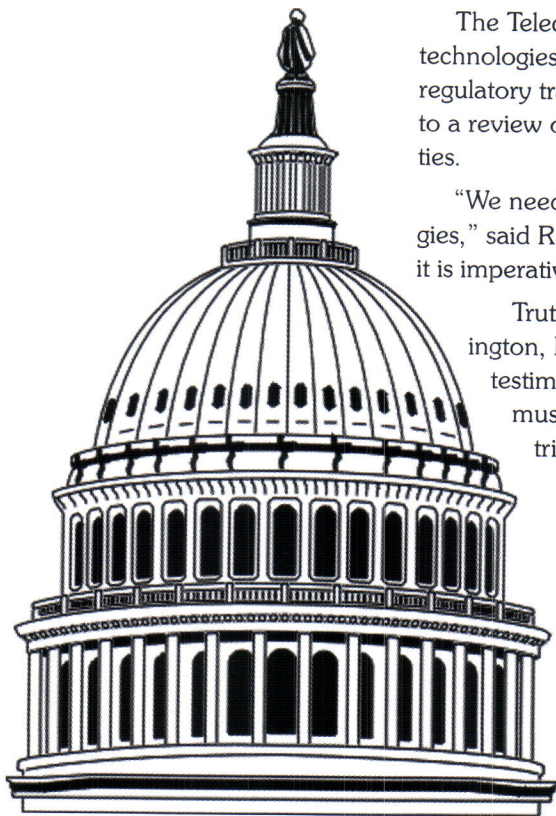
The Telecommunications Act of 1999 opened the gates to a flood of new technologies, services, and regulations. Those who followed the legislative/regulatory track at the 28th Annual Conference in Nashville this July were treated to a review of current rules and a look at what it means to colleges and universities.

“We need these regulations to help us interact with all of the new technologies,” said Randal J. Hayes from the University of Northern Iowa. But, he notes, it is imperative to keep on top of the direction of the regulations.

Truth in billing is one area where ACUTA is taking a lead role in Washington, D.C. ACUTA asked for preauthorization of charges, but noted in its testimony that verbal approval will not be sufficient. Written approval is a must. ACUTA also asked the FTC to disallow the use of ANI as a billing trigger.

“Today we live in a whole different world. The major change over the years is that there is more responsibility for the users to come forward with opinions on regulatory matters,” said Anthony Tanzi of Brown University, ACUTA’s president-elect who has chaired the legislative/regulatory committee for the past two years.

“The states are usually delighted when a user shows up to testify,” agreed Laura McDonald, attorney with Levine, Blaszak, Block & Boothby in Washington, D.C. While much of the focus is on national legislation, she encouraged ACUTA members to get



involved at the state level, where they can have major impact on decisions.

"The FCC may be the chiefs of staff," she said, "but the states are the field officers." The states need help, too. A few years ago, a state PUC (public utility commission) might have regulated a couple of ILECs (incumbent LECs). Today it has to deal with those ILECs plus 30 or more CLECs (competitive LECs).

McDonald reviewed the advantages and disadvantages of a new class of carrier, the ELEC (enterprise LEC). A college or business that chooses to act as its own CLEC and deliver services to the larger community would be considered an ELEC.

The idea is, of course, legal, thanks to the Telecom Act of 1996. The question for schools is whether it is practical. There is no simple rule of thumb to determine whether it is an economical proposition, McDonald said. Each school would have to look at its own business plan and proceed from there. She warned that a college which becomes an ELEC will be viewed by telcos as a competitor. That will affect bargaining for services and may even pop up in seemingly unrelated areas like contributions to the university's athletic programs.

As an alternative, McDonald said, it is quite possible to drop hints to a current provider that the college might become an ELEC and use the resulting commotion as the basis for bargaining for better rates or added services.

Universal Service

The question of universal service charges continues to drag on. The FCC is reexamining how it implements the high-cost fund. Over the next six to nine months the FCC

will be dealing with questions on the size of the fund, whether fees will be shifted to the states, and whether there will be fee increases.

"The FCC has been aggressive in trying to come up with a new set of regulations on access rules and charges," Kenneth Krisko, an attorney with Wiley, Rein & Fielding in Washington, D.C., told conference attendees. He predicted some movement in the next three to six months on the issue.

Cable Open Access

The heart of the cable open-access battle, Tanzi noted, is gaining Internet access over cable. The question at hand is whether cable providers will have to open networks to local telcos or ISPs (Internet Service Providers). Don't think in terms of your local mom-and-pop ISP; companies like AOL are the drivers in the battle.

Cable modems are attractive to consumers. They provide high-speed, broadband access to the Internet. The question is whether cable companies should be obligated to let rivals use their networks.

Services today are linked to specific browsers. To get access to another browser, the customer has to pay an extra fee. Competitive ISPs want to be able to gain equal access to the cable networks and to be able to sell to subscribers directly.

"This is resonant of the old [telco] deregulation argument," Tanzi said. As in most such cases, the fight hinges on money.

The cable companies have an argument against open access which appeals to reason. Unlike the telcos, the cable companies are not regulated monopolies that put in public networks. They used private or shareholder dollars to build their networks. They took considerable risks. Many failed. But those

survivors want to reap the rewards of their efforts and innovation.

AT&T has spent \$100 billion to acquire TCI and MediaOne. It is now upgrading the network and eventually will provide phone service, Internet access, and content. "They see it as a gamble," acknowledged Jeffrey S. Linder, attorney with Wiley, Rein & Fielding in Washington, D.C. "They say they took a big risk and should reap all of the rewards."

Among the technological boosts is huge expansion of the fiber backbone (the "last mile" will still be coax). AT&T says it will use its network to bring new residential phone competition to the market. Linder, who represents AOL and telco GTE—both strong proponents of opening up the cable system to equal access—isn't so sure the cable operators' arguments hold water. He said such service would require buying an all-or-nothing bundled package. He expects it to be attractive to no more than 20 percent of the residential customers.

Linder said there is a real fear that AT&T will monopolize access to the Internet and could maintain its inside track by making it difficult for competing content providers, software developers, and other providers to get into the market.

Telcos are rolling out their competing DSL (digital subscriber line) services. While there are about a half-million cable modem users, the number of paying DSL subscribers is only in the tens of thousands.

The spirit of technological innovation is noticeably missing in the cable companies' approach to opening up networks. They say, in effect, that there is no easy way to allow open access to their systems. Competitors say it's a small

problem and one that they already can solve. "I believe the answer rests with who you put the question to," Tanzi noted.

The FCC appears opposed to the idea of opening up the networks for fear it will scare away investment dollars. "FCC wants nothing to do with this," Linder said. Congress may try to move some legislation, but that will take time.

Linder predicts that eventually 80 percent of all Internet access will be cable based, not telco based, even though DSL service is

"The FCC now suggests that we reform the reforms...[B]y combining the PICC and CCLC into the SLC charge, the FCC may hope to bring the Universal Service Fund into balance."

—Randy Hayes
University of Northern Iowa

dedicated and does not degrade as subscribers are added. Cable is a shared service, so speeds drop as users are added. DSL can be deployed to a maximum of 70 percent of the houses in the United States since it cannot be used over DLC (digital loop carrier).

Meanwhile, local communities such as Portland, San Francisco, and Broward County (Florida) are taking steps to open up the cable networks. This piecemeal approach is deadly to any service provider's business plan. "I think that AT&T at some point will realize that enough pressure exists at the community level, and you'll see an effort by AT&T to let some steam off by reaching business deals with ISPs to provide service," Linder said. "I don't think the FCC will

condition the AT&T-MediaOne merger on this," he added.

"ACUTA will watch this battle carefully," Tanzi said. Keeping in mind that some schools are registered as cable providers, he added, "It could trickle down to the campus level."

Voice-Over-IP

In a somewhat related area, look for a fight over VoIP (voice over IP). US West has filed a petition saying that VoIP is nothing more than a typical phone-to-phone service, just like any other circuit-switched call. Even though it uses the Internet (which the FCC has been consistently reluctant to regulate), US West maintains that it should be dealt with as a traditional phone call.

US West wants providers of VoIP to pay into the Universal Service Fund. The result may be VoIP regulations at both the federal and the state level.

Hayes said the issue revolves around reciprocal compensation. Originally designed for two-way calling, reciprocal compensation called for the LEC to pay a CLEC or ISP when the CLEC or ISP processed a local call to the termination point. "This has become a major cash cow for CLECs and ISPs," Hayes said. "The LECs say it is not a two-way street since ISPs are simply processing the Internet calls."

LECs argue that most of those calls are not local, but actually interstate calls, and the FCC agreed. Since interstate calls are not compensated, an adjustment would be required. But, in most cases, the FCC said, the individual states should make the ruling. And at the state level, most rulings to date favor the ISP over the LEC, Hayes said.

Is it impossible to maintain separate standards for circuit-switched and IP-based services?

The FCC is likely to take up this question in the next 12 months.

Beyond U.S. boundaries, the ITU (International Telecommunications Union) may get involved. Some other countries, like Switzerland, actually have tariffs providing a higher cost for a VoIP call than for normal telephony.

"If IP telephony becomes a substitute for circuit-switched calls, the FCC may have no choice but to get into regulating it," Linder said. Part of the reason is the FCC wants to spread contributions to the Universal Service Fund as broadly as possible. And, although the FCC does not want to regulate the Internet, universal service is an FCC favorite and the VoIP issue gives them an incentive to start poking around the issue.

Competitive Networks

The Competitive Networks Proceeding is examining impediments to competitors who want to provide services in buildings where ILECs have exclusive contracts. In many cases a multiresident building or office building is served by an ILEC. The CLEC cannot get access. Perhaps there really is no room in the risers. Perhaps the landlord does not want to give up space in the building for another telco POP.

This question includes hard-wired and wireless access, said Krisko. He said the FCC is taking a broad look at what kinds of rules are needed. The FCC will find itself dealing with the mundane aspects of cable access and demarcation points.

"What can the FCC do to regulate private landowners who get in the way of competition?" Krisko asked. He predicts an uphill battle for competitors who want to impose requirements on landowners to open up their buildings. However, the FCC may go ahead

and restrict LECs from entering exclusive contracts with landowners.

PICCs and SLCs

PICC is the presubscribed IXC charge. It is sometimes referred to as "pick" or "pixie." SLC is the subscriber line charge, or "slick."

PICC charges recently jumped from 53 cents to \$1.44. The related charge for ISDN lines jumped from \$1.50 to \$2.53. The cap on business multilink services rose from \$2.75 to \$4.31.

"The FCC now suggests that we reform the reforms," a frustrated Hayes told conference attendees. He said that by combining the PICC and CCLC (carrier common line charge) into the SLC, the FCC may hope to bring the Universal Service Fund into balance.

"Calculate and monitor surcharges," Hayes urged members. He warned against the practice of "jamming"—where a LEC places a PIC freeze on accounts so a competitor can't take over local toll services. The incumbent usually will claim it is done "for the customer's protection." It may not necessarily be a bad thing; in fact, it probably would be a benefit to most universities to have PICC freezes on trunks. However, they should be user-originated, not slipped in by the telco.

Tanzi also noted that the FCC is changing the rules for Centrex charges. What has been subscriber-based billing would become location-based billing. "The FCC has indicated it wants to establish one primary line per location and designate each additional line as "secondary." It is unclear whether this means the campus itself or a dormitory room would be designated as the primary line location. Either way, this has serious fiscal implications for telecom, says Tanzi. "Location-based billing is not rational. Students cannot choose

the location where they live, the number of roommates, or their service provider."

Traditionally, a college dorm was considered a subscriber-based location and each Centrex telephone line was charged one PICC and SLC. Moving to location-based billing could add significant costs to Centrex systems, even small systems. As an example, Brown University has 3,100 Centrex lines. Using a "campus" definition, the estimated annual budget increase due to higher cost PICCs and SLCs for secondary lines is \$108,000. This comes at a time when rates for room contracts have been set and bills have already been sent to students.

Other Issues

The FCC continues to grapple with the problem of phone number exhaust. The question is whether the FCC needs to revisit the entire numbering system used in the United States.

In the past, experts predicted we would run out of 10-digit numbers around the year 2025. Newer research says exhaust will come between 2010 and 2015. At that point look for 12-digit phone numbers.

The question of number overlays versus number splits has been left to the state. However, the FCC is adamant that any solution be technology neutral—that is, it cannot apply only to wired lines or only to wireless.

Soon, callers may have to pick up fees for calling a wireless phone. "The crux of the calling-party-pays issue is what, if anything, does the FCC need to do to give wireless subscribers the ability to have the calling party pick up the charges for the wireless call," said Krisko.

Calling party pays is common in other parts of the world, especially

Europe. "The wireless industry has pushed to move forward," Krisko said. "They see it as an opportunity to create competition for LECs."

Be that as it may, there are a host of implementation issues to be resolved. Wireless carriers say they need uniform notification requirements nationwide. Individual states are concerned that they can adopt sufficient consumer protection so wire-line users are not jumping off into a world of unknown charges when they call someone who happens to have a wireless phone. Questions must be answered on blocking access to calls to wireless numbers. There are open questions on feasibility and costs.

"I wouldn't look for fast action," Krisko said. Indeed, the question has been bouncing around for at least 18 months. "The FCC has been hesitant to deal with this. They will take their time," he said.

Linder said he sees no change in the current definition of colleges as aggregators. "I don't think there is a desire to change that," he said. The one exception may be if a college outsources the telecommunication function to an outside agency.

Meanwhile, other legislative and regulatory issues move along. What's an ACUTA member to do? The best step, Hayes said, is to stay abreast of the issues and to get involved. "Keep reading the ACUTA homepage for the legislative and regulatory updates," he concluded.

Curt Harler is a freelance writer and contributing editor for the ACUTA Journal. He regularly attends ACUTA events and has written extensively for the telecom market. Reach Curt at curt@curtharler.com.



The Virtual Campus: Reality Check for the 21st Century

by Marybeth Susman, PhD

It is not enough to say that higher education is going through a paradigm shift. We are in the middle of an orbital shift and our educational solar system is very volatile. Where once students revolved around their higher education institution, going from department to department, office to office, class to class to gather their services and curriculum, telecommunications provides the ability to have institutions revolve around their students.

In the virtual education business, we imagine students as stationary and bring all services to them, when and where they want it. Admissions, enrollment, financial aid, cashier, advising, career exploration, library, bookstore, faculty and student interaction, and coursework are accessed from a single Web site. Students log in at any time of day from any location that can get them to the Internet. There are students who go to class from their local grocery store, from coffee houses, from their office, or from their sofa. They may attend

from midnight to 2:00 a.m.—or from 9:00 to 9:15 a.m., then from 11:00 to 11:45 a.m., then half an hour after work—from 20 time zones. They meet fellow students from their own city and state, but are as likely to have classmates logging in from Malaysia, Sweden, and South Africa. Students can carry their college in their laptop. And given the way telecommunications technology is going, they soon may carry their whole education in their wristwatch.

Three major factors are driving this orbital shift.

1. *Sophisticated Consumers*

We are a nation of sophisticated consumers getting even savvier about how technology can serve us. We no longer would use a bank that doesn't provide ATM service, and the Internet is becoming the "store" of choice for more and more citizens. You can qualify and receive a home mortgage over the Net. Consumers who do these things expect the same service from higher education institutions.

We don't worry any more about whether someone will adopt the new technology. The technology has adopted us. We use a computer when we use a microwave oven or drive a car. The technology is hidden in it, and one needn't be a rocket scientist to use it. (The modern day car has more technology in it than Apollo 11, and you had to be a rocket scientist to run it.)

If there is someone out there who hasn't touched a PC keyboard yet, don't bother. Soon we will just talk to our computers and never touch a keyboard again. With the converging technologies we will have an information appliance in our home. When the phone rings, we will answer our television set. Moreover, it will become second nature to us to communicate, enter, and retrieve information with our information appliance.

2. *Lifelong Learning*

The second driving force behind the orbital shift is the number of jobs that average citizens can expect to have in their lifetime. Gone are the 25-year jobs. Most

Mary Beth Susman is the first person in the United States to have lead two virtual postsecondary institutions that are statewide consortiums. She was recently made CEO of the Kentucky Commonwealth Virtual University (KCVU) having come from Denver, Colorado, where she was president of the Colorado Electronic Community College, a statewide virtual community college. KCVU is a virtual institution made up of all public and private higher education institutions in Kentucky.



citizens will have seven jobs in their lifetime. Each job requires some learning curve and the need to find learning that integrates into work and family obligations. Also gone is the luxury of resting on the laurels of our high school or even college education. In information technology alone it is predicted there will be 150 job descriptions in the next three years for which we have no name yet. Knowledge is growing too fast and too deep for us to stay current and employable without lifelong education.

3. Convenience

Presently only about 20 percent of the college-going population are between the ages of 18 and 22. That means 80 percent are older, usually working and raising families. They are not looking for a residential experience on campus. In our busy lives, time is the coin of the realm. It's not location, location, location; it's convenience, convenience, convenience.

Even for the traditional student, we are discovering that convenience sells. Ironically, our on-

campus students are the first and largest group to access Internet classes. We developed a courier service for library materials and discovered that students living in a dorm across the street from the library opted to pay the \$25 fee to have materials delivered to their dorm room. So anytime, anywhere education is not just for the distant student.

Higher Education Telecommunications Departments

We have always relied on our telecommunications specialists to help us with our connectivity, to keep us in faster, smarter machines, among many other things. Because they are often the early adopters of technology on campus, the telecommunications staff have been the mentors and prophets for us academic types. Their role in the orbital shift will become even more crucial. We won't be satisfied with a workstation on every desk. We will need a laptop in every lap, docking stations, call centers, and big, fat pipes for speedy, dense media.

The average American thinks of technology as a light switch. When they push the switch they expect instantaneous response. We've driven our information technology departments crazy with our unrealistic expectations. It is only going to get worse.

The Marriage

There are mergers going on within our institutions (if not hostile takeovers). In some institutions it has been customary for administrative computing to be separate from academic computing. The virtual university requires a marriage of these two sides of the house. Sometimes the proposed union can have as much opposition as the Capulets had to the Montagues. If you are in an institution where administrative and academic computing have developed separate and robust capacity, it can be even more difficult to effect the marriage. The two sides have grown comfortable with their platforms, and probably their platforms don't talk to each other. (Often, neither do the departments).

We have learned in virtual delivery that administrative and academic computing must come together. And actually, putting coursework on the Internet is the easy part. What is difficult to provide in anywhere, anytime technology is all the other activities that wrap around actual curriculum delivery—the activities traditionally associated with administrative computing: admissions, registration, transcripts, grades, financial aid, accounts payable, scholarships, student ID, library cards, activities enrollment, bookstore, advising, special needs, career placement, internships, co-op experiences, and the list goes on.

Moreover, the orbital shift demands *disintermediation* to provide the best service to students. That is, students must be able to access these administrative services directly, with the fewest number of intermediaries (people) possible. Students will be activating our registration systems when they enroll, and checking their accounts payable without waiting for the accounts clerk to do it for them.

Customer Service

Heretofore, *customer* has not been an accepted word in academia to describe a student. We continue to be uncomfortable with the jargon of commerce. But the market place has found untapped value in higher education, and for-profit educational institutions are rapidly stepping in to claim it, using best business practices and treating the student as a valued customer. The University of Phoenix, DeVry, and Sylvan Learning Systems are among the fastest growing sectors of the education industry. We expect Disney and Microsoft to jump in any day, and how can public and nonprofit institutions with limited resources compete with them? The choices for our

student customers are going to get bigger, and market forces will determine who survives and who doesn't. There are an estimated 100,000 college courses on the Internet now. If a student isn't receiving assistance rapidly and courteously, he or she can change colleges on a keyboard. We will need to develop customer loyalty and a reputation for unequalled quality and service to retain their business.

What's a College to Do?

• *Make Partnerships*

It is increasingly evident that higher education cannot shift its orbit alone. We don't have the resources or know-how to do it all. We will make partnerships with private companies to provide services for us. We purchase services from a menu of options; we lease instead of buy; we enter backend load agreements wherein the private company partner risks its own capital (not ours) for a share of the revenues. So when we grow, they grow.

We invite other educational institutions to join us. Instead of competing with the college next door, we invite it to build curriculum with us and divide the cost of construction; share faculty and divide the cost of delivery; provide financial aid services to it and let it provide billing services to us so we don't both have to build two departments.

We invite as many educational institutions as possible to join us on our Web site. We discover that if our Web site has student options to matriculate at four or five (or 50) colleges, our customer base grows. It is analogous to the placement of an antique store. One antique store on a street draws hardly any customers, but five of them on the same street attract a geometrically rising customer base. It is the

psychology of the shopping mall, if you will pardon the serious lapse into crass commercial analogies.

• *Disaggregate*

Higher education in the old solar system aggregates all products and services under one roof. We manufacture the product (curriculum), distribute it, provide materials fulfillment, make loans and grants, and provide job placement, housing, food, and recreation.

In the new solar system we disaggregate products and services. Faculty do not have to be in the same place as students, nor does the curriculum have to be any place at all except the buffer. Indeed, it will become more common for faculty not to write their curriculum for the Internet but to use off-the-shelf products that they adapt. Expecting faculty to write every Internet course is like expecting them to write every textbook they teach from. Besides, publishers and media companies will make such robust products with mind-bending simulations and graphics in which they invest thousands (or millions) of dollars that it would be a waste of resources for education institutions to compete.

Faculty can be teaching from anywhere in the world. They need not be anywhere near a campus. Faculty may find themselves with opportunities as "free agents," the best being in high demand by colleges and universities all over the globe.

We find ourselves outsourcing student services: an online tutoring service here, a billing service there. Electronic bookstores vie for our business, as do companies that provide platforms for Web-based courses. We lease server space or have someone do it for us and hire a firm to provide a statewide faculty development program.

Curriculum is disaggregated as well. All curricula is written in

modules, with each module clearly stating what the learner will be able to perform when finished. Several modules add up to one course but can be unbundled and repackaged to deliver as corporate training in smaller chunks.

• *Reduce Trade Barriers*

In the age of NAFTA and the European Common Market, we educators have to be able to reduce our own trade barriers. The nontransferability of coursework has been one of the biggest barriers we have created. Students will choose the most transferable curriculum, and those institutions that craft seamless transfer and articulation agreements within and between states and countries will attract the most customers. When you can access your education from anywhere on the globe, you want to be able to "cherry-pick" the best. If it is not transferable at one institution, then the student needs only find another where it is transferable. The geographic barriers that kept student choices at a minimum have disappeared and will no longer support our long-standing provincialism about what is "acceptable" coursework.

• *Develop Common Platforms*

Like reducing trade barriers, we need to think about common platforms, a common currency of curriculum, if you will. There is logic to creating common expectations of learner outcomes in our common courses. If there were common expectations, courses would transfer more easily. Industry has known this for a long time and has developed industry standards so that, for instance, electric plugs fit any socket. We have the opportunity to learn from industry not to create Beta tapes when VHS will be the consumer winner, or an operating system that won't work on your PC. The more we can standardize our product,

the better the quality and the higher the demand.

Web-based courses are well served by being created with a common look and feel. Students who become familiar with a navigation system will return to that old familiar system, just as we return to the grocery store where we know how the shelves are laid out. All one needs to do to prosper in this environment is to create the "TV Guide" to Web-based courses: a publication that makes rational, predictable sense of the customer's choices in this media.

What's a Telecommunication Leader to do?

The orbital shift needs people who think in systems. The experience and training of network engineers, telecommunications specialists, and other information technology experts provides them with special skills for finding

solutions in systemic frameworks. To assist in this new education solar system, our telecommunications specialists can effect a knowledge transfer from the hardware and software systems they work in daily and apply it to people-ware systems. And instead of thinking about campus systems, help your colleagues construct global systems of educational services to students. The problem-solving skills of the network engineer can be brought to bear in constructing a user-friendly, rational, and predictable system for anywhere, anytime access to education. And we academics who know only about 13 technology words (but can use them in lots of sentences) need interpreters, guides, and scouts who will go ahead of us to alert us to hostile and friendly territory in this new solar system we are constructing.



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Coping with Unauthorized Charges

A Report on the ACUTA Survey of Unauthorized Telecommunications Charges

Survey Background

This spring, a significant number of colleges and universities contacted ACUTA with complaints about unauthorized charges appearing with increasing frequency on their monthly telephone bills. To assist in understanding the scope and severity of the problem, ACUTA surveyed its members in April. A two-page questionnaire, designed to provide a snapshot of the types and frequency of problems being experienced, was faxed to a sample of 50 percent of ACUTA institutional members. Approximately one half of those who received the questionnaire completed and returned it. The survey response is a representative sample of approximately 800 colleges and universities.

Population Served by Institutions' Telecommunications Services

Among 188 institutions responding to the survey, 168 reported residential students; one-half of these 168 institutions reported 1,641 or more residential students. Telecommunications services, based on the numbers reported to the survey, are provided for almost all residential students.



Institutions Reporting	188
Institutions with Residential Students	168
Institutions with fewer than 900 students	37
Institutions with 900–1,599 students	37
Institutions with 1,600–3,199 students	41
Institutions with 3,200 students or more	40
Institutions with PBX	127
Institutions with Centrex	34
Institutions with both PBX & Centrex	6

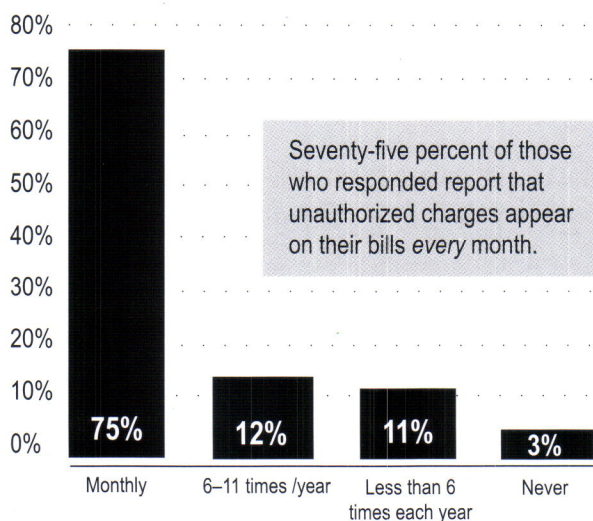
Among 185 institutions reporting, one-half have 4,600 or more enrolled students. A majority of these students reside off-campus. In comparison with telecommunications services provided to residential students, relatively few institutions provide telecom services to off-campus students. Among 36 institutions reporting, an average of 753 off-campus students receive telecom services provided through the institution. One-half of these 36 institutions provide services to 165 or fewer off-campus students.

Another measure of the size of the telecom infrastructure represented by ACUTA members is the number of faculty and staff. The 177 institutions reporting have an average of 1,914 full-time-equivalent faculty and staff. One-half of these institutions have 694 or more faculty and staff or the full-time equivalent. Approximately one-fourth of the survey sample consists of schools that provide telecom services to 3,200 students or more. Among 39 of these larger institutions reporting, there is an average of 5,078 faculty and staff and an average of 5,958 residential students, most of whom receive telecom services through the institution.

Type of Service, Number of Lines, and Size of Staff

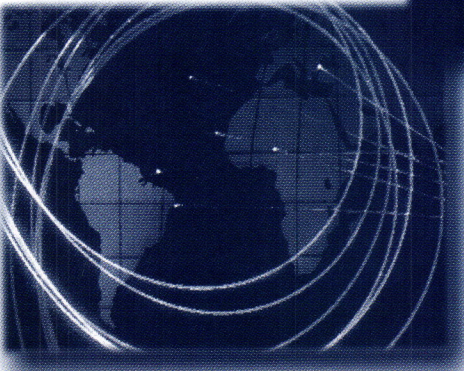
Two-thirds of the institutions reporting have a PBX system. Another 18 percent have a Centrex system, and six institutions reported both PBX and Centrex systems. The largest institutions, those providing telecom services to 3,200 or more students, are twice

1 Frequency of Unauthorized Charges on Monthly Bill





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as likely, compared with smaller institutions, to have a Centrex system; 42 percent of these larger institutions reported a Centrex system.

Among 176 institutions reporting, there is an average of 2,619 telephone lines assigned to employees. One-half of these institutions provide 1,123 or more telephone lines to employees. Among 158 institutions reporting, there is an average of 1,645 telephone lines assigned to students. One-half of these 158 schools provide telephone lines to 1,029 or more students. The largest institutions provide telephone lines to an average of 6,538 employees and 3,651 students.

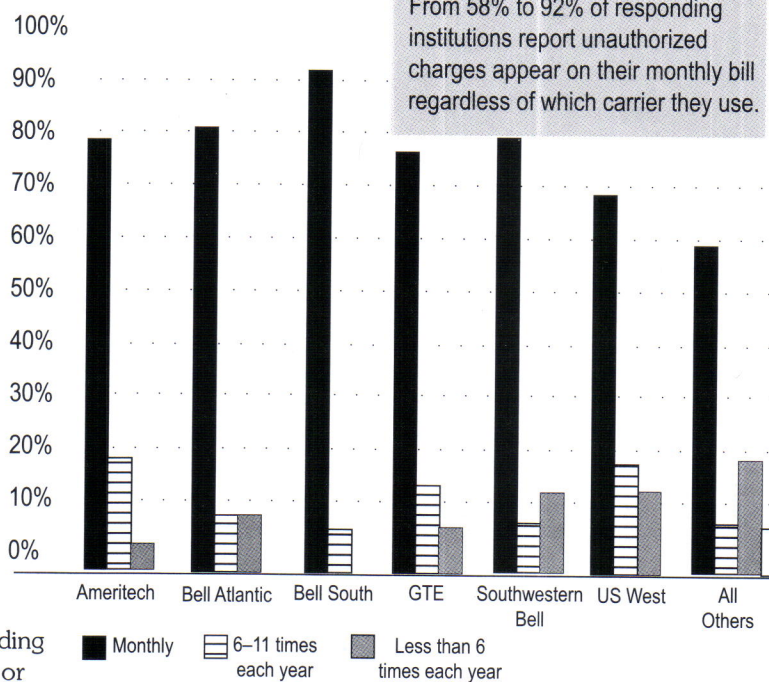
Among 180 institutions reporting, one-half have three or fewer full-time-equivalent staff in the department responsible for voice communications. This relatively small staff size is the norm for three-fourths of the institutions responding to the survey.

Only among the largest institutions, those providing telephone services to 3,200 or more students, or services to 2,000 or more faculty and staff, does the size of the telecom staff increase appreciably. Among these largest institutions, although there is an average of 24 full-time equivalent employees on the telecom staff, one-half have 10 or fewer employees in the department responsible for voice communications.

Frequency of Unauthorized Charges

Three-fourths of all 188 surveyed institutions report that unauthorized charges are present in every

3 Frequency of Unauthorized Charges on Monthly Bill by Local Exchange Carrier

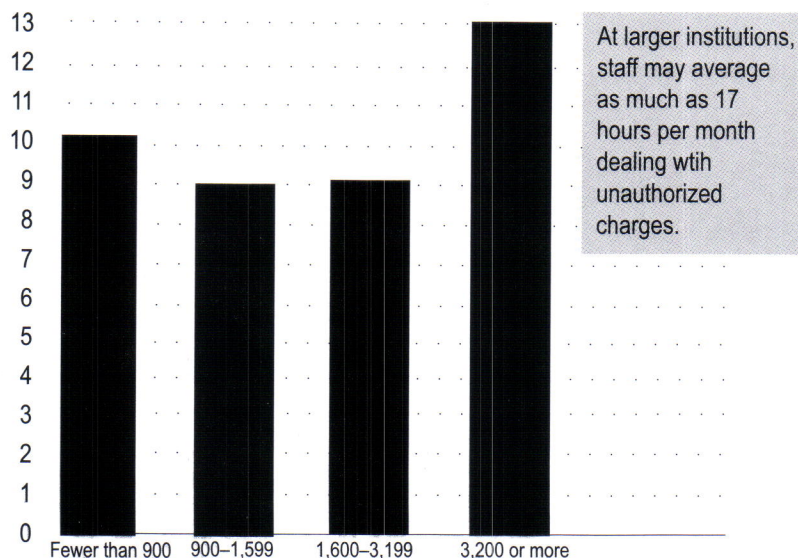


monthly bill they receive from their local exchange carrier. Larger institutions are more likely to experience these unauthorized charges: 90 percent of these institutions report they are billed each month for unauthorized charges.

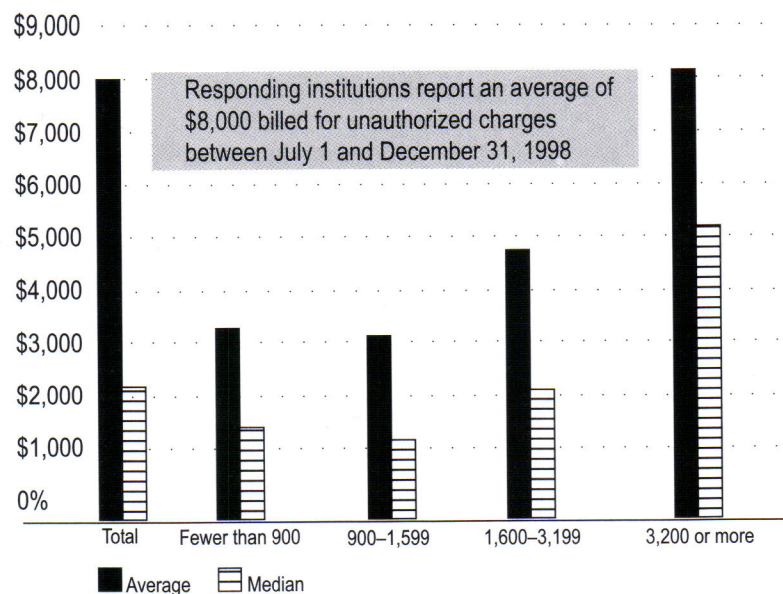
Depending on who your LEC is and the size of your campus, your staff may average as much as 17 hours per month identifying unauthorized charges, requesting credit, and following up to ensure that credits are received. One-half of the 180 reporting institutions say their telecom staff devotes at least seven hours a month to this effort. The monthly hours devoted to this effort are the equivalent of 20 or more full-time employees continuously working on the problem, among this sample of all colleges and universities. (See Table 2.)

One-half of those surveyed were able to specify the dollar amount of unauthorized charges billed to the institution between July 1 and December 31, 1998. These 96 institutions reported an average of \$7,973 in unauthorized charges with smaller institutions averaging \$3,200 and the largest institutions averaging more than \$8,000. Generalizing these figures to the entire sample of 188 institutions, this would amount to nearly \$1.5 million in unauthorized charges over the six-month period.

2 Staff Hours Per Month Spent Dealing with Unauthorized Charges Based on Number of Students Receiving Telecom Services



4 Total Amount Billed for Unauthorized Charges 7/1/98 – 12/31/98
Based on Number of Students Receiving Telecom Services



Forty percent of those surveyed report the incidence of unauthorized charges is increasing. Another 37 percent believe the incidence is remaining about the same as it has been in the recent past. Only 17 percent, primarily smaller institutions, believe the incidence of unauthorized charges is decreasing.

Cooperation of LECs and Vendors

Bell Atlantic, the LEC most frequently reported, is the LEC for 29 percent of respondents, including one-third of the largest institutions. Ameritech is the carrier for 13 percent; US West, 11 percent; Bell South, 9 percent; Southwestern Bell, 8 percent; and GTE, 7 percent. The problem of unauthorized charges is common across all of these LECs. (See Table 3.)

When institutions bring an unauthorized charge to the attention of their LEC, the LEC may remove the charge without question, advise contacting the responsible vendor, advise contacting the vendor but with some reconsideration if that fails, or refuse to credit under any circumstance. The last outcome was reported by only one of our respondents. (See Table 5.)

When institutions attempt to contact the responsible vendor, about 80 percent say they are usually successful. Fewer than one-half of those surveyed report that the vendor resolves the problem most of the time; another 36 percent, half the time; and 15

percent say the vendor does not usually resolve the problem to their satisfaction.

Conclusion

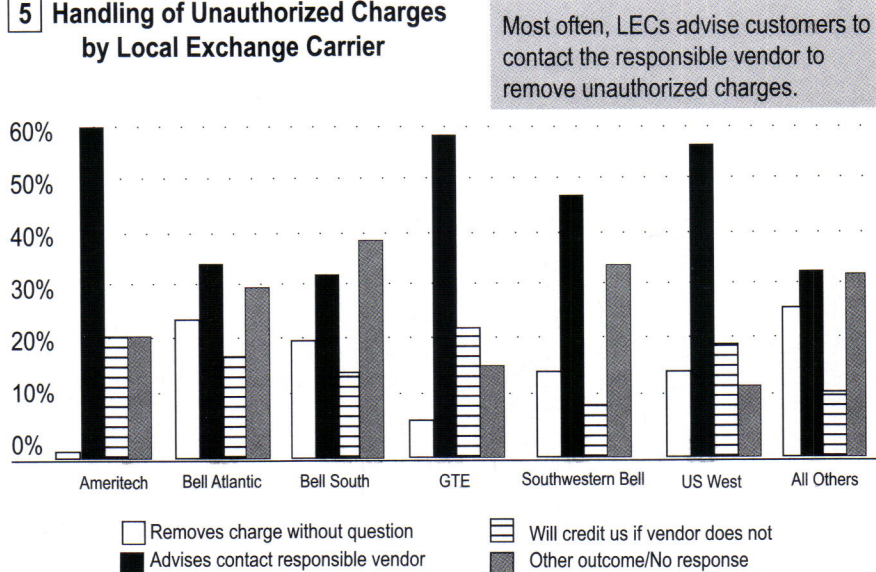
How does this information benefit ACUTA members?

The results of this survey were presented in testimony this May before the Federal Trade Commission (FTC) by Anthony Tanzi, RCDD, Chair of the ACUTA Legislative/Regulatory Affairs Committee. The FTC is considering expanding its current "900 number" rules to cover more types of telephone-billed purchases. In contrast to the testimony of various telecom service providers who claimed that the incidence of unauthorized charges appearing on telephone bills has been significantly reduced, this survey data showed that the problem is not going away and is even perceived as increasing by a large percentage of ACUTA members. ACUTA intends to continue

pursuing this issue with both the FTC and the Federal Communications Commission.

"The conclusion we should draw from looking at these statistics is that billing accuracy is now, more than ever, our own responsibility," says Tanzi. "We cannot separate ourselves from the billing process; we must move the process if we expect resolution. We must monitor the process in order to reach closure, and it is imperative that each of us be actively involved in implementing those processes that will prevent unauthorized charges in the first place. Whether we like it or not, that's now a part of our job."

5 Handling of Unauthorized Charges by Local Exchange Carrier



Cable Management— Control Over Chaos

by Larry Foster

Some of the most significant operational costs and latency in processing work orders and resolving trouble tickets can be attributed to a poorly installed and inaccurately documented communications infrastructure. With the convergence of voice, video, and data communications technologies, having a coherent implementation, testing, and documentation strategy for the entire communications infrastructure becomes more essential than ever.

Southern Illinois University at Edwardsville (SIUE) recently undertook an 11-month infrastructure audit and restructuring project. The project was preceded by the procurement of a new telemanagement system that included an integrated cable management system. It was followed by the implementation of a new PBX system coupled with the addition of a new residence hall and expansion of “per pillow” voice and data communications services to all on-campus apartments. During the time frame of this project, the university’s data network doubled in size. As is typical of most institutions, the expansion of the communica-

tion infrastructure at SIUE was not matched by an expansion in personnel to provide support.

A number of lessons were learned, including how a good project strategy based on a finite capital investment in time and a solid cable management system (CMS) can yield significant perennial savings in processing work orders and alleviate downtime even as the communication infrastructure grows geometrically.

In addition to the project at SIUE, some very innovative initiatives in cable management are taking place at the University of Michigan (U of M) and Michigan Technological University. All three of these universities have achieved their goal of working more efficiently by capitalizing on a well-managed communication infrastructure. Working more efficiently does not mean merely working harder and faster. All three universities have been able to provide significantly improved service with fewer resources while experiencing tremendous growth in their integrated communication infrastructure.

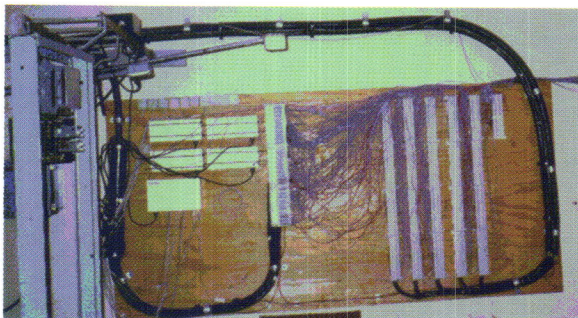


Figure 1. Before picture of a typical building distribution frame. The jumper wires from the outside plant to the building riser cable were not run through D-rings. The token ring hub jumper wires are run through the air directly to the punch-down block.

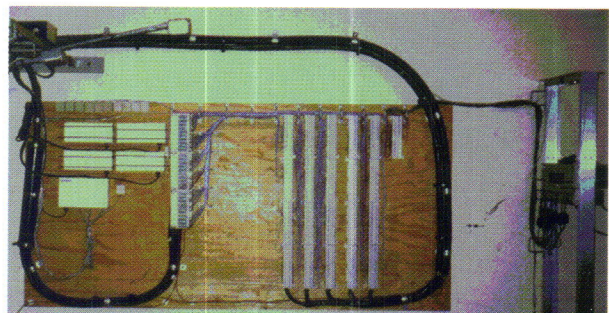


Figure 2. Results after less than two days of repair work. The jumper wires are properly installed. The token ring hub is relocated from the middle of the room. Wires are mounted and run through the D-rings.



Figure 3. Before picture of a typical intermediate distribution frame (wiring closet). Jumper wires are run point-to-point and not through any D-rings.



Figure 4. Results after less than one day of repair work. Jumper wires are properly secured. It is very easy to determine port availability.

The Phoenix Project: In the Beginning

The project at SIUE started without a title. But even before we began, it became evident to everyone involved that the task of auditing would quickly evolve into a major restructuring project worthy of a title. The before and after pictures shown in Figures 1 through 6 illustrate a few examples of the “spaghetti wiring mess” encountered at most of SIUE’s wiring closets and the noticeable improvements that can usually be accomplished in less than one day at each distribution frame. However, the wiring closet examples paled in comparison to what we encountered in the manholes. A few days of repair work followed by periodic maintenance checks alleviated most of the problems and helped us recover a significant amount of cable plant.

Figures 7 and 8 (page 34) illustrate the components of a typical voice network and a typical data network. The results of relating the diagrams to the SIUE communications infrastructure are tabulated below the diagrams in Table 1.

Capital Expenditure Versus Continued Operating Costs: Invest Now or Pay Forever

Assuming that we could document the infrastructure, we could more accurately predict personnel costs and better determine the cost of service delivery. We concluded

that the ideal contract between the university and the service provider would provide for fixed personnel budgeted on an annual basis and not subject to the current variances in time and personnel resource needs.

The solution required developing a business case to baseline the average cost of work orders and trouble tickets. In addition to personnel costs, an important parameter to include in the investigation was the average time period required to process a work order and trouble ticket. Often “oiling the squeaky wheels” and ignoring the occasional complaints from the quiet customers masked the overall problem. Most of the prominent customers were not aware of the problems many other customers encountered.

Based on the volume of work orders and expected reduction in trouble-ticket activities, we determined that two telecommunication technicians could support the infrastructure. Our contractor was very interested in negotiating an extended contract based on a fixed and predictable revenue stream since they had been alternately augmenting and then cutting back the on-site technicians based on the volume of work orders and state of the infrastructure feeding various service locations.

Developing the Project Plan: Objectives, Strategies, Contributors, and Inhibitors

Our most important objective at SIUE was to transition quickly from a “fire fighting” mentality that merely fixed problems into a more proactive, strategic mode. Continually fixing the squeaky wheels would inevitably contribute to the failure of the overall objective. Cooperation from all campus units that would be affected by this project was paramount.

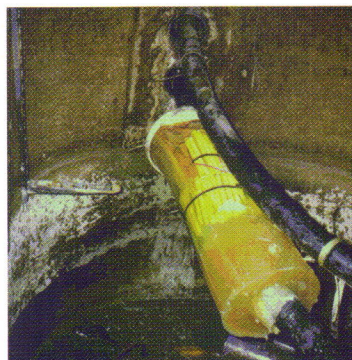


Figure 5. Before picture of a typical manhole. Cable was cut too short. The 900-pair feeder cable is not mounted on the rack. The weight of the cable eventually broke several of the connections. Encapsulate was sprayed into the splice box to prevent water seepage. Water eventually leaked through the box and corroded the splices.



Figure 6. Results after less than three days of repair work. The cable pairs are spliced and sealed in an airtight case. A brace is installed to prevent the weight of the cable from breaking the splices. A maintenance tag is applied to the splice box to indicate the last time the splice box was checked. Manholes should be periodically checked to prevent deterioration of the splices.

Figure 7. Abbreviated example of a typical data network

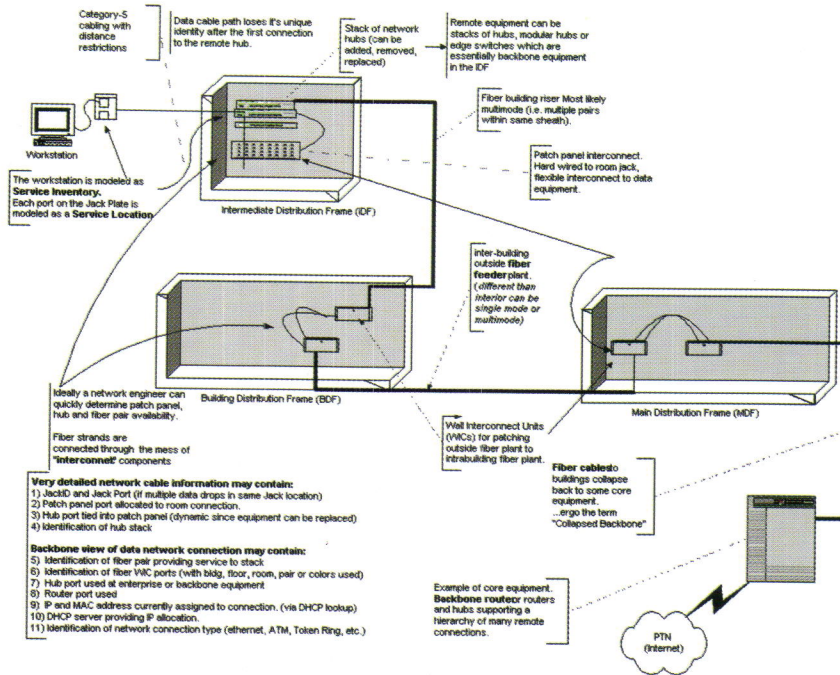


Figure 8. Abbreviated example of a typical telephone path

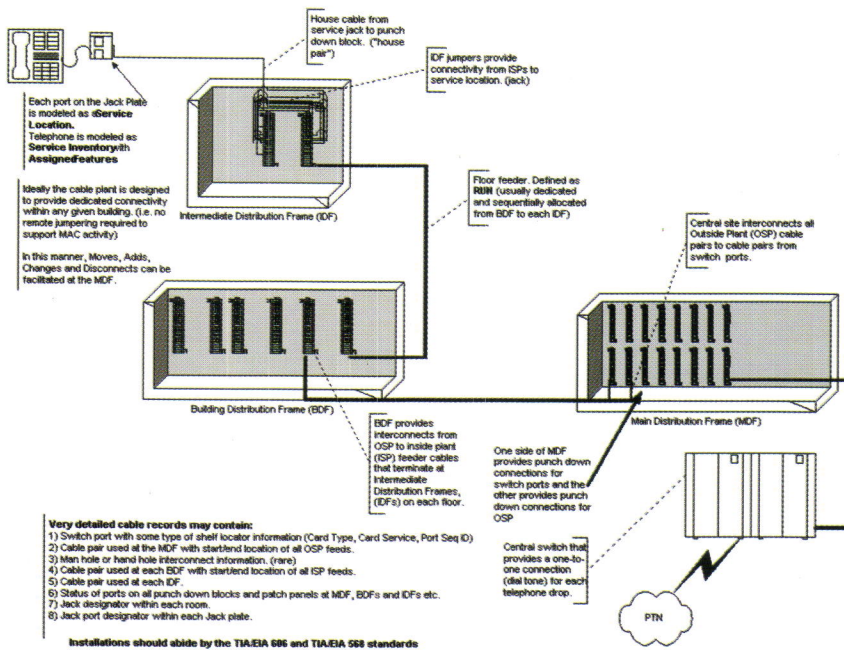


Table 1

Component	Voice Network	Data Network	Comments
Main Distribution Frames (MDF)	3	3	Data network already followed EIA/TIA specs.
Building Distribution Frames (BDF)	64	35	Data network already followed EIA/TIA specs.
Intermediate Distribution Frames (IDF)	158	78	Data network already followed EIA/TIA specs.
Manhole splices	64	N/A	Data OSP was all fiber.
Outside Service Plant (OSP)	60 feeds	20 fiber runs	No documentation existed for fiber network
Inside Service Plant (ISP)	120 feeds	50 fiber runs	Copper ISP consisted of legacy Bell Centrex wiring

The dean of the library, our acting director, approached this challenge by meeting with each unit and discussing the long-term benefits as well as immediate problems. This series of meetings achieved two objectives: It provided a forum in which users could voice their opinions and complaints, and it educated each unit about the big picture. Because halting communications services on campus was not an option, we chose the strategy outlined in Table 2 (page 35). This four-phase approach allowed us to alleviate many of the problems early in the project and complete the project in 11 months. Each phase of the project focused on specific components of the infrastructure without adversely affecting the throughput of work orders or trouble tickets.

We realized benefits during each phase of the project. Table 3 summarizes some of the results.

A Good Cable Management System: Beware of the Graphical (CAD) Trojan Horse

After achieving what we considered the "Holy Grail" of documenting the cable plant, we wanted to make sure we did not cut ourselves short by limiting our expectations of the cable management system. A cable management system can be as simple as a spreadsheet or as elegant as a relational database that not only tracks cable pairs, but models interconnect devices such as punch-down blocks, patch panels, hubs, routers, and PBXs.

Relating an icon in a CAD system to an element of a cable management database makes for great esthetics but normally comes with high overhead in both system and human resources. Many vendors emphasize the ability to directly link to a CAD system. This is not a difficult technology since

Table 2. 4-Phase Activity Plan

Activity	Quantity	Avg Unit Time(Days)	Total People Days	Project Phase
Resplice Manholes	64	2	128	One
Repair MDFs	3	3	9	Two
Repair BDFs	64	1.5	96	Two
Repair IDFs	158	.75	118	Two
Document MDFs	3	2	6	Three
Document BDFs	64	.5	32	Three
Document IDFs	158	.25	40	Three
Document Fiber	70	.25	18	Three
Upload to new TMS (via imports)	15,000(records)	1	1	Four
TOTAL LINEAR TIME: 11 months				

Table 3

Activity	Project Phase	Major Benefits
Resplice Manholes	One	Major reduction in trouble tickets & recovery of wire
Repair MDFs	Two	Reduction of noisy lines & drop in trouble tickets on digital lines
Repair BDFs	Two	Quicker turnaround in processing work orders
Repair IDFs	Two	Continued
Document MDFs	Three	Recovery of many switch ports & OSP pairs
Document BDFs	Three	Recovery of many ISP pairs
Document IDFs	Three	Consistent time frame for processing all work orders
Document Fiber	Three	Ability to expand & divide data network
Upload to new TMS (via imports)	Four	Major reductions in processing work orders & trouble tickets. Ability to plan major projects.

the underlying management of both data systems should be a structured ODBC-compliant database. However, this feature should be considered secondary to data access issues, which are a real challenge facing communication support units in these early days of rapidly converging technologies.

The real strength that a cable management system should provide is the ability to produce reports based on any type of query and to facilitate the entry of data in a logical and intuitive manner. The cable management system should be based on open technologies so data can be fed to other systems. Having a comprehensive picture of all the components of the entire communications infrastructure is becoming more valuable as very expensive devices, such as edge switches and ATM hubs, are continually deployed to remote locations.

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SIUE has continued to realize the benefits of the Phoenix Project. The project alleviated a significant portion of the overhead associated with trouble tickets and work orders. Volume in both of these categories is much more manageable now, and the average time spent on orders and trouble tickets has

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been significantly reduced due to the well-documented cable plant. The Phoenix Project provides a good example of how a well planned and executed restructuring project can help a university operate much more efficiently and use far fewer resources. (For more about SIUE's activities contact Angela Imming, aimming@siue.edu.)

An Integrated System

While having a well-documented and structured infrastructure can reduce work-order processing time and alleviate trouble tickets, some universities such as Michigan Tech and U of M are taking the benefits of cable management to an entirely new level. Both of these institutions have a cable management system that is integrated with their work-order and inventory management system. Michigan Tech has integrated its telemanagement system (TMS) with its network management system and designed a process on top of its TMS that monitors for changes to its service locations based on work orders. It also uses its cable management system to associate service locations (i.e., ports on a wall jack plate) with the actual port on the remote device provisioning the specific service. Upon the completion of a work order, a simple network management (SNMP) call is transmitted to the correct remote Ethernet hub to turn on/off the port or allow additional IP access to a particular port. This has reduced the turnaround time of work orders for network services from three or four days to three to seven minutes. (For more about Michigan Tech's activities, contact Dan deBeaubien, dan@mtu.edu.)

U of M is facing the inevitable challenge of managing thousands of intelligent and expensive interconnect devices, such as multimedia hubs, switches, and routers, which are dispersed throughout its very large and remote campus locations. The deployment of these devices represents not only a significant capital investment but also a significant logistical challenge for maintenance. Each remote device may or may not have an associated warranty and upgrade program. Warranties and upgrade processes can be very difficult to track in an ever-changing communications infrastructure. U of M has embarked on a project to

model interconnect devices as part of the communications infrastructure. Eventually it will be able to mirror the accomplishments at Michigan Tech.

Because the U of M network is not as homogeneous as the network at Michigan Tech, U of M is currently concentrating on completing a database that can relate any virtual network (e.g., VLAN, ELAN, etc.) from one service location to all other service locations. The database will identify the location and status of each interconnect, interconnect port availability, and physical path between all the defined virtual circuit service locations. The major benefit will be that all of this management will be accomplished within the same TMS system U of M

uses to bill their operations and send changes to their telephone switch automatically. (For more about U of M's activities contact Steve Godell, sgodell@umich.edu.)

As individual devices used to provide dial tone or "net tone" become more decentralized and remotely deployed, the length of the actual end-service cable paths becomes shorter. However, the complexity of interconnections becomes far more significant. In the future, the real challenge will be the demand to quickly associate a service location with a device provisioning the service regardless of where it is located, then to isolate communications problems throughout the mesh of intelligent

interconnect devices. The convergence of technologies is molding the two distinctly different communications infrastructures, voice and data, into one network designed to support the transmission of high-speed digital packets throughout a mesh of intelligent interconnected devices that dynamically route traffic based on the availability of bandwidth.

The Importance of Standards

A very important component of managing any communications infrastructure is adhering to the industry cabling standards. Documents published by professional associations such as the Telecommunication Industry Association, the Institute of Electrical and Electronics Engineers, and the Building Industry Consulting Service International can not only help you meet the quality of service requirements of your organization today but can also provide an efficient,

It is not uncommon to be "held hostage" by a few select personnel who believe knowledge not shared equates to job security. The cost of doing business in this type of environment is very expensive and the risk is very high.

cost-effective, and scalable solution for the future. Once standards are implemented, it is critical to maintain the documented records in an online, easily updateable management system so that your efforts do not go to waste and so that you can enjoy the efficiencies that an integrated cable and order system provide.

Processes that are difficult to explain are inherently flawed. Prior to the Phoenix Project, technicians assigned to SIUE had a very difficult time explaining why some systems failed and others worked. The explanation for the deviation in processing work orders or resolving troubles was presented in technical terms and scrambled acronyms. Many of the problems were attributed to bad pairs. People joked about the "gremlins in the conduit" eating the wire. The actual explanation for such a large variation in the time required to process work orders and trouble tickets along with an abnormal, continuous increase in the quantity of bad pairs was a poorly installed and maintained infrastructure.

It is not uncommon to be "held hostage" by a few select personnel who believe knowledge not shared equates to job security. The cost of doing business in this type of environment is very expensive and the

risk is very high. Don't be afraid to ask questions when explanations fail to make sense. If necessary, bring in external consultants to assess the state of the communications infrastructure.

Conclusion

The decision to develop documentation for a communications infrastructure can yield tremendous benefits. Universities with a well-documented infrastructure and good cable management system are actively pursuing and embracing new communications technologies. Some universities, like Michigan Tech, have reduced the turnaround time of a work order from days to minutes. Other universities, like U of M and SIUE, are continually leveraging technology to help reduce operational costs and succeed at working more effectively and efficiently rather than just harder and faster.

Larry Foster is the manager of professional services at Pinnacle Software Corporation. He held previous positions as an assistant director of Information Technology, campus network engineer, and as an instructor in the Electrical Engineering Department at Southern Illinois University-Edwardsville. He can be contacted via e-mail at lfoster@pinsoft.com.



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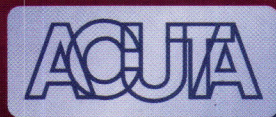
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Interview

Douglas Van Houweling, PhD

UCAID

Douglas Van Houweling, PhD, is president and CEO of the University Corporation for Advanced Internet Development (UCAID). UCAID is a consortium of U.S. research universities, in collaboration with private and public sector partners, currently engaged in the Internet2 project to advance networking technology and applications for the research and education community. Prior to undertaking his responsibilities at UCAID, Van Houweling was dean for academic outreach and vice provost for information and technology at the University of Michigan. Van Houweling has played a major role in the developing Internet environment in the United States, implementing numerous initiatives to establish cooperative information technology efforts among universities.

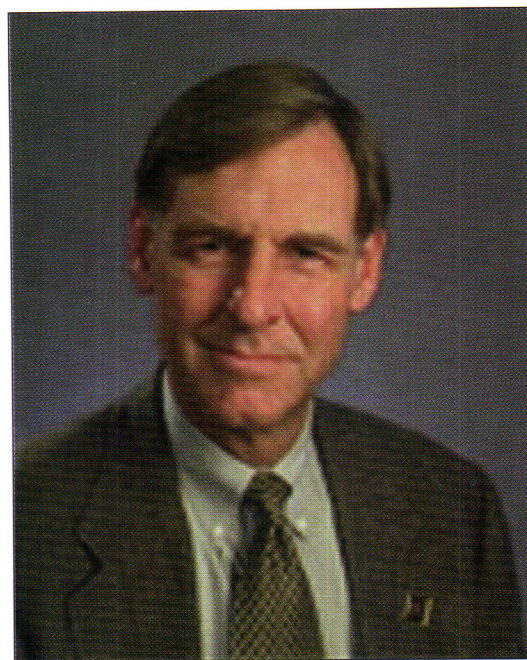
Dr. Van Houweling delivered the keynote address at ACUTA's 28th Annual Conference in July. Publications Committee members Barb Renner, University of Cincinnati, and Dick Kaye, University of California at Davis, had an opportunity to pose a few questions to Dr. Van Houweling about Internet2 and its potential impact on campus telecommunications. That interview is presented on this and the following pages.

ACUTA: Internet2 is sort of a generic term. Aren't there really two different competing Internet2s? Will one win, do they talk to each other now, and will they eventually be completely integrated into one network? Can you explain the difference between them?

DVH: Internet2 actually isn't a generic term. It's a project that has been launched and led by the universities here in the United States. It's proven to be such an attractive name that it's been used by other people around the world. But when we talk about Internet2, we talk about this particular project. The project's objective is to develop new applications and new network capabilities and to transfer those applications and capabilities to the commercial Internet. So we see Internet2 as something that sort of goes away after the project is gone. And what we do with Internet2 becomes part of the commercial Internet.

ACUTA: The original Internet was first a military network and then included mostly academia, but now it is the commercial behemoth we've come to love (or hate). Is this what we want and expect to happen with Internet2? If Internet2 is really the Internet backbone of the future, how will Internet1 fold into it, and when do we expect that to happen?

DVH: As the capabilities that we develop from the Internet2 project become part of the worldwide commercial Internet, that Internet will grow even more rapidly than it has to date. And, if it's a behemoth today, it's going to be an even bigger one tomorrow. I



believe, though, that we're taking a set of steps in the development of Internet2 that will make it easier to manage. In particular, introducing concepts of service quality into the network, and making it possible for the network to be sensitive to the needs of the applications should make this even larger network of the future easier to use and easier to manage.

What we believe is that the original Internet backbone will incorporate Internet2 technology and thereby be a much higher performance backbone. We expect that that will happen in the next two to three years. We're already seeing some commercial backbone networks that use Internet2 technology, and we expect to see more as time unfolds.

ACUTA: How does an institution become classified and officially part of the I2?

DVH: As I said before, Internet2 is a project of U.S. universities and any United States higher education institution that wishes to make a

commitment to participating in the overall Internet2 effort, which includes devoting resources to pushing technology forward, can become a member of Internet2. The commitment is the key. To be a member of Internet2, the president of a university has to sign a letter which says that the university will provide a high-performance network environment on the campus and connect that high-performance network environment to the national high-performance network. In addition, of course, there's a membership fee that universities pay, and member university faculty and staff need to participate in the Internet2 work on each campus.

ACUTA: What is the deployment schedule for Internet2?

DVH: The Internet2 infrastructure is already pretty well deployed. We have two backbone networks. One of them is a very high performance backbone network service that MCI Worldcom provides through a cooperative agreement with the

National Science Foundation, and the second, of course, is the Abilene network that UCAID has developed with Qwest, Cisco, Nortel, and Indiana University. Both of these networks are in operation nationwide, very stable, and today there are approximately 75 universities that are connected to one or the other of those backbone networks. Since the backbone networks are, in turn, connected with one another, if you're connected to one of them, you're connected to all of the other universities that are involved. So, deployment is really going very well at the network level. That allows us now to focus on issues like applications and network control software and so on and what we call middleware, which is where we are increasingly turning our focus today.

ACUTA: Our members are aware of Internet2, particularly as they have been involved in making the connections. What they may not be aware of, however, are the



applications. Can you describe some of the major applications currently using I2 and what is planned?

DVH: Applications that are being developed on Internet2 cover quite a wide range. Typically, though, they all share some characteristics. First, they need an advanced network just to operate. Second, they usually transmit or deal with high-definition or high-resolution graphics or video. Quite often they connect the high-performance computers together. They very often provide researchers and teachers access to each other to help them do their work. So, at one end, we see applications that are focused mainly on helping individual researchers do work.

Using one of these applications that we call data mining, a researcher sits down at a personal computer somewhere in the country. Using Internet2, she logs very large data sets together into a single virtual data set on which she can then do analysis.

For instance, one particular application is trying to understand which kinds of surgical procedures work best in the healthcare industry. Typically, the outcome data for any surgical procedure is spread around major medical centers all over the United States. So if you want to do a national study, you've got to bring that data all together. But you can't bring it all together except virtually. And this data-mining application allows you to do that and to do analysis.

As almost everybody knows, we decided not to build the superconducting super-collider in Texas. So, the high-energy physics community in the United States now does its main experimental work outside the U.S. A lot of it, in future years, is done in Switzerland

at Lucerne. As a consequence, not only do they need to be able to work with their colleagues around the world on these large experiments, they also need to get the enormous amounts of data that come from these large, high-energy physics experiments to be able to analyze it in their own university. And so, getting all that data across the ocean, making it available for researchers in high-energy physics here in the U.S. is another very

What we believe is that the original Internet backbone will incorporate Internet2 technology and thereby be a much higher performance backbone. We expect that that will happen in the next two to three years.

important application. There are sets of tools that those in the physics community are developing to do that.

ACUTA: Internet2 will provide interconnections for scientific and other research. What can we expect in research on networking itself?

DVH: One of the most important requirements for an advanced, high-performance network is that we be able to measure its performance very accurately and precisely. Whereas in a normal, low-

performance Internet, if you drop one percent of the packets, it doesn't usually interfere very much with the application, that's not true in a high-speed, high-performance Internet. If you drop one packet in a thousand, you'd really be in trouble. So what we're doing is deploying very advanced measurement systems around the network. Of course, we do that partly so we can know if the network is performing correctly.

With this deployment, we are also building a very large database of information on how the network performs from one moment to the next, as various things happen to the network. As a result, researchers now have this very rich data resource that they can use to understand how high-performance Internets actually perform in real life, not how they behave in theory. That's an example of the kind of network research that is being facilitated by Internet2.

ACUTA: Are there particular institutions that are doing network research or are all of them?

DVH: There are several special initiatives that are going on around the U.S.; one at UC San Diego in connection with the supercomputing center there, another by a not-for-profit in New York, Advanced Networking Services, which is measuring the performance of given links on a one-way basis. As this all unfolds, we're seeing similar work being done at Indiana University and some other universities around the country.

ACUTA: What have been the results of the Internet2 testbed? Is there hard data to look at or review?

DVH: I guess we think of all of Internet2 as a testbed; we don't think of a separate Internet2 as a

testbed. The use of the Internet2 capabilities has really begun in earnest in the last six months. The very high performance Backbone Network Service was there before that, but it was primarily connecting supercomputing centers, not being used for a broad set of applications. So I would say that right now we are just at the beginning of gaining useful experience about how universities can use these high-performance networks. Probably, if you ask me the question about what's the result six to nine months from now, I'd be able to tell you quite a bit more. But today the important thing is that the testbed seems to be working well; that is, the network stays up, it performs well. And there's an increasingly large number of faculty and students and staff of university members who are using it on a regular basis.

ACUTA: Video has been a favorite of distance learning for over a decade now. How is I2 supporting video applications for instruction, research, telemedicine, etc.?

DVH: This is a major focus of Internet2. We have a digital video initiative that involves probably 30 of our member institutions. We've put in a very large digital video server facility together with IBM in the suburbs of Chicago. We're now positioned to serve video at high-performance, meaning high-definition, video wherever Internet2 goes. Furthermore, we just tested the use of multicast protocols in Internet2 about a month ago, which means that one server can literally serve millions of users if there's some kind of video you want to broadcast to a large group of people in an efficient fashion. That capability is just in place. We've tested it in segments of our network, the backbone. We anticipate that broadcast-quality

video will be a very important component in Internet2.

Then, of course, the use of video for supporting people working together is another very high-priority issue. We have any number of disciplinary research communities that are exploring that. I mentioned earlier the high-energy physicists. They need to get together worldwide to talk about their results. We also now have under development a consortium of universities and research labs working on developing an AIDS vaccine. They're going to use these capabilities to help them do that work as well.

ACUTA: What are your thoughts on storage and retrieval of material used in the video applications?

DVH: Some of the most exciting things we've seen actually is the work of some of our members, in

particular, Carnegie-Mellon. They've actually developed an application that takes off-air video from the news channels and indexes it and makes it possible for you to go in and search. For instance, you can type in the word *Kosovo* and it will retrieve for you all the video clips that contain the word *Kosovo* and display those video clips for you on the screen. Then, you can actually click on the still, a thumbnail of the video clip, and immediately you see the video and you hear the person talking. The dialogue runs by, underneath the screen. You can actually put it in a mode that fast forwards. Say it's a five-minute clip and the word *Kosovo* is mentioned once at the beginning and once at the end. You can actually put it in a mode that jumps ahead to the next place on the video. So, it's a fascinating



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application in making possible access to information in the video format.

I'm confident these techniques will be used for much more than just indexing the news. Think if you were doing a review for a final exam in a course and you wanted to hear the times the professor actually mentioned a subject. You could do that and sort of get a review of what he said about the subject.

ACUTA: While the backbone is high speed, do you envision users that range as low as RealPlayer to MPEG-2 and higher being able to draw from storage?

DVH: Yes, in fact the storage is optimized for high-speed, high-bandwidth use because that is what Internet2 is all about. We use MPEG-2 as the main compression technology for that purpose.

ACUTA: How about hierarchical organizational studies for storage and retrieval?

DVH: Yes. We have a digital storage initiative which is actually an effort that's designed to allow us to put a more hierarchical and efficient storage structure in place to support the distribution of video. What we're trying to do is to keep it technologically hierarchical but not make it organizationally too hierarchical.

ACUTA: The question of funding for the Internet is surfacing a lot these days. In regard to Internet2, what are the plans for funding the full deployment of the network?

DVH: One of the things that an institution commits to when it joins Internet2 is that it will use its institutional funds to pay for the on-campus deployment and pay its fair share of the national deployment. So far, we've got 159 members signed up, and they've all agreed to do that, so I think we're

in good shape on that funding. The federal government has had a program through the National Science Foundation that provides grants to help institutions get started on that process, but that program is now coming to an end. So, it's going to be mainly funded by universities and colleges which join. Fortunately, our corporate members have been very generous in donating routers and other kinds of networking gear to our university members—by now, over \$40 million worth. That has substantially reduced the cost of deploying the network.

ACUTA: What is your assessment of the condition of our networks as we enter the 21st century?

DVH: Our networks are in better shape than they've ever been. There was a lot of talk a year or two ago about how the Internet was going to collapse and so on, and of course, it hasn't happened. Because of the work that we are doing in Internet2, we are now developing even better techniques to make the network stable and perform better. So, I think the Internet today performs a lot better than it used to, and I believe that two or three years from now it's going to be very stable and reliable indeed.

ACUTA: What would the network be like today if Internet2 didn't happen?

DVH: I don't think today's Internet would be enormously different, because the Internet2 project really hasn't been going that long. But, we're already seeing across the world much larger levels of investment in high-speed networks and high-speed network connections. Not just for universities but for other organizations as well. I believe that's at least partly because people understand that the Internet2 effort is going to lead to

more applications and better technology to support those high-speed applications.

ACUTA: How should ACUTA members prepare themselves for their involvement in Internet2?

DVH: Obviously, if you're on a campus where you want to participate in advanced networking, join the Internet2 project. But, if you're not, then I think the right thing to do is to pay very close attention to the work that is going on in the regional academic networks across the country. Do this because almost every one of those regional networks is anchored by several universities that are members of the Internet2 project. They're busy deploying the technology in their region to reach the other schools. I think that this technology will ripple out as it becomes less experimental to the broad range of schools. The important thing is to stay aware of what is going on.



Correction

In the summer 1999 issue of the *ACUTA Journal*, two names were inadvertently omitted from the credits at the close of Dr. Ron Kovac's article entitled "Pursuing the Promise of the Paperless Office." Dr. Kovac would like to acknowledge the assistance of students Julie Gentry and Gregg Hanson, participants in the Document Imaging and Management class and co-authors of the article.

Institutional Excellence Award Winner: Central Methodist College

As winner of the prestigious Institutional Excellence in Telecommunications Award in the small school category, Central Methodist College was honored at ACUTA's 28th Annual Conference for its TeleCommunity Center. This article was adapted from material submitted for the award.

Fayette, Missouri, located about 30 miles northwest of Columbia, may never be considered the high-tech center of America; but due to the vision and creative partnering of Central Methodist College (CMC) and Southwestern Bell, people of all ages in this rural midwestern community now have a better foothold on the future. They call it the TeleCommunity Center, and they come from miles around to take advantage of what it offers.

For the neophyte or technophobic, the center offers classes in the basics of computing. "Most people come to the Center to take our classes," says Rod Koelker, director of technology at CMC who heads up the day-to-day operations of the center. "We encourage people to learn how to use the equipment so they can work independently, and we work

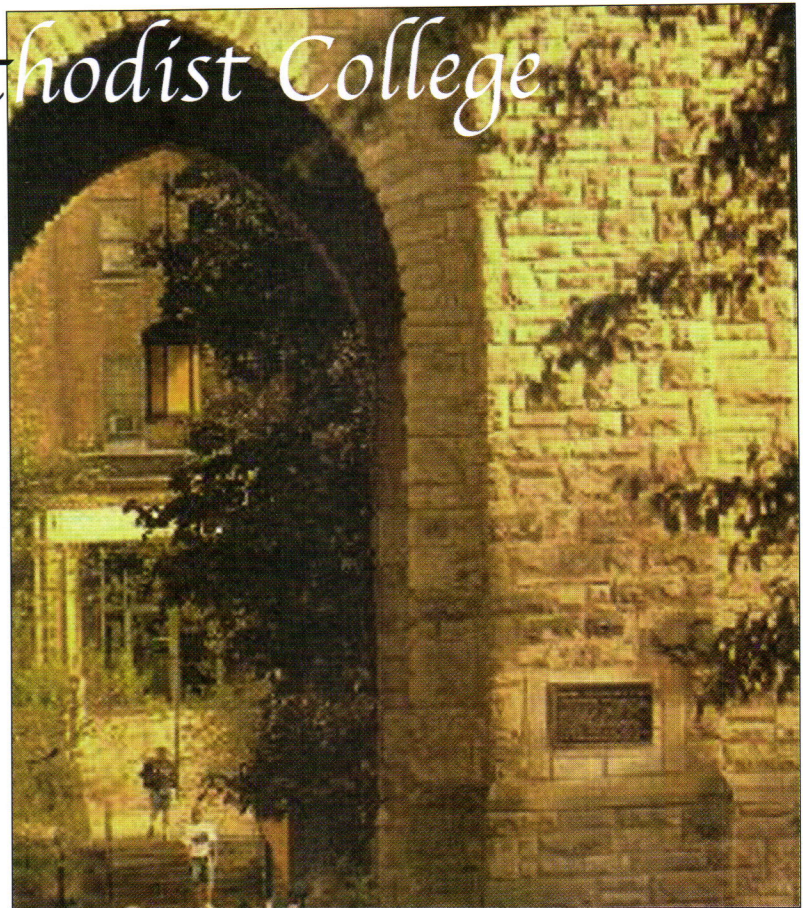
closely with them to make them comfortable with the technology.

"In order to keep the overhead down, the center relies on volunteer technical trainers from the community and student body," says Koelker. "These individuals go through a regular interview process and, when approved, attend a train-the-trainer course that gives them the resources necessary."

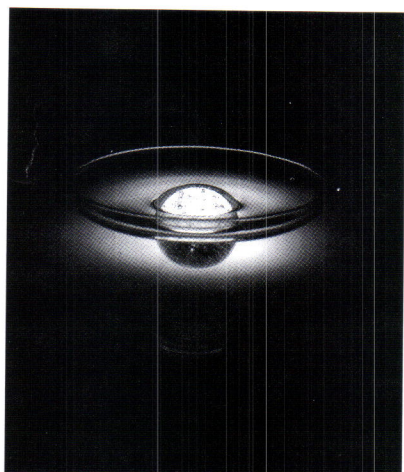
Since the center opened in December 1996, 872 classes have been taught to over 6,000 attendees. A typical day sees two classes along with drop-in traffic which comes to access the Internet or work on personal projects.

The TeleCommunity Center also provides "assistive technology" designed to help individuals with various disabilities, from the blind to the immobile. As the equipment continues to improve, the center allows these individuals to sample a selection of technologies without the disappointment of having to purchase a product only to find out it really does not meet their needs.

One of the more exciting technologies available at the center is video. According to Koelker, video conferencing services have been used to make contact with military personnel away from home, conduct job interviews, take court



Institutional Excellence in Telecommunications Award



Lee Thomas Photography

The Award for Institutional Excellence in Telecommunications is ACUTA's most prestigious award, recognizing telecommunications excellence and professionalism. Winners are selected by the ACUTA Awards Committee on the basis of the telecommunications department's contribution to and support of the mission of the institution. Applications are evaluated on the basis of scope and complexity of the endeavor, technological leadership, benefit to the institution and key constituents, and demonstration of excellence and professionalism.

Information regarding this competition for 1999–2000 will be mailed to all member institutions in December. Details can also be found on the ACUTA Web site at www.acuta.org.

depositions, and implement distance-learning applications. During a virtual visit to the Space Center in Houston, children from rural Missouri were able to talk with NASA engineers and see the astronauts working on a full-size model of the Space Station.

Another benefit of the center is that the students, faculty, and community are allowed to check out smaller items of equipment to facilitate various projects. Although this places the equipment at some risk, the benefit of exposing individuals and organizations to various forms of technology far outweighs that risk. In this and other ways, the center offers the college an additional connection to the local community, helping to bridge a gap that exists between many towns and the institutions located within their boundaries.

"Technology has opened so many doors for all of us," says Koelker. "It's very gratifying to have a hand in providing access to the world for my friends and neighbors."

The Center's Beginning

Planning for the Southwestern Bell TeleCommunity Centers (there are now six of them in Missouri) actually began in 1991. Recognizing that technology was going to become a major discriminator among the citizens of Missouri, Southwestern Bell Telephone and the Coro Fellows (a nonprofit, nonpartisan organization that conducts training programs in public affairs) collaborated to research what was needed and how best to meet the growing needs of their customers. The outcome, after years of planning, was the TeleCommunity Center.

All the centers are unique in that they offer their technology, staff, and expertise to the community for free. "To our knowledge," states Koelker, "these are the only centers of their kind in the nation, and their success has surpassed the expectations of company executives, stockholders, community leaders, and industry partners."

A number of organizations risked not only their investment but also their reputation to participate in the venture, including Southwestern Bell, Microsoft, Compaq Computer, Apple Computer, a variety of software companies, and CMC.

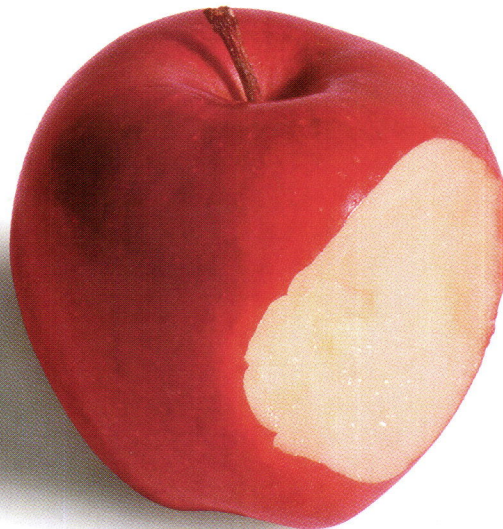
Benefits to the College

For CMC, the center presents an opportunity to establish itself as a leader in the fields of continuing education, community outreach, and technology leadership. "Our mission is to integrate a high quality liberal arts education and professional preparation to promote lifelong learning, social responsibility, and service," says CMC president Marianne Inman. "The TeleCommunity Center contributes in many ways to the accomplishment of this mission."

For a small, private, liberal arts college in the Midwest, this is just one example of the can-do spirit and educational leadership which makes this organization so successful.

CMC currently has two regional campuses. Having the center on the main campus facilitates a low-cost expansion and additional entry in the nontraditional student market. Among the goals for CMC as a partner in the center are an expansion of

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its outreach, an increase in traditional and nontraditional student enrollment, and further facilitation of adult learning initiatives using the center and its distance-learning capabilities.

CMC is a partner in the Missouri Interactive Television Education Network, which reaches several area public school systems spread out over a large rural area, according to Koelker. "With two additional dial-up facilities connected to the center," he adds, "CMC has the flexibility and capability to send and receive three programs at the same time. For a school with an on-campus student population of 1,300, this can be a significant source of revenue if committed correctly. The Board of Curators and college administration are currently planning to establish a Division of Adult Studies. We see the TCC becoming a welcome member of this team and division."

Community Benefits

All of the TeleCommunity Centers were evaluated after their first year of operation by the Coro Fellows Program, an independent organization. They interviewed employees and representatives from each of the centers. They evaluated the media coverage that had appeared in print. They conducted a critical analysis of prior studies about the impact of community technology centers similar to the TeleCommunity Centers. And they completed a survey of 100 members chosen at random. The results,

presented in a statewide video-conference that included all the centers, revealed increases in the use and purchase of technology, increased interest in the pursuit of more formal education, and a positive impact on the personal and professional lives of those who have visited the center.

The TeleCommunity Center currently operates through funding from the partners of the consortium. All services and benefits to the students of the institution and the community at large are offered at no charge. According to Koelker, as part of its next phase of growth, the center is pursuing additional sources and partners with the intent to continue all of its services at no cost to the community.

Conclusion

New construction was not chosen to house this state-of-the-art technology center. Rather, it is located in historic Cupples Hall, a building that dates from 1899 and is listed on the National Register of Historic Places. Housed in a building that represents the strength of tradition, the center is actually a metaphor for the college as a whole: Rooted in the best of our heritage, the institution serves the present with distinction as it is focused firmly on the future. Both the college and the community are proud of the exceptional opportunities and capabilities represented in the TeleCommunity Center.



Executive Director

continued from page 48

includes other companies in the telecommunications industry.

Finally you can also respond to a call for presentations, sign up to be a session moderator or monitor, and check the latest agendas for ACUTA educational programs via the Web site.

We are proud that the ACUTA Web site was selected as a "World Class Web Site" of associations in a study sponsored by the American Society of Association Executives Foundation.

The Journal of Telecommunications in Higher Education, which debuted in Spring 1997, has continued to be a major focus. Four quarterly issues were published, with positive feedback regarding content and excellent advertising support. The *Journal* is entirely self-supporting. Maintaining and improving the quality and relevance of the articles in this publication will be an ongoing focus of the publications committee and the staff.

We have continued to **strengthen relationships and information exchange with other professional associations** in higher education and telecommunications. Through these activities we have increased ACUTA's visibility, and the association is recognized as a resource for information on technology in higher education.

The professional staff team is committed to continually promoting ACUTA's place in a dynamic higher education and technology environment, and continuing to meet your changing needs.

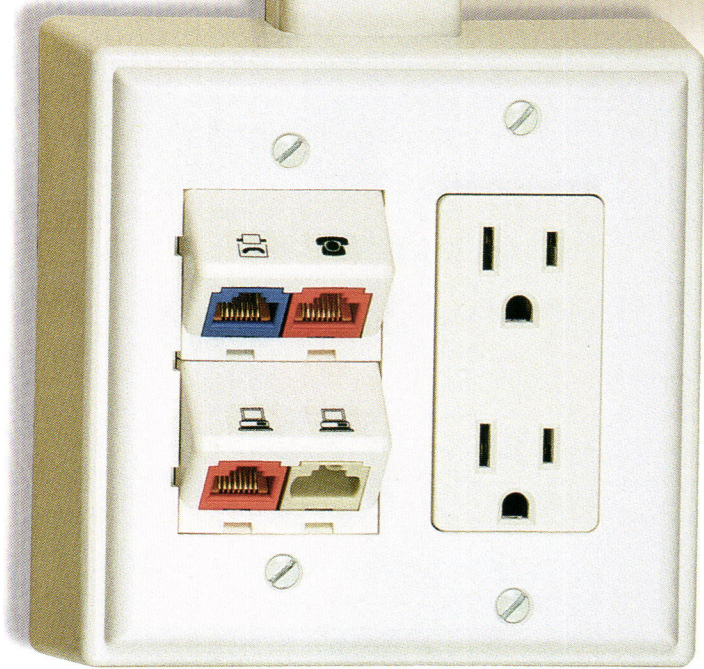


Advertiser's Index

Amtelco	9	NEC America	4
ASD	14	Optus Telequip	Inside front cover
AT&T	Inside back cover	Panduit	47
Berk-Tek	11	Physical Optics	Back cover
Compco	27	SpectraCorp	19
Ericsson	5, 7	Startel	45
Hubbell	17	Switchview	29
Interalia	13	World XChange	35
MiCTA	41		



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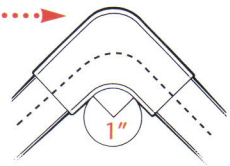
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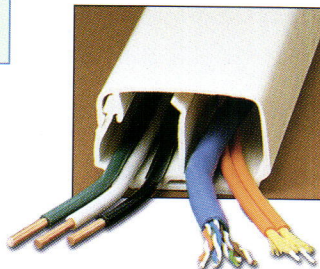
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From the Executive Director

Jeri A. Semer, CAE

Each year at the annual business meeting, I have the pleasure of presenting a summary of the past year's activities in the ACUTA headquarters office. Since not everyone was able to join us for the conference in Nashville, I would like to share some highlights of this report, including some ongoing efforts and new developments that you can expect to see in the coming months. If something piques your interest or stimulates any questions, I hope you will contact me at jsemmer@acuta.org or at the ACUTA office.

In another active year for the ACUTA office, we have continued to **add to the services** we offer to our members. I'm happy to report that ACUTA **membership has grown** during the past year. As of May 31, we had added seven more institutions (810 total) compared to the previous year. Total membership of corporate affiliates remained steady at 177 companies, but we had a net increase of three silver and two gold company memberships. Just as important, we retained over 92 percent of our members from the prior year—evidence of satisfaction with the return on your dues investment.

In 1998 we finished a **major strategic planning effort**, culminating in a new mission statement, goals, objectives, and action items. Due to the rapid changes in higher education and telecom, we have already updated the strategic plan in 1999. The committees and staff have been working on action items from the new plan, and we've made real progress in accomplishing our goals.

We've also been working to **develop new programs and services** and refine the existing ones to meet your needs in the coming years. These efforts are based on the member needs assessment survey completed just one year ago in July 1998.

We've also focused on **improving your electronic access to ACUTA resources** by expanding and improving the Web site. ACUTA's homepage was introduced July 1, 1995. Since that time, we have had over 65,079 separate visits to the site—26,000 of which occurred in the past year.

An all-new ACUTA Web site was unveiled in Nashville. The new site is built on a dynamic new software platform and is designed

to be more interactive and easier to navigate. It will be continually updated by drawing directly from the association's databases. Later this year you will be able to access the facilities and services information, and those who responded to the facilities and services survey will be able to update information for their campus online.

Another feature we added this year is **audio and video highlights of the ACUTA seminars and conferences**, including seven sessions from the Nashville conference. I hope you and your colleagues will check out the site to enjoy some of the general sessions and breakout sessions. Of course, there is no charge for this feature.

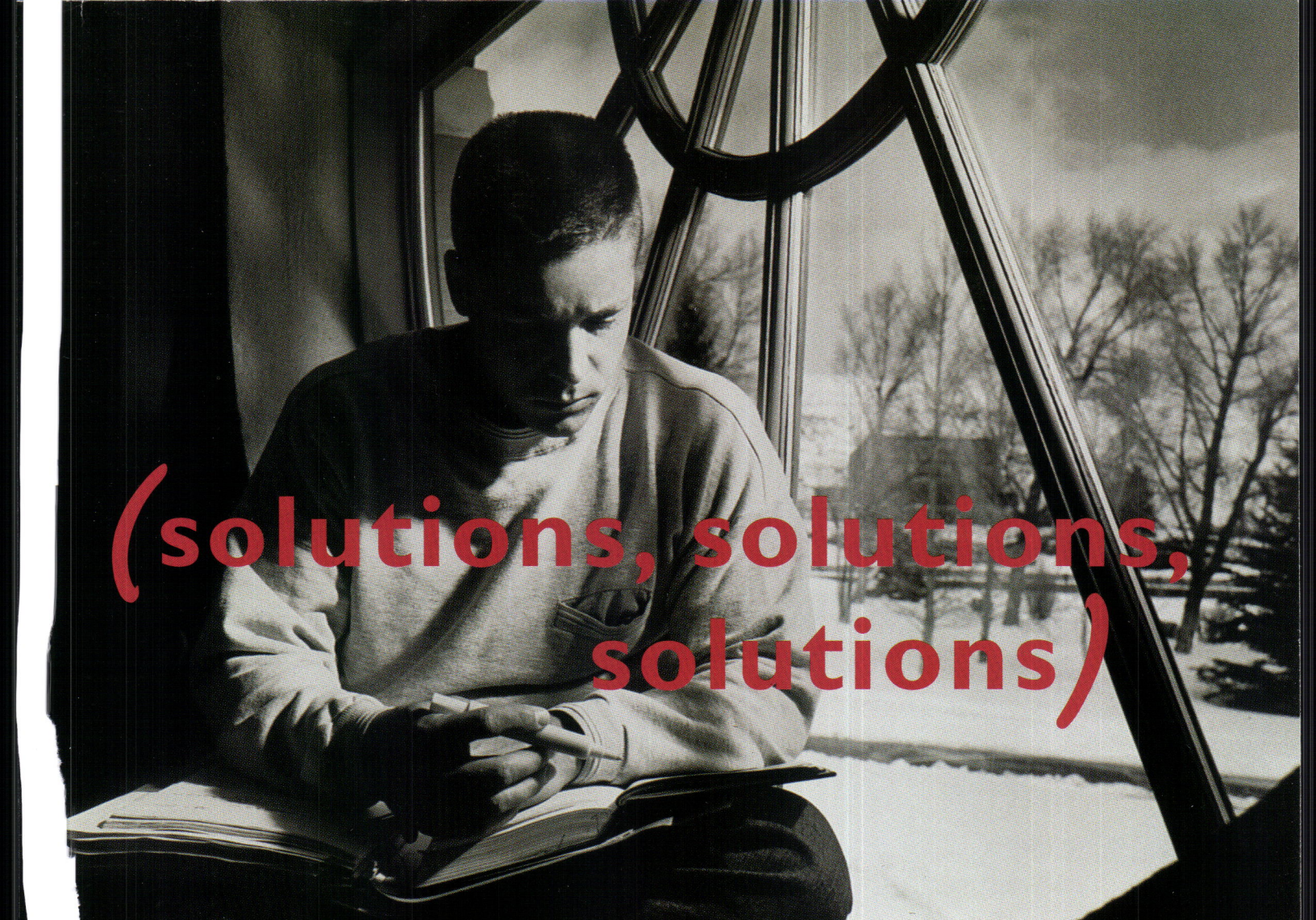
We will also continue to update the regulatory information that you need to keep current regarding potential effects on your institution.

We also changed the software that we use for listserv administration during the past year. What that means to you is that you can more easily subscribe and unsubscribe yourself from the telecom listserv via the ACUTA Web site, and you have more options for reading listserv messages—either via e-mail or by reviewing them on the Web at your convenience.

We have also **expanded the job postings area** on the Web. In fact, the number of job postings outgrew the ACUTA newsletter, so we're maintaining a complete and up-to-date listing on the Web and printing just a few in the newsletter.

I hope you are using the **online Products and Services Guide**. This database enables you to search for companies offering a product or service that you need. It features ACUTA corporate affiliates who support the association in many ways, but it also

continued on page 46



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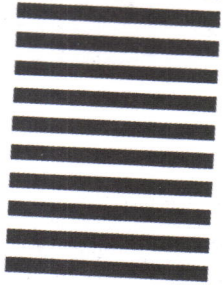
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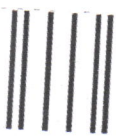


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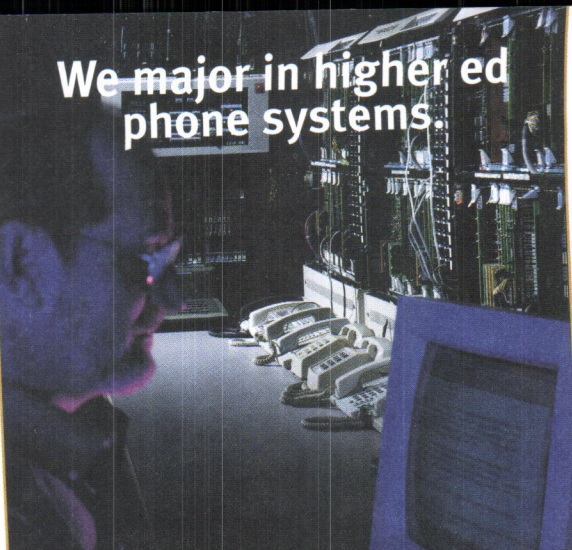


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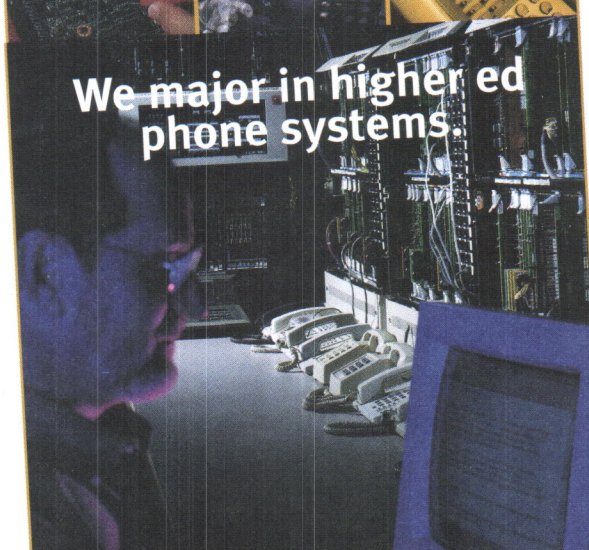


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