

# CRS Report for Congress

## Telecommunications Act: Competition, Innovation, and Reform

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Charles B. Goldfarb  
Specialist in Industrial Organization and Telecommunications Policy  
Resources, Science, and Industry Division



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Committees of Congress

# Telecommunications Act: Competition, Innovation, and Reform

## Summary

In 1996, Congress enacted comprehensive reform of the nation's statutory and regulatory framework for telecommunications by passing the Telecommunications Act, which substantially amended the 1934 Communications Act. The general objective of the 1996 Act was to open up markets to competition by removing unnecessary regulatory barriers to entry. At that time, the industry was characterized by service-specific networks that did not compete with one another: circuit-switched networks provided telephone service and coaxial cable networks provided cable service. The act created distinct regulatory regimes for these service-specific telephone networks and cable networks that included provisions intended to foster competition from new entrants that used network architectures and technologies similar to those of the incumbents. This "intramodal" competition has proved very limited. But the deployment of digital technologies in these previously distinct networks has led to market convergence and "intermodal" competition, as telephone, cable, and even wireless networks increasingly are able to offer voice, data, and video services over a single broadband platform. However, because of the distinct regulatory regimes in the act, services that are provided by different network technologies, but compete with one another, often receive different regulatory treatment. Also, the act created a classification, "information services," that was not subject to either telephone or cable regulation. Today, some voice and video services that are provided using Internet protocol technology may be classified as information services and therefore not subject to traditional voice or video regulation.

There is consensus that the current statutory framework is not effective in the current market environment, but not on how to modify it. The debate focuses on how to foster investment, innovation, and competition in both the physical broadband network and in the applications that ride over that network while also meeting the many non-economic objectives of U.S. telecommunications policy: universal service, homeland security, public safety, diversity of voices, localism, consumer protection, etc. Given the underlying cost structure of broadband networks — huge sunk up-front fixed costs — the marketplace will likely support only a limited number of such networks. Today, the market is largely a duopoly: the telephone company network and the cable company network. The physical network providers argue that they will be discouraged from undertaking costly and risky build-outs if their networks are subject to open access and/or non-discrimination requirements. On the other hand, independent applications providers argue that in order for them to best meet the needs of end users and offer innovative services they must have nondiscriminatory access to the physical network. There is much debate over the advantages and disadvantages of structural regulation (such as open access), *ex ante* non-discrimination rules (such as mandatory network neutrality requirements), *ex post* adjudication of abuses of market power on a case-by-case basis, and reliance on non-mandatory principles. There is general agreement that there would be great consumer benefits from entry by a wireless broadband network to compete with the telephone and cable networks. There also is debate about how to modify the universal service program and intercarrier compensation rules in light of the major market changes. This report will be updated as warranted.

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# Telecommunications Act: Competition, Innovation, and Reform

## Overview

### The Big Picture

A comprehensive statutory framework for U.S. communications policy, covering telecommunications and broadcasting, was first created in the Communications Act of 1934 (“1934 Act”).<sup>1</sup> That act created the Federal Communications Commission (“FCC” or “Commission”) to implement and administer the economic regulation of the interstate activities of the telephone monopolies and the licensing of spectrum used for broadcast and other purposes. It explicitly left most regulation of intrastate telephone services to the states. In the 1970s and 1980s, a combination of technological change, court decisions, and changes in U.S. policy permitted competitive entry into some telecommunications and broadcast markets. In 1996, Congress passed the Telecommunications Act (“1996 Act”),<sup>2</sup> which opened up markets to competition by removing unnecessary regulatory barriers to entry.

The 1996 Act attempted to foster competition among providers that use similar underlying network technologies (for example, circuit-switched telephone networks) to offer a single type of service (for example, voice). Thus, there is one regulatory regime for carriers providing voice telephone service and another regime for cable television providers. Information services<sup>3</sup> are not subject to either regulatory regime. The subsequent deployment of digital broadband technologies in telephone and cable networks has resulted in these networks providing services that compete with one another, but that sometimes are subject to different regulatory requirements. Voice and video services can now be provided using Internet protocol and thus might be classified as unregulated information services, but these services compete directly with regulated traditional voice and video services. Moreover, these digital technologies do not recognize national borders, much less state boundaries.

There is consensus that the current statutory framework is not effective in the current market environment, but not on how to reform that framework. Key issues

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<sup>1</sup> 47 U.S.C. 151 *et. seq.*

<sup>2</sup> P.L. 104-104, 110 Stat. 56.

<sup>3</sup> The act defines “information service” as the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications.” (Title I, Section 3(20) of the 1934 Act)

of contention have been identified, however, and various proposals have been put forward to resolve these issues.

Both houses of Congress have begun debating how to modify the 1996 Act, most of which resides within the Communications Act of 1934, as amended. That debate focuses on *how to foster investment, innovation and competition in both the physical broadband network and in the applications that ride over that network while also meeting the many non-economic objectives of U.S. telecommunications policy*: universal service, homeland security, public safety, diversity of voices, localism, consumer protection, etc.

The underlying cost structure of broadband networks — huge sunk up-front fixed costs — can only support a limited number of broadband networks, though there generally is no similar cost constraint on the number of applications providers. In this new environment, there will be three broad categories of competition: (1) intermodal competition among a small number of broadband network providers that offer a suite of voice, data, video, and other services primarily for the mass market; (2) intramodal competition among a small number of wireline broadband providers that serve multi-locational business customers who tend to be located in business districts; and (3) competition between these few broadband network providers and a multitude of independent applications service providers.<sup>4</sup> These three areas of competition will all be affected by a common factor: will there be entry by a third broadband network to compete with the broadband networks of the local telephone company and the local cable operator?

There are four general approaches to the regulation of broadband network providers vis-a-vis independent applications providers: structural regulation, such as open access; *ex ante* non-discrimination rules; *ex post* adjudication of abuses of market power, as they arise, on a case-by-case basis; and reliance on antitrust law and non-mandatory principles as the basis for self-regulation. At present, the FCC follows the last two approaches. In this report, a number of regulatory proposals, sometimes incorporating elements from more than one of these approaches, are discussed.<sup>5</sup>

At the same time, there is consensus that two sets of mechanisms that are fundamental to U.S. telecommunications policy and the provision of telecommunications services — universal service mechanisms to ensure that basic telephone service remains affordable and available to all households and intercarrier compensation mechanisms by which networks are compensated for carrying traffic that originates or terminates on another network — need to be modified to accommodate the new market conditions. But there is no agreement on what those modifications should be.

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<sup>4</sup> In addition, there will continue to be niche providers that offer consumers users competitive options for specific services.

<sup>5</sup> This report does not address proposed legislation. For a discussion of specific proposals relating to the regulation of broadband network providers that were incorporated into bills introduced in the 109<sup>th</sup> Congress (none of which were enacted), see CRS Report RL33496, *Access to Broadband Networks*, by Charles B. Goldfarb.

## Problems with the Current Statutory and Regulatory Framework for Telecommunications

Technological change is driving the convergence of a number of previously distinct telecommunications and media markets. Digital technologies are being deployed in and carried over wireline, cable, and wireless networks that are increasingly capable of providing voice, data, and video services over a single broadband platform.<sup>6</sup> The U.S. communications infrastructure is evolving from circuit-based networks, in which individual applications (such as voice telephony) are tightly woven into the network architecture, to Internet Protocol (“IP”) networks, in which multiple applications ride on top of the physical (transmission) network layer. There is consensus that the current statutory and regulatory framework for telecommunications is ill-suited for the current market environment. There is disagreement, however, about what modifications are necessary and how comprehensive those modifications should be.

At the time of the 1996 Telecommunications Act, the last comprehensive review of U.S. telecommunications policy, the environment we live in today was barely contemplated:

- voice, data, and video transported in packets of digitized bits over routes that pay no attention to state or even national boundaries;
- network “usage” measured in terms of bandwidth rather than time;<sup>7</sup>
- an end-user service provided over competing wireline, cable, and/or wireless broadband networks;
- those networks capable of providing multiple services; and

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<sup>6</sup> There is no single, agreed-upon definition of “broadband.” In its data collection, the Federal Communications Commission defines “high-speed lines” as connections that deliver services at speeds exceeding 200 kilobits per second (“kbps”) in at least one direction and “advanced service lines” as connections that deliver services at speeds exceeding 200 kbps in both directions. (See *High-Speed Services for Internet Access: Status as of December 31, 2005*, Industry Analysis and Technology Division, Wireless Competition Bureau, Federal Communications Commission, July 2006, 2005, at p. 1, fn. 1, available at [[http://www.fcc.gov/edocs\\_public/attachmatch/DOC-266596A1.pdf](http://www.fcc.gov/edocs_public/attachmatch/DOC-266596A1.pdf)], viewed on December 20, 2006.) Speeds that minimally meet these definitions would not be sufficient for the provision of broadcast-quality video service. Thus, for example, telephone companies that currently offer digital subscriber line (“DSL”) broadband connections would have to upgrade those connections in order to offer video service.

<sup>7</sup> In circuit-based networks, for the duration of any communication, a circuit is tied up from the calling party’s premise all the way to the called party’s premise. In IP-based networks, a communication is converted into digital bits and small packets of bits are transmitted over whatever route is available. With broadband in place, even the “last-mile” into the calling and called parties’ premises may accommodate multiple simultaneous applications, depending on each application’s bandwidth requirements.

- no knowledge of the next “killer application” (comparable to the World Wide Web or e-mail) that will drive network and software investment.

Given the distinct, service-specific networks then in use, the 1996 Act created distinct vertical regulatory “silos” that equated specific services with specific network technologies. The statutory framework for regulating telecommunications services is found in one title of the 1996 Act<sup>8</sup> and for cable services in another title.<sup>9</sup> In addition, the 1996 Act defines a category of services, “information services,” consisting of

the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications.<sup>10</sup>

These information services are not subject to any of the specific regulatory regimes in the 1996 Act; FCC jurisdiction over them is limited to its ancillary authority under Title I of the 1934 Act.<sup>11</sup> The distinction in the 1996 Act between telecommunications services and information services was an outgrowth of a line of FCC decisions dating back to the 1970s that distinguished between “basic” services that were subject to regulation and “enhanced” services that the Commission chose not to regulate in order to foster their development and deployment.<sup>12</sup> Keeping with

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<sup>8</sup> Title I of the 1996 Act, which is incorporated into Title II of the Communications Act as amended, 47 U.S.C. 151 (“1934 Act”).

<sup>9</sup> Title II of the 1996 Act, which is incorporated into Title VI of the 1934 Act.

<sup>10</sup> Title I, Section 3(20) of the 1934 Act.

<sup>11</sup> 47 U.S.C. § 154(i) states: “The Commission may perform any and all acts, make such rules and regulations, and issue such orders, not inconsistent with this Act, as may be necessary in the execution of its functions.”

<sup>12</sup> See *Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities*, Docket No. 16979, Notice of Inquiry, 7 FCC 2d 11, 1966, (known as the “Computer I Notice of Inquiry”); *Regulatory and Policy Problems Presented by the Interdependence of Computer and Communications Services and Facilities*, Docket No. 16979, Final Decision and Order, 28 FCC 2d 358, 1971, (known as the “Computer I Final Decision”); *Amendment of Section 64.702 of the Commission’s Rules and Regulations (Second Computer Inquiry)*, Docket No. 20828, Tentative Decision and Further Notice of Inquiry and Rulemaking, 72 FCC 2d 358, 1979, (known as the “Computer II Tentative Decision”); *Amendment of Section 64.702 of the Commission’s Rules and Regulations (Second Computer Inquiry)*, Docket No. 20828, Final Decision, 77 FCC 2d 384, 1980, (known as the “Computer II Final Decision”); *Amendment of Section 64.702 of the Commission’s Rules and Regulations (Third Computer Inquiry)*, CC Docket No. 85-229, Report and Order, 104 FCC 2d 958, 1986, (known as “Computer III”). In its Computer II Final Decision at pp. 432-435, paras. 126-132, the Commission found that the enhanced services market was highly competitive with low barriers to entry and therefore declined to treat providers of enhanced services as common carriers subject to regulation under Title II of the act.



this regulatory history, the Commission has chosen to forbear from regulating information services, again seeking to foster their development and deployment.<sup>13</sup>

These distinct regulatory regimes did not create significant problems so long as technological and market forces did not erode the distinctions between cable, telecommunications, and information services — and so long as it was possible to unambiguously classify services into these categories. But they became problematic when technological change made it more difficult to determine which service category a particular service fell under and when market convergence resulted in competition between services that were classified, and thus regulated, differently.

Since 1996, the distinctions between these service categories have become increasingly blurred. For example, some providers are offering voice over Internet protocol (“VoIP”) services that meet the definition of information services while competing directly with traditional voice telecommunications services. Similarly, some providers have begun to offer IP video services that arguably would meet the definition of information services while competing directly with traditional cable services. Those IP-based service providers assert that their offerings should be subject only to the limited regulatory oversight of information services, not to the more intrusive regulation of telecommunications services and cable services, respectively.

It has proven to be an administrative and legal morass to determine whether an information service — which, by definition, provides certain capabilities via telecommunications — is purely an information service, and therefore subject only to a light regulatory regime, or has a distinct telecommunications service component that would make it subject to the more rigorous common carrier regulation imposed on telecommunications services. For example, in 2002 the FCC concluded that the telecommunications functionality in the cable modem service offered by cable companies to provide high speed access to the Internet is integral to the service, and not transparent to the consumer, and therefore cable modem service should be treated as a pure information service, and not subject to the access requirements imposed on telecommunications services.<sup>14</sup> That decision was upheld by the Supreme Court in June 2005.<sup>15</sup> At the same time, although the FCC had tentatively concluded that DSL service, which is offered by telephone companies to provide high-speed access to the Internet, also is an information service, with an integral telecommunications

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<sup>13</sup> See, for example, *In the Matter of Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities; Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities*, 17 FCC Rcd. 4798, 4799 (March 15, 2002).

<sup>14</sup> *In the Matter of Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities; Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities*, 17 FCC Rcd. 4798, 4799 (March 15, 2002).

<sup>15</sup> *National Cable & Telecommunications Association v. Brand X Internet Services*, 125 S. Ct. 2688 (2005). This decision does not preclude the FCC from regulating information services, such as cable modem service or DSL services, based on its ancillary authority under Title I of the act.

component, rather than a telecommunications service,<sup>16</sup> it had continued to treat the transmission component of DSL as a telecommunications service, and therefore DSL continued for more than three years to be subject to the access and other telecommunications service requirements. Local telephone companies were required to unbundle and separately tariff the underlying transmission component of their DSL Internet access services. On August 5, 2005, the FCC adopted an order that granted DSL Internet access providers the same regulatory classification and treatment as cable modem Internet access providers.<sup>17</sup>

There is an expectation that providers of information services will attempt to configure their service offerings in a fashion that will maximize the likelihood that the FCC will classify them as pure information services for regulatory purposes. As explained in greater detail below in the section on VoIP, however, the Commission continues to make determinations, based on the underlying network architectures used, about whether any specific service offering should be classified and regulated as an information service or as a telecommunications service.

The current siloed statutory and regulatory framework has not been able to accommodate the rapid pace of market convergence; it sometimes treats differently providers or services that are in direct competition with one another. The disparate rules have sometimes created incentives for providers to tailor their investment decisions and product offerings to avoid/exploit artificial regulatory distinctions rather than to efficiently serve customer needs. Similarly, the mechanisms currently embodied in statutes and rules to support such social policy goals as universal service are based on the pre-1996 market environment and are no longer sustainable or as effective as they could be.

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<sup>16</sup> *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, Universal Service Obligations of Broadband Providers*, CC Docket Nos. 02-33 and 01-337, Notice of Proposed Rulemaking, adopted February 14, 2002.

<sup>17</sup> *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities; Universal Service Obligations of Broadband Providers*, CC Dockets Nos. 02-33 and 01-337, Report and Order, adopted August 5, 2005 and released September 23, 2005. In order not to disrupt markets, however, the FCC created a one-year transition period during which independent ISPs would continue to be able to obtain DSL transmission service from incumbent local exchange carriers and also a 270-day transition period (which could be extended) during which the DSL revenues would continue to be treated as interstate telecommunications service revenues for the purposes of funding universal service. The FCC also stated that it retained ancillary authority to regulate DSL service and adopted a Further Notice of Proposed Rulemaking to determine whether it should construct consumer protection rules for broadband services. In addition, the Commission adopted a non-binding policy statement consisting of four principles: consumers are entitled to access the lawful Internet content of their choice; consumers are entitled to run applications and services of their choice, subject to the needs of law enforcement; consumers are entitled to connect their choice of legal devices that do not harm the network; and, consumers are entitled to competition among network providers, application and service providers, and content providers.

## Public Policy Issues to Debate

While there are many dimensions to the debate about reform of the statutory and regulatory framework for telecommunications, there appear to be two fundamental underlying issues that affect all others.

*First, in this new environment in which applications are no longer tightly woven into the network architecture, what is the best regulatory framework for fostering investment and innovation in both the physical broadband network and in the applications (services) that ride over that network?* The physical network providers (local exchange carriers and cable system operators) argue that they will be discouraged from undertaking costly and risky broadband network build-outs and upgrades if their networks are subject to open access and/or non-discrimination requirements that might limit their ability to exploit vertical integration efficiencies or to maximize the return on (or even fully recoup) their investments. On the other hand, the independent applications providers argue that in order for them to best meet the needs of end users and offer innovative services in competition with the vertically integrated network providers and, in some cases, services not offered at all by network providers. They must have the same unfettered open access to the physical networks that the network providers enjoy or, at the least, be protected by non-discrimination rules. Similarly, many end users argue that their broadband network providers should not be allowed to restrict their usage of the broadband network so long as they do not in any way compromise the integrity of the network.

This big-picture issue raises a number of corollary issues:

- In a complex technical environment in which a broadband platform typically consists of a physical (transmission) network layer, a logical layer (usually the TCP/IP<sup>18</sup> suite of protocols), an applications layer, and a content layer,<sup>19</sup> and in which services pass

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<sup>18</sup> TCP/IP stands for Transmission Control Protocol/Internet Protocol. IP is responsible for moving packets of data from node to node. IP forwards each packet based on a four byte destination address (the IP number). The Internet authorities assign ranges of numbers to different organizations. The organizations assign groups of their numbers to departments. IP operates on gateway machines that move data from department to organization to region and then around the world. TCP is responsible for verifying the correct delivery of data from client to server. Data can be lost in the intermediate network. TCP adds support to detect errors or lost data and to trigger retransmission until the data are correctly and completely received.

<sup>19</sup> Since the 1970s, engineers have developed various network design models incorporating protocols in a layered manner. While the network configurations have varied somewhat (there may be different numbers of layers if, for example, network functions are combined in some network designs and separated in others), there is general agreement that the broadband networks currently being deployed consist of layers or tiers, starting with the lowest layer of physical infrastructure and ending with the highest layer of content, with a logical TSP/IP layer that both can accommodate every type of physical network (DSL, cable modem, ethernet, fiber optics, satellite, Wi-Fi, Bluetooth, etc.) as well as a multitude of (continued...)

over both the broadband network provider's last-mile network and the Internet, where and how can denied access harm consumers? What does it mean to have nondiscriminatory access? Should access be viewed from the perspective of an end user or of an independent applications provider or of a competing network? Which access restrictions are justifiable to maintain the integrity and operational efficiency of the network?<sup>20</sup> Should access regulation take the form of structural open access requirements or *ex ante* non-discrimination rules or *ex post* adjudication of abuses of market power as they arise on a case-by-case basis?<sup>21</sup> Or should there be no regulation, with industry voluntarily adhering to non-discrimination principles such as the Internet Consumer "four freedoms" enunciated by former FCC Chairman Michael Powell<sup>22</sup> or the principles in the non-binding policy statement adopted by the FCC on August 5, 2005?<sup>23</sup>

- How many competing physical broadband networks are needed for market forces alone to ensure that the network providers lack the incentive and the ability to restrict access or otherwise discriminate against independent applications providers to the detriment of consumers? To what extent can federal spectrum policy and infrastructure programs foster the deployment of multiple competitive broadband networks, thereby alleviating the need for access rules? Or, is it the case that additional access networks will

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<sup>19</sup> (...continued)

applications and content. See, for example, Richard S. Whitt, "A Horizontal Leap Forward: Formulating a New Public Policy Framework Based on the Network Layers Model," December 2003, available at [[http://www.netsedgeconsulting.com/copy\\_of\\_advocacy/whitt\\_fclj\\_vol\\_56\\_no\\_3\\_a\\_horizontal\\_leap\\_forward.pdf](http://www.netsedgeconsulting.com/copy_of_advocacy/whitt_fclj_vol_56_no_3_a_horizontal_leap_forward.pdf)], viewed on December 15, 2006. Professor Tim Wu has suggested, however, that in order to construct simple regulatory rules that would be subject to minimal administrative and litigative encumbrances, it might be preferable to construct a regulatory framework that defines just two layers: a physical transport infrastructure layer and an application services layer. See Tim Wu, "A Flat Model of Telecommunications Regulation," Columbia Program in Law and Technology Occasional Paper (2006), available upon request from the author, who can be reached at [<http://www.timwu.org>].

<sup>20</sup> For a more detailed discussion of these broadband access issues, see CRS Report RL33496, *Access to Broadband Networks*, by Charles B. Goldfarb.

<sup>21</sup> *Ex ante* rules impose explicit requirements, restrictions, or prohibitions to which parties know in advance they are required to adhere. The regulatory agency typically need not analyze the impact of a party's failure to comply with the rule before taking remedial action. By contrast, *ex post* adjudication of abuses of market power typically requires the regulatory agency to make a finding of abuse of market power before taking any remedial action.

<sup>22</sup> These four Internet Consumer Freedoms are: freedom to access content, freedom to use applications, freedom to attach personal devices, and freedom to obtain service plan information.

<sup>23</sup> *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, CC Docket No. 02-33, Policy Statement, FCC 05-151, released September 23, 2005.

increase the competitive options available to end users, but may not improve the market position of independent applications providers who do not have the option of choosing among access networks for the best terms, conditions, and rates for interconnection, but rather must connect to all of the access networks in order to reach their customers?<sup>24</sup>

*Second, while market demand appears to be sufficient to generate competitive broadband network deployment in many urban areas without government intervention, that may not be the case in rural or other high cost (or low income) areas, where high costs and/or limited demand may render it economically infeasible to deploy multiple broadband networks, or even a single network, without government intervention. Does Congress want to expand the scope of universal service to include universal access to a broadband network at affordable rates? If so, how can the needed universal service support mechanisms accomplish this in an efficient and sustainable fashion that does not harm other policy goals, such as competitive neutrality? More basically, how “broad” is the “broadband” that should be provided as part of universal service? Bigger may be better, but only at an associated cost. Is it sufficient, for example, to limit a subsidy program in high cost areas to support for broadband service capable of (relatively low quality) video streaming if the unsubsidized market is driving companies to deploy broadband capable of offering (higher quality) broadcast-quality video service in urban areas? Should the universal service subsidy support access to the physical broadband network or should it support specific services provided over that network?*

There are corollary issues relating to how the universal service program would be affected by changes in economic regulation. For example, when the FCC recently re-classified DSL service as an information service rather than a telecommunications service, it had two effects on universal service. First, the current universal service assessment base, interstate and international telecommunications revenues, was immediately reduced. Second, currently federal universal service funding is only available to support telecommunications services. If DSL services are no longer

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<sup>24</sup> There is a growing economics literature on these “two-sided market,” in which a network provider has two distinct sets of customers, end users and applications providers, to whom it provides service and sets terms, conditions, and rates for network access. In the case of broadband networks, end users need access to a broadband network to obtain broadband applications, and independent applications providers need access to that broadband network in order to provide their applications services to the end users who are connected to that network. See, for example, Jean-Charles Rochet and Jean Tirole, “Platform Competition in Two-Sided Markets,” *Journal of the European Economic Association*, June 2003, Vol. 1, Issue 4, pp. 990-1029; Julian Wright, “Access Pricing under Competition: An Application to Cellular Networks,” *Journal of Industrial Economics*, 2002, Vol. 50, Issue 3, pp. 289-315; Julian Wright, “The Determinants of Optimal Interchange Fees in Payment Systems,” *Journal of Industrial Economics*, March 2004, Vol. 52, Issue 1, pp. 1-26; Julian Wright, “One-Sided Logic in Two-Sided Markets,” *The Review of Network Economics*, March 2004, Vol. 3, Issue 1, pp. 42-63; Stephen C. Littlechild, “Mobile Termination Charges: Calling Party Pays versus Receiving Party Pays,” *Telecommunications Policy*, 2006, Vol. 30, pp. 242-277; and Mark Armstrong, “Competition in Two-Sided Markets,” *RAND Journal of Economics*, 2006, forthcoming.

telecommunications services, eligible high-cost carriers would no longer be able to obtain universal service funds in support of those services. Thus, reform of economic regulation must be undertaken in conjunction with review of existing universal service programs.

*Another important element of the debate is how to develop a regulatory framework that will not quickly become obsolete as the market continues to experience rapid technological change.* For example, many technologists envision the development of highly decentralized peer-to-peer networks to efficiently deliver interactive services in the future; these networks would have no major nodes and therefore no single points of failure, making them more secure and robust than current networks that rely on key servers.<sup>25</sup> Already there is discussion of the need to construct a new, more secure Internet.<sup>26</sup> Thus, although it would not be appropriate to base a new regulatory paradigm on a presumption that peer-to-peer network architecture will predominate, it also would not make sense to construct a regulatory framework that cannot accommodate that architecture.

*Further complicating these issues, it will be necessary to chart a transitional course* as the shift to a digital, broadband environment will not occur instantaneously and some providers and customers will continue to be dependent on old technology for some period of time.<sup>27</sup>

Finally, although the current statutory and regulatory framework allows the FCC to preempt state laws that restrict competition,<sup>28</sup> it generally limits FCC regulatory authority to interstate and international services,<sup>29</sup> leaving jurisdiction over intrastate telecommunications services to the states. It also gives states or localities the

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<sup>25</sup> See, for example, the research projects listed on the website of the Parallel and Distributed Operating Systems Group at MIT, available at [<http://pdos.csail.mit.edu>] (viewed on December 15, 2006).

<sup>26</sup> See, for example, Ariana Eunjung Cha, "Viruses, Security Issues Undermine Internet," *Washington Post*, June 26, 2005, at pp. A1, A15.

<sup>27</sup> For example, in order not to disrupt markets, when the FCC adopted an order on August 5, 2005, changing the classification of DSL from a telecommunications service to an information service, it created a one-year transition period during which independent ISPs would continue to be able to obtain DSL transmission service from incumbent local exchange carriers and also a 270-day transition period (which could be extended) during which the DSL revenues would continue to be treated as interstate telecommunications service revenues for the purposes of funding universal service. In addition, because a blanket re-classification of DSL to information service would, under current rules relating to National Exchange Carrier Association ("NECA") tariffs and pools that help fund universal service, reduce the universal service support available to certain rural telephone companies for the provision of DSL services, those carriers were given the option of continuing to treat DSL as a common carrier (telecommunications) service.

<sup>28</sup> 47 U.S.C. § 253.

<sup>29</sup> 47 U.S.C. §§ 151-152.

authority to grant cable franchises and to regulate rights-of-way.<sup>30</sup> As voice, data, and video services increasingly are provided over technologies and networks that do not follow state, or even national, borders, however, it is becoming less effective to perform certain types of regulation — and especially economic regulation — at the state or local level. *One task of telecom reform is to identify those regulatory elements that can continue to be performed effectively at the state or local level and those that should be centralized.*

The purpose of this report is to provide an analytical overview of the market and technological developments that have rendered the current statutory and regulatory framework ineffective and, in some cases, contrary to stated U.S. telecommunications policy objectives, and to present options for reforming the framework.<sup>31</sup> After a background discussion, it addresses the following issues:

- What are the advantages and disadvantages of the various different approaches to regulating access to broadband networks? Four options are discussed: open access, *ex ante* non-discrimination rules, *ex post* adjudication of abuses of market power, and self-regulation based on non-mandatory principles.
- How might the current statutory framework be modified to address the head-to-head competition developing between the broadband networks of telephone companies and cable operators?
- How might public policy foster the deployment of additional broadband networks?
- How might the rules for intercarrier compensation — the payments that carriers make to one another for terminating the calls originated by their subscribers — be made competitively neutral without impinging on other goals of U.S. telecommunications policy?
- In a broadband environment, which services should be supported by a universal service subsidy, who should receive the subsidy, who should contribute to a universal service fund, and how should the contributors be assessed?
- How do other programs and policies, such as federal grant and loan programs and policies toward municipal provision of broadband networks, contribute to the universal availability of broadband networks?

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<sup>30</sup> 47 U.S.C. § 522.

<sup>31</sup> This report does not address specific proposed legislation. For a brief discussion of a number of issues potentially under consideration by Congress, please see CRS Report RL32949, *Communications Act Revisions: Selected Issues for Consideration*, by Angele A. Gilroy, which provides, by topic, a listing of relevant available CRS reports.

- How might current policies concerning voice over Internet protocol, access to 911 and E911, CALEA, and localism, competition, and diversity of voice in media change to better accommodate the current and future market and technological environment?

## Background: The 1996 Act

In 1996, Congress passed the Telecommunications Act, the first major rewrite of our nation's telecommunications law since the enactment of the 1934 Communications Act. The general objective of the 1996 Act was to open up markets to competition by removing unnecessary regulatory barriers to entry.<sup>32</sup> Congress attempted to create a regulatory framework for the transition from primarily monopoly provision to competitive provision of telecommunications services.

One key provision allowed the FCC to preempt enforcement of any state or local government statute, regulation, or legal requirement that acted as a barrier to entry in the provision of interstate or intrastate telecommunications service.<sup>33</sup>

Since the value of a network service, such as telecommunications service, increases as the number of other parties connected to the network increases,<sup>34</sup> new entrants would have a very difficult time entering the market if they could not interconnect their networks with those of the incumbent carriers. Competitive provision of service would benefit consumers most if all carriers' networks were interconnected. Thus, another key provision of the 1996 Act set obligations for incumbent carriers and new entrants to interconnect their networks with one another, imposing additional requirements on the incumbents because they might have the incentive and ability to restrict competitive entry by denying such interconnection or by setting terms, conditions, and rates that could undermine the ability of the new entrants to compete.<sup>35</sup>

With competitive provision of service, many calls will originate on the network of the carrier to whom the calling party subscribes but end up on the network of

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<sup>32</sup> The conference report refers to the bill "to provide for a pro-competitive, de-regulatory national policy framework designed to accelerate rapidly private sector deployment of advanced services and information technologies and services to all Americans by opening all telecommunications markets to competition....", Conference Report, Telecommunications Act of 1996, House of Representatives, 104<sup>th</sup> Congress, 2d Session, H.Rept. 104-458, at p. 1.

<sup>33</sup> 47 U.S.C. § 253.

<sup>34</sup> Economists call this phenomenon "direct network externalities." A positive/negative externality is a benefit/cost that is not accounted for in the price of a good or service. Direct network externalities are positive externalities because a network connection is more valuable if it can be used to reach more people, but the subscriber is not charged more as the number of other subscribers increases. In most situations, pollution is an example of a negative externality, because it imposes costs on others but the perpetrator generally is not forced to compensate the harmed parties.

<sup>35</sup> 47 U.S.C. § 252.



another carrier (to whom the called party subscribes). While it might be possible to have the calling party pay its carrier for originating a call and the called party pay its carrier for terminating that call, for various reasons it has been traditional in the United States for the calling party's carrier to pay the called party's carrier for completing the call — this is called intercarrier compensation<sup>36</sup> — and, in turn, for the calling party's carrier to recover those costs in the rates charged to its subscribers. The 1996 Act requires that intercarrier compensation rates among competing local exchange carriers be based on the “additional costs of terminating such calls.”<sup>37</sup> However, as discussed below, the framework created by the 1996 Act set different intercarrier compensation rates for services that were not competing at that time but do compete today.

To foster competition in both the long distance and local markets, the 1996 Act created a process by which the Regional Bell Operating Companies (“RBOCs”) would be freed from the restriction on their offering long distance service (which was one of the terms of the 1982 Consent Decree settling the government's antitrust case against the former Bell System monopoly)<sup>38</sup> once they made a showing that their local markets had been opened up to competition.<sup>39</sup>

Because Congress did not believe it would be viable for competitive entrants to fully build out their networks immediately, it included a provision requiring the incumbent local exchange carriers to make available to entrants, at cost-based wholesale rates, those elements of their network to which entrants needed access in order not to be impaired in their ability to offer telecommunications services.<sup>40</sup>

Prior to enactment of the 1996 Act, universal service (primarily for high-cost rural service) had been funded through implicit subsidies in above-cost rates for the “access charges” that long distance carriers paid as intercarrier compensation to local telephone companies for originating and terminating their subscribers' long distance calls, above-cost business rates, and above-cost urban rates. Recognizing that new entrants would target those services that had above-cost rates, and thus erode universal service support, Congress included in the 1996 Act a provision requiring universal service support to be explicit, rather than hidden in above-cost rates.<sup>41</sup> This requirement has only been partially implemented, however, and therefore significant implicit universal services subsidies still remain in above-cost rates for certain services.

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<sup>36</sup> For a detailed discussion of intercarrier compensation, see CRS Report RL32889, *Inter-carrier Compensation: One Component of Telecom Reform*, by Charles B. Goldfarb.

<sup>37</sup> 47 U.S.C. § 252(d)(2)(A)).

<sup>38</sup> Modification of Final Judgment, *United States v. American Telephone and Telegraph Company*, 552 F. Supp 131 (D.D.C. 1982).

<sup>39</sup> 47 U.S.C. § 271.

<sup>40</sup> 47 U.S.C. §§ 251(c)(3) and 252(d)(1).

<sup>41</sup> 47 U.S.C. § 254(e).

The regulatory framework created by the 1996 Act was intended to foster “intramodal” competition within distinct markets, that is, competition among companies that used the same underlying technology to provide service, such as the development of competition between the incumbent local and long distance wireline carriers plus new competitive local exchange carriers, all of which used circuit-switched networks to offer voice services. It did not envision the intermodal competition that has subsequently developed, such as wireless service competing with both local and long distance wireline service, VoIP competing with wireline and wireless telephony, IP video competing with cable television. Given the focus on intramodal competition and the lack of intermodal competition, there was little concern about statutory or regulatory language that set different regulatory burdens for different technology modes.

As a result, the current statutory and regulatory framework may be inconsistent with, or unresponsive to, current market conditions in several ways:

- service providers that are in direct competition with one another sometimes may be subject to different regulatory rules because they use different technologies;<sup>42</sup>
- economic regulations intended to protect against monopoly power may not be fully taking into account intermodal competition; and
- the framework may not effectively address interconnection, access, and social policy issues for an IP architecture in which multiple applications ride on top of the physical (transmission) network layer.

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<sup>42</sup> For example, for certain long distance calls, if the caller uses a wireless telephone number, the caller’s wireless carrier is subject to a cost-based “reciprocal compensation” intercarrier compensation charge for the termination of that call. But if the caller made an identical call, from the same location to the same called party, using a wireline telephone (and hence a wireline long distance carrier), that carrier would be subject to above cost “access charges” for the completion of the call. As another example, when a long distance call is made to a called party’s wireline telephone, that party’s wireline local exchange carrier can charge the calling party’s long distance carrier an above-cost access charge for terminating the call; but if an identical long distance call were made to the same called party, from and to the same physical location, but to the called party’s wireless telephone, the called party’s wireless carrier is not allowed to charge the calling party’s long distance carrier any access charge for terminating the call. Indeed, the average intercarrier compensation rate ranges from 0.1 cents per minute for traffic bound to an information service provider (“ISP”) to 5.1 cents per minute for intrastate traffic bound to a subscriber of a small (rural) incumbent local exchange carrier; individual rates can be as low as zero and as high as 35.9 cents per minute — even though in each case basically the same transport and switching functions are provided. (See CRS Report RL32889, *Intercarrier Compensation: One Component of Telecom Reform*.) As another example of distortions in intermodal competition caused by current rules, the Federal Universal Service Fund is funded through an assessment on interstate telecommunications service revenues that exceeds 10% (the exact assessment rate varies from quarter to quarter); information services, even if they compete directly with the interstate telecommunications services, are not assessed.

At the same time, it might not be wise to simply replace the statutory provisions fostering intramodal competition with provisions fostering intermodal competition on the expectation that intermodal competition will always be effective. For the foreseeable future, the primary source of competition in the telecommunications service market for large business (“enterprise”) customers will be intramodal, rather than intermodal. Cable networks were constructed to serve residential customers and therefore tend not to be ubiquitously deployed in business districts. Even the largest cable companies are only in selected geographic markets in the country, and may not be able to meet the needs of large, multi-locational business customers. Also, it is likely to take many years for wireless carriers to construct networks that can meet the bandwidth and security requirements of large corporations. Competitive provision of broadband services to these enterprise customers therefore is most likely to be intramodal. But even intramodal competition may be decreasing in the enterprise market. Until recently, the long distance carriers, in particular AT&T and MCI, were the largest providers of service to enterprise customers, with various competitive local exchange carriers (“CLECs”) also offering enterprise service. In addition, as they began to meet the conditions in the 1996 Act that allowed them to offer service outside their regions, the RBOCs were becoming significant competitors to AT&T and MCI in the enterprise market. The recent acquisitions of AT&T by SBC (with the new company renamed AT&T) and of MCI by Verizon have eliminated those two RBOCs as competitors in the enterprise market and also in the Internet backbone market. Also, although the remaining CLECs have built fiber rings in business areas that connect directly to their major customers’ locations, they have not captured sufficient traffic to capture the scale economies needed to justify buildout of a ubiquitous transport network. Rather, they have relied on the RBOCs, AT&T, and MCI for transport facilities on many routes. As a result, in approving those mergers, the Department of Justice and the FCC set a number of conditions intended to retain competitive options for enterprise and Internet customers, including the divestiture of some key transport facilities and ensuring CLECs and ISPs access to certain facilities or services at set rates for at least two years.<sup>43</sup> Nonetheless, some enterprise customers and CLECs remain concerned about their reduced options for retail services and transport facilities.

## **Competition and Innovation in the Internet Protocol Environment**

In a relatively short period of time, the telecommunications sector has evolved from monopoly provision of services over service-specific networks, to a brief period of limited intramodal competition (from wireline competitive access providers and

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<sup>43</sup> These conditions include divesting connections to more than 350 buildings in their respective territories, using long-term leases known as indefeasible rights of use; freezing special access rates for 30 months; offering stand-alone DSL service; continuing settlement-free peering arrangements with at least as many Internet backbone providers as they had prior to the merger; posting their peering policies on publicly accessible websites for two years; abiding by the FCC’s network neutrality goals; not seeking increases in unbundled network element rates for two years; and not increasing the rates paid by existing in-region customers of AT&T and MCI for wholesale DS1 and DS3 local private line services.

competitive local exchange carriers for the provision of telephone services and from a small number of cable “overbuilders”) over service-specific networks, to incipient intermodal (wireline, wireless, and cable) competition over increasingly multiple-service broadband platforms. These new broadband networks are the physical vehicle for bringing into the home the applications (services) of both the network providers, themselves, and the independent applications providers. At this stage of the transition, however, most customers continue to receive services over legacy service-specific narrowband networks.

It is important to understand what this new environment — characterized by convergence of previously distinct markets and government policy focused on fostering facilities-based intermodal competition — is likely to yield. The market convergence currently underway will not result in a multitude of broadband networks because the underlying cost structure for such networks (the huge sunk up-front fixed costs that can only be recovered if the company can exploit significant economies of scale and scope) will only support a limited number of networks. This is the case for wireline or wireless networks. Moreover, market convergence is not simply the ability to bundle voice, data, and video services into a single product offering. Rather, it is a technological spillover (from digital technology) that reduces entry costs so that *firms that already have single-use networks* providing voice, data, or video services can now use those networks with relatively inexpensive upgrades to offer multiple services over a single platform.<sup>44</sup> For example, at far less cost than would be required to build an entirely new network, the incumbent local exchange carriers can deploy DSL equipment on their copper networks to offer data and video services or the cable companies can upgrade their networks to offer VoIP. In this situation, in which underlying costs are likely to limit the number of network providers, public policy can nonetheless foster competition by removing impediments to single-use networks expanding into other markets. At the same time, policy makers should remain vigilant that the few network providers not constrain the ability of independent applications providers that do not have their own broadband networks to compete in those applications markets.

In the new environment, there will be three broad categories of competition and innovation issues, tied together by one common issue. These three categories are:

- intermodal competition and innovation among a small number of broadband network providers that offer a suite of voice, data, video, and other services primarily for the mass market;<sup>45</sup>

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<sup>44</sup> For a full discussion of this, see George Ford, Thomas Koutsky, and Lawrence Spiwack, “Competition After Unbundling: Entry, Industry Structure and Convergence,” Phoenix Center Policy Paper Number 21, July 2005, available at [<http://www.phoenix-center.org/pcpp/PCPP21Final.pdf>], viewed on December 18, 2006.

<sup>45</sup> As will be discussed below, the telephone companies have sought, at both the federal and state levels, modification of existing cable franchising requirements to eliminate what they characterize as impediments to their entry into the video market, including the need to negotiate individual franchise agreements with thousands of local jurisdictions, build-out requirements for their networks, and certain in-kind payments.

- intramodal competition and innovation among a small number of wireline broadband providers that serve multi-locational business customers who tend to be located in business districts;<sup>46</sup> and
- competition between those few broadband network providers and a multitude of independent service providers, often for applications that have a more specialized customer base.

The common issue: how many broadband networks will there be and how will that affect competition among network providers and competition between those network providers and the independent applications providers?

Despite all the technological and market changes that have occurred and continue to take place, competition issues in the telecommunications sector will continue to focus on the physical transport link into both business and residential customers' premises. The new network architectures may allow many applications to ride on a single physical transmission layer, but access to that layer and competition among the small number of physical network providers remain the primary competition issues.

## **Applications Innovation: Competition Between Integrated Network Providers and Independent Applications Providers**

Integrated network providers and independent applications providers come from very different traditions. The network providers (the local exchange carriers, cable companies, and wireless carriers) come from the tradition of employing a vertically integrated business model, providing, as a single product offering, the network connection and a specific service or suite of services. They are used to developing and deploying their networks in the context of a business plan that jointly maximizes profits from the physical network and the services they provide over that network. Their network rollout and applications product rollout are coordinated. Network architecture is driven, at least in part, by the services they intend to offer. Underlying this approach is the assumption that investment can best be supported and innovation can best be achieved by giving the vertically integrated network provider free rein over network architecture, control of network intelligence, and discretion over the extent to which it gives competing applications providers access to its network.

In sharp contrast, many of the independent applications providers (and their customers) come from the Internet tradition of "network neutrality," that is, an Internet that does not favor one application (or one applications provider) over others. In practice, even the Internet does not adhere to pure network neutrality; for example,

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<sup>46</sup> The large business customers are likely to have such great bandwidth demands that they will have dedicated pipes to their major locations with broadband capability and will be reliant on the broadband network providers' general buildout only to connect to their smaller locations or to their customers' locations. Some parties have expressed concern, however, that with the completion of the SBC-AT&T and Verizon-MCI mergers, these large business customers may not have many alternative sources, especially to the extent that cable networks tend to be built out to residential neighborhoods rather than business districts.

the Internet protocol works well for data applications, which are insensitive to “latency” (delay), and less well for voice and video applications that are sensitive to latency, because it lacks a universal quality of service guarantee.<sup>47</sup> Nonetheless, the assumptions that underlie the Internet tradition are that the innovation process is a survival-of-the-fittest competition among developers of new technologies, that the most promising path of innovation cannot be predicted in advance, and that therefore it is not optimal to allow any private or public entity to direct that path; the network should be “neutral.” This reasoning supports the need for “end-to-end” design, by which, whenever possible, communications protocol operations occur at the end-points of a communications system (i.e., a “dumb network” with “smart terminals”). But since until 1995 the Internet was supported by government funding, rather than market funding, this approach has not focused in the past on the task of raising sufficient capital to build out physical networks.

The vertically integrated network providers and the independent applications providers are not inherently at odds with one another, however; they share many goals. The Internet environment is characterized by “indirect network externalities,” in which independent actions taken by hardware and software providers benefit one another. The greater the investment in physical network to improve connection speed and quality of service, the greater the opportunities for software providers to develop new, potentially profitable applications. At the same time, the greater the number of software applications available, the greater the end-user demand for broadband connections. A network provider will have an incentive not to restrict applications providers’ access to its physical network to the extent that could reduce demand for connections to that network (though that effect could be limited if end users have no alternative broadband networks available to turn to).

At the same time, vertically integrated network providers might face a counter-incentive to restrict or delay network access to applications providers; an example is if the vertically integrated companies are developing applications that would compete with independent providers’ applications and would like to exploit “first-in” advantages. They also will have the incentive to deploy a network architecture most consistent with their own plans for applications, which may not coincide with the needs of the independent applications providers or with the desire of end users to use their broadband network for applications (telecommuting, home networking, or other purposes) that might undermine the ability of the network provider to price discriminate or in other ways jointly maximize the profits from its network and own suite of applications. For example, some critics have claimed that the RBOCs resisted deploying DSL technology in their networks for more than a decade because of concern that offering a high-speed DSL service would cannibalize the revenues and profits that were being generated by their T-1 (large capacity dedicated pipe) service. According to these critics, despite the fact that the relatively inexpensive

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<sup>47</sup> For a more detailed discussion of the issues of network neutrality, open access, and broadband discrimination, see Tim Wu, “Network Neutrality, Broadband Discrimination,” *Journal on Telecommunications & High Technology Law*, Vol 2, 2003, pp. 141-178. Professor Wu’s article is one of many in a very lively debate in the academic economic and legal literature. See footnote 1 and other citations in the Wu article for a list of other academic articles. See also CRS Report RL33496, *Access to Broadband Networks*, by Charles B. Goldfarb.

DSL technology had been available for a long time, the RBOCs began deploying DSL only once there was significant risk of ceding the mass market high-speed connection market to cable modems. (The RBOCs have responded that they had not deployed DSL because the market had not yet developed for the high-speed service.)

In a market characterized by economic interdependence between a platform and applications made for that platform, sometimes an arm's-length relationship between the platform provider and the applications providers will be less efficient than a closer vertical relationship. Academic economists have employed the concept of internalizing complementary efficiencies ("ICE") to explain vertical competitive effects — why sometimes the platform provider chooses an open architecture and modular design to interact with the full universe of applications providers and sometimes chooses to interact only with its own vertically integrated applications subsidiaries or affiliates.<sup>48</sup> The ICE theorem suggests that a monopolist broadband network provider has incentives to provide independent applications providers access to its broadband platform when it is efficient to do so, and to deny such access only when access is inefficient. But economic theory further explains that platform providers will not always make the optimal choice. There are a number of circumstances when the platform provider's choice might not be efficient or benefit consumers.<sup>49</sup> Economic theory therefore suggests that there may be pitfalls in either a blanket requirement for access to the broadband network or blanket deregulation.

In a market characterized by high sunk up-front fixed costs and very low variable (usage) costs once the up-front costs have been sunk, which is descriptive both of the physical broadband network and the software applications provided over that network, it often is efficient for a firm to employ price discrimination to recover its fixed costs. That is, it may be most efficient to segment customers according to the intensity of their demand for the broadband connection (or application), charging a higher price for the customers with higher intensity of demand. In the case of the broadband connection, that intensity might be measured in terms of the amount of bandwidth demanded. As will be discussed below, such price discrimination based on bandwidth usage need not infringe on network neutrality (need not favor some

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<sup>48</sup> See Joseph Farrell and Philip Weiser, "Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age," *Harvard Journal of Law and Technology*, Fall 2003, pp. 85-133.

<sup>49</sup> Farrell and Weiser identify 8 such circumstances: (1) if its rates for platform access are regulated; (2) if the platform monopolist can use otherwise efficient price discrimination to make even inefficient vertical leveraging profitable; (3) if an applications provider is a potential competitor at the platform level that the monopoly platform provider wants to weaken; (4) if the monopoly platform provider can use its market bargaining power to impose a licensing or other arrangement on an applications provider that discourages future applications innovations; (5) if the platform monopolist is incompetent and therefore cannot recognize optimal choices; (6) if the platform monopolist perceives that allowing open access today would undermine its ability to close access in the future even if it would be efficient to do so; (7) if, for regulatory strategy considerations, the platform monopolist is afraid that agreeing to open access for, say ISPs, would raise the risk of having open access imposed in another market, such as cable video programming; and (8) if the platform is not essential for all uses of the application and there are economies of scale or network effects in the application.

applications over others) so long as the market segmentation is based on the amount of bandwidth used rather than on the specific application and so long as customers who want to use the network for a bandwidth-intensive application are able to pay more for that additional bandwidth, rather than being prohibited from using the network to access bandwidth-intensive applications.

### **Broadband Network Restrictions.**

In 2002, Professor Tim Wu performed a survey of broadband usage restrictions and network designs for the 10 largest cable operators and six major DSL operators.<sup>50</sup> The survey found that, on the whole, broadband providers' networks and usage restrictions favored client-server applications (such as the World Wide Web) and disfavored home networking, peer-to-peer applications, and home telecommuting. Cable operators tended to impose far more restrictions on usage than DSL operators. Specifically,

- Nearly every cable operator and one third of DSL operators restricted end users from operating a server and/or providing content to the public. This restriction is potentially very significant because it affects the broadest class of applications: those where the end user shares content, as opposed to simply downloading content. It favors a “one-to-many” or “vertical model” of applications over a “many-to-many” or “horizontal” model. In application design terms, the restriction favors client-server applications over peer-to-peer designs. The inability to provide content or act as a server could serve to restrict a major class of network applications.
- Every cable operator and most DSL operators had some ban on using a basic residential broadband connection for “commercial” or “enterprise” use. The most controversial of such restrictions barred home users from using virtual public networks, which are used by telecommuters to connect to their work network through a secure connection.
- When home networking became widespread in 2002, four of the ten largest cable operators contractually limited the deployment of home networks by setting restrictions on the number of computers that could be attached to a single connection. In contrast, some DSL operators in their agreements explicitly acknowledged that multiple computers could be connected to the DSL connection, though sometimes only through a single DSL account and a single IP address obtained from the DSL operator.
- Several cable operators sought to control the deployment of home wireless networks by banning the connection of Wi-Fi equipment.

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<sup>50</sup> See Tim Wu, “Network Neutrality, Broadband Discrimination,” *Journal on Telecommunications & High Technology Law*, Vol. 2, 2003, at pp. 158-168.



- The practice of designing asymmetric networks, with more downstream bandwidth than upstream bandwidth, favors the development of applications that are one-to-many or client-server in design. Applications that would demand residential accounts to deliver content as quickly as they receive it are limited by asymmetric bandwidth.

It was not clear how actively network providers had attempted to enforce those restrictions in their contracts with subscribers, though there was anecdotal evidence of some enforcement. Nor was it clear whether such restrictions would continue when wireless technology was able to provide greater competition to wireline and cable network providers. In some ways, there appear to be fewer usage restrictions today than there were in 2002. It is noteworthy, however, that the cable networks imposed more usage restrictions than did the DSL network. There are two possible explanations for this: (1) cable was the largest broadband platform provider and could offer greater bandwidth and these “first-in” and technology advantages might have allowed it to set strategic usage restrictions that other platforms could only set at their peril, and (2) since cable’s broadband architecture requires customers to share bandwidth, there was greater need for cable to manage the bandwidth usage of its customers. Yet, cable operators have not barred streaming video, despite its potential for competing with cable television.

It does not appear that these restrictions will go entirely away anytime soon. Vendors are actively marketing equipment designed to facilitate applications-based screening and control for broadcast networks, such as products intended to address peer-to-peer traffic and unauthorized Wi-Fi connections and control over network utilization.<sup>51</sup> Network providers are deploying such equipment, though it is not clear exactly how they are using it.

Access and usage restrictions may be justified if they are needed to protect the integrity of the network or to operate the network efficiently (for example, bandwidth management needed to maintain quality of service). But there may be situations where the network provider has chosen an overly restrictive solution that will discourage applications innovation and competition. For example, if a network provider must manage bandwidth usage in order to maintain quality of service for video and voice services, it would be more efficient for the provider to do so by setting rates that rise as bandwidth usage increases rather than by prohibiting all bandwidth-intensive applications. The former represents an application of price discrimination that most economists recognize as efficient; the latter may be unnecessarily restrictive.

Professor Wu concluded that, on the whole, the evidence from his survey suggested that the operators were often pursuing legitimate goals, such as price

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<sup>51</sup> Tim Wu, “Network Neutrality, Broadband Discrimination,” *Journal on Telecommunications & High Technology Law*, Vol. 2, 2003, at pp. 165-166. One manufacturer claimed its product is used on hundreds of university campuses to control peer-to-peer traffic, but those universities may be motivated by concern about intellectual property rights infractions as well as by bandwidth management issues.

discrimination and bandwidth management. The problem was they often used methods, like bans on certain forms of applications, that are likely to unnecessarily distort the market and future applications development. The use of restrictions on classes of application to pursue bandwidth management and price discrimination may be inefficient and may unnecessarily harm consumers; the objectives may be attainable through less restrictive means.

In November 2005, several ISPs alleged that Verizon restricted their access to its broadband network immediately after the FCC's August 2005 decision that DSL service is an information service and therefore not subject to Title II access requirements.<sup>52</sup> They claimed that, prior to the FCC decision, Verizon had offered them access to its broadband network at the Layer 2 or data link level, which allowed them to offer their own services at a guaranteed a quality of service. But after the FCC decision, Verizon replaced that access offering with an offering that only allowed access at the Layer 3 or network level, which in essence is a complete package that the ISP can only resell, without offering additional services. A Verizon representative conceded the change in service offering, but claimed that "No customers have been cut off and no Internet sites are being blocked, and the customers of these ISPs will have full Internet access under the new service arrangement."<sup>53</sup>

More recently, the three largest RBOCs have announced their intentions to take advantage of new technology that allows them to distinguish among the digitized packets on their high-speed networks to charge those providers of applications who want to be able to guarantee their customers an assured quality of service — for example, for voice or video service — a premium for such assured high quality delivery.<sup>54</sup> The RBOCs claim that even if an end-user customer pays a high price for a lot of bandwidth, that customer could not receive an assured quality of service for voice or video service received over the public Internet. That customer might blame its broadband network provider or the applications provider for the degraded service quality even if the problem resided in the Internet. But today an RBOC can distinguish the packets destined for that provider's end-user customers and, by connecting the provider directly to its proprietary IP networks, can guarantee the quality of service of the provider's offerings. The RBOCs argue that such guaranteed quality of service is of value to the applications provider as well as to the end user, and therefore they should be able to charge the provider a premium for such assured quality. Independent applications providers have criticized these proposed quality of service charges, arguing that the RBOCs could impose high quality of services charges on them that they do not impose on their own applications. They also have voiced concern that the RBOCs could use the new packet identification equipment to provide better service to their own end-user customers than to competitors' end-user customers, and could strategically deploy network capacity sufficient to meet the

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<sup>52</sup> Louis Trager, "ISPs Accuse Verizon of Double-Cross on FiOS Wholesaling," *Communications Daily*, November 3, 2005, at pp. 5-7.

<sup>53</sup> *Communications Daily*, November 8, 2005, at p. 8.

<sup>54</sup> See, for example, Dionne Searcey and Amy Schatz, "Phone Companies Set Off a Battle Over Internet Fees," *Wall Street Journal*, January 6, 2006, at p. A1.

quality of service needs of their own applications offerings but not sufficient to meet the needs of their competitors' offerings.

## **Approaches to Regulating Access to Broadband Networks**

There are four general approaches to the regulation of broadband network providers vis-a-vis independent applications providers:

- structural regulation, such as open access;
- *ex ante* non-discrimination rules;
- *ex post* adjudication of abuses of market power, as they arise, on a case-by-case basis; and
- reliance on antitrust (and unfair methods of competition) law and non-mandatory principles as the basis for self-regulation.

There have been a plethora of proposals for such regulation, with the proposals sometimes incorporating elements from more than one of these approaches.<sup>55</sup>

*Ex ante* rules and *ex post* adjudication both typically focus on anti-competitive discrimination that harms consumers, but in distinct ways. *Ex ante* rules have been characterized as “positive” anti-discrimination rules in that they create affirmative legal duties that are intended to remedy either past discrimination or the likelihood of future discrimination,<sup>56</sup> prohibiting certain activities before the fact. By contrast, *ex post* adjudication typically seeks to punish identified episodes of discrimination on a case-by-case basis, after the fact. Positive schemes impose more up-front costs, by restricting certain behaviors, some of which might have proven beneficial to consumers. But, depending on the cost to consumers (in terms of denied access to potentially highly valued applications) of allowing discrimination to occur and then adjudicating after the fact, the ultimate cost of *ex ante* rules might prove lower than *ex post* adjudication.

### **Open Access.**

Although there is not a single agreed-upon definition of open access, it generally refers to a structural requirement that would prevent a broadband network provider from bundling broadband service with Internet access from its own in-house Internet service provider and would require the network provider to make its broadband transmission capability available to independent ISPs on a nondiscriminatory basis. Proponents of open access argue that if a broadband network provider, such as a cable operator, is allowed to bundle ISP services with its

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<sup>55</sup> For a discussion of specific proposals for the regulation of access to broadband networks that were introduced in the 109<sup>th</sup> Congress — none of which was enacted — see CRS Report RL33496, *Access to Broadband Networks*, by Charles B. Goldfarb.

<sup>56</sup> See Tim Wu, “A Flat Model of Telecommunications Regulation,” Columbia Program in Law and Technology Occasional Paper (2006), available upon request from the author, who can be reached at [<http://www.timwu.org>].

broadband connection at a single price, and not offer the broadband connection separately, it would be in a position to foreclose competition among Internet applications.<sup>57</sup> They claim that as ISPs expand the services they offer, bundling would foreclose competition in an increasing range of services provided over broadband lines. If the customer has no choice but to accept from the broadband provider a single bundle that includes both the broadband connection and ISP service, then an independent ISP would always be at a price disadvantage and could only compete by offering unique capabilities that are sufficient to overcome that price disadvantage. This is likely to limit an independent ISP's customer base to those customers with unique needs that are not met by the mass market broadband provider.

Proponents of open access claim that allowing network providers to restrict independent ISPs' access will (1) eliminate, or at least reduce, ISP competition; (2) allow legacy monopoly networks to improperly affect the architecture of the Internet in an effort to protect their own business plans; (3) discourage innovators from investing in a market in which a dominant player has the power to behave strategically against them; and (4) make government intervention to control certain forms of speech easier and therefore more likely.

Open access has been criticized on several fronts. First, broadband network providers and a number of academics<sup>58</sup> claim that, due to indirect network externalities and internalizing network efficiencies, network providers do not have the incentive to restrict independent applications providers access to their networks, or would do so only where it was efficient. They further argue that even if one group of network providers — for example, the cable companies — were to restrict access, wireline broadband providers and other competitors are unlikely to follow suit, so independent ISPs would have access to customers.

Some critics claim that open access would retard deployment of broadband networks by reducing the ability of network providers to exploit vertical integration efficiencies and also by reducing the revenues network providers could generate from their applications, thereby making some network investments unprofitable. They also suggest that the close coordination between a network provider and an applications provider needed for optimal joint development of network and applications is sometimes only possible through vertical integration. For example, Professor James Speta argues that “Vertical integration of access providers may be necessary. Especially in initial periods of deployment, broadband access providers must ensure

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<sup>57</sup> See, for example, Mark Lemley and Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 *UCLA Law Review* 925 (2001).

<sup>58</sup> See, for example, James B. Speta, “Handicapping the Race for the Last Mile? A Critique of Open Access Rules for Broadcast Platforms,” 17 *Yale Journal on Regulation* (2000), at p. 76; Joseph Farrell and Philip Weiser, “Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age,” 17 *Harvard Journal of Law and Technology* (2003), at pp. 4-6; Glen Robinson, “On Refusing to Deal with Rivals,” 87 *Cornell Law Review* (2002), at pp. 1216-1217.

a supply of complementary information services.... [A] broadband provider must either provide those goods itself or arrange for a source of supply.”<sup>59</sup>

Also, to the extent open access regulation prevents broadband operators from architectural cooperation with independent ISPs for the purpose of providing quality of service (“QOS”) dependent applications, it could harm network neutrality. By threatening the vertical relationship required for certain application types, it could maintain IP’s discrimination in favor of data applications.

In response to these criticisms of open access, its proponents have pointed out a fundamental contradiction among the criticisms.<sup>60</sup> On one hand, critics argue that, due to indirect network externalities, broadband network providers’ self-interest will lead them to place minimal restrictions on customers’ usage of, and independent applications providers’ access to, their networks. On the other hand, critics argue that restricted access is needed to ensure that the network providers generate enough revenues to recoup their investment in the network.

### **Ex Ante Non-Discrimination Rules.**

The basic principle behind a network non-discrimination regime is to give users the right, by rule, to use non-harmful attachments or applications, and to give equipment and applications innovators the corresponding right, also by rule, to supply them. It therefore applies both to end users and to independent applications providers. Proponents claim that such a regime avoids some of the costs of structural regulation by allowing for efficient vertical integration so long as the rights granted to the users of the network are not compromised.

Proponents contend that the ability of a network provider to discriminate is greater with a digital broadband network than with an analog narrowband network offering dial-up service. Analog network operators cannot easily distinguish between types of digitized packets of information going across their lines. But digital network operators can distinguish among the packets on their high-speed networks.<sup>61</sup> For example, some universities are performing application-specific screening to identify students illegally copying entertainment materials and, presumably, similar capabilities could be used to identify applications the network provider wishes to restrict or prohibit.

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<sup>59</sup> James B. Speta, “Handicapping the Race for the Last Mile: A Critique of Open Access Rules for Broadband Platforms,” *Yale Journal on Regulation*, Volume 17, 2000, at p. 83.

<sup>60</sup> See, for example, Mark Lemley and Lawrence Lessig, “The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era,” *UCLA Law Review*, Volume 48, April 2001, at p. 968.

<sup>61</sup> See, for example, Amy Schatz and Anne Marie Squeo, “As Web Providers’ Clout Grows, Fears Over Access Take Focus,” *Wall Street Journal*, August 8, 2005, at p. A1.

Typically proponents of non-discrimination rules are proponents of network neutrality — not favoring one application (or applications providers) over another.<sup>62</sup> They argue that network neutrality, as embodied in *ex ante* non-discrimination rules, fosters the goal of stimulating investment and innovation in broadband technology and services in two ways: (1) by eliminating the risk of future discrimination, thereby providing independent applications providers greater incentives to invest in broadband applications, and (2) by facilitating fair competition among applications, ensuring the survival of the fittest.

Proponents claim that a network that is as neutral as possible, with such neutrality ensured by explicit non-discrimination rules, provides entrepreneurs predictability in that all applications are treated alike. This, they argue, will foster investment in broadband applications by eliminating the unpredictability created by potential future restrictions on network usage. Neutrality provides applications designers and consumers alike with a baseline on which they can rely. Proponents allege the recent restrictions that cable operators placed on virtual private networks is indicative of the tendency of some network providers to restrict new and innovative applications they see as either unimportant or a competitive threat. Such usage restrictions, they claim, particularly harm those small and startup developers that are most likely to push the envelope of what is possible using the Internet's architecture.<sup>63</sup>

Proponents also claim that the most promising path of development will be difficult to predict in advance; neutral network development is likely to yield better results than planned innovation directed by a single prospect holder. Any single entity will suffer from cognitive biases (such as a predisposition to continue with current ways of doing business). These proponents conclude that restrictions on

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<sup>62</sup> A detailed discussion of network neutrality and non-discrimination rules can be found in Tim Wu, "Network Neutrality, Broadband Discrimination," *Journal on Telecommunications & High Technology Law*, Vol. 2, 2003, at pp. 141-178 and in an *ex parte* letter from Tim Wu and Lawrence Lessig, dated August 22, 2003, submitted to the FCC in CS Docket No. 02-52, available at [[http://www.freepress.net/docs/wu\\_lessig\\_fcc.pdf](http://www.freepress.net/docs/wu_lessig_fcc.pdf)], viewed on December 27, 2006. The discussion in this report draws heavily from those analyses.

<sup>63</sup> The independent applications providers and other supporters of enforceable network neutrality rules are not all small players, however. When the FCC was considering re-classifying DSL services as information services rather than telecommunications services, in early August, 2005, representatives from Microsoft, Dell, Yahoo, and the Consumer Electronics Association ("CEA"), as well as consumer organizations, met with FCC commissioners and "explained the need for 'net neutrality' provisions because network operators have the opportunity, incentive and ability to violate these net neutrality principles." See, for example, the *ex parte* letter, dated August 2, 2005, from Veronica O'Connell, Senior Director, Government Affairs, Consumer Electronics Association, to Marlene H. Dortch, Secretary, Federal Communications Commission, on behalf of Microsoft Corporation, Media Access Project, Vonage, Dell, and CEA. Similarly, as entertainment companies seek ways to distribute movies and television shows over the Internet, they have expressed concern about having to rely on broadband networks owned by competitors, such as Time Warner, for access to end users. See Amy Schatz and Anne Marie Squeo, "As Web Providers' Clout Grows, Fears Over Access Take Focus," *Wall Street Journal*, August 8, 2005, at p. A1.

usage, however well-intended, tend to favor certain applications over others. A regulatory framework that requires network providers to justify deviations from neutrality would prevent both unthinking and ill-intentioned distortions of the market for new applications. The proponents of non-discrimination rules argue that the restrictions that some network providers have imposed on home networking, online gaming, and VPNs not only directly harm consumers and applications providers today, but also have a chilling effect on innovators and venture capitalists considering future applications development and deployment. They argue that the possibility of discrimination in the future dampens the incentives to invest today.

Two very different proposals for *ex ante* rules merit discussion; one would enact a “pure” *ex ante* regime, the other would enact a hybrid regime that constructs *ex ante* rules only where antitrust enforcement might not be sufficient.

***Ex Ante Neutrality Regime.*** Professor Wu has proposed what he calls a neutrality regime that would set *ex ante* non-discrimination access rules that would apply to the “inter-network” portion of a broadband network provider’s network (that is, the portion that it collectively manages with other network providers), but not to the local portion of the network that is under the provider’s sole control. Each broadband network provider is a member of two networks: the local network that provides the last-mile of transport to its end-user customers and which it owns and manages by itself, and the inter-network, which it collectively manages with other service providers. If a broadband network provider imposes local network restrictions, usually those restrictions will only affect its local network. Such restrictions are likely to be necessary for good network management. In contrast, restrictions at the inter-network layer or applications layer will affect the entire network, inter-network as well as local network, and can cause externality problems.

The *ex ante* neutrality regime is based on a non-discrimination rule that distinguishes between discrimination at the local network level (acceptable) and at the inter-network level (unacceptable); the rule would make operational the network neutrality principle at the inter-network level.<sup>64</sup> The rule prohibits discrimination

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<sup>64</sup> The specific rule would be as follows:

- \_\_\_\_\_ Forbidding Broadcast Discrimination
- (a) Broadband Users have the right reasonably to use their Internet connection in ways which are privately beneficial without being publicly detrimental. Accordingly, Broadband Operators shall impose no restrictions on the use of an Internet connection except as necessary to:
- (1) Comply with any legal duty created by federal, state or local laws, or as necessary to comply with any executive order, warrant, legal injunction, subpoena, or other duly authorized governmental directive;
  - (2) Prevent physical harm to the local Broadband Network caused by any network attachment or network usage;
  - (3) Prevent Broadband users from interfering with other Broadband or Internet User’s use of their Internet connections, including but not limited to neutral limits on bandwidth usage, limits on mass transmission of unsolicited email, and limits on the distribution of computer viruses, worms, and limits on denial-of-service or other attacks on others;

(continued...)

based on such inter-network elements as IP addresses, domain name, and cookie information. Its general principle is: absent evidence of harm to the local network or the interests of other users, broadband network providers should not discriminate in how they treat traffic on their broadband network on the basis of inter-network criteria.

Thus, for example, under the *ex ante* neutrality regime, a broadband network provider concerned about managing bandwidth would be prohibited from blocking traffic from game sites based on either application information or the IP address of the application provider. But it would be allowed to invest in policing bandwidth usage; users interested in a better gaming experience would need to buy more bandwidth, not get permission to use a given application. As another example, in 2005 the FCC entered into a consent decree with Madison River Communications, a rural telephone company, which had been blocking ports used for VoIP applications, thereby affecting their customers' ability to use VoIP through VoIP service providers.<sup>65</sup> Under this regime, such discriminatory behavior would be *ex ante* illegal.

Since Professor Wu would not regulate customer access to the local network portion of the broadband network, he would allow cable operators to tie cable modem

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<sup>64</sup> (...continued)

(4) Ensure the quality of the Broadband service, by eliminating delay, jitter or other technical aberrations;

(5) Prevent violations of the security of the Broadband network, including all efforts to gain unauthorized access to computers on the Broadband network or Internet;

(6) Serve any other purpose specifically authorized by the Federal Communications Commission, based on weighing of the specific costs and benefit of the restriction.

(b) As used in this section,

(1) "Broadband Operators" means a service provider that provides high-speed connections to the Internet using whatever technology, including but not limited to cable networks, telephone networks, fiber optic connections, and wireless transmission;

(2) "Broadband Users" means residential and business customers of a Broadband Operator;

(3) "Broadband Network" means the physical network owned and operated by the Broadband Operator;

(4) "Restrictions on the Use of an Internet Connection" means any contractual, technical, or other limits placed with or without notice on the Broadband user's Internet Connection.

<sup>65</sup> *In the Matter of Madison River Communications, LLC and affiliated companies*, DA 05-543, File No, EB-05-IH-0110, Acct. No. FRN: 0004334082, Consent Decree, undated. Under this decree, Madison River agreed not to block ports used for VoIP applications or to otherwise prevent customers from using VoIP applications, and paid a fine of \$15,000. It is possible that Madison River's primary incentive for blocking Vonage service was to protect against the loss of access charge revenues. As explained below in the section on Intercarrier Compensation, rural telephone companies currently get a large portion of their revenues from above-cost access charges imposed on long distance carriers for originating or terminating long distance calls. If intercarrier compensation reform were enacted that removed the implicit subsidies from access charges and placed those subsidies in an expanded Federal Universal Service Fund, the incentive to block VoIP calls would be significantly reduced.



service (broadband access) to ISP service (an application) and, similarly, would allow ILECs to tie DSL service (broadband access) to voice service (an application). That is, ILECs would not be required to offer end users what is sometimes referred to as “naked DSL” service: DSL service without voice service. But because he would prohibit discriminatory access to the inter-network, Professor Wu would prohibit a cable operator from refusing to allow a customer to use its cable modem to obtain ISP service from another ISP and would prohibit an ILEC from refusing to allow a customer to use its DSL service to obtain voice service from another voice provider.

*Ex ante* non-discrimination rules have been subject to criticism from parties that argue that such rules would intrude too much into the business plans of broadband network providers. These critics argue that non-discrimination rules impinge on the ability of broadcast network providers to fully exploit efficiencies from vertical integration or to use price discrimination or other pricing strategies to maximize return on investment. Professor Wu responds that his proposal, which limits the non-discrimination prohibition to the inter-network portion, minimizes that effect by allowing the network provider to take advantage of those economies of scope and vertical integration advantages (such as offering service level guarantees not provided on a shared network) that come with building one’s own physical network — so long as no restrictions (such as prohibiting access to certain IP addresses) are placed on use of the shared portion of the Internet network. On the other hand, some parties have been concerned that by allowing the broadband network providers unlimited control over the local portion of their networks, those providers still could distort applications markets to their advantage, though it might be more difficult or more expensive to do so.

Another criticism of *ex ante* non-discrimination rules is that they inherently lead to delays, litigation, and other regulatory costs, as parties fight over interpretation of the rules. The complexity of communications networks, it is argued, renders it difficult, if not impossible, to construct clear *ex ante* rules. These critics point to the industry experience implementing the 1996 Act. Professor Wu has responded that delays, litigation, and other regulatory costs of administering an *ex ante* non-discrimination rule could be minimized by identifying only two network layers — the transport infrastructure layer and the application services level<sup>66</sup> — and by restricting the rules to the inter-network portion of the network.

The other major criticism is that *ex ante* rules of any sort, and especially those relating to network access, will artificially aid an independent applications provider in its contractual negotiations with a broadband network provider by allowing it to threaten to bring a regulatory complaint and attendant costs if the network provider does not accept its terms. According to this argument, the network provider often might be forced to accept unfavorable or inefficient access terms to avoid the threat of litigation.

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<sup>66</sup> Tim Wu, “A Flat Model of Telecommunications Regulation,” Columbia Program in Law and Technology Occasional Paper (2006), available upon request from the author, who can be reached at [<http://www.timwu.org>].

***The European Union Framework.*** The European Union (“EU”) has adopted a legislative framework for the regulation of electronic communications (“EU Framework”) that includes creation of *ex ante* rules to supplement an antitrust approach to regulation.<sup>67</sup> The EU Framework creates a single regulatory structure that covers all electronic networks and services within its scope, without regard to underlying technology.<sup>68</sup> It aims to “reduce *ex-ante* sector-specific rules progressively as competition in the market develops.”<sup>69</sup> The rules, requirements, or obligations imposed on providers are service-specific and are determined by the level of competition in the market.<sup>70</sup> The EU Framework calls for periodic review of all regulatory obligations,<sup>71</sup> although no time period is specified.

Under the EU Framework, specific *ex ante* regulatory obligations are imposed only on those providers that:

- have significant market power; *and*
- are operating in markets where competition is not effective; *and*
- where national and European Community competition law (i.e., antitrust) remedies are not sufficient to address the problem.<sup>72</sup>

The Framework Directive equates “significant market power” with “dominance.” It states that a provider “shall be deemed to have significant market power if, either individually or jointly with others, it enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to

<sup>67</sup> The single document most concretely laying out the Framework is Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communication networks and services, OJ L 108, 24.4.2002, pp. 33-50. The complete Framework consists of four additional EU directives plus two documents prepared by the Commission of the European Communities, as required by Article 15, paragraphs 1 and 2, of the Framework Directive (at p. 44).

<sup>68</sup> All transmission infrastructures used to offer electronic communications services to the public (including those used to carry broadcasting content, such as cable television networks, terrestrial broadcasting networks, and satellite broadcasting networks) are within the scope of the new regulatory Framework. (Framework Directive at p. 33, paragraph 5.) Content services (such as broadcast content and e-commerce services), electronic communications equipment, and private networks that are not used to offer services to the public, are outside the scope of the Framework (Framework Directive at pp. 33-34, paragraphs 5-6 and 8-10, and p. 39, Article 2, Definition d.)

<sup>69</sup> Commission of the European Communities, “Commission Recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services” (Commission Recommendation), OJ L 114, at p. 45, paragraph 1.

<sup>70</sup> Framework Directive at p. 45, Article 16, paragraphs 3-4.

<sup>71</sup> Framework Directive at p. 36, paragraph 27, and at p. 38, paragraph 39.

<sup>72</sup> Framework Directive at p. 36, paragraph 27.

behave to an appreciable extent independently of its competitors, customers, and ultimately consumers.”<sup>73</sup>

As required by the Framework Directive, the Commission of the European Communities (a body of the EU) has prepared Commission Guidelines that describe in detail how to measure effective competition and significant market power,<sup>74</sup> and also a Commission Recommendation that identifies 18 product and service markets in which *ex ante* regulation may be warranted because of a lack of effective competition.<sup>75</sup>

The Commission, itself, does not devise specific rules, requirements, and obligations for electronic communications providers. Rather, the National Regulatory Agencies of each of the EU’s member states must perform market analysis within their national boundaries to determine which providers have significant market power and, based on that market analysis, create the appropriate specific regulations, rules, or obligations to impose on those providers.<sup>76</sup> To date, very few of the member states have performed this market analysis or implemented regulations, rules, or obligations, and thus there is no empirical evidence on the impact of this regulatory framework.

The Commission Guidelines state that, although a high market share alone is not considered sufficient to establish possession of significant market power, concerns about single firm dominance arise with market shares of 40% or above.<sup>77</sup> Providers with market share of 25% or less are deemed unlikely to have significant market power. Emerging markets, where *de facto* the market leader is likely to have a substantial market share, should not be subject to inappropriate *ex ante* regulation.<sup>78</sup>

Proponents of the EU Framework argue that telecommunications regulation should be viewed as an applied case of antitrust and therefore should adhere to antitrust principles.

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<sup>73</sup> Framework Directive at p. 44, Article 14, paragraph 2.

<sup>74</sup> “Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services,” (Commission Guidelines), OJ C 165, 11.7.2002, pp. 6-30. These detailed guidelines describe the relationship between the Framework and EU competition law. They include discussions of the criteria for defining the relevant product market (including demand-side substitution and supply-side substitution) and relevant geographic market, and criteria for assessing significant market power (including dominance, collective dominance, and the leverage of market power).

<sup>75</sup> Commission of the European Communities, “On Relevant Product and Service Markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services” (Commission Recommendations), OJ L 114, pp. 45-49.

<sup>76</sup> Commission Guidelines at p. 7, paragraph 9, and p. 8, paragraph 19.

<sup>77</sup> Commission Guidelines at p. 15, paragraph 75.

<sup>78</sup> Commission Guidelines at p. 10, paragraph 32.

Critics of the EU Framework claim that although the rules are set *ex ante*, they fail to provide either network providers or independent applications providers the type of certainty that fosters innovative activity because they are determined on a case-by-case basis and do not take advantage of characteristics common to most communications markets. As one critic explains:

...what distinguishes telecommunications problems is that they share consistent features found in some but not all antitrust cases. Most telecommunications problems feature many if not all of the following economic features: (1) a physical infrastructure of high fixed cost, that is (2) a large source of both positive externalities including network externalities, that (3) can be used to provide a range of services, and (4) in an environment of rapid technological change that makes the infrastructure useful for different services than those for which it was originally designed.<sup>79</sup>

Given these common market characteristics, it might be possible to construct general rules that provide certainty for network providers and independent applications providers alike.

Another criticism of the EU Framework is that reliance on antitrust principles simply replaces the current contentious battle over the classification of services with a new contentious battle over proper market definition, since any determination of whether a firm has significant market power is likely to depend heavily on the geographic and product market definitions chosen.

### ***Ex Post* Adjudication of Abuses of Market Power.**

The Regulatory Framework Working Group of the Digital Age Communications Act Project of the Progress and Freedom Foundation (“PFF Working Group”) has proposed replacing the current statutory and regulatory framework that relies heavily on proscriptive rules that set *ex ante* structural and behavioral requirements (such as access requirements or non-discrimination rules) with a system that would adjudicate alleged abuses of market power *ex post*, as they arise, on a case-by-case basis. It proposes enacting a new statute, the Digital Age Communications Act (“DACA”),<sup>80</sup> modeled after the Federal Trade Commission Act,<sup>81</sup> that would give the FCC (or a successor agency) the authority to adjudicate allegations of “unfair methods of competition ... and unfair or deceptive acts in or affecting electronic communications networks and electronic communications services.” These unfair practices could include interconnection-related practices (such as the refusal to interconnect or unfair terms, conditions, and rates of interconnection):

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<sup>79</sup> Tim Wu, “A Flat Model of Telecommunications Regulation,” Columbia Program in Law and Technology Occasional Paper (2006), available upon request from the author, who can be reached at [<http://www.timwu.org>].

<sup>80</sup> Digital Age Communications Act: Proposal of the Regulatory Framework Working Group of the Digital Age Communications Act Project of the Progress and Freedom Foundation, June 2005, available at [<http://www.pff.org/issues-pubs/other/050617regframework.pdf>], viewed on December 18, 2006.

<sup>81</sup> 15 U.S.C. §§ 41-51.

- *if* such practices were shown to pose a substantial and non-transitory risk to consumer welfare;
- *and if* the Commission determined marketplace competition were not sufficient to protect consumer welfare;
- *and if* the Commission considered whether requiring interconnection would affect adversely investment in facilities and innovation in services.

Under the proposal, the Commission could require the guilty party to pay damages to the harmed party if any violation were found. Also under the proposal, the Commission would have very constrained authority to prescribe rules, which would automatically sunset after five years. The FCC's authority to approve an application to assign or transfer control of a license (that is, to review mergers) would be limited to ensuring that any such change in control did not violate existing FCC rules.

The PFF Working Group claims that the potential harm to consumers from bad regulation far exceeds the potential harm from badly functioning markets and therefore the burden of proof must fall on the regulator for imposing any regulation. It seeks to “codif[y] a presumption that regulation is unnecessary to protect consumers and provide[] tools that can adequately address competition problems that arise in communications markets.” It states that even inefficient market outcomes are likely to be less problematic than regulatory solution because (1) markets are effective at responding to and overcoming their own inefficiencies, (2) government may not have the incentive to improve matters, and (3) policy makers are likely to lack the information needed to make efficient decisions. Thus, it proposes *ex post* rather than *ex ante* regulation and the five-year sunset provision. The PFF Working Group further argues that a new statute is needed in order to replace the current model of regulation based on vague standards such as the “public interest” and “just and reasonable” with the well-established “unfair competition” standard of the FTC. It explicitly seeks, in each and every provision of its proposed statute, to minimize the FCC's regulatory authority.

The PFF Working Group proposal for *ex post* regulation has been subject to several criticisms. First, it is based on the assumption that consumer welfare loss from bad regulation is always far greater than consumer welfare loss from badly performing markets, and that it is therefore best to err on the side of under-regulating. This may or may not be true in the case of markets characterized by networks where the platform provider and applications providers must cooperate to maximize consumer welfare. There is a large and growing academic law and economics literature on these unique markets; there is no consensus in the literature, or from empirical evidence, that in these markets there is less risk from erring on the side of under-regulation than on the side of over-regulation. Nor is there theoretical or empirical proof that the potential harm to consumers from distortions created by *ex ante* rules are greater than those created by *ex post* adjudication. It is possible that a narrowly crafted *ex ante* non-discrimination rule could create less distortion than *ex post* adjudications that will inherently result in some, and potentially many, innovative independent applications providers being driven from the market, thereby

denying customers the benefit of their services. The PFF Working Group proposal appears implicitly to recognize that possibility by giving the FCC rulemaking authority, which, although constrained, would allow the Commission to consider adoption of *ex ante* rules where appropriate.

More generally, critics claim that *ex post* regulation distorts the business plans, and undermines the negotiating position, of independent applications providers by placing the burden of proof for network access on them if they seek to develop and introduce an application that may not fit into the business plan of the network provider. According to this argument, the independent applications provider might be forced to modify its planned application or accept unfavorable or inefficient access terms to avoid the threat of being denied access to the broadband network.

Some critics also oppose the PFF Working Group proposal to eliminate the public interest standard, claiming reliance on what is basically an antitrust standard fails to take into account non-economic objectives of U.S. telecommunications policy, such as localism and diversity of voices.

### **Antitrust Law and Non-Mandatory Principles as the Basis for Self-Regulation.**

The broadband network providers have argued that they should not be subject to access regulation because they face strong market incentives not to restrict the access of independent applications providers to their networks. They cite the existence of indirect network efficiencies, which reward network providers for keeping their network open, and the availability to most Americans of at least two broadband networks. They argue that any access regulation would cause harm, by curtailing their ability to vertically integrate to exploit efficiencies such as ensuring quality of service levels needed for video and voice services.<sup>82</sup> They argue that where they have placed usage restrictions on customers those restrictions were needed to ensure quality of service and other bandwidth management objectives and to make it feasible to undertake their huge infrastructure investments. They also claim that they remain subject to the antitrust laws, which would constrain them from undertaking any anticompetitive activities that are harmful to consumers.

These arguments have been subject to a number of attacks. Critics have pointed to the widespread, documented usage restrictions that network providers have placed on end users, which the critics claim have harmed consumers, for example, by denying access to virtual private networks needed for telecommuting. Critics claim that these usage prohibitions are far more restrictive than needed to manage bandwidth, and often are imposed for strategic purposes, not for network efficiency reasons. They also claim that not regulating access will harm innovation by giving the broadband network providers the ability to strategically constrain independent applications.

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<sup>82</sup> See, for example, *ex parte* letter dated February 21, 2003, from Daniel L. Brenner and Michael Schooler, counsel for the National Cable & Telecommunications Association, to Marlene Dortch, Secretary of the Federal Communications Commission, submitted in CS Docket No. 02-52.

Former FCC chairman Michael Powell has suggested that it might not be necessary to impose regulations if the industry were to agree to follow certain “Internet Freedom” principles as the basis for self-regulation. Mr. Powell has constructed guiding principles,<sup>83</sup> noting that:

Promoting competition among high-speed Internet platforms is only half of our task, however. We must ensure that the various capabilities of these technologies are not used in a way that could stunt the growth of the economy, innovation and consumer empowerment. Thus, we must expand our focus beyond broadband networks — the so-called “physical layer” of the Internet’s layered architecture.

Referring explicitly to the research and analyses performed by Professors Weiser, Farrell, and Wu, cited earlier, Mr. Powell explained that there are circumstances in which broadband network providers might choose to restrict usage on their network, and that some troubling restrictions have appeared in broadband service plan agreements. But he stated that he did not believe that there was yet a case for government imposed regulations regarding the use or provision of broadband content, applications, and devices. Instead, he challenged the industry to avoid future regulation by embracing what he called the four Internet Freedoms. These are:

- *Freedom to Access Content:* Consumers should have access to their choice of legal content.
- *Freedom to Use Applications:* Consumers should be able to run applications of their choice.
- *Freedom to Attach Personal Devices:* Consumers should be permitted to attach any devices they choose to the connection in their homes.
- *Freedom to Obtain Service Plan Information:* Consumers should receive meaningful information regarding their service plans.

In presenting these principles, Mr. Powell indicated that broadband network providers have a legitimate need to manage their networks and ensure a quality experience; thus reasonable limits sometimes must be placed on service contracts. Such constraints, however, should be clearly spelled out and should be as minimal as necessary. Since no one can know for sure which “killer” applications will emerge to drive deployment of the next generation high-speed technologies, the industry must let the market work and allow consumers to run applications and attach devices unless they exceed service plan limitations or harm the provider’s network. (The broadband network providers have not explicitly opposed Mr. Powell’s proposal; nor have they explicitly endorsed it.)

In its August 5, 2005 order and related actions, the FCC, in effect, implemented Mr. Powell’s proposal. It ruled that DBS service, like cable modem service, is an

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<sup>83</sup> Remarks of Michael K. Powell, Chairman, Federal Communications Commission, at the Silicon Flatirons Symposium on “The Digital Broadband Migration: Toward a Regulatory Regime for the Internet Age,” University of Colorado School of Law, February 8, 2004.

information service and therefore not subject to any of the access requirements in Title II of the Communications Act. It also adopted a non-binding policy statement consisting of four principles: consumers are entitled to access the lawful Internet content of their choice; consumers are entitled to run applications and services of their choice, subject to the needs of law enforcement; consumers are entitled to connect their choice of legal devices that do not harm the network; and, consumers are entitled to competition among network providers, application and service providers, and content providers.<sup>84</sup>

Critics have challenged Mr. Powell's proposal — and, by extension, the FCC's August 5, 2005, order and policy statement — on several grounds. They point to the many documented instances of usage restrictions placed on end users as proof that, left unregulated, market forces are not robust enough to ensure unrestricted access. They argue that the search for the killer application that might drive investment in both infrastructure and applications is more likely to be successful in a regulatory regime that fosters network neutrality than in a regime that allows the few broadband network providers to determine the direction of the network. They argue that it is impossible to undo harm after it has occurred and that, in light of the identifiable reasons why network providers might have both the incentive and the ability to restrict access, it is dangerous to move forward based on non-mandatory principles that the network providers have not, in any case, endorsed.

Critics also claim that antitrust laws, which generically address monopoly behavior and anticompetitive practices, are inefficient vehicles for addressing the impediments to competition and innovation that are most common in communications markets. These critics argue that there is abundant empirical evidence that there are greater opportunities for firms to erect barriers to entry in “network” markets than in traditional markets and that as a result relying primarily on *ex post* antitrust enforcement leaves consumers subject to unnecessary risk. They also oppose elimination of the public interest standard.

## **Platform Innovation: Mass Market Competition Among Broadband Network Providers**

Currently, in most locations, the incumbent local exchange carrier (“ILEC”) and the local cable company are the only broadband network providers serving the mass market. Wireless (including satellite) carriers, cable overbuilders, or power companies may provide a relatively ubiquitous third broadband connection some time down the road, but in the next few years are likely to offer mass market customers a competitive option in scattered locations at most. Nor have the ILECs demonstrated tangible plans to extend their broadband networks beyond their current service areas to compete head-on with other ILEC broadband providers.

It appears that the competition that is developing between telephone and cable providers is taking the form of “triple play” offerings of voice, data, and video services. At present and in the near future, some telephone companies will bundle

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<sup>84</sup> “FCC Eliminates Mandated Sharing Requirement on Incumbents’ Wireline Broadband Internet Access Services,” FCC News, August 5, 2005.



re-sold satellite video services with their voice and DSL services to compete with cable companies' triple play. But the largest ILECs and even many small rural carriers have begun to upgrade their networks to have the bandwidth capacity to offer video services themselves.<sup>85</sup> Broadband network providers will seek to distinguish themselves by offering premium services such as video on demand, bundles that include wireless service (with that service provided over a separate wireless network, though perhaps using hybrid telephones that can be used on wireless and wireline networks), access to advanced electronic games, etc. A key will be to offer a broadband connection with sufficient bandwidth to accommodate whatever service becomes the killer application, or at least an important application.

As explained earlier, these broadband networks actually consist of two parts: the last-mile local network privately owned and operated by the broadband network provider and the inter-network that is jointly operated by multiple Internet backbone providers. Success for any broadband network provider will depend on the bandwidth, security, and service quality it can ensure over its local network.

Although currently all ubiquitous broadband networks provide hard wires into the customer premise, the various network providers are each deploying unique network architectures. Most of the large cable companies have upgraded their coaxial cable networks and now are offering video, data, and voice services in many areas of the country, especially in urban areas. Their cables into customers' premises often have sufficient bandwidth to "broadcast" to customers' premises hundreds of video channels for the customers to choose among and their set-top boxes allow customers to select video on demand, although the video choices available at any particular point in time may be limited. Currently deployed cable modem technology, however, requires clustered customers to share bandwidth capacity, so that connection speeds fall as more neighbors use the network.

### **Traditional Cable vs. IP Video.**

The two largest ILECs, AT&T<sup>86</sup> and Verizon, are pursuing quite distinct architectures, with the Verizon architecture in many ways more like cable architecture than like the AT&T architecture. Verizon reportedly will spend \$6 billion over five years to bring optical fiber directly to as many as 16 million homes in its service areas.<sup>87</sup> Verizon has begun deployment of its "FiOS TV" network, which will require the replacement of current copper wires into the household premise with optical fiber. This requires a truck roll to physically replace the copper with fiber. But that fiber has such high capacity that it is likely to allow Verizon to bring as much or more bandwidth to the home as cable systems, thus allowing Verizon to simultaneously "broadcast" a large number of video channels and offer video on demand. At the customer premise, the viewer will use the remote control

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<sup>85</sup> Deployment by small rural telephone companies of broadband networks capable of providing voice, data, and video is discussed below in the section entitled "Other Programs and Policies that Contribute to the Universal Availability of Broadband Networks."

<sup>86</sup> When SBC acquired AT&T in 2005, it changed its corporate name to AT&T.

<sup>87</sup> Michael Totty, "Who's Going to Win the Living-Room Wars?", *Wall Street Journal*, April 25, 2005, at p. R4, citing a UBS analyst report.

to the set-top box to choose the channel to be watched at any point in time, just as is done for cable service today. Also like cable, the signals for premium channels will be “broadcast” in coded form, and households that do not subscribe to particular premium channels will not be able to decode the signals. Verizon will use a particular wavelength on their fiber to implement QAM, a cable protocol used as a transport mechanism. This architecture appears to be consistent with the definitions of “cable service” and “cable system” in Section 602 of the Communications Act.<sup>88</sup>

In contrast, AT&T reportedly is spending \$4 billion over three years to string optical fiber cable to neighborhoods totaling as many as 18 million homes, and plans to deliver television services using Internet technology called IPTV.<sup>89</sup> Rather than “broadcasting” a constant stream of all available programs, as the cable companies and Verizon do, IPTV stores a potentially unlimited number of programs on a central server, which users then call up on demand. AT&T will not replace the copper lines that currently run into customer premises. Instead, to make sure there is sufficient bandwidth between the neighborhood node where the optical fiber terminates and the household premise, it will upgrade the DSL equipment currently at those nodes and in households with VDSL technology. At the household, the viewer will use the IP technology to send a signal to the AT&T end-office to send a particular channel or video on demand selection. That signal will be sent over the same bandwidth used for data and VoIP service. In AT&T’s system, a single customer line will have enough bandwidth to support up to four active television sets per household at a time, or up to two HDTV channels at a time.

The Verizon and AT&T broadband network architectures each have their advantages and disadvantages. For example, AT&T’s IP approach has greater two-way capability and therefore probably can better accommodate two-way applications than the Verizon architecture. On the other hand, AT&T’s architecture provides far less bandwidth into the household, and thus may not be able to accommodate some bandwidth-intensive applications that the Verizon architecture could accommodate. AT&T may face customer resistance to an IP system that may experience some delay when changing channels. AT&T’s reliance on DSL technology also may create problems with home networking. Telephone wires currently enter the house and then the inside wiring goes to the various telephones. But television sets may not be located near the telephones. AT&T’s plan requires 20-25 megabits of bandwidth into the home, but with its architecture — deploying optical fiber to the neighborhood node, and then continuing to use copper into the home with VDSL — bandwidth falls as the distance to a customer’s house increases. It may be that only those homes within a couple of thousand feet of the neighborhood node will be able to be fully served. On the other hand, Verizon’s choice of deploying optical fiber all the way to the home, which requires a very large investment in optical cable, labor-intensive truck rolls, and in some cases digging up of land to replace the copper with optical cable, will be far more expensive per household served and thus may be constrained both by limits on Verizon’s capital budget and by customer resistance to digging up

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<sup>88</sup> 47 U.S.C. § 522.

<sup>89</sup> Michael Totty, “Who’s Going to Win the Living-Room Wars?”, *Wall Street Journal*, April 25, 2005, at p. R4, citing a UBS analyst report.

their yards to lay fiber. Some observers have questioned whether Verizon's fiber to the home approach can prove out financially, even as they concede that the huge bandwidth provided could give it a leg up in the long run.

Unlike current copper networks, both the AT&T architecture and the Verizon architecture could leave customers without telephone service if their electricity goes out, though for different reasons. Fiber to the home technology does not incorporate line powering, so Verizon might have to provision the optical interface at its customers' premises with back-up batteries. But even then, the batteries would probably last at most 8 to 16 hours, less time than might be needed in case of natural disruptions such as hurricanes. At the same time, DSL modem systems of the sort used by AT&T require active electric power at the customer premise, which may not be available during emergencies. In both cases, customers might have to rely on wireless telephone service during time of electric power loss.

The marketplace will determine which of these network strengths and weaknesses are most important to end users. These architectural differences, in addition to creating competing platforms for triple play service, offer platform diversity to independent applications providers. Where the competing networks have distinct characteristics that better meet the needs of some sets of applications and are less effective for other sets of applications, applications providers are not constrained in their product development to the characteristics of a single platform. Thus, competing distinct broadband networks fosters applications innovation.

AT&T claims that since it will be using IP technology to offer video service, it is not subject to cable television regulation, most notably, franchising requirements. Under federal law, franchise authorities<sup>90</sup> may require a cable operator to pay a franchise fee of up to 5% of cable service revenues;<sup>91</sup> may establish requirements for designation of channel capacity for public, educational, or governmental ("PEG") use and for the construction of "institutional networks" that serve educational and governmental functions of the franchiser;<sup>92</sup> may require the franchisee to provide facilities or financial support for PEG access;<sup>93</sup> may require a cable system to designate channel capacity, up to maximum levels based on system capacity, for

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<sup>90</sup> Although franchising is most commonly performed by local jurisdictions, and it is common to talk of "local franchising authorities," there is no statutory language explicitly requiring that franchising be performed at the local level, as opposed to the state level. According to Sec. 601 of the Communications Act, "the term 'franchising authority' means any governmental entity empowered by the Federal, State, or local law to grant a franchise." (47 U.S.C. § 521) At the same time, Sec. 601 also explicitly identifies a local purpose for regulation of cable television: "[to] establish franchise procedures and standards which encourage the growth and development of cable systems and which assure that cable systems are responsive to the needs and interests of the local community" (47 U.S.C. § 521)

<sup>91</sup> 47 U.S.C. §§ 542(a) and 542(b).

<sup>92</sup> 47 U.S.C. § 531.

<sup>93</sup> 47 U.S.C. § 541(a)(4)(B).

commercial use by persons unaffiliated with the cable system;<sup>94</sup> must allow the cable system a reasonable period of time to build out its system to cover all households in the franchise area;<sup>95</sup> and must prohibit the redlining of low income neighborhoods.<sup>96</sup>

Clearly, if AT&T were not subject to a 5% franchise fee and other cable franchising requirements, but its competitors were, it would enjoy a significant competitive advantage. To the extent such advantage would artificially raise the relative costs or otherwise harm competing broadband network providers, or otherwise weaken them, then their ability to foster innovation by providing a unique alternative broadband platform could be undermined.

Verizon has agreed that it is subject to franchise requirements, but argues that a streamlined state-wide or nationwide franchising process is needed because the extremely time consuming process of negotiating literally thousands of individual franchise agreements could slow down its entry into video by years and could endanger its planned upgrade to a broadband network.

### **Reviewing the Current Framework for Cable Franchising.**

These potential inconsistencies suggest that it is timely to review the current statutory and regulatory framework for cable, found primarily in Title VI of the Communications Act, to determine whether it would be in the public interest to streamline the franchising process (for example, by consolidating it at the state or federal level) and/or to lessen or eliminate some current regulations. For example:

- Are there elements of the current federal and state regulatory framework for cable service that impede entry into the video market and, if so, would the benefits to consumers from modifying or eliminating these elements outweigh the benefits of maintaining them?
- Is the potential for competition from the new telephone company-based video providers sufficient to lighten or eliminate the remaining economic regulations of all video providers, including incumbent cable companies? (Already, the only cable rates subject to regulation are basic cable rates and cable equipment rates.)
- Is there a need for more stringent economic regulation of the incumbent cable companies than of new subscription video providers?
- Which current regulations are intended to “assure that cable systems are responsive to the needs and interests of the local community”? To what extent can competitive provision of subscription video

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<sup>94</sup> 47 U.S.C. § 532.

<sup>95</sup> 47 U.S.C. § 541(a)(4)(A).

<sup>96</sup> 47 U.S.C. § 541(a)(3).

create market forces that would, on their own, force video providers to be responsive to local community needs and interests? To what extent can centralized (state or federal) regulation, rather than local franchise regulation, address local needs? Is enforcement of consumer protection and customer service requirements better addressed at the local level or centrally at the state or federal level?

- If there already is a ubiquitous provider of broadband video service — the local cable system — in a municipality, does the public benefit from requiring new entrants also to provide ubiquitous service? On one hand, the existing telephone networks do not conform to municipal boundaries, so even a complete broadband buildout of a telephone company’s network might not provide ubiquitous coverage of a particular political jurisdiction. On the other hand, less than ubiquitous coverage might leave some households without a competitive alternative and also might allow the new entrant to strategically “cherry-pick” the most valuable neighborhoods.
- If the underlying public interest objectives that are served by the current PEG and institutional network requirements are fully met by the incumbent cable companies, such that there would be little public benefit to imposing the same requirements on new entrants, how could these requirements be maintained on the incumbents without placing them at a competitive disadvantage?
- With respect to the long-standing media policy objective of diversity of voices, the media ownership rules address horizontal ownership relationships, not vertical ones. Congress enacted sections 611 and 612 of the Communications Act<sup>97</sup> to ensure diverse sources of video programming on cable television if cable companies are vertically integrated into program production. Section 612 allows franchising authorities to require a cable system to designate channel capacity, up to maximum levels based on system capacity, for commercial use by persons unaffiliated with the cable system. Section 611 allows franchising authorities to require the designation of channel capacity for public, educational, or governmental use. The public access channels, in particular, are intended to ensure that diverse voices are heard. How should these statutory provisions be applied to telephone company-based video providers?

Some observers have argued that fairness in the marketplace requires that the new telephone-based video providers be subject to the same requirements as the incumbent cable operators. In particular, some have argued that the new entrants should be subject to the same buildout requirements as the cable operators. But economists have explained that the costs of a particular regulatory requirement may

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<sup>97</sup> 47 U.S.C. § 531 and 532.

be very different for an incumbent and a new entrant, and if imposed in exactly the same fashion may act as a barrier to entry and increase the “first mover” advantage already enjoyed by the incumbent.<sup>98</sup> For example, a buildout requirement is one of the costs of entry into the market. For the incumbent cable operator, the buildout requirement may have been imposed at a time when cable operators received an exclusive franchise and thus it represented a cost of entry into a protected monopoly market. Moreover, that cost is now sunk and likely has long since been recovered. In contrast, for a new telephone-based entrant, a buildout requirement would represent an entry cost into a competitive market environment and would not be viewed as sunk when it makes the decision to enter or not enter. Thus, the imposition of identical franchise (or other regulatory) requirements on an incumbent and a new entrant might not represent an equal burden in the marketplace.

At the same time, the advent of IP video potentially raises a new regulatory issue. While it is unlikely that an independent applications provider would be able to put together a suite of video programming to compete head-on with AT&T, Verizon, or cable operators for the provision of multiple channels of subscription video service, it is possible that an independent applications provider might be able to offer specialty video programming, perhaps independent films or local sports programming, using IP technology. While a single applications provider of this sort might not be a threat to the business plan of the large cable and telephone companies, a plethora of such independent video providers — or, in the future, the development of a direct link between content providers and end users via peer-to-peer connections — might be a threat. The network providers might then have the incentive to restrict end user access to these services. This raises the non-discrimination issues discussed earlier: should vertically integrated broadband network providers have the right to restrict IP video or other applications that challenge their own video services or should end users’ have nondiscriminatory access to all applications that do not threaten the integrity of the network be mandatory?

## Fostering Additional Broadband Networks

### Intermodal Competition from Advanced Wireless Networks.

In the debate among proponents of the various approaches to regulation of broadband networks — structural requirements, *ex ante* non-discrimination rules, *ex post* adjudication of abuses, and reliance on antitrust law and non-binding principles — the only point of agreement is that end users would benefit, and the need for regulation might be reduced, if customers had more than two broadband networks to choose among.<sup>99</sup>

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<sup>98</sup> See, for example, George Ford, Thomas Koutsky, and Lawrence Spiwack, “Competition After Unbundling: Entry, Industry Structure and Convergence,” Phoenix Center Policy Paper Number 21, July 2005, at pp. 36-39, available at [<http://www.phoenix-center.org/pcpp/PCPP21Final.pdf>], viewed on December 27, 2006.

<sup>99</sup> Some parties that have voiced concern about a duopoly market structure have pointed to the history of the wireless telephone industry. According to those commentators, for a decade, when there were only two cellular telephone providers in any geographic area (the  
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In almost all geographic markets today, however, the mass market broadband market structure is characterized by duopoly provision of broadband network services (cable modem service from the local cable system or DSL service from the local telephone company), plus competition among independent applications service providers and the two vertically integrated broadband network providers for the provision of broadband applications (services). Most parties agree that the dynamics in both the network market and the applications market would likely change if there were three or more widely available broadband network options. For example, as discussed earlier, network providers face countervailing incentives. On one hand, due to indirect network externalities, they have the incentive to minimize restrictions on independent applications providers' access to their networks. On the other hand, they sometimes have the incentive to restrict such access when to do so would yield them first-in advantages or other strategic advantages in the applications market or would aid in their ability to bolster profits through price discrimination.

A third network provider, entering the market after the first two have been established, is likely to seek customers by differentiating its network access offering — perhaps by offering nomadic, portable, or mobile access services not available from the two wireline providers and/or by configuring its network architecture and service offerings in a fashion to accommodate independent applications not accommodated by the incumbents' architectures and service offerings.<sup>100</sup> A third network therefore may well strengthen the market forces for nondiscriminatory network access and may reduce the need for regulatory intervention. Given the high sunk up-front costs and initially low scale economies, however, a new entrant is less likely to be able to provide strong price competition, even if its underlying cost structure (when operating closer to capacity) were lower than that of the incumbents. Also, if the new entrant can succeed in gaining end-user customers — and thus also independent applications provider customers — primarily because of its nomadic, portable, or mobile feature, it may have the same market incentives as any other network provider enjoying its middle position in a two-sided market. Once the new entrant has acquired end-user customers, independent applications providers may have no choice but to interconnect with the new entrant's broadband network at terms, conditions, and rates over which they have little or no leverage, with possible harmful implications for competition in the applications market. Thus, it is not

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<sup>99</sup> (...continued)

incumbent local exchange carrier and a second carrier), there was little investment, innovation, or market success and no attempt to position wireless service as a direct competitor with wireline telephone service. Only when the FCC made additional spectrum available for wireless service (allocating spectrum in the 1900 MHz band for personal communications service), allowing several additional carriers to offer service in most geographic areas, did wireless begin to experience rapid technological and market advances that redounded to the benefit of consumers. Other commentators, however, claim that the rapid changes of the 1990s were due to technological change lowering costs to the point that wireless service could become a substitute for traditional fixed telephone service, not due to change in the market structure.

<sup>100</sup> The latter might be accomplished by deploying a symmetric network with as much uplink bandwidth as downlink bandwidth or by not partitioning the available bandwidth for specific services. See CRS Report RL33496, *Access to Broadband Networks*, by Charles B. Goldfarb.

certain whether entry by a third network provider would eliminate the need for regulation.

Still, entry by a third broadband network provider could threaten the profits of incumbent wireline and cable broadband network providers to the extent they lose customers to the entrant and to the extent a third network reduces their negotiating strength vis-a-vis independent applications providers and end users. The incumbent network providers might benefit, however, if such entry justified the easing of regulatory requirements. The incumbents have argued that regulation of their networks inevitably introduces inefficiencies, distortions, and unnecessary costs. If entry of a third broadband network created market forces that decreased both the perceived and the actual need for regulation of the broadband networks, and if such regulation did indeed impose those inefficiencies on network providers, then regulatory relief induced by competitive entry could benefit the incumbents.

While ultimately broadband may be provided over power lines (“BPL”) and/or satellite, there is general agreement that a third ubiquitous broadband network option is most likely to be provided using terrestrial wireless technology. In recognition of that fact, the FCC created a Wireless Broadband Access Task Force that issued a report in February 2005.<sup>101</sup> The report identified two policy reasons for fostering deployment of wireless broadband networks:<sup>102</sup>

- Terrestrial wireless technology provides both mobility and portability, efficiently connects devices within short distances, and bridges longer distances more efficiently than wireline and cable technologies. Wireless technologies frequently are a more cost-effective solution for serving areas of the country with less dense population, and provide rural and remote regions new ways to connect to critical health, safety, and educational services.
- Terrestrial wireless networks can provide competition to existing broadband services delivered through the currently more prevalent wireline and cable technologies. Wireless broadband can create a competitive broadband marketplace and bring the benefits of lower prices, better quality, and greater innovation to consumers.

There appears to be consensus that one objective of U.S. telecommunications policy should be to foster the deployment of wireless broadband networks. But any actions to foster deployment should not take the form of industrial policy favoring any specific wireless technology, since there are a variety of technologies that can offer broadband capability. Nor should it provide wireless technology an artificial advantage over other broadband technologies.

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<sup>101</sup> “Connected on the Go: Broadband Goes Wireless,” Report by the Wireless Broadband Access Task Force (“FCC Wireless Broadband Task Force Report”), Federal Communications Commission, GN Docket No. 04-163, February 2005.

<sup>102</sup> FCC Wireless Broadband Task Force Report, at pp. 13-14.



Wireless broadband can be provided using fixed or portable technologies (such as Bluetooth or ultra-wide band for short-range communications, Wi-Fi for medium-range, and WiMAX for longer-range) or by using mobile technologies (such as those used for third-generation (“3G”) or forthcoming fourth-generation (“4G”) mobile cellular service). Currently, Wi-Fi primarily provides wireless Internet access for laptop computers and personal digital assistants; WiMAX expands networks with wireless links to fixed locations; and 3G brings Internet capabilities to wireless mobile phones.<sup>103</sup> Over time, the capabilities of all these technologies are likely to expand. The short and medium range technologies share unlicensed spectrum with other technologies. WiMAX and 3G operate on designated, licensed frequencies (though it may soon be possible for WiMAX to operate on unlicensed spectrum). Proponents of each of these technologies share the concern that there may be insufficient unfettered spectrum available for their technologies to be developed to full market potential (though recent FCC actions have at least started the process for making such spectrum available). It is not yet clear whether these various wireless technologies ultimately will be competing for customers or complementing one another by providing a broader base and greater choice of devices for wireless communications and networking.

Wi-Fi, or wireless fidelity, is the most widely employed of the family of Institute of Electrical and Electronics Engineers (“IEEE”) standards for frequency use in the unlicensed 2.4 GHz and 5.4/5.7 GHz spectrum bands. Those are the bands on which wireless local area networks operate. The FCC’s Wireless Broadband Access Task Force and others have identified a variety of actions to foster Wi-Fi usage, including managing spectrum in a fashion that eliminates artificial restrictions on the availability of unlicensed spectrum, promoting voluntary frequency coordination efforts by private industry, considering increasing the power limits in certain bands available for use by unlicensed devices in order to improve their utility for license-exempt wireless Internet service providers.

WiMAX is an industry coalition of network and equipment suppliers that have agreed to develop interoperable broadband wireless based on IEEE standard 802.16. It can transmit data up to 30 miles and may ultimately be used to provide the broadband “last mile” to end users, that is, a means to provide fixed and portable wireless services to locations that are not connected to networks by cable or high-speed wires. WiMAX uses multiple frequencies around the world, an impediment to interoperability. In the United States, the biggest band of spectrum currently available for WiMAX use is around 2.5 MHz, which has already been licensed, primarily to Sprint Nextel and Clearwire. It now appears that the successful bidders in the recent auction for the Advanced Wireless Service (AWS) Spectrum will use that spectrum to provide mobile wireless services rather than fixed and portable service using WiMAX. Another spectrum band that could be used for WiMAX is the 78 MHz of spectrum in the 700 MHz band — 18 MHz of which has already been auctioned off and the remaining 60 MHz of which will be auctioned off in 2008 as

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<sup>103</sup> For a more detailed discussion of terrestrial wireless technologies, see CRS Report RS20993, *Wireless Technology and Spectrum Demand: Advanced Wireless Services*; and CRS Report RS21508, *Spectrum Management and Special Funds*, both by Linda K. Moore.

part of the transition of broadcast television from analog to digital technology.<sup>104</sup> But the broadcasters do not have to release that spectrum until February 17, 2009. Moreover, that spectrum is viewed as the equivalent of “Riviera beachfront property,”<sup>105</sup> that will be sought by multiple bidders, many of which would not intend to use it for WiMAX service.

Today’s mobile wireless networks can only provide voice and limited data service. The next major advance in mobile technology, referred to as 3G, has been deployed overseas and is beginning to be introduced in the United States. It dramatically increases communications speed. Fourth generation networks, which may be available in the near future, are expected to deliver wireless connectivity at speeds up to 20 times faster than 3G. Some U.S. providers may choose to leapfrog directly from second to fourth generation technology. Third generation and future developments in wireless technology will be able to support many services for business and consumer markets, such as: enhanced Internet links, digital television and radio broadcast reception, high-quality streaming video, and mobile commerce, including the ability to make payments.

The reallocation of spectrum to make more available for advanced wireless services is a specific example of a broader public policy objective: the management of spectrum in a fashion that promotes its efficient use to provide innovative services to Americans. There is a very lively debate about how best to manage the spectrum to maximize consumer welfare. There has been much criticism that legacy command-and-control regulation of spectrum — under which spectrum is assigned to specific uses and access to that spectrum for other uses is prohibited — does not take into account advances in technology that have created the potential for systems to use spectrum more intensively and to be much more tolerant of interference than in the past.<sup>106</sup> Two proposed alternative approaches have been the subject of much discussion: the granting of exclusive, tradeable spectrum usage rights through market-based mechanisms and creating open access to unlicensed spectrum “commons.” The three approaches are not necessarily mutually exclusive; some portions of the spectrum could remain subject to command-and-control, while other portions are allocated by the market and the remainder is held as commons. The debate about how best to allocate spectrum, however, is beyond the scope of this report.

Some observers have suggested that a third network provider might have less incentive to provide strong price and service competition — to challenge the network access status quo — if it shared ownership or a strategic alliance with one of the incumbent networks. For example, if the new network were an advanced wireless network that shared ownership with one of the RBOCs (Verizon Wireless/Verizon or Cingular/AT&T/BellSouth) or if the wireless network had a strategic relationship

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<sup>104</sup> For a full discussion of the Digital Television Transition, see CRS Report RL31260, *Digital Television: An Overview*, by Lennard G. Kruger.

<sup>105</sup> See Howard Buskirk and Adrienne Kroepsch, “Interest High in 700 MHz Spectrum to be Sold by FCC,” *Communications Daily*, October 4, 2006, at p. 3.

<sup>106</sup> For a detailed discussion of spectrum management issues, see Spectrum Policy Task Force Report, Federal Communications, ET Docket No. 02-135, November 2002.

with the major cable companies (an alliance has been formed between four of the major cable companies and Sprint/Nextel to offer bundled “quadruple play” voice/data/video/wireless in competition with the RBOCs),<sup>107</sup> then there might be some reluctance on the part of the new entrant to employ an entry strategy that disrupts the market. This might suggest that, in any auction of spectrum for 3G or 4G services, some preference be given to bidders that are independent of the RBOCs, Sprint/Nextel, and major cable companies, or that some portion of the auctioned spectrum be set aside for independent providers.

On the other hand, there appear to be strong incentives for any broadband wireless network provider, even if it were owned by a telephone company or in a marketing relationship with a cable company, to be an aggressive competitor. First, wireless service is growing faster than wireline service, so it would not seem to be in a company’s long term strategic interest to constrain its wireless activities to protect its wireline business. Second, the broadband wireless networks are likely to extend geographically beyond the geographic reach of any telephone company or cable company network and therefore wireless providers will in many instances not be competing against an affiliated network. It would be difficult for a national wireless carrier to strategically provide two levels of competition: aggressive competition outside an affiliated network’s region and passive within. Third, there will probably be multiple broadband mobile wireless networks — at the national level, Cingular, Verizon, Sprint/Nextel, and perhaps T Mobile, and at the regional level Alltel/Western Wireless — so any single network will face intramodal competitive pressure on price and service access.

### **Intramodal Competition from CLECs for Large Business Customers.**

Much of the criticism of the 1996 Act has focused on those provisions that attempted to facilitate the transition from monopoly to competitive provision of telecommunications services, most notably the provisions requiring the incumbent local exchange carriers to make elements of their networks available to new entrants under certain conditions. Those provisions were intended to foster intramodal competition with the understanding that new entrants could not instantaneously build out ubiquitous networks like those of the incumbent monopolies.

Ten years after enactment of the 1996 Act, no intramodal entrant has been able to construct a ubiquitous network. It has not proven viable to replicate the local loop (“last mile” connection) between a network’s switch and a customer’s premise, except in the case of large business customers whose traffic volume is sufficient to justify deploying a large pipe to the premise. As a result, the competitive local exchange carriers’ (“CLECs”) networks typically consist largely of fiber rings in business areas that connect directly to their major customers’ locations. Nor has it proven viable for the CLECs to fully replicate the RBOCs’ transport networks, the connections between the nodes in their networks, through which aggregated traffic is routed. Even the CLECs that had been serving the most multi-locational business

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<sup>107</sup> See, for example, “Cable’s Cell Deal,” *Broadcasting & Cable*, November 7, 2005, at p. 8.

customers, AT&T and MCI, and which have now been acquired by SBC and Verizon, respectively, had not been able to capture sufficient traffic to create the scale economies needed to support a ubiquitous transport network. Rather, they continued to rely on the RBOCs for transport facilities on many routes.

Cable networks were constructed to serve residential customers and therefore tend not to be ubiquitously deployed in business districts. Even the largest cable companies are only in selected geographic markets in the country, and may not be able to meet the needs of large, multi-locational business customers. Also, it is likely to take many years for wireless carriers to construct networks that can meet the bandwidth and security requirements of large corporations. Competitive provision of broadband services to large business market customers therefore is most likely to be intramodal. But the acquisitions of AT&T by SBC and of MCI by Verizon have eliminated two significant competitors in the enterprise market and also in the Internet backbone market. In approving those mergers, the Department of Justice and the FCC set a number of conditions intended to retain competitive options for enterprise and Internet customers, including the divestiture of some key facilities and ensuring CLECs and ISPs access to certain facilities or services at set rates for at least two years.<sup>108</sup> Nonetheless, some enterprise customers and CLECs remain concerned about their reduced options for retail services and transport facilities. These parties have proposed placing conditions on the proposed merger of AT&T and BellSouth that are similar to those placed on the SBC/AT&T and Verizon/MCI mergers.

It therefore might not be wise to simply replace the statutory provisions fostering intramodal competition with provisions fostering intermodal competition on the expectation that intermodal competition will always be effective. Intramodal competition will remain important, especially for large business markets. But given the inability of facilities-based CLECs to attain the economies of scale needed to support ubiquitous transport networks, there might be reason to maintain some of the current statutory provisions intended to foster that competition.

### **Antitrust Savings Clause: The *Trinko* Decision**

The 1996 Act includes an “antitrust savings clause” stating that neither the act nor any amendments made by it “shall be construed to modify, impair, or supersede the applicability of any of the antitrust laws.”<sup>109</sup> In a 2004 decision,<sup>110</sup> involving an antitrust suit brought against Verizon, an incumbent telephone company that had been disciplined by both the FCC and the New York Public Service Commission (“PSC”) for breaching its duty under the 1996 Act to adequately share its network with competitive providers, in which the plaintiff alleged that such breaches

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<sup>108</sup> See footnote 43.

<sup>109</sup> P.L. 104-104, § 601(b)(1).

<sup>110</sup> *Verizon Communications v. Law Offices of Curtis V. Trinko*, 540 U.S. 398 (2004). For a full discussion of this case, see CRS Report RS21723, *Verizon Communications, Inc. v. Trinko: Telecommunications Consumers Cannot Use Antitrust Law to Remedy Access Violations of Telecommunications Act*, by Janice E. Rubin.

represented exclusionary and anticompetitive behavior, the Supreme Court ruled that the breached FCC and PSC rules affirmatively required Verizon to aid its competitors and that failing to meet those requirements was not a sufficient basis for finding a violation of antitrust law. The Court found that “the act does not create new claims that go beyond the existing antitrust standards.” The Court also found that the plaintiff, a customer of one of the CLECs, did not have standing to bring the case.

Congressional reaction to the *Trinko* decision was mixed. House Judiciary Committee Chairman Sensenbrenner stated concern that the decision not be “perceived as giving a green light to all manner of anticompetitive behavior by the Bells.... The Committee on the Judiciary ... will not hesitate to develop legislative responses to competitive problems that may arise as a result of this decision.”<sup>111</sup> House Judiciary Committee ranking minority member Conyers called for legislation to address the “Supreme Court’s horrible blunder.”<sup>112</sup> On the other hand, Representative Tauzin, then-chairman of the House Energy and Commerce Committee, expressed his approval that the Supreme Court had “decisively reiterated ... that the regulation of the telecommunications industry should be the purview of the FCC and the state [public utility commissions], rather than judges all across the country.”<sup>113</sup>

It may be that, when Congress inserted the “antitrust savings” clause in the 1996 Act, many Members believed that the clause was preserving an unlimited private right of action on the part of other-than-directly affected parties to sue under the antitrust laws. But, as this case indicates, the clause may be of little effect in instances such as this in which it is found that traditional antitrust principles/standards are not implicated. Given the Verizon decision, there are at least three congressional options that might have the effect of providing the breadth of private action some members of Congress apparently thought they had assured. First, Congress could amend the savings clause to clarify that the phrase, “the antitrust laws,” means the literal words of the statutory provisions, but excludes any judicial interpretation of them. Second, Congress could amend the “enforcement” provisions of the 1996 Act so that even if there had already been regulatory action, certain provisions of the act would remain enforceable by private individuals who are not competitors of local exchange carriers, but, rather, their customers or customers of would-be or actual competitors. Third, Congress could characterize a violation of any (or some) mandatory, competitive obligation(s) of the act as *prima facie* evidence of violation of the antimonopoly provision of the antitrust laws (15 U.S.C. § 2). Congress could also choose to allow the current law to remain unchanged.

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<sup>111</sup> “Sensenbrenner Statement on Supreme Court’s *Trinko* Decision,” U.S. House of Representatives Committee on the Judiciary, January 14, 2004, available at [<http://judiciary.house.gov/legacy/news011404.htm>], viewed on December 19, 2006.

<sup>112</sup> “Conyers Disheartened by Supreme Court Decision Obliterating Antitrust Law in Telecom Industry,” U.S. House Committee on the Judiciary, January 13, 2004, available at [[http://www.house.gov/judiciary\\_democrats/supremectrinkopr11304.pdf](http://www.house.gov/judiciary_democrats/supremectrinkopr11304.pdf)], viewed on December 19, 2006.

<sup>113</sup> “Sensenbrenner: Verizon Ruling May Require Legislation,” *Congress Daily*, January 14, 2004.

## Intercarrier Compensation

Since the value of access to a network or of a network service, such as a telecommunications service, increases as the number of other parties connected to the network increases, new entrants would have a very difficult time entering the market if they could not interconnect their networks with those of the incumbent carriers under nondiscriminatory terms and conditions. Thus a key provision of the 1996 Act set obligations for incumbent carriers and new entrants to interconnect their networks with one another, imposing additional requirements on the incumbents because they might have the incentive and ability to restrict competitive entry by denying such interconnection or by setting terms, conditions, and rates that could determine the ability of the new entrants to compete.<sup>114</sup>

With multiple networks interconnecting to provide service, a necessary component of a competitively neutral regulatory regime is nondiscriminatory intercarrier compensation — the payments that interconnected carriers make to one another when more than one carrier’s network must be used to complete a call or other electronic communication.<sup>115</sup> When Congress passed the 1996 Act, there was very limited competition across the boundaries of local exchange service, long distance service, and wireless service, and thus the act did not focus on intercarrier compensation rates, though it did prescribe that intercarrier compensation rates between competing local exchange carriers be based on the “additional costs of terminating such calls.”<sup>116</sup> Primarily, though, the 1996 Act left in place existing intercarrier compensation rates.

But that system of intercarrier compensation was implemented on a piecemeal basis, as specific existing telecommunications services were opened to competitive provision or providers offering entirely new services (such as wireless service) were allowed to interconnect with the public switched telephone network. Today, these intercarrier compensation payments vary widely, depending on the following:

- whether the interconnecting party is a local exchange carrier (“LEC”),<sup>117</sup> an interexchange (long distance) carrier, a commercial mobile radio service (“CMRS” or wireless) carrier, or an information service provider, and

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<sup>114</sup> 47 U.S.C. § 252.

<sup>115</sup> For a detailed discussion of intercarrier compensation issues, see CRS Report RL32889, *Intercarrier Compensation: One Component of Telecom Reform*, by Charles B. Goldfarb.

<sup>116</sup> 47 U.S.C. § 252(d)(2)(A).

<sup>117</sup> These payments vary even among LECs, depending on whether the carrier is an incumbent local exchange carrier, that is one of the legacy LECs that was a government sanctioned local monopoly provider prior to the implementation of the 1996 Act; a small LEC (sometimes referred to as a rural LEC), that is an ILEC serving a small rural area; or a competitive local exchange carrier, that is a new competitive provider of local exchange service that was allowed to enter the market as a result of enactment of the 1996 Act.

- whether the service is classified as telecommunications or information, local or long distance, or interstate or intrastate,

even though in each case basically the same transport and switching functions are provided.

As shown in **Figure 1**, a chart prepared by the Intercarrier Compensation Forum (“ICF”),<sup>118</sup> today the *average* intercarrier compensation rate ranges from 0.1 cents per minute for traffic bound to an ISP to 5.1 cents per minute for intrastate traffic bound to a subscriber of a small (rural) incumbent local exchange carrier; individual rates can be as low as zero and as high as 35.9 cents per minute.<sup>119</sup> These intercarrier compensation charges can represent a substantial portion of the costs of providing certain services and, in the case of long distance calls that interexchange carriers are required by statute and FCC rule to offer at a single rate nationally,<sup>120</sup> can exceed the retail price for the service.<sup>121</sup>

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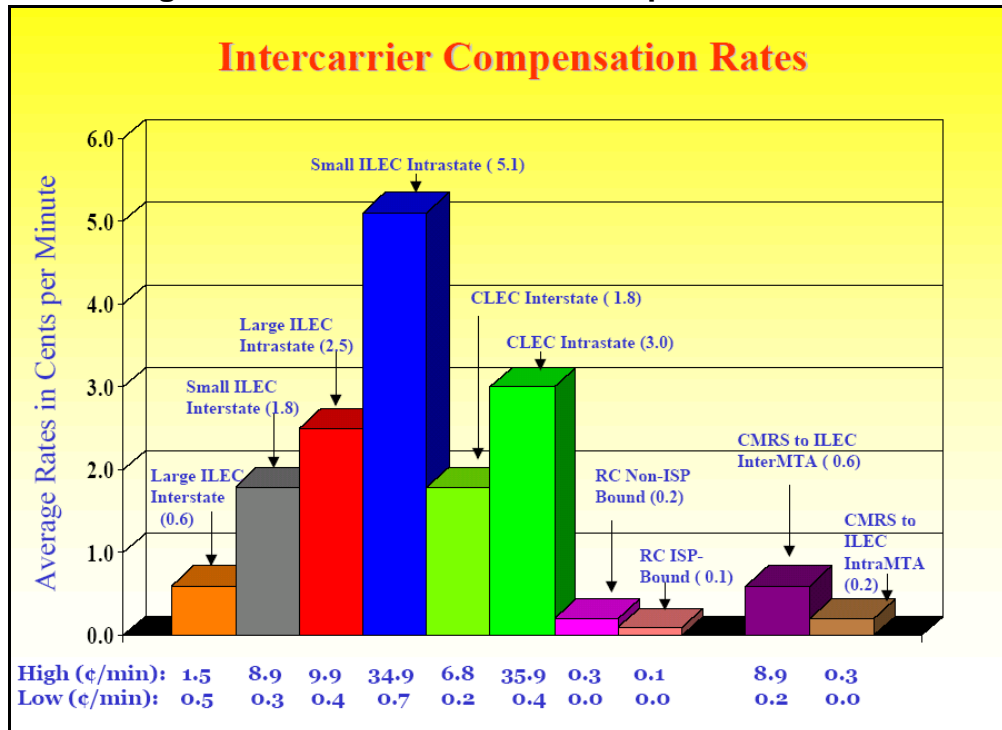
<sup>118</sup> The ICF is a group of carriers from different segments of the telecommunications industry that has submitted a proposal for comprehensive intercarrier compensation reform in a proceeding currently open at the FCC: *In the Matter of Developing a Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, Ex-Parte Brief of the Intercarrier Compensation Forum in Support of the Intercarrier Compensation and Universal Reform Plan (“ICF Plan”), October 5, 2004.

<sup>119</sup> ICF Plan at Appendix C, p. 2. In Figure 1, “RC” refers to “reciprocal compensation,” the cost-based system for intercarrier compensation between providers of local service mandated by the 1996 Act (47 U.S.C. §§ 251(b)(5), 252(d)(1)(A), and 252(d)(2)(A)). “IntraMTA” and “InterMTA” refer to the distinction between those calls originating on wireless networks that are treated as local vs. long distance for intercarrier compensation purposes, as discussed in greater detail below. All classifications with the words “intrastate” or “interstate” refer to intercarrier compensation rates for long distance calls.

<sup>120</sup> In section 254(g) of the 1996 Act, 47 U.S.C. § 254(g), Congress instructed the FCC to “adopt rules to require that the rates charged by providers of interexchange telecommunications services to subscribers in rural and high cost areas shall be no higher than the rates charged by each such provider to its subscribers in urban areas. Such rules shall also require that a provider of interstate interexchange telecommunications services shall provide such services to its subscribers in each State at rates no higher than the rates charged to its subscribers in any other State.” To implement this statutory instruction, the FCC adopted a geographic rate averaging rule and a rate integration rule. (47 C.F.R. § 64.180.)

<sup>121</sup> The “access charges” that some rural local exchange carriers charge long distance carriers for originating the long distance calls made by customers located in those rural areas, or for terminating the long distance calls made to customers located in those rural areas, exceed the nationally averaged price that the long distance carriers charge their subscribers for those calls, and thus the long distance carriers lose money on each long distance call into or out of those rural exchanges. As a result, long distance carriers are reluctant to make available to customers in those areas service packages that are likely to be attractive to heavy long distance users.

Figure 1: Current Inter-carrier Compensation Rates



Source: Intercarrier Compensation Forum

Given the wide variation in intercarrier compensation rules applied to carriers and technologies that are now competing with one another, the FCC adopted a Further Notice of Proposed Rulemaking in February 2005 to review and reform its rules with the goal of constructing a unified intercarrier compensation regime.<sup>122</sup> The FCC sought public comment on nine comprehensive intercarrier compensation reform proposals or sets of principles that have been submitted to the FCC as well as a staff proposal.<sup>123</sup> The issues raised in the ICC FNPRM are not new to the

<sup>122</sup> *In the Matter of Developing a Unified Intercarrier Compensation Regime*, Further Notice of Proposed Rulemaking (“ICC FNPRM”), adopted February 10, 2005, released March 3, 2005.

<sup>123</sup> See the following documents filed with the FCC in the Intercarrier Compensation proceeding: The National Association of Regulatory Utility Commissioners (“NARUC”) Study Committee on Intercarrier Compensation Goals for a New Intercarrier Compensation System, May 5, 2004; Cost Based Intercarrier Compensation Coalition (“CBICC”) Proposal, September 2, 2004; Ex Parte Brief of the Intercarrier Compensation Forum in Support of the Intercarrier Compensation and Universal Service Reform Plan, October 5, 2004; The Intercarrier Compensation and Reform Plan of the Alliance for Rational Intercarrier Compensation, October 25, 2004; A Comprehensive Plan for Intercarrier Compensation Reform Developed by the Expanded Portland Group, November 2, 2004; Western Wireless Intercarrier Compensation Reform Plan, December 1, 2004; Updated Ex Parte of Home Telephone Company, Inc. and PBT Telecom, November 2, 2004; Ex Parte of CTIA — The Wireless Association, November 29, 2004; the National Association of State Utility Consumer Advocates (“NASUCA”) Intercarrier Compensation Plan, December 17, 2004;

(continued...)



Federal Communications Commission. In 2001, the FCC opened a rulemaking proceeding and adopted a Notice of Proposed Rulemaking seeking information on how to develop a unified intercarrier compensation regime.<sup>124</sup> Most recently, the FCC has sought comment on an intercarrier compensation reform plan, often referred to as the “Missoula Plan,” submitted by the National Association of Regulatory Utility Commissioners (“NARUC”), that was the product of a three-year process of industry negotiations led by NARUC.<sup>125</sup> NARUC itself has not taken a position on the plan, which is supported by many industry parties, but also opposed by many.

There is general agreement that intercarrier compensation reform is needed because:

- *The current regime distorts investment decisions and undermines efficient competition* by providing artificial advantages/disadvantages to those service providers that happen to be subject to favorable/unfavorable intercarrier compensation rules. For example, for non-local calls made within any of the 51 Metropolitan Trading Areas (“MTAs”) in the United States,<sup>126</sup> if the caller uses a wireless telephone, the caller’s wireless carrier is subject to a cost-based “reciprocal compensation” charge for the termination of that call; but if the caller made an identical call, from the same location to the same called party, using a wireline telephone (and hence a wireline long distance carrier), that carrier would be subject to an above cost “access charge” for the termination of the call. As another example, when a long distance call is made to a called party’s wireline telephone, that party’s wireline local exchange carrier can charge the calling party’s long distance carrier an above-cost access charge for terminating the call; but if an identical long distance call were made to the same called party, from and to the same physical location, but to the called

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<sup>123</sup> (...continued)

“A Bill-and-Keep Approach to Intercarrier Compensation Reform,” ICC FNPRM, Appendix C.

<sup>124</sup> *In the Matter of Developing a Unified Intercarrier Compensation Regime*, Docket No. 01-92, Notice of Proposed Rulemaking (“ICC NPRM”), 16 FCC Rcd at 965.

<sup>125</sup> “Comment Sought on Missoula Intercarrier Compensation Reform Plan,” FCC Public Notice, DA 06-1510, CC Docket No. 01-92, July 25, 2006.

<sup>126</sup> Rand McNally & Co. has formulated 493 non-overlapping Basic Trading Areas (“BTAs”) that cover the entire United States and its territories. Each BTA represents a geographic region, defined by a group of counties that surround a city, which is the area’s basic trading center. The FCC has used these BTAs to determine service areas for PCS wireless licenses. In turn, these 493 BTAs are aggregated into 51 Major Trading Areas (“MTAs”), usually composed of several contiguous basic trading areas. Individual MTAs are quite large, and can encompass several states. For a map showing the MTA boundaries, see [<http://wireless.fcc.gov/auctions/data/maps/mta.pdf>] (viewed on 4/14/05). The intercarrier compensation rules are different for intraMTA wireless calls that originate and terminate within an MTA and interMTA wireless calls that originate and terminate in different MTAs.

party's wireless telephone, the called party's wireless carrier is not allowed to charge the calling party's long distance carrier any access charge for terminating the call.

- *The current regime fails to provide innovators certainty about the intercarrier compensation regime to which their services will be subject.* For example, since VoIP service is, on one hand, an application of an information service and, on the other hand, functionally equivalent to a traditional voice telephone call, it arguably fits into two different classifications for the purposes of intercarrier compensation. Information services are not subject to access charges; long distance telephone calls are. As discussed in the section on VoIP below, the FCC has begun to make decisions, on a case-by-case basis, about the classification of specific voice product offerings that use IP technology to varying degrees. The business plans of VoIP providers will be strongly affected by the ultimate decision about how they are classified for intercarrier compensation purposes.
- *The current regime encourages uneconomic arbitrage;* that is, providers making business decisions based on the artificial rates set for intercarrier compensation, rather than on true underlying costs. For example, because of the traffic patterns of ISPs and some anomalies in the rules,<sup>127</sup> some CLECs have pursued the market strategy of targeting ISPs as customers. They have offered ISPs service at what may have been below-cost rates because they could more than recoup any losses by charging above-cost rates to the carriers of the ISPs' subscribers for terminating the large volume of subscriber calls to those ISPs.<sup>128</sup> Regulators also may seek to exploit uneconomic arbitrage. For example, state regulators as well as rural LECs may have the incentive to limit the scope of rural local calling areas since calls that are classified as long distance will generate more revenues (through toll charges or access charges) than they would if classified as local and also will tend to move the burden of cost recovery from local rural customers to urban long distance

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<sup>127</sup> Specifically, (1) ISPs are treated like end users; (2) ISPs receive far more calls than they make, so an ISP's LEC will terminate far more calls from the ISP's subscribers than it originates from the ISP; (3) for many of those terminated calls, the ISP's LEC can charge the carriers serving the ISP's end user customers above-cost access charges; and (4) the ISP's LEC can choose a single point of interconnection with the carriers serving the ISP's end user customers in a way that requires those carriers to bear most of the costs of transporting the traffic to the ISP. The specifics of this are discussed in the section below on "Where should networks be allowed, or required, to interconnect with one another?"

<sup>128</sup> In its 2001 ISP Report and Order, the FCC found that "under the current carrier-to-carrier recovery mechanism, it is conceivable that a carrier could serve an ISP free of charge and recover all of its costs from originating carriers." The ILECs were somewhat constrained in their ability to compete with the CLECs for these ISP customers because in certain situations they are not allowed to negotiate individual contracts with customers, but rather are limited to offering services through tariffs that are generally available to all customers.

customers (since long distance rates are averaged and thus urban customers who can be served at low cost face higher averaged rates that contribute to the recovery of higher rural costs).

- *The current regime creates an artificial cost structure, based on minutes of use, which appears to be inconsistent with actual cost causation in networks and which renders it difficult for carriers to meet the preferences of many consumers for offerings consisting of large baskets of minutes or unlimited calling at a fixed price. For example, under the current access charge regime, interexchange carriers are charged on a per-minute-of-use basis for the switching used to originate and terminate their customers' calls, making the interexchange carriers' underlying cost structure usage-sensitive even though the preponderance of those switching costs appear not to be usage-sensitive.<sup>129</sup> But by facing these artificially imposed usage-based costs, long distance carriers are discouraged from offering large baskets of minutes or unlimited calling at a fixed price since they would lose money when serving high usage customers, who are the customers most likely to select such packages.<sup>130</sup>*
- *The current regime requires carriers to expend millions of dollars and scarce information technology resources developing systems to identify, measure, monitor, bill, reconcile, audit and dispute the classification of traffic as local or toll, intrastate or interstate, intraMTA or interMTA,<sup>131</sup> information service or telecommunications service, etc., in order to determine which intercarrier compensation rules apply. It also encourages wasteful litigation as carriers fight among themselves about that classification of traffic. These costly nonproductive activities will continue to grow as providers respond to consumer demand for bundled offerings of services that fit into different classifications.*

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<sup>129</sup> A more detailed discussion of switching costs is presented below in the section entitled, "What is the underlying cost structure of the transport and switching functions?"

<sup>130</sup> The long distance carriers assert that the Bell operating companies, which are now allowed to offer long distance service and typically do so as part of a package of local and long distance service, do not face the same problem. The long distance carriers claim that, even if the Bell companies' long distance arms must pay the same usage-based access charges to their local operating companies as the long distance carriers pay, the underlying costs to the Bells are not usage-sensitive. That is, any losses that the Bells' long distance arms might suffer, when serving a high usage customer, by having to pay minute-of-use access charges while offering large baskets of minutes or unlimited calling at a fixed price, are matched by the additional profits that the Bells' local operating companies generate from those minute-of-use access charges (since their underlying costs are not increasing with usage).

<sup>131</sup> The intercarrier compensation rules are different for intraMTA wireless calls that originate and terminate within an MTA and interMTA wireless calls that originate and terminate in different MTAs.

- *The current regime undermines the stability of universal service subsidy funds.* Where ILECs rely at least in part on the profits from above cost access charges to defray the cost of providing universal service, this funding source is in jeopardy because the number of minutes subject to access charges is declining as carriers with more favorable intercarrier compensation treatment (for example, wireless and VoIP carriers) are gaining market share and traditional long distance carriers have an incentive to manipulate the complex packages of services that they offer to minimize their exposure to access charges.

At the same time, in some quarters there is resistance to comprehensive intercarrier compensation reform because of concerns that some carriers and some consumers may be harmed by the changes. In this view:

- If the access charges currently imposed by local exchange carriers on interexchange carriers to originate and terminate long distance calls were reformed to more accurately reflect the low proportion of switching costs that appear to be usage-sensitive (and the high proportion that appear to be fixed), per-minute access charges imposed on the long distance carriers would fall, but the fixed costs of switching would likely be recovered by raising the subscriber line charge imposed on end users for connecting to the network. Consumer groups have consistently opposed line charges of any sort, arguing that such charges unfairly burden low usage and low income customers.<sup>132</sup>
- The access charges that long distance carriers must pay to small rural local exchange carriers for originating or terminating the long distance calls of the rural carriers' customers tend to be higher than the access charges paid to urban carriers. This is in part because the small rural carriers' underlying costs are higher than those of urban carriers due to the lack of population density and lack of scale economies and in part due to efforts by regulators to keep rural end users' local rates low. Also, the rural carriers' local calling areas tend to be narrowly defined and to serve only a small number of households. Many of their customers' incoming and outgoing calls therefore are classified as toll (long distance) calls, for which the rural LECs receive above-cost minute-of-use access charges from long distance carriers, rather than the fixed end-user charge typical of local service. As a result, the small rural LECs historically have generated a much larger portion of their total revenues from access charges than have urban LECs.<sup>133</sup> Since the access charges of rural

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<sup>132</sup> See, for example, "Jessica Zufolo: Emerging VoIP Policy is Driving Investment," *Telecom Policy Report*, September 29, 2004.

<sup>133</sup> The ICC FNPRM, at paragraph 107, states: "According to NTCA [the National Telecommunications Cooperative Association], rural LECs receive on average 10 percent (continued...)"

LECs exceed costs by more than those of urban LECs, and since rural LECs have depended on access charges more than urban LECs, reforming access charges to bring them down to cost would place a greater revenue burden on rural LECs than on urban LECs. Absent another revenue source, end-user line charges would have to be raised more in rural areas than in urban areas. To keep line charges from growing to the point where local service becomes unaffordable or non-comparable with urban rates, a new universal service funding mechanism would be needed to replace the implicit universal service funding currently in the rural carriers' access charges. Although all the proposals for intercarrier compensation reform have included new universal service funding mechanisms, the rural LECs prefer not to have to rely so heavily on an explicit universal service funding mechanism. They generally prefer to have three revenue sources — line charges, universal service funds, and above-cost access charges — rather than just the first two. In part, this is because they prefer to recover a larger portion of their costs from long distance carriers (whose averaged rates subsidize rural customers) than from their own end-user customers in subscriber line charges. And in part it is because they are concerned about relying too heavily on universal service funds, which they consider a potentially unstable source of revenue, especially now that rural wireless carriers are seeking these same universal service funds.

- Although section 254(e) of the 1996 Act requires universal service support to be explicit and sufficient,<sup>134</sup> many state regulators continue to set intrastate access charges, and especially the intrastate access charges of rural carriers, at above-cost rates that exceed interstate access charges, in order to create a revenue source (ultimately borne primarily by customers of long distance carriers that do not live in rural areas) that will help keep local rates low. Some parties question whether the FCC has the authority to modify intrastate access charges (as part of comprehensive intercarrier compensation reform) without the formal involvement of the states.

The rural telephone companies have an additional problem relating to intercarrier compensation. They claim that they are unable to receive compensation for the termination of a very substantial portion of the traffic they receive from outside their service areas because they are unable to identify the originating carrier. This problem, referred to as “phantom traffic,” has grown in recent years. Typically, it occurs when traffic is passed from an originating local or long distance carrier to

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<sup>133</sup> (...continued)

of their revenue from interstate access charges and 16 percent from intrastate access charges. In comparison, it asserts that the BOCs [Bell Operating Companies] receive only four percent of their revenue from interstate access charges and six percent from intrastate access charges.”

<sup>134</sup> The 1996 Act states at § 254(e): “Any such support should be explicit and sufficient to achieve the purposes of this section.”

an intermediate or “transiting” carrier (most typically the Regional Bell Operating Company located closest to the rural telephone company), which then passes the traffic on to the terminating rural carrier. The transiting carriers sometimes, however, will not pay the rural carrier for terminating the call, but rather will insist that the terminating carrier seek payment directly from the originating carrier. Unfortunately, at times the information identifying the originating carrier has been stripped away before the call reaches the terminating carrier.<sup>135</sup> This allegedly happens most frequently when the originating carrier is a long distance or wireless carrier, which must pay above-cost access charges for the termination of the call but would prefer to transit the call through an intermediate local exchange carrier, since the latter would only have to pay cost-based reciprocal compensation rates for the termination of the call.<sup>136</sup> It is likely that intercarrier compensation reform that equalizes the termination rates for long distance and local calls would reduce this phantom traffic problem, but it still is essential that the identification problem be corrected as it places an unfair burden on rural carriers.

Given the many affected interests with conflicting views and the impact of intercarrier compensation on such fundamental public policy objectives as competition and universal service, Congress might choose to use its deliberations on reform of the Communications Act as an opportunity to provide the FCC statutory guidance on how to proceed with its intercarrier compensation reform efforts.

## Universal Service in a Broadband Environment

The universal availability of basic telecommunications service at affordable rates has been a fundamental element of telecommunications policy in the United States since the enactment of the Communications Act in 1934. To achieve this, a universal service subsidy system has been employed to keep end user rates affordable for low income households and for households and small businesses in high cost areas (and, since 1996, to provide discounts to schools and libraries for telephone service, Internet access, and internal network wiring, and to public and non-profit rural health care providers for telecommunications services and installations and for long distance Internet connections).

This policy goal can be fully compatible with the development of a competitive market for telecommunications services, including the last mile into customers’ premises, so long as the universal service funding mechanism is constructed in a competitively neutral and efficient fashion. That cannot be accomplished if any of the universal service subsidy is hidden in above-cost rates for certain services that are

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<sup>135</sup> See, for example, Josh Long, “Rural Telcos Grapple to Identify Phantom Traffic,” posted April 1, 2004, available at [<http://www.xchangemag.com/articles/441coverstory3.html>]. viewed on December 19, 2006.

<sup>136</sup> The long distance and wireless carriers claim that the rural telephone companies are responsible for the phantom traffic problem because they have not deployed facilities with the signaling system (SS-7) capable of identifying the originating carrier and have chosen to route traffic in a fashion that does not transfer billing information. See *Communications Daily*, August 5, 2005, at pp. 6-7.

intended to subsidize the below cost rates for other services. In that situation, a competitor could successfully enter the market by undercutting the above-cost prices for those services whose rates are raised to include implicit subsidies, but could not compete in the provision of those services whose rates are set below cost.

The policy goal also cannot be achieved if the universal service subsidy is not available on the same basis to all competitors in the market. This is especially important today, with competing wireline, cable, mobile wireless, and fixed wireless technologies all potentially able to offer service to rural customers. In addition, if the universal service funding mechanism is not efficient — and therefore requires more resources than is necessary to provide universal availability — it will place an unnecessary burden on telecommunications markets (or on the general public, if supported by general tax revenues).

The 1996 Act took a major step in the direction of reconciling universal service with competitive markets by requiring that “[a]ny such support should be explicit and sufficient to achieve the purposes....”<sup>137</sup> This requirement has not yet been achieved, however. Although competitive market forces have driven some above-cost rates down toward cost, especially for business services, and an explicit Federal Universal Service Fund (“FUSF”) funding mechanism has been created that provides a significant portion of total universal service subsidies,<sup>138</sup> many rates continue to be set above cost in order to include hidden universal service subsidies (for example, the intrastate access charges of many rural telephone carriers discussed earlier in the section on intercarrier compensation).

## **Which Services Should Be Supported by a Universal Service Subsidy and Who Should Receive the Subsidy?**

The 1996 Act instructs the FCC and a Federal-State Joint Board on Universal Service to base policies for the preservation and advancement of universal service on seven principles. One of those principles is: “Access to advanced telecommunications and information services should be provided in all regions of the Nation.”<sup>139</sup> The act is not specific about how this should be accomplished and does not explicitly include advanced services among those that should be subsidized to achieve universal service. To date, the Joint Board and the FCC have not included advanced services in the definition of universal service. But there has been considerable national discussion of the role of broadband networks in stimulating economic development and some Members of Congress believe the time is ripe to debate the inclusion of access to a broadband network in universal service.

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<sup>137</sup> 47 U.S.C. § 254(e).

<sup>138</sup> The FCC has reported that, for the first quarter of 2007, total projected FUSF program support will be \$1.850 billion, and the total FUSF program collection will be \$1.622 billion. See “Proposed First Quarter 2007 Universal Service Contribution Factor,” CC Docket No. 96-45, Federal Communications Commission Public Notice DA 06-2506, released December 13, 2006, at p. 2.

<sup>139</sup> 47 U.S.C. § 254(b)(2).

While market demand appears to be sufficient to generate competitive broadband network deployment in many urban areas without government intervention, that may not be the case in rural or other high cost (or low income) areas, where high costs and/or limited demand may render it economically infeasible to deploy multiple broadband networks, or even a single network, without government intervention.

If Congress wants to expand the scope of universal service to include universal access to a broadband network at affordable rates, it must address a number of issues. Most basically, how “broad” is the “broadband” that should be provided as part of universal service? Bigger may be better, but only at an associated cost. As explained earlier, one of the primary drivers of broadband deployment has been network providers’ desire to bring sufficient bandwidth to customer premises to support the triple play of voice, data, and subscription video services. Of these three applications, video is the one that requires the most bandwidth, but it also is the one that has the least nexus to public safety or economic development. Thus, it may be difficult to establish a public interest justification for subsidizing the additional bandwidth needed for video. On the other hand, one of the principles in the universal service section of the 1996 Act states that “Consumers in all regions of the Nation ...should have access to telecommunications and information services, including interexchange services and advanced information services, that are reasonably *comparable* to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas.”<sup>140</sup> Is it sufficient, for example, to limit a subsidy program in high cost areas to support for broadband service capable of (relatively low quality) video streaming if the unsubsidized market is driving companies to deploy broadband capable of offering (higher quality) broadcast-quality video service in urban areas — even though subscription video is needed neither for public safety nor for economic development?

Also, the sparse population and longer distances in rural areas translate into low density of demand, limited economies of scale, and hence higher costs, such that there is uncertainty whether even a single broadband network can be sustained. Is it possible, then, to construct a universal service subsidy program that is open to all competing technologies (and thus competitively neutral) without creating incentives for the deployment of multiple networks, none of which can exploit economies of scale to constrain costs?

Historically, universal service has been limited to basic telephone service, but the subsidy has been given to the provider, rather than to the end user. (The latter might be accomplished in the form of a voucher that could be used to reduce a cost-based rate to an affordable rate.). Since wireline, wireless, and cable companies all may offer local telephone service in a particular high cost area, all three can potentially qualify as “eligible telecommunications carriers” (“ETCs”) in that locality and receive universal service funds. The competing carriers only receive funds for those customers they capture, but since a customer can elect to obtain service from more than one carrier at the same time, more than one carrier can receive universal service funding for serving that customer. Typically, customers do not receive basic

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<sup>140</sup> 47 U.S.C. § 254(b)(3). Emphasis added.



voice service from both the local telephone company and the local cable operator, so it is unlikely that those two carriers would each receive universal service funds for serving the same customer. But many customers do receive both fixed telephone service (from a telephone company or a cable operator) and mobile telephone service (from a wireless carrier), and in that case both the fixed and the mobile telephone service provider would receive the universal service subsidy. Thus, competitive entry in that situation will increase the total size of the universal service fund. Data from the 2005 annual report of the Universal Service Administrative Corporation (“USAC”), which administers the federal universal service fund, corroborates this.<sup>141</sup> High cost funds in 2005 were distributed as follows: \$3,186 million to incumbent ETCs (that is, the incumbent local exchange carriers) and \$639 million to competitive ETCs (the vast majority of which were wireless carriers).<sup>142</sup>

The potential growth in the size of the federal universal service fund from customers being able to subscribe for services from multiple carriers, with more than one of those carriers becoming eligible for FUSF payments, might be exacerbated if the scope of universal service were expanded to include advanced services or the connection (access) to a broadband network. One possible way to limit the increase in subsidy requirements would be to expand the definition of universal service to include the connection to a broadband network, but, at the same time, to require each customer in a high cost area eligible for universal service support to choose a single broadband provider as its “principal” provider and only that chosen provider would be eligible for the subsidy.<sup>143</sup> This approach would have the advantage of constraining the size of the universal service fund. But it also likely would reduce the total flow of subsidy dollars to rural areas and might distort the market by encouraging consumers to choose broadband service even if they do not seek it.

Having invested in a broadband network, each network provider will seek to maximize its return from that investment, most likely by enticing its customers to choose bundled packages of “value added” services for which it can charge prices that reflect that value. Network providers are likely to avoid the alternative pricing strategy of setting separate charges for the network connection (access) and for individual services for several reasons: (1) most consumers prefer a single bill; (2) there is risk that network access could become a low-markup commodity if

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<sup>141</sup> Universal Service Administrative Corporation 2005 Annual Report (available at [[http://www.usac.org/\\_res/documents/about/pdf/annual-report-2005.pdf](http://www.usac.org/_res/documents/about/pdf/annual-report-2005.pdf)], viewed on December 20, 2006), at p. 41.

<sup>142</sup> According to a chart in the USAC 2005 Annual Report (at p. 2), total high cost funding increased from approximately \$1.6 billion in 1998 to more than \$3.8 billion in 2005. Total funding to wireless carriers and other new competitors in 2005 was only \$639 million. The bulk of the increase in the fund is attributable to two proceedings at the FCC that removed implicit universal service funds from two categories of rural local exchange carriers — very small carriers subject to rate-of-return regulation and somewhat larger carriers subject to price cap regulation — and replaced those implicit subsidies with new or expanded explicit universal service funding mechanisms.

<sup>143</sup> This approach, requiring the end user to identify a single “principal” carrier eligible to receive FUSF, could be followed even if the definition of universal service were not expanded to include broadband services or broadband access.

competing networks eventually are deployed and the revenues generated by value-added applications then might flow to independent services providers; and, (3) it might not be easy to set up a discriminatory pricing scheme for access that would allow them to maximize their profits. This raises an interesting issue. Today, universal service is defined in terms of providing basic local telephone service and typically only providers that offer, as one option, basic voice service (a connection plus limited local service) are eligible for FUSF funds. If the universal service definition were changed to cover access to broadband, would it be appropriate to make universal service funds available only to those carriers that offer their customers, as one option, a basic service package consisting only of the broadband connection (or of the connection plus basic local voice service)? If that were a requirement for receiving FUSF support, however, network providers would not be able to tie broadband access to the purchase of value-added services and thus might not be able to compel customers to select those service packages that maximize the providers' profits.

Currently, the Federal Universal Service Fund subsidy is made directly to those carriers that qualify as ETCs. The specific payments made to individual carriers are subject to a number of very arcane accounting rules, some of which limit funding to wireline providers because only those providers are eligible for certain pools of money.<sup>144</sup> The various mechanisms use different costing methodologies, but where the subsidy is available to the incumbent wireline telephone company and new entrants, the payments to all are based on the costs of the wireline company. The latter have complained that some of the new entrants, in particular the wireless carriers, have lower costs and therefore should receive lower subsidies; otherwise, they claim, the wireless carriers will enjoy a windfall. The lower cost carriers have countered that, for competitive neutrality, each provider should be given the same level subsidy and then allowed to compete on an equal footing in the market. A low cost provider might be able to set lower rates since it needs less subsidy to meet the higher cost provider's rates, and over time the subsidy could be reduced or eliminated if lower cost rural providers could offer affordable service with little or no need for a subsidy. Economists argue that to base universal service payments on providers' costs — so that high cost providers receive higher subsidy payments — is to subsidize the inefficient at the expense of whoever is paying the subsidy.

The incumbent local exchange carriers have made another argument for why they should enjoy superior, or even exclusive, access to the universal service subsidy: they have made a commitment to be the carrier of last resort and serve every customer in their serving area. But those states that have awarded ETC status to other carriers have tended to require such a commitment from those carriers as well (though there may remain issues of the geographic reach of each ETC's services).

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<sup>144</sup> There currently are a number of components of the high cost fund, each with specific eligibility requirements. A competitive ETC is only eligible to receive a particular component if the ILEC in its service area is eligible to receive support for that component. The components are: high cost loop support, safety net additive support, safety valve support, local switching support, interstate access support, high cost model support, and interstate common line support.

In an attempt to determine whether there is a potential market solution to these issues, the Federal-State Joint Board on Universal Service has sought comment on the merits of using reverse auctions to determine high-cost universal service support.<sup>145</sup> Under a reverse auction, each competing provider would bid the lowest amount of subsidy that it would require to serve all the customers in a particular high cost area, with the lowest bidder gaining the subsidy. The Joint Board sought comment on a number of difficult implementation issues for such a reverse auction mechanism. For example, what is the specific service that the bidders are committing to offer? Should there be separate auctions for fixed voice, mobile voice, and broadband services, or just a single auction? Does the service include a carrier of last resort requirement, so that the winning bidder is obligated to serve each and every customer in the service area? How could end users have access to competitive options under a reverse auction mechanism in which only a single provider receives a subsidy?

### **Who Should Contribute to a Universal Service Subsidy Fund and How Should Contributors be Assessed?**

There are several sources of universal service funding. At the federal level, the FCC has proposed a 9.7% assessment on interstate and international telecommunications service revenues for the first quarter of 2007.<sup>146</sup> This assessment provides the bulk of universal service funds. In addition, at the federal level, some interstate access charges and other service charges, particularly those of some rural carriers, may still be set above cost in a fashion to contribute to universal service. At the state level, some states have created state universal service funds financed by assessments on certain intrastate and interstate telecommunications revenues. Also, most states maintain some intrastate rates, in particular the intrastate access charges imposed by rural carriers, above cost to contribute to universal service.

There is consensus in the industry that continued reliance on interstate and international telecommunications revenues as the funding base would threaten the predictability, sufficiency, competitive neutrality — and very stability — of the Federal Universal Service Fund, for a variety of reasons.

- Total end-user interstate and international telecommunications service revenues reached a peak of \$81.7 billion in 2000 and fell to

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<sup>145</sup> “Federal-State Joint Board on Universal Service Seeks Comment on the Merits of Using Auctions to Determine High-Cost Universal Service Support,” Federal Communications Commission Public Notice, FCC 06J-1, released August 11, 2006.

<sup>146</sup> See “Proposed First Quarter 2007 Universal Service Contribution Factor,” CC Docket No. 96-45, Federal Communications Commission Public Notice DA 06-2506, released December 13, 2006, at p. 1. The assessment rate is modified quarterly, to take into account changes both in the size of the revenue base and in the quantity of subsidy dollars needed. Some international revenues are excepted from the assessment and some interstate telecommunications revenues that are recovered as part of a bundled offering of interstate telecommunications services and other services, for example those from wireless carriers, are assumed to be a specific percentage of the total revenues, and only that percentage is assessed the 9.7%.

an estimated \$76.7 billion in 2004.<sup>147</sup> They appear to be falling at a rate of about 1% per year. The precipitous fall in the interstate and international telecommunications revenues of the traditional long distance carriers has been partially, but not completely, countered by an increase in interstate and international telecommunications revenues among wireless carriers and incumbent local exchange carriers. But the downward trend in total end-user interstate and international telecommunications revenues is expected to continue as a result of a number of factors: the continued fall in rates for interstate and international calls as VoIP service grows, continued substitution of e-mail and other Internet applications for long distance service, and the classification of DSL service and certain other services as information services, rather than telecommunications services. (The FCC has taken a step to address the impact of one of these trends. Although the FCC has not yet classified interconnected VoIP services as either telecommunications services or information services,<sup>148</sup> it has extended the universal service obligations to providers of interconnected VoIP service.<sup>149</sup> Although this action will not eliminate the downward pressure that VoIP places on interstate and international rates, it does eliminate one cause of that pressure — VoIP service being exempt from the FUSF contribution assessment.)

- It has become increasingly difficult to identify (and audit) individual companies' interstate and international telecommunications service revenues because these services are being offered to both business and residential customers as part of bundled packages that include other services. Both customers and service providers have the incentive to understate the proportion of total revenues generated by these bundled services that are attributable to interstate and

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<sup>147</sup> See *December 2005 Monitoring Report*, Federal/State Joint Board on Universal Service, Table 1.1, total Telecommunications Industry Revenues, at p. 1-13, released December 5, 2005, available at [[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-262986A3.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-262986A3.pdf)], viewed on December 20, 2006. In order to avoid duplicative assessments, only end-user interstate and international telecommunications revenues are assessed; the “carrier’s carrier” interstate and international telecommunications revenues generated when a wholesale carrier sells services to retail carriers as inputs into the provision of end-user services are not assessed.

<sup>148</sup> The FCC has defined interconnected VoIP services as those VoIP services that (1) enable real-time, two-way voice communications; (2) require a broadband interconnection for the user’s location; (3) require IP-compatible customer premises equipment; and (4) permit users to receive calls from and terminate calls to the public switched telephone network. See *In the Matter of E911 Requirements for IP-Enabled Service Providers*, WC Docket No. 05-196, First Report and Order and Notice of Proposed Rulemaking (2005), adopted May 19, 2005 and released June 3, 2005, at para. 24.

<sup>149</sup> *In the Matter of Universal Service Contribution Methodology; Federal-State Joint Board on Universal Service; IP-Enabled Services*, WC Docket No. 06-122, CC Docket No. 96-45, and WC Docket No. 04-36, Report and Order and Notice of Proposed Rulemaking, adopted June 21, 2006 and released June 27, 2006, at para. 2.

international telecommunications services. (Here, too, the FCC has taken a step to address the impact of this trend. It raised the “safe harbor” percentage of wireless carriers’ total end-user telecommunications revenues attributable to interstate services — and thus subject to the FUSF contribution assessment — from 28.5% to 37.1%, to better reflect end users’ actual usage patterns.<sup>150</sup>

At the same time, it set a safe harbor percentage of interconnected VoIP providers’ total service revenues attributable to interstate revenue — and thus subject to the FUSF contribution assessment — of 64.9%.<sup>151</sup>)

- As a result of the significant market changes and substantial revenue shifts, the assessment percentage has not been predictable, further complicating business decisions by adding a regulatory uncertainty to the mix.

There are a number of alternatives to an assessment on interstate telecommunications revenues to provide the funding needed for universal service that might better meet the policy objectives articulated by Congress. Some of these could not be implemented without congressional action. These include:

- an assessment on all telecommunications service revenues: interstate, international, and intrastate. Since telecommunications services increasingly are being offered as bundled packages of interstate and intrastate minutes, at a fixed price, expanding the assessment base in this fashion would have the advantages of both increasing the total subsidy base and eliminating the problem of determining the proportion of a fixed monthly charge that should be attributed to interstate service. Because of a court decision prohibiting the FCC from assessing intrastate revenues,<sup>152</sup> Congress would have to modify the Communications Act before the FCC could include intrastate revenues in the assessment base. But not all services can be readily classified as telecommunications services or information services, as demonstrated by the example of interconnected VoIP services, which the FCC has not yet classified. As a result, the Commission had to make a service-specific ruling that, despite not being classified as a telecommunications policy, interconnected VoIP service is subject to the FUSF assessment. As new and innovative services are offered that have some characteristics of telecommunications services and some characteristics of information services, the Commission may continue to have to make ad hoc decisions about how they should be

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<sup>150</sup> Id. at para. 2.

<sup>151</sup> Id. at para. 53.

<sup>152</sup> In *Texas Office of Public Utility Counsel v. FCC*, 183 F.3d 393 (5<sup>th</sup> Cir. 1999), the U.S. Court of Appeals for the Fifth Circuit overturned the FCC order assessing intrastate as well as interstate revenues to fund the schools and libraries portion of the FUSF.

treated with respect to the FUSF assessment, with the potential for inconsistent treatment of services that compete with one another.

- as assessment on all telecommunications service and information service revenues. This would increase the assessment base and eliminate the disparate treatment of telecommunications services and information services that compete directly with one another. But it would impose an assessment on information services, which would be inconsistent with congressional and FCC policy to foster the development of these services by minimizing regulatory burdens on them. It also might prove very difficult to determine which information services should be subject to the assessment since information services cover such a wide range of applications. This option also would require modification of the Communications Act before the FCC could include all these revenues in the assessment base.
- an assessment on the revenues of all services and equipment that benefit from the subsidies provided by the Federal Universal Service Fund, such as revenues from the services and products that receive discounts under the schools and libraries fund, as well as on services. This option would assess not only telecommunications and information service providers, but also companies that manufacture goods or provide other services that are subsidized by the Fund. This would increase the assessment base, but it would be inconsistent with congressional and FCC policy to foster the development of information services and it likely would be extremely difficult to identify the portion of revenues of non-telecommunications service companies that would be subject to the assessment. This option, too would require modification of the act before the FCC could include all these equipment and service revenues in the assessment base.
- an assessment on all connections to the public switched network, weighted by the bandwidth of those connections. Ultimately, all telecommunications users must connect to the public switched network to complete communications. Thus, a per connection assessment, based on bandwidth, would significantly widen the assessment base and could be structured in a way that is competitively neutral.<sup>153</sup> There would be issues about how to assign different assessment weights to connections of various capacity (bandwidth). Consumer groups have opposed this approach, arguing

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<sup>153</sup> For example, a medium or large business customer may receive service either by installing its own switch (called a PBX), which requires a smaller number of lines into the premise because traffic is aggregated into a smaller number of large pipes at the PBX, or by using a portion of the local telephone company's end office switch (known as Centrex service), which requires a larger number of lines because the traffic is not aggregated at the customer premise. An appropriate weighting ratio would have to be set for Centrex vs. PBX service, but such weighting has been performed many times in FCC rules.

that it harms end users who have very low network usage, including low income households. Proponents have responded that since universal service is intended to subsidize connection to the public switched network, a per connection charge is appropriate. They also argue that many low income households are actually large telecommunications users; many of them make calls to family members in the military or (for immigrants) living overseas or calls from retirees living in the Sun Belt to family members living in more northern climes. In addition, proponents argue that many low income households are eligible for subsidized telephone service as part of the low income universal service program and these households would not be subject to the per line assessment. There are differences of opinion about whether the Communications Act would have to be modified before the FCC could use connections as the assessment base.

- an assessment on all telephone numbers in use. Just as every end user needs a connection to the public switched network, every end user needs a telephone number identifier. A per telephone number connection would significantly widen the assessment base and could be structured in a way that is competitively neutral.<sup>154</sup> Consumer groups have had the same criticisms of a per number assessment as they had for a per connection assessment, and proponents have made the same responses. There is also some possibility that future technological changes will lead to use of a customer identifier other than the telephone number. There are differences of opinion about whether the Communications Act would have to be modified before the FCC could use telephone numbers as the assessment base.
- using funds from general tax revenues. Since universal service is a subsidy program that is intended to benefit all sectors of the U.S. economy and all segments of the population, some have argued that it should be funded from general tax revenues. This would eliminate the market distortions inevitable when an assessment is imposed only on a subset of competitors or consumers and thus economists have argued this is the most efficient option. But this would make universal service funding subject to annual appropriations, which particularly in times of budget deficits might place such funding at risk. This option requires annual or multi-year appropriations action by Congress to be implemented.
- continue to fund universal service in part by allowing rural carriers to set above-cost intercarrier compensation rates as a way to

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<sup>154</sup> Just as in the case for connections, the number of telephone numbers required by a medium or large business customer will depend on the internal telecommunications architecture chosen by that customer, with certain configurations requiring more, and certain fewer, telephone numbers. This might require construction of weights for business customer telephone numbers.

maintain lower local rates. Some rural carriers are very concerned about relying entirely on external sources of universal service funding, especially at a time when competitors, such as wireless carriers, are seeking certification as ETCs to compete for those funds. These rural LECs would prefer to be able to ensure an internal funding source by maintaining above-cost rates for originating or terminating certain traffic where the other carrier involved with the call is a captive customer. This, however, would maintain the market distortions that exist today that hamper competition. This option would not require prior congressional action, but it might be challenged in court by parties that seek to remove all implicit universal subsidies from the rates of telecommunications services.

## Transition Issues

As explained earlier, in order not to disrupt markets, when the FCC adopted an order on August 5, 2005, changing the classification of DSL from a telecommunications service to an information service, it created a 270 day transition period (which could be extended) during which the DSL revenues would continue to be treated as interstate telecommunications service revenues for the purposes of funding universal service. In addition, because a blanket re-classification of DSL to information service would, under current rules relating to National Exchange Carrier Association (“NECA”) tariffs and pools that help fund universal service, reduce the universal service support available to certain rural telephone companies for the provision of DSL services, those carriers were given the option of continuing to treat DSL as a common carrier (telecommunications) service. Whichever universal service reforms are adopted, given the heavy reliance of rural telephone companies and their customers on universal service funding, there will have to be a transition period to minimize disruptions.

## Other Programs and Policies that Contribute to the Universal Availability of Broadband Networks

According to the latest FCC data on the deployment of high-speed Internet connections, as of December 31, 2005, high-speed Internet subscribers were reported to be present in 99% of the most densely populated zip codes and in 88% of zip codes with the lowest population densities.<sup>155</sup> The FCC found that 99% of the U.S.

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<sup>155</sup> *High-Speed Services for Internet Access: Status as of December 31, 2005*, Industry Analysis and Technology Division, Wireless Competition Bureau, Federal Communications Commission, July 2006, 2005, at p. 4, available at [[http://www.fcc.gov/edocs\\_public/attachmatch/DOC-266596A1.pdf](http://www.fcc.gov/edocs_public/attachmatch/DOC-266596A1.pdf)], viewed on December 20, 2006. The FCC identified the most densely populated zip codes as the top decile, with more than 3,147 persons per square mile, and the least densely populated zip codes as the bottom decile, with fewer than 6 persons per square mile.



population lives in the 99% of zip codes where a provider reports having at least one high-speed service subscriber.<sup>156</sup>

Section 706 of the 1996 Act requires the FCC to determine whether “advanced telecommunications capability [i.e., broadband or high-speed access] is being deployed to all Americans in a reasonable and timely fashion.” If this is not the case, the act directs the FCC to “take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.”<sup>157</sup> In its most recent report pursuant to Section 706, the Commission concludes that “the overall goal of section 706 is being met, and the advanced telecommunications capability is indeed being deployed on a reasonable and timely basis to all Americans.”<sup>158</sup> Two commissioners, however, dissented from that conclusion, claiming that the FCC’s continuing definition of broadband as 200 kilobits per second is outdated and is not comparable to the much higher speeds available to consumers in other countries, and that the use of zip code data does not sufficiently characterize the availability of broadband across geographic areas.<sup>159</sup>

Many rural telephone companies already are deploying broadband networks, and some of those are deploying networks capable of offering IP video. According to an article in *Rural Telecommunications*,<sup>160</sup> by the end of 2003, 100 independent telephone companies were offering digital video content services, another 60 were expected to do so by the end of 2004, and it was projected that between 500 and 800 additional independent telephone companies would be doing so in the next four to five years. According to a report in *Broadcasting & Cable*,<sup>161</sup> two small, rural telephone companies — Farmers Telephone Cooperative in Kingstree, SC, and Progressive Rural Telephone in central Georgia — are upgrading their copper networks with IPTV technology to offer video service as well as voice and data services, and will be offering service before SBC and Verizon do. Farmers will send three video streams to member households so each can have up to three television sets receiving IPTV signals. It will send standard-definition video signals over DSL lines and high-definition television content over ADSL lines.<sup>162</sup> Progressive will deliver IPTV and music content across its access lines. Its service will include 141 television networks, six local channels, and 35 music channels. Similarly, *Rural*

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<sup>156</sup> Id. at p. 4.

<sup>157</sup> P.L. 104-104, § 706. See 47 U.S.C. § 157 note.

<sup>158</sup> *Availability of Advanced Telecommunications Capability in the United States*, Fourth Report to Congress, Federal Communications Commission, GN Docket No. 04-54, FCC 04-208, September 9, 2004, at p. 8.

<sup>159</sup> Id., pp. 5, 7.

<sup>160</sup> Rachel Brown, “Now Playing: Television Over the Telephone Lines,” *Rural Telecommunications*, July-August 2004, at pp. 14-20.

<sup>161</sup> Ken Kerschbaumer, “Telco TV: Smaller is Quicker,” *Broadcasting & Cable*, Volume 135, Issue 24, June 13, 2005, at p. 28.

<sup>162</sup> Asymmetric digital subscriber line is a DSL technology that is expected to be especially effective for the provision of video on demand and similar services.

*Telecommunications* reports that Dakota Central Telecommunications of Carrington, ND, is using IPTV to offer voice, data, and video services both to the 5,000 customers in its own service area and to 16,000 customers in the neighboring city of Jamestown.<sup>163</sup> A Yankee Group analyst reportedly has stated that, while smaller, rural telephone companies have a disadvantage in terms of available capital and the ability to get the best rates for cable networks, they are likely to be competing with a local cable system that, even if it is owned by a large cable operator, is not technologically cutting-edge.<sup>164</sup> This suggests that the scope of the current universal service subsidy program, in conjunction with various grant and loan programs targeted on rural development, may be sufficient to support deployment of broadband network platforms capable of offering triple play voice, data, and video bundles in many rural areas.

At the same time, some industry observers have claimed that broadband deployment is occurring more rapidly in those rural areas served by small telephone companies and cooperatives than in those rural areas served by the RBOCs and other large incumbent telephone companies. For example, in their announcements concerning deployment of broadband networks capable of offering video as well as voice and data services and in their testimonies before Congress, neither Verizon nor SBC was willing to commit to deployment in their more rural service areas.<sup>165</sup>

### **Grant and Loan Programs.**

In addition to the Federal Universal Service Fund, there are a number of federal programs intended to foster deployment of broadband networks and services.<sup>166</sup>

- The Farm Security and Rural Investment Act of 2002 (P.L. 107-171) authorized the Rural Broadband Access Loan and Loan Guarantee Program (administered by the Rural Utilities Service (“RUS”)) for eligible entities for facilities and equipment providing broadband service in rural communities. Section 6103 made available, from the funds of the Commodity Credit Corporation, a total of \$100 million through FY2007 (\$20 million for each of fiscal years 2002 through 2005, and \$10 million for each of fiscal years 2006 and 2007). P.L. 107-171 also authorized any other funds appropriated for the

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<sup>163</sup> See John Griffin, “Bundling for Success: A Pitch for the Triple Play,” *Rural Telecommunications*, March-April 2005, at pp. 14-19.

<sup>164</sup> Ken Kerschbaumer, “Telco TV: Smaller is Quicker,” *Broadcasting & Cable*, Volume 135, Issue 24, June 13, 2005, at p. 28.

<sup>165</sup> See, for example, the testimonies and responses to questions of Lea Ann Champion, Senior Executive Vice President, IP Operations and Services, SBC Services, Inc., and of Robert E. In galls Jr., President, Retail Markets Group, Verizon Communications, on “How Internet Protocol-Enabled Services are Changing the Face of Communications: A Look at Video and Data Services,” before the House Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet, April 20, 2005.

<sup>166</sup> For a detailed discussion of these programs, see CRS Report RL30719, *Broadband Internet Access and the Digital Divide: Federal Assistance Programs*, by Lennard G. Kruger and Angele A. Gilroy.

broadband loan program. The FY2006 Department of Agriculture appropriations act (P.L. 109-97) provided \$10.75 million for the cost of broadband loans to support a loan level of \$500 million. The broadband loan program has received 185 applications, requesting a total of \$3.456 billion in loans. As of September 30, 2006, 63 applications had been approved (totaling \$1.1 billion), 20 were in review (totaling \$930 million), and 102 had been returned (totaling \$1.516 billion).<sup>167</sup>

- Complementing the broadband loan program, the RUS has established a broadband pilot grant program that issues grants to applicants proposing to provide broadband service on a “community-oriented connectivity” basis to rural communities of under 20,000 inhabitants. The program targets rural, economically-challenged communities by providing support for broadband service to schools, libraries, education centers, health care providers, law enforcement agencies, public safety organizations, residents, and businesses. The FY2006 Department of Agriculture appropriations act (P.L. 109-97) provided \$9 million for broadband grants.

In addition to these programs, RUS, NTIA, the Economic Development Administration in the Department of Commerce, several offices in the Department of Education, several organizations in the Department of Health and Human Services, several offices in the Department of Homeland Security, the National Foundation on the Arts and Humanities, the Appalachian Regional Commission, and the Denali Commission all have programs that could help fund the deployment of broadband network infrastructure or of broadband customer premises equipment.

These programs are being used by rural telephone companies to construct broadband networks. For example, Dakota Central Communications (“DCT”), a telephone cooperative serving 5,000 customers, has used the RUS broadband program to fund its deployment of IPTV architecture to offer triple play service both to its own customers and to 16,000 households in a nearby town. As reported in *Rural Telecommunications*,<sup>168</sup>

When money became available through the Rural Utilities Service (RUS) broadband program, moving into triple-play services with residential customers seemed like a natural next step. “We applied for and received a loan from RUS totaling \$15.5 million, then supplied an additional \$3.5 million of our own, [DCT general manager Keith] Larson said.

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<sup>167</sup> A listing of approved and pending applications is available at [<http://www.usda.gov/rus/telecom/broadband.htm>], viewed on December 20, 2006.

<sup>168</sup> John Griffin, “Bundling for Success: A Pitch for the Triple Play,” *Rural Telecommunications*, March-April 2005, at p. 16.

## Municipal Provision of Broadband Networks.

A growing number of municipalities, in both rural and urban areas, have announced plans to undertake deployment, or already have begun deployment, of broadband networks in their jurisdictions. Some have taken this step to provide broadband access in locations that the private sector has not shown an inclination to serve, typically small towns or low income neighborhoods in larger cities. Others have chosen to follow the model of Starbucks and other retailers by providing Wi-Fi hot spots as a “loss-leader” to attract upscale customers to retail districts. These municipal networks have used a variety of technologies, ranging from optical fiber to Wi-Fi. But at least 15 states have adopted laws banning or limiting these municipal networks.<sup>169</sup>

Proponents of municipal broadband networks argue that the marketplace, on its own, will steer broadband network to those locations that will be most profitable to serve, leaving less financially attractive locations unserved and placing those locations at a disadvantage in terms of attracting and supporting businesses and providing first quality education and health care. They claim government intervention is justified in support of economic development.<sup>170</sup>

Critics of municipal broadband networks argue that it is too soon to conclude that the marketplace will not serve all locations, that municipal networks enjoy an artificial advantage over private networks because of cost of capital and rights-of-way advantages, that many of the proposed broadband networks are based on unrealistic financial assumptions that will leave local taxpayers paying for mistakes, and that municipal networks are less likely than private networks to be upgraded as technological advances make improvements possible.<sup>171</sup> Some critics are concerned that with the development of WiMAX technology, municipalities with small Wi-Fi networks will upgrade and expand to WiMAX, which is potentially capable of providing the “last mile” connection to residents in competition with private networks. The RBOCs and cable companies have been supporting efforts at the state and federal level to prohibit municipal broadband networks.

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<sup>169</sup> “Principles for an Open Broadband Future: A Public Knowledge White Paper,” Public Knowledge, July 6, 2005, at p. 5, available at [<http://www.publicknowledge.org/pdf/open-broadband-future.pdf>], viewed on December 21, 2006.

<sup>170</sup> For example, on October 24, 2003, the High Tech Broadband Coalition and Fiber-to-the-Home Council filed an *amicus* brief with the Supreme Court in the case of *Jeremiah W. Nixon, Attorney General of Missouri, et.al., v. Missouri Municipal League, et. al.*, supporting the continued deployment of municipal broadband communications networks. In their brief, the two organizations argued that municipalities are an important link in enhancing broadband penetration, especially in rural and less densely populated areas that are not an investment priority for private sector service providers.

<sup>171</sup> See, for example, Thomas M. Lenard, “Wireless Philadelphia: A Leap Into the Unknown,” The Progress & Freedom Foundation, Release 12.3, April 2005, available at [<http://www.pff.org/issues-pubs/pops/pop12.3lenardwifi.pdf>], viewed on December 21, 2006.

In an interview with the *Wall Street Journal*,<sup>172</sup> FCC chairman Kevin Martin stated:

I grew up in what was then a rural area in North Carolina and my parents lived on a gravel road. I think it's critical that we make sure that people who live in rural areas are able to be connected to all the advances in technology that are available. If you're asking about the role that local and city governments can play trying to deploy their own equipment, I think there is, at times, a role for them in that. There's always a balance. You prefer private sector deployment whenever possible and you want to make sure we don't get in a situation where the private sector players are trying to compete with government-sponsored players who have easier access to rights-of-way and government-backing. On the other hand, there are instances and communities where there aren't any private companies that want to deploy. No one is coming to deploy and I think in those instances people need to be able to make sure they can provide a service to their citizens. You have to have the right balance.

## Corollary Issues

### Voice over Internet Protocol (VoIP)

Today, the vast majority of Americans still obtain voice services over traditional circuit-switched networks that are subject to the common carrier regulations in Title II of the Communications Act. These regulations include specific network interconnection, access, intercarrier compensation, public safety, and law enforcement requirements, as well as assessments on all interstate and international telecommunications services to fund universal service. At the same time, a small, but growing number of customers obtain voice services from VoIP service providers.<sup>173</sup> But depending on how these VoIP services are provided, the FCC has classified them as telecommunications services or as information services — or, in the case of interconnected VoIP services, has not yet classified them one way or the other — which has resulted in uncertainty about the regulatory requirements to which they are subject.

The FCC has ruled that a particular type of VoIP service — provided only to customers that already separately receive broadband Internet access service, so that their VoIP provider does not, itself, offer transmission service or transmission capacity, and requiring the customer to have enhanced premise equipment or downloaded software — (1) is neither a “telecommunications service” nor

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<sup>172</sup> Amy Schwarz, “Questions for Kevin J. Martin,” *Wall Street Journal Online*, July 18, 2005.

<sup>173</sup> In its recent report and order on Universal Service Contribution Methodology (*In the Matter of Universal Service Contribution Methodology; Federal-State Joint Board on Universal Service; IP-Enabled Services*, WC Docket No. 06-122, CC Docket No. 96-45, and WC Docket No. 04-36, Report and Order and Notice of Proposed Rulemaking, adopted June 21, 2006 and released June 27, 2006, at para. 3), the FCC cited a market review and forecast prepared by the Telecommunications Industry Association indicating that at the end of 2005 there were 4.2 million VoIP subscribers in the United States.

“telecommunications,” but rather is an “information service” that should be unregulated; and (2) cannot be characterized as purely intrastate and therefore is subject only to federal jurisdiction.<sup>174</sup> As a result, that service is not subject to the interconnection, access, intercarrier compensation, public safety, law enforcement, and universal service requirements in Title II. But the FCC also has ruled that voice services that are provided partly through IP technology, but that use ordinary customer premises equipment without enhanced functionality, originate and terminate on the public switched telephone network, undergo no net protocol conversion, and provide no enhanced functionality to end users due to the provider’s use of IP technology, are telecommunications services and subject to Title II regulation.<sup>175</sup> More recently, the FCC found that, although it was not ready to classify “interconnected VoIP services” — services that are interconnected with the public switched network so that the subscriber is able to receive calls from other VoIP services users and from telephones connected to the public switched telephone network<sup>176</sup> — as telecommunications services or information services, providers of those services are required to provide enhanced 911 service,<sup>177</sup> to accommodate wiretaps under the Communications Assistance for Law Enforcement Act (“CALEA”),<sup>178</sup> and to contribute to the Federal Universal Service Fund.<sup>179</sup>

As a result, today competing voice services are subject to different regulatory regimes depending on whether they are classified by the FCC as telecommunications services or information services, or whether the FCC has made an ad hoc finding that services that have certain specific characteristics are subject to particular regulations. The Commission is continuing in its attempt to at classifying IP-enabled services in an on-going rule making proceeding.<sup>180</sup> But it is constrained by current statute in its ability to provide regulatory parity to competing voice services when one subset of

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<sup>174</sup> *In the Matter of Petition for Declaratory Ruling that pulver.com’s Free World Dialup is Neither Telecommunications Nor a Telecommunications Service*, WC Docket No. 03-45, Memorandum Opinion and Order, adopted on February 12, 2004 and released February 19, 2004, at paragraph 5.

<sup>175</sup> *In the Matter of Petition for Declaratory Ruling that AT&T’s Phone-to-Phone IP Telephony Services are Exempt from Access Charges*, WC Docket No. 02-361, Order, 19 FCC Rcd 7457 (2004), at para. 1.

<sup>176</sup> See footnote 148 above.

<sup>177</sup> *In the Matter of E911 Requirements for IP-Enabled Service Providers*, WC Docket No. 05-196, First Report and Order and Notice of Proposed Rulemaking (2005), adopted May 19, 2005 and released June 3, 2005, at para. 2.

<sup>178</sup> *In the Matter of Communications Assistance for Law Enforcement Act and Broadband Access and Services*, ET Docket No. 04-295, RM-10865, First Report and Order and Further Notice of Proposed Rulemaking, adopted August 5, 2005 and released September 23, 2005, at para. 1.

<sup>179</sup> *In the Matter of Universal Service Contribution Methodology; Federal-State Joint Board on Universal Service; IP-Enabled Services*, WC Docket No. 06-122, CC Docket No. 96-45, and WC Docket No. 04-36, Report and Order and Notice of Proposed Rulemaking, adopted June 21, 2006 and released June 27, 2006, at para. 2.

<sup>180</sup> *In the Matter of IP-Enabled Services*, WC Docket No. 04-36, Notice of Proposed Rulemaking, FCC 04 28 (March 10, 2004).

those services clearly meets the current statutory definition of telecommunications service, a second subset clearly meets the current statutory definition of information service, and a third subset is ambiguous as to its classification. While the FCC can choose to forbear from regulating those competitive interstate services that are classified as telecommunications services, it may not have the authority to require state jurisdictions to forbear on regulation of intrastate telecommunications services.

This suggests that it may be timely to review the Title II telecommunications requirements. That review might address which requirements may be applicable to all voice services, regardless of the technology and network architecture used to provide those services, which may only be relevant for dominant firms, and which may not be relevant at all with the advent of competition.

## **Access to 911 and E911**

Competition in the provision of applications (services) is developing today between integrated network providers that have ubiquitous networks and independent applications providers that have more limited networks and capabilities. In some situations, it would be inefficient, if not impossible, for a new entrant to replicate the facilities of a network provider. For example, for public safety reasons, the FCC has determined that all interconnected VoIP providers must be able to provide their customers access to 911 and E911 service, and that for this to happen there is need for cooperation between VoIP providers and ILECs.<sup>181</sup> The FCC thus has required all interconnected VoIP providers to:

- deliver all 911 calls to the customer's local emergency operator (as a standard, not optional, feature);
- provide emergency operators with the call back number and location information of their customers (i.e., E911) where the emergency operator is capable of receiving it. Although the customer must provide the location information, the VoIP provider must provide the customer a means of updating this information, whether he or she is at home or away from home; and
- inform their customers, both new and existing, of the E911 capabilities and limitations of their service.<sup>182</sup>

At the same time, the FCC has required ILECs to provide access to their E911 networks to any requesting telecommunications carrier. They must continue to provide access to trunks, selective routes, and E911 databases to competing carriers.

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<sup>181</sup> For a detailed discussion of issues related to E911, including VoIP-related issues, see CRS Report RL32939, *An Emergency Communications Safety Net: Integrating 911 and Other Services*, by Linda Moore.

<sup>182</sup> *In the Matter of E911 Requirements for IP-Enabled Service Providers*, WC Docket No. 05-196, First Report and Order and Notice of Proposed Rulemaking, FCC 05-116, released June 3, 2005.

Although some proponents of minimal government intervention have argued that customers should be allowed to choose low-cost options that do not include public safety features such as access to 911 and E911 service, the FCC had determined that in this case government intervention was justified by the public safety concern. At the same time, without rules in place to ensure all voice providers access to the E911 network, new entrants could be denied entry into the market. Some observers have argued that the VoIP providers currently are enjoying a “free ride” and an artificial marketplace advantage because their services are not subject to state taxes imposed on telecommunications services to support the E911 call centers (sometimes referred to as public safety answering points or “PSAPs”) run by municipalities or states. These PSAPs are the physical locations where emergency calls are received and then routed to the proper emergency services.

## Law Enforcement (CALEA)

In 1994, Congress enacted the Communications Assistance for Law Enforcement Act (“CALEA”),<sup>183</sup> to preserve the ability of law enforcement officials to conduct electronic surveillance effectively and efficiently despite the deployment of new digital and wireless technologies that have altered the character of such surveillance.<sup>184</sup> CALEA requires telecommunications carriers to modify their equipment, facilities, and services, wherever achievable, to ensure that they are able to comply with authorized electronic surveillance actions. In implementing CALEA, the FCC adopted an order on August 5, 2005 concluding that CALEA applies to facilities-based providers of any type of broadband Internet access service — including wireline, cable modem, satellite, wireless, and power line — and to VoIP providers that offer services permitting users to receive calls from, and place calls to, the public switched public network (these providers are sometimes referred to as “interconnected VoIP providers”) because these providers offer services that are a replacement for a substantial portion of the local telephone exchange service.<sup>185</sup> At that time the FCC also adopted a Further Notice of Proposed Rulemaking seeking more information about whether certain classes or categories of facilities-based broadband Internet access providers, notably small and rural providers and providers of broadband networks for educational and research institutions, should be exempt from CALEA. On May 3, 2006, the FCC adopted a second order<sup>186</sup> that affirmed that the CALEA compliance deadline for facilities-based broadband Internet access and interconnected VoIP services will be May 14, 2007; clarified that the date would apply to all such providers; explained that the FCC does not plan to intervene in the standards-setting process in this matter; permitted telecommunications carriers the

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<sup>183</sup> P.L. 103-414, 47 U.S.C. 1001-1010.

<sup>184</sup> For a detailed discussion of CALEA, see CRS Report RL30677, *Digital Surveillance: The Communications Assistance for Law Enforcement Act*, by Patricia Moloney Figliola.

<sup>185</sup> *In the Matter of Communications Assistance for Law Enforcement Act and Broadband Access and Services*, ET Docket No. 04-295, TM-10865, First Report and Order and Further Notice of Proposed Rulemaking, adopted August 5, 2005 and released September 23, 2005.

<sup>186</sup> *In the Matter of Communications Assistance for Law Enforcement Act and Broadband Access and Services*, ET Docket No. 04-295, TM-10865, Second Report and Order and Memorandum Opinion and Order, adopted May 3, 2006 and released May 12, 2006.



option of using Trusted Third Parties to assist in meeting their CALEA obligations; restricted the availability of compliance extensions to equipment, facilities, and services deployed prior to October 25, 1998; found that it had the authority under section 229(a) of the Communications Act to take enforcement action against carriers that fail to comply with CALEA; concluded that carriers are responsible for CALEA development and implementation costs for post-January 1, 1995 equipment and facilities; and declined to adopt a national surcharge to recover CALEA costs.

The important law enforcement objectives of CALEA potentially can conflict with the goals of competition and innovation. Some technologies and network architectures may be able to accommodate the CALEA requirements more readily — more quickly, less expensively, or with less impact on efficiency — than others. Also, CALEA requirements might impose substantial up-front costs on new technologies, architectures, or services that could be an impediment to their successful entry into the market, thus slowing innovation. There may be some tension in the future if network technologies and architectures migrate away from centralized networks to peer-to-peer networks, which have potential benefits to consumers both in terms of security and of allowing service providers and end users to interact more directly, but which may not be very accommodating to law enforcement concerns.

## **Media Policy: Localism, Competition, and Diversity of Voices**

Localism,<sup>187</sup> competition, and diversity of voices have long been the fundamental goals of U. S. media policy. With the convergence of media, telecommunications, and information service markets, these goals may now have to be considered when developing telecommunications policy as well.

### **Subscription Multi-Channel Video Services.**

As discussed earlier, Section 601 of Title VI of the Communication Act explicitly identifies a local purpose for regulation of cable television: “[to] establish franchise procedures and standards which ... assure that cable systems are responsive to the needs and interests of the local community.” Key sections in Title VI related to localism and diversity of voices allow franchise authorities to (1) require cable systems to set aside channels for public, educational, or governmental (“PEG”) use and to provide facilities and/or financial support for PEG access;<sup>188</sup> (2) set aside channels for commercial use by persons unaffiliated with the cable system;<sup>189</sup> and (3) place safety and convenience restrictions on the construction of cable systems over public rights-of-way and easements.<sup>190</sup> If new entrants begin to offer subscription multi-channel video services in a fashion that does not meet the definition of cable

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<sup>187</sup> For a detailed discussion of statutes and rules affecting localism, see CRS Report RL32641, “*Localism*”: *Statutes and Rules Affecting Local Programming on Broadcast, Cable, and Satellite Television*, by Charles B. Goldfarb.

<sup>188</sup> Section 611, 47 U.S.C. § 531 and Section 621(a)(4)(B), 47 U.S.C. § 541(a)(4)(B).

<sup>189</sup> Section 612, 47 U.S.C. § 532.

<sup>190</sup> Section 621(a)(2), 47 U.S.C. § 541(a)(2).

service — for example, as an IP application that might meet the definition of an information service that is not subject to Title VI regulation — policy makers might want to consider whether the new service offering should be subject to the requirements in these provisions in order to foster the policy goal of localism, or whether the localism concerns are being fully met by the incumbent.

In addition, as discussed earlier, policy makers might want to consider the implications, from the perspective of diversity of voices, of a broadband network provider that offers its own subscription multi-channel video service refusing to allow its customers access to the IP video services provided by an independent applications provider.

### **Multicasting and “Must Carry” Requirements.**

As part of the transition to digital television, television broadcast licensees have been given 6 MHz of spectrum on which to operate digitally and on February 17, 2009 will have to return the spectrum on which they currently operate in analog mode. With digital technology, one option available to licensees is to use their 6 MHz of spectrum for multicasting — that is, to broadcast multiple programming streams. In support of the goal of localism, cable operators have been required to carry the “primary” signals of the local broadcast stations in their service areas. The FCC has ruled that a television broadcaster that is multicasting video signals must identify one signal as its primary signal that cable systems must carry, but that cable systems have no obligation to carry additional multicast signals.<sup>191</sup> This decision was based in part on the concern that multicast “must carry” might infringe on the first amendment rights of cable operators and in part on the concern that the multicast signals might tend to be duplicative and might not meet the desires of viewers as well as cable channels.

Some observers have suggested that limiting must carriage to a single, primary signal might result in missing an opportunity to foster localism. For example, in considering what public interest obligations might be consistent with allowing broadcasters to air multiple signals, the FCC might consider modifying the current rule that requires cable operators to carry only the primary programming stream of each local television broadcaster by requiring cable operators to carry each programming stream that offers distinct programming aimed at a different, previously unserved geographic portion of the broadcaster’s serving area. This could explicitly address those situations in which a broadcaster’s serving area crosses state borders, awarding the broadcaster must carry rights for a second signal if the programming on that signal specifically addresses the needs and interests of the viewing households in the second state. If the FCC were to consider this approach, it would want to take into account the impact on cable systems of requiring them to carry additional broadcast channels.<sup>192</sup> It also would want to determine how best to construct a rule

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<sup>191</sup> *In the Matter of Carriage of Digital Television Broadcast Signals: Amendments to Part 76 of the Commission’s Rules*, CS Docket No. 98-120, Second Report and Order and First Order on Reconsideration, released February 23, 2005.

<sup>192</sup> For example, in his July 12, 2005 testimony (at pp. 3-4) on “The Digital TV Transition” (continued...)

that did not artificially encourage or discourage broadcasters from choosing multicasting over other potential applications of digital technology to their 6 MHz of spectrum, such as high definition television. Congress might choose to direct the FCC to study and construct recommendations for rules (and, if necessary, statutory changes) to address the potentially related issues of mandatory carriage of multiple broadcast signals and better serving the needs and interests of viewers in different governmental jurisdictions.

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<sup>192</sup> (...continued)

before the Senate Commerce, Science, and Transportation Committee, Kyle McSlarrow, president and chief executive officer of the National Cable and Telecommunications Association, claimed that cable systems only have finite capacity and mandatory carriage of multicast broadcast signals would command channel capacity that could be better used providing innovative new applications sought by consumers.