The last major overhaul of U.S. federal telecommunications laws occurred nine years ago, with the Telecommunications Act of 1996. Now Congress—along with the Federal Communications Commission (FCC), state and local governments, and a cast of thousands representing the interests of the telecommunications industry, its customers, and many other stakeholders—is reopening the reform debate. This time around, a central theme will be the Internet, which was barely mentioned in the act of 1996. And this time around, higher education has a particularly high stake in the outcome.

Colleges and universities are both major customers and major suppliers of telecommunications and information services. More important, they are banking on the rapid deployment of an affordable broadband Internet that connects everyone, everywhere. Although nearly all parties in the telecommunications debate support the goal of extending broadband Internet services to everyone, they differ substantially in how to do so. These differences in tactics and details are what will make up the heart of the debate on telecommunications reform.

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Broadband Everywhere

One factor pressing the issue of access to broadband networking is the very public example of the many already-connected colleges and universities, businesses, government offices, clinics, and private citizens that have developed an astonishing array of products and services based on this new form of communications. Not that long after colleges and universities learned to mount a course syllabus on the Web, it became feasible to offer the entire course, complete with sound and full-motion video, online discussion groups, shared data repositories, and specialized interactive tools of the discipline. Such online courses can greatly extend the geographical reach of higher education, increasing the availability and flexibility of educational opportunities for potential students. Such courses can also improve the quality of the education, even for students residing on a single campus, by providing more active learning experiences, access to a richer set of supporting materials, and more frequent opportunities for discussion.

Over the last decade, broadband networking has enabled the transformation of many types of academic research into global “team sports,” based on networked collaboration systems that link investigators, instruments, data, computers, and specialized professional tools. These advances can improve the quality as well as the pace of research by extending the circle of participation. The same broadband networks can provide almost immediate access to the process and to the results of research for use in education. Meanwhile, academic libraries have been undergoing a major transformation of content and culture based on broadband access to vast online repositories. These are expanding to include whole new types of content, such as the collected, high-resolution observations of major telescopes for online viewing and analysis. The recent agreements between Google, Stanford, Michigan, and Oxford will transform the way existing academic information is discovered and compared, as will the rise of data mining in the academic environment. And of course, colleges and universities depend on broadband networks across and between campuses to perform daily operations, to provide services to those off campus, to recruit future students, and to stay in touch with alumni.

In short, higher education has learned how to capitalize on broadband networks to strengthen and extend the reach of its core activities. Colleges and universities have networked their campuses to support these new capabilities and have invested in broadband pathways that interconnect their institutions. What higher education cannot do by itself is provide broadband connections to the millions of potential participants who remain “off net” in rural or underserved parts of the campus communities. Only when everyone has broadband connections can higher education offer its new, networked services to all. The good news for colleges and universities is that since broadband networking has been embraced as a critical ingredient for government services, workforce development, health care, economic development, and global competitiveness, higher education has many allies in its quest.

Broadband Now

Another factor promoting broadband access for all is the fundamental change in the economics of this situation. Until very recently, extending the reach of broadband networking everywhere was not considered economically feasible. The only two-way communications link that has reached nearly everyone has been the wired telephone system. But this system was designed and built for POTS (plain old telephone service), not broadband...
networking, especially in the “last mile” connections to the residence.

In recent years, telephone services have been augmented with newer DSL (digital subscriber line) technologies that can offer an initial version of broadband networking, but only for a limited distance and at much lower speeds than are typically seen on campus. At the same time, many cable television systems have been upgraded to support an initial version of broadband using “cable modems,” though again at a slower rate than supported on campus. Although neither of these services extended broadband networking very far from populous areas, both have been successful in fueling a demand for ever-faster connections as business, government, education, and individuals all began to offer a rich array of services that depend on broadband capabilities for voice, music, photographs, and video. Both telephone and cable television companies are now in the process of updating their equipment to improve the speed of their initial broadband connections, and some rural and urban communities have taken it upon themselves to establish broadband networks where private industry has not made the investment. (It must be noted that quite a few other countries have found the will and the way to deploy broadband networking everywhere through policies of government incentives and/or subsidies.)

Much of the excitement in networking over the last two years has involved a set of new, wireless technologies that can support broadband access to remote areas at a dramatically lower price point, since they do not require the expense of pulling a new wire or optical fiber to a distant location. This breakthrough has spurred many more rural and urban communities and start-up ISPs to consider establishing new networks where industry has not invested. Similar wireless services can be established for a relatively low cost in cities that are already wired, providing much-needed direct competition in broadband services. Still others are experimenting with delivering broadband services over power lines, which already span the last mile, or through satellites or with new optical fibers pulled directly to the home. Meanwhile, the prices of networking equipment have plummeted due to the economics of mass-produced digital electronics. The combination of all of these factors makes broadband for everyone a feasible goal today.

The Triple Play

Perhaps the biggest incentive for private investment in new broadband technology is the lure of the “triple play”—that is, using a single communications system to
Done right, telecommunications reform would present higher education with major opportunities by rapidly concluding the deployment of an affordable broadband Internet that can be used by anyone, anywhere.

deliver voice (including telephone), video (including television), and data. Not possible with slower, traditional technologies, the triple play is now in reach, since all three forms of information can be expressed as streams of digital “bits” that can be carried successfully on a single broadband network. Telephone companies are introducing digital television services. Cable TV companies are adding telephone services. Independent broadband Internet service providers (including campus networking departments) are offering video and voice as well as data.

The triple play is an example of convergence, a development in which previously separate technologies merge into one. In this case, convergence offers several dramatic advantages. There can be a substantial cost savings to the operators in the long run, since only one system needs to be designed, manufactured, delivered, installed, maintained, upgraded, and billed. (Of course, an initial investment or upgrade may be required to achieve convergence in existing systems.) In locations where there are already separate services, such as telephone and cable television, the triple play can lead to direct competition, almost always a significant benefit to the consumer. Finally, the operators of converged systems have at least the opportunity to earn revenue on the content itself (e.g., television programming) and not just on the underlying communications system. The triple play drives investment in broadband networking because a slow network or dial-up Internet service simply cannot meet the demands of the traffic. The triple play is certain to fuel customer demand for broadband as the new digital television and voice services offer consumer-friendly features such as Web-based customization of call processing and video-on-demand—services that are not available with legacy telephone and television.

Higher education institutions, as major providers of telecommunications services on campus, will also profit from the cost savings of convergence in the long run. They are already benefiting from dramatic reductions in the prices of commercial services purchased and will eventually benefit from the flexibility and cost savings (at least per unit of service) in the operations of their campus communications systems as these converge into the campus data network. Currently, however, most colleges and universities are reflecting the telecommunications environment at large: that is, they are operating old, separate, legacy systems side-by-side with new, production broadband networks, while experimenting with convergence.

Why Telecommunications Reform?
So, technological innovations are leading to dramatic changes in the communications environment, changes that in turn will present important new opportunities for higher education. What needs reforming in this rosy picture? The answer is that reform is needed not for the technologies but for the laws and regulations that govern the use of the technologies. The present laws and regulations evolved in a very different communications environment, one in which telephone, broadcast radio and television, and cable television service were delivered through separate and different technologies supported by distinct industries. Current laws and regulations require difficult and sometimes contradictory interpretations when faced with newer technologies and, especially, with convergence itself. They may have the effect of subsidizing old technologies at the expense of innovation, may favor newer technologies with unequal tax advantages, may distort the competitive operations of the market, and may inhibit wary investors.

This hurts customers (including higher education) at the bottom line, but more important, it impedes the further deployment of the broadband networking that higher education needs to reach future students and colleagues. The billions of dollars at stake mean that there is intense pressure on Congress to take action (or not) on all sides of each issue. Most policymakers agree, however, that the rapid and complete deployment of broadband networking in the United States is critical to continued economic development and global competitiveness, and so some version of reform is essential.

Done right, telecommunications reform would present higher education with major opportunities by rapidly concluding the deployment of an affordable broadband Internet that can be used by anyone, anywhere. Imagine a world in which no one is precluded by geography from benefiting from and contributing to campus programs of education, research, and service. Collaboration tools, now used only by students and faculty on campus or in those off-campus locations served by fast broadband networking, could be used by anyone, anywhere. Access to extensive repositories of information would be fast and easy anywhere. Institutions of all types would accelerate the evolution of their innovative, online services in the knowledge that they could be used to serve everyone. The design and operation of on-campus communications services would be simplified. Higher education would have the choice of more commercial services competing on quality and price. In short, there would be great improvements in key systems that campuses use to support core activities.

Done wrong, telecommunications reform could present higher education with major challenges. Broadband deployment to underserved areas could be slowed, if not stopped. Local and state governments (and even institutions of higher education) could be prevented from deploying new networks in their communities even though incumbent providers choose to focus on more profitable markets elsewhere. Historical taxes and fees on legacy telephone service could dwindle without replacement, placing great pressure on the programs of universal service, 9-1-1, and other social benefits. Major government subsidies for telecommunications services
Over the last decade, broadband networking has enabled the transformation of many types of academic research into global “team sports,” based on networked collaboration systems that link investigators, instruments, data, computers, and specialized professional tools.

could remain directed, as they are now, to legacy telephone connections, slowing the rate of convergence. Prices could be set artificially high in the absence of real market competition. Providers could try to limit and control the content on the network. The Internet could become Balkanized, with full access to all information and services available only in certain locations.

In the latter scenario, colleges and universities would continue to contend with broadband haves and have-nots and would be forced, as they are now, to develop and maintain separate and unequal systems at additional cost. In the future, as now, campuses would not be able to well serve or benefit from the intellect of a significant portion of the nation. Legacy systems that are simply unable to support future tools of education and research would remain in place long past their time. Investments in telecommunications research would be slowed, limiting the deployment of innovative products. Higher education, a foundry of network innovation, would be forced to continue to go it alone in important aspects of telecommunications.

Problems with Current Telecommunications Law
Over the last century, numerous telecommunications services have been introduced: the telephone, broadcast radio and television, cable television, satellite television, and the cell phone. Each relied on its own technologies that were developed and supported by new and separate industries. Customers bought connections to each service and used the services for discrete purposes. U.S. telecommunications law, codified in the Communications Act of 1934, evolved in parallel with the underlying technologies, treating each as a special case, with sometimes very different rules. The Communications Act was modified by the Telecommunications Act of 1996. The Telecommunications Act is divided into several titles: Title II covers traditional wired phone service; Title III covers communications over the airwaves, such as cellular phones and broadcast television and radio; Title VI covers cable TV (see Figure 1).

Each title spells out distinct rules for that communication service. For example, under Title II, telephone service providers are taxed on their revenues from interstate and international calls to support the Universal Service Fund (USF), which collects money from profitable urban areas and subsidizes phone service in (mostly rural) areas where it might otherwise be unaffordable. Telephone service providers are required to interconnect with each other, to compensate each other for completing certain types of calls, and to open their networks to rival service providers at rates set by the government. Under Title VI, cable television providers have programming “must carry” rules and pay as much as 5 percent of their revenue to local governments under required franchise agreements. The remaining titles establish many other regulatory distinctions.

The introduction of the Internet marked the beginning of a major shift in the communications market, from one of networks that provided distinct services in monopolistic environments to one of convergence and competition. Telephone, cable, and cellular companies all got into the Internet service provider (ISP) business, forcing the question of how Internet services should be classified. The Telecommunications Act of 1996 resolved this question by defining a new category called “information services.” These are services—including voice mail, financial data transmissions, and the Internet—that are built on top of telecommunications services using computer transactions. (“Telecommunications services” are based on phone-to-phone communications and are defined as voice communications offered to the public for a fee.) Regulatory parity between ISPs has been maintained by leaving information services, regardless of the kind of network over which they are carried, unregulated. Until now, this has been a basically sound policy because offering an Internet connection had not directly challenged a competitor’s core business.

Voice and Video over the Internet
In 2004, Voice over Internet Protocol (VoIP) became commercially viable and rocked the communications policy
world. Unlike previous Internet services, it defies the “information services” policy distinction and puts two communications giants—the telephone industry and the cable industry—in direct competition for a fundamental service: voice communications. Reversing the challenge is Video over Internet Protocol (IPTV), which will allow telephone companies to enter the video business and offer services comparable to those of cable TV.

Regarding VoIP, Kevin Werbach, founder of the Supernova Group and assistant professor of legal studies and the Wharton School, stated: “VoIP breaks the mold. It is voice as a data service. Considered another way, the 1996 Telecommunications Act assumes that data applications operate on top of a regulated voice network. VoIP, by contrast, delivers voice on top of an Internet protocol data channel, which can run on any type of digital network.” What does this mean for traditional telephone service providers? It means that one of the most highly regulated industries in the country will begin to lose its long-standing customers to a voice service that can be offered more inexpensively, free of taxes and regulation, by any broadband ISP. But this is not just a crisis for the telephone companies. Taxes and regulations on phone service have provided many valuable public services that will also be fighting to survive as consumers migrate to VoIP. These public services include the following:

1. Facilitating the ability of law enforcement to wiretap and gather information from voice communications (Communications Assistance for Law Enforcement Act, CALEA)

IPTV offers similar challenges. Local governments generate funds and exert control over programming through franchise agreements with cable companies. Should IPTV providers also be required to sign franchise agreements? Should franchise agreements be nationalized or eliminated? What happens to the “must carry” rules for local programming?

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Higher education has long played a direct role in the evolution of telecommunications through the development and deployment of advanced networks, information repositories, and online applications that support and transform its core activities. Colleges and universities have often hosted the first demonstrations of the power of broadband networks and the value of advanced applications for education and research. These activities have been the primary founding rationale for numerous associations and coalitions, including the Coalition for Networked Information, Internet2, EDUCAUSE Net@EDU, the NSF Middleware Initiative, the EDUCAUSE Learning Initiative, National LambdaRail, numerous distributed research grids, and a wide variety of regional, state, and municipal networks. The most successful of these projects have influenced the direction of the entire industry in technologies, products, and business models.

Higher education's historic leadership in broadband deployment is having a profound effect on the current debate surrounding telecommunications reform, in which many of the starting points now taken for granted reflect what was once the minority view of Internet visionaries. But as interest in telecommunications reform intensifies in the policy arena, higher education must take an even larger and direct role in the debate. The policy issues have been tracked in the EDUCAUSE Policy Program for over eight years and have become the focus of the Broadband Policy Group of Net@EDU. In 2004, this group developed a white paper, “Broadband America: An Unrealized Vision” ([http://www.educause.edu/LibraryDetailPage/666?ID=NET0409](http://www.educause.edu/LibraryDetailPage/666?ID=NET0409)), which laid out the relevant policy issues for higher education and proposed a corresponding set of principles to inform policy positions. On June 6, 2005, a synopsis of these principles was published in a special telecommunications issue of Role Call magazine (see Figure 2). This announcement marked the agreement by a core group of higher education leadership associations on the importance of this issue to the community.

Broadband networking is widely recognized as a critical success factor for education, government, commerce, workforce training, economic development, and global competition. Yet the United States, where it all began, trails many nations in the deployment of broadband Internet to all citizens. Much of the problem can be directly attributed to issues of federal policy. There is no clear policy agenda to achieve affordable broadband connections for everyone. Existing laws impose artificial barriers to competition through unequal taxation and regulation. The traditional classification of services for purposes of regulation causes uncertainty, discouraging investment in new services and slowing innovation. Current policy reflects a legacy of monopoly providers of distinct services more than the converged environment that already exists, much less the open and fair competition that is needed for the rapid and robust emergence of next-generation services.

The stakes are high. The time is now for higher education to up the ante in the telecommunications reform debate. C

Notes
1. The term broadband here is not precisely defined, but it certainly presupposes a network that can carry several streams of full-motion, high-resolution video, high-quality voice, and significant data streams to and from every location. Requirements can only grow as new applications of broadband networking are introduced in the coming years.
2. Kevin Werbach, e-mail communication, August 3, 2005.
3. Representatives of EDUCAUSE, Internet2, ACUTA, and now the presidential associations and their member institutions are joining forces to inform policymakers of common interests. Activities include presentations and articles in the annual and regional meetings and in the publications of these various associations, in addition to informative communications with Congress and the FCC. A record of these efforts and progress can be found at [http://www.educause.edu/policy].

Figure 2

**National Broadband Internet for Education and Innovation**

America needs a secure, affordable, fast, and improved Internet so that anyone, anywhere will have access to higher education.

To accomplish this we must:

- Make high-speed access open to all
- Support state and local networks
- Create a level playing field for competing technologies
- Support R&D to continue to enhance the Internet

[www.BroadbandForHigherEducation.org](http://www.BroadbandForHigherEducation.org)

American Council on Education ➔ Association of American Universities ➔ American Association of State Colleges and Universities ➔ National Association of College and University Business Officers ➔ National Association of Independent Colleges and Universities ➔ National Association of State Universities and Land-Grant Colleges ➔ United Negro College Fund ➔ EDUCAUSE ➔ Internet2 ➔ ACUTA—The Association for Communications Technology Professionals in Higher Education

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Should the second and third video service providers in a community meet the franchise requirements of the first?