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The Internet and "Telecommunications Services," Universal Service Mechanisms, Access Charges, and Other Flotsam of the Regulatory System

Jonathan Weinberg

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The communications world is changing, and packet-switched

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The communications world is changing, and packet-switched

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networks are taking over. Traditionally, telephone networks have relied on a "circuit-switched" architecture—that is, when one user makes a call to another, a circuit within the network is opened and dedicated to that call for as long as the call lasts. In the 1960s, however, scientists began developing "packet-switching" techniques for communicating information. In packet-switching, the information (a telephone conversation, video clip, computer program, newspaper article, or something else) is sliced up into small packets, each carrying its own copy of the destination address. The packets travel individually to their destination, not necessarily over the same route, and are reassembled in proper sequence when they arrive. Packet-switching is the way the Internet works.

The traditional communications world relies on distinct infrastructures for each communications service. Voice travels over a nationwide wired, intelligent, circuit-switched network, with a single 64 Kilobytes per second (Kbps) voice channel set aside for each call. Video moves over a separate system of terrestrial broadcast stations, supplemented by coaxial cable or hybrid fiber-coax networks carrying video programming from a cable headend to all homes in a given area. Data is piggybacked onto the voice network via an awkward kluge, under which the information is converted from digital to analog form and back again.

But digitization and packet-switching have the potential to change that traditional design. One can convert any information—be it voice, video, text, or data—into digital form. Packet-switching, with or without the use of Internet Protocol (IP), enables the transmission of that digitized information across different networks without regard to the underlying network technology. This means that the digitized information corresponding to any service can be transmitted over any physical infrastructure—copper wires, fiber, hybrid fiber-coax, microwave, direct broadcast satellites or carrier pigeon. Proprietors of copper (or hybrid fiber-coax, or wireless) infrastructure can offer services not previously associated with those physical facilities, and new services can be

1 This is oversimplified; time-division multiplexing techniques allow multiple calls to share a given circuit. Even if multiplexing techniques are used, it remains the case that each call has a fixed share of network resources allocated to it for the duration of the call. See HARRY NEWTON, NEWTON'S TELECOM DICTIONARY 728-29 (14th ed. 1998).
2 See id. at 527.
delivered, via the Internet, over any physical facilities supporting high-speed data transmission.\(^6\)

Both local exchange carriers and cable operators are now entering the market to provide high-speed data services. Consumers with Internet access can engage in real-time voice transmission via IP. Cable operators are planning to use packet-switching to provide voice telephony over cable facilities.\(^7\) New services, including video, can be offered over various facilities; all that is necessary is bandwidth. And an increasing number of firms are designing nationwide, packet-switched, backbone networks to carry that traffic.\(^8\) These networks are not designed to support a particular service; they carry whatever information is necessary for the service the consumer wants.

These developments, however, give rise to a regulatory dilemma. American communications law has developed along service-specific lines, with complex and distinct regulatory structures covering telephony (wired and wireless), broadcasting, cable television, and satellites. It has so far left IP transmission largely unregulated. As those technologies converge, we need to figure out what to do with the old regulatory structures.

In this Article, I will focus on one aspect of that problem: To what extent should (or can) we impose legacy telephone regulation on IP networks? As a broad-brush matter, it seems plain that it would be a Very Bad Idea either (1) to impose such regulation, or (2) not to impose it. Imposing legacy regulation on IP networks seems like a bad idea because that regulation was not designed for those networks. It was developed to fit a circuit-switched world, served mostly by monopoly telephone service providers, and it is characterized by extensive cross subsidies and a general disregard of innovation and competitive markets. Not imposing regulation, though, seems untenable as well: IP and conventional networks are merging. To maintain extensive regulation of the circuit-switched world and minimal regulation of the IP world will simply invite arbitrage, and will undercut the legitimate policy goals of the old system.

This problem is made more difficult by the snarl of cross subsidies that comprise much of modern telephone regulation. Telephone pricing

6 Thus, a telephone company recently announced plans to offer 80 channels of cable programming over copper pair, using rate-adaptive digital subscriber line (DSL) technology. See Fred Dawson, Small Telco Eyes Cable over DSL, MULTICHANNEL NEWS, Aug. 31, 1998. US WEST is seeking cable franchises for video services it plans to offer over a fiber/copper network using DSL. And various players are offering video over the Internet. See Richard Tedesco, Who’ll Control the Video Streams?, BROADCASTING, Mar. 8, 1999, at 20.


8 These networks may rely on native IP, like Qwest’s, or on Asynchronous Transfer Mode (a high-speed packet-like transmission technology), like Sprint’s planned Integrated On-demand Network. See Jacob Ward, Sprint’s Brave New Network, THE INDUSTRY STANDARD (June 5, 1998) <http://thestandard.net/articles/display/0,1449,544,00.html>.
today is characterized by a variety of subsidies: some federal, some state; some explicit, some implicit. On the federal level, the government administers explicit subsidies through “universal service” contributions and disbursements. It implements implicit subsidies through the interstate access charge system, and through geographic averaging of interstate long distance rates. States typically administer implicit subsidies via geographic averaging of local telephone rates, business-to-residential subsidies, and the pricing of vertical features, intrastate access, and intrastate tolls. The most important of these is geographic rate averaging: high-density urban areas, where costs are lower, underwrite the provision of service to low-density, high-cost rural areas.

The Federal Communications Commission (FCC) must, therefore, face the following questions: To what extent should the Internet, and IP networks generally, be brought into the web of subsidies that characterize much of modern telephone regulation? What are the consequences if they are not?

In this Article, I will focus my attention on explicit federal universal service subsidies and, to a lesser extent, on the interstate access charge system. After providing some background in Part I, I will suggest in Part II that the distinction between “telecommunications” and “information service,” embedded in current law, cannot coherently be applied to IP-based services. Rather than attempting to single out “telecommunications” providers for universal service contribution obligations, it might make sense to impose those obligations on the owners of the physical transmission facilities used for the services. In Part III, I will suggest that in the long run, providers of interstate IP-based services should pay any congestion costs they impose on the local exchange. Such a step may only be appropriate, however, in the presence of meaningful competition in the local market, and only if the failure to require such payments is shown to distort ISPs’ market incentives.

I. Background

This background section begins with a brief description of the Internet architecture. It then turns to Title II of the 1934 Communications Act, the charter of U.S. telephone regulation. It describes how the FCC, in

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9 “Implicit subsidy,” in this context, means that “a single company is expected to obtain revenues from sources at levels above ‘cost’ (i.e., above competitive price levels), and to price other services allegedly below cost.” Federal-State Joint Bd. on Universal Serv., 12 F.C.C.R. 8776, 8784 n.15 (1997) [hereinafter Universal Service Order], appeal pending sub nom. Texas Office of Pub. Util. Counsel v. FCC, No. 97-60421 (5th Cir. filed June 25, 1997).
10 See 47 C.F.R. Part 69.
12 See Universal Service Order, supra note 9, ¶¶ 10-12, at 8784.
implementing the statute, has approached the intersection of federal and state authority and the intersection of computing and communications technology. Finally, it discusses the ways in which the 1996 Telecommunications Act has altered those accommodations.

A. Internet Architecture

The Internet is a network of networks, communicating using packet-switching technology. A key part of that technology is the Internet Protocol (IP), which provides the intelligence to transmit packets successfully even if source and destination are on different physical networks. IP converts multiple physical networks, which may run on completely different hardware, into a single logical network. Any computer on any of the underlying networks can thus communicate with any other.\(^1\)

On a more prosaic level, the Internet is a set of computers, packet routers, and the physical communications paths (such as copper wire, or fiberoptic cable, or terrestrial wireless, or satellite transmission, or coaxial cable) connecting them. A packet router is a data communications device whose job it is to tell packets where to go; each time a packet hits a router, the router examines that packet’s address information and determines where to send it next.\(^2\) Typically, each router is connected to at least two others.\(^3\) For the most part, the Internet’s physical transmission paths are copper or fiber lines leased from telephone companies or other providers.\(^4\) All telephone lines are not the same, though. At one extreme is an ordinary analog voice line, which can be used for data by means of a modem transmitting information at (for example) a rate of 28.8 Kbps. As one seeks increasing speed, one might lease data lines from the telephone company rated at T-1 (1.544 megabytes per second, or Mbps) or T-3 (45 Mbps), or an OC-3 fiberoptic line (155 Mbps), or an OC-12 (622 Mbps).\(^5\)

When I am at home in Ann Arbor, and send an e-mail message to a Yale Journal on Regulation editor who has an account on the Yale University system, the packets constituting that message move something like this: Each packet begins at my home computer, and travels over my home telephone line to a server belonging to Msen, my Internet service provider. Msen is in the business of supplying Internet access to residences

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15 See id. at 11.
16 See id. at 11-12.
17 See id. at 12. See generally NEWTON, supra note 1, at 695, 696 (describing data transmission standards).
and businesses. It has modern banks in two dozen Michigan cities, and provisions its network using telephone lines leased from companies in the state. Msen has made the business choice to provide service only in Michigan, though; its network doesn’t extend beyond the state. In order for my packets to leave Michigan, therefore, Msen must pass them to a backbone provider. A backbone provider is a firm that owns high-speed routers physically located in a number of cities across the United States, and has leased (or constructed) high-speed data lines to connect those routers. It thus controls a high-speed interstate data pathway. To get my packets to Yale University, Msen will most likely pass them via a Detroit interconnection point to a national backbone provider known as UUNET. (UUNET is currently a unit of MCI Worldcom.) UUNET may route the packets to New York and hand them off to CERFnet, a national backbone provider purchased last year by AT&T. CERFnet would then convey the packets to the Yale University network in New Haven; that network would reassemble the packets into my e-mail message and deliver them to the recipient.

Who pays for all this? Internet service providers, and Internet backbone providers, interconnect by means of “transit” or “peering” arrangements. Msen pays UUNET for transit. That is, it pays UUNET to accept traffic coming from Msen’s network, and to deliver that traffic either to a destination on UUNET’s own network or to a third network for ultimate delivery. UUNET and CERFnet, by contrast, have a peering arrangement—that is, each has agreed to deliver traffic to the other, so that the customers of one network can exchange traffic with the customers of the other, and neither network pays the other for that service. As a general matter, the major national backbones peer with one another. Networks that enter into peering arrangements are usually (although not always) more or less the same size, so that roughly equivalent numbers of packets flow in each direction.

20. See id. at 221.
22. See Application of Worldcom, Inc. ¶ 148, at 18,106.
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My monthly subscription payment to Msen covers my share of its costs for interconnection to UUNET and other backbone providers. It also covers my share of Msen's costs to transport packets within its own network: that is, capital expenditures for routers, servers, modems and associated equipment, and monthly payments for leased lines to connect those pieces of equipment.25

B. Telephone Regulation

All of these relationships developed within the context of a much older, completely unrelated telephone regulatory system. Federal regulation of telecommunications began with the Mann-Elkins Act of 1910,26 which subjected telephone and telegraph service to the jurisdiction of the Interstate Commerce Commission (whose main job was railroad regulation).27 Twenty-four years later, Title II of the Communications Act28 moved the job of telecommunications regulation to the new FCC. Nevertheless, for both the substantive standards applicable to telephone and telegraph service providers and the procedural mechanisms used to enforce those standards, Title II looked to then-existing railroad law.29

Title II, as enacted in 1934, regulated the conduct of communications "common carriers," defined to include any person (other than a broadcaster) "engaged as a common carrier for hire, in interstate or foreign communication by wire or radio."30 Its keystones were requirements that carriers' rates be embodied in published tariffs31 and be just, reasonable, and nondiscriminatory.32 Carriers were required to interconnect with other carriers,33 and to obtain agency permission before building or acquiring new lines.34 The agency had the power to prescribe just and reasonable

25 Finally, it covers costs relating to operations, customer acquisition, and customer service. See Lee W. McKnight & Brett Leida, Internet Telephony: Costs, Pricing and Policy, 22 TELECOMM. POL’Y 555, 557-59 (1998); Srinagesh, supra note 24.
32 See §§ 201(b), 202(a).
33 See § 201(a).
34 See § 214.
charges,\textsuperscript{35} to suspend and investigate tariffs,\textsuperscript{36} and to award damages.\textsuperscript{37} The FCC administered these provisions with the goals (among others) of safeguarding against anticompetitive behavior, minimizing the potential for improper cross subsidization and protecting the quality and efficiency of telephone service.\textsuperscript{38} Over time, Congress added new requirements relating to such disparate issues as carriers’ disclosure of private customer information,\textsuperscript{39} obscene or harassing telephone calls,\textsuperscript{40} the use of telecommunications services by the hearing-impaired,\textsuperscript{41} pay-per-call services,\textsuperscript{42} and facilitation of police eavesdropping.\textsuperscript{43}

1. The Federal-State Divide.

The Communications Act, though, did not arrogate exclusive control to the FCC. Rather, it divided authority between the national government and the states: It assigned the FCC authority over interstate communication, but left to the states regulation of intrastate communications.\textsuperscript{44} Even before the passage of the 1934 Act, it became clear that this dividing line between federal and state jurisdictions was problematic.\textsuperscript{45} A long-distance call, after all, passes over the network of the local telephone company serving the caller, and that of the long-distance company, and that of the local telephony company serving the called party. What does such a call do to the Act’s jurisdictional boundaries? In \textit{Smith v. Illinois Bell Telephone Co.}, the Supreme Court provided an answer: To the extent that local plant is used for interstate calling, the Court stated, it is beyond the reach of the state regulator.\textsuperscript{46} Its costs relate to “property used in the interstate service,” and must be included in the interstate rate base, under federal control.\textsuperscript{47} The cost of

\begin{footnotesize}
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\item \textsuperscript{35} See § 205.
\item \textsuperscript{36} See § 204.
\item \textsuperscript{37} See §§ 206-09.
\item \textsuperscript{38} See Amendment of Section 64.702 of the Comm’n’s Rules and Regulations, 72 F.C.C.2d 358, 389-90 (1979).
\item \textsuperscript{39} See 47 U.S.C. § 222 (Supp. II 1996).
\item \textsuperscript{40} See 47 U.S.C. § 223 (1994).
\item \textsuperscript{41} See § 225.
\item \textsuperscript{42} See § 228.
\item \textsuperscript{43} See § 229.
\item \textsuperscript{44} See § 152(b).
\item \textsuperscript{46} Smith v. Illinois Bell Tel. Co., 282 U.S. 133 (1930).
\item \textsuperscript{47} Id. at 148-49; see also National Ass’n of Regulatory Util. Comm’rs v. FCC, 737 F.2d 1095 (D.C. Cir. 1984) (discussing \textit{Smith}). In \textit{Smith}, the Supreme Court reviewed a district court decision adjudicating the legality of Illinois Bell’s Chicago payphone rates. The Court explained that
\end{itemize}
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local telephone company plant must thus be allocated between the intrastate and interstate jurisdictions.\textsuperscript{48}

In the wake of \textit{Smith v. Illinois Bell}, AT&T increased its per-minute long-distance rates to reflect that portion of local plant costs assigned to the interstate jurisdiction, and returned the corresponding revenues to the local companies (who, for the most part, were its subsidiaries, so the reimbursement was just a division of revenues within the AT&T corporate family).\textsuperscript{49} After the beginning of long-distance competition,\textsuperscript{50} the new long-distance carriers came to make similar payments.\textsuperscript{51} Under FCC rules promulgated in 1983, AT&T and its competitors each made competitively neutral “access payments” to the (now independent) local carriers for the right to originate and terminate traffic on their networks.\textsuperscript{52}

As the FCC recognized, though, this impact of \textit{Smith v. Illinois Bell} was economically questionable. Local plant costs are for the most part not traffic sensitive. That is, the cost of installing, and maintaining, a wire from an Ameritech central office to my house is the same whether I use that line five minutes each day or eighteen hours. Yet, under the access-charge system, those costs were recovered through a per-minute (traffic-sensitive) charge on long-distance usage. Heavy long-distance users ended up paying more than the costs they imposed on the network; light users paid less. This created arbitrage incentives, raising the possibility that heavy users might turn to solutions in which they bypassed the local telephone networks entirely when initiating long-distance traffic, avoiding access charges and shifting those costs onto an ever-shrinking rate base.

Accordingly, the Commission began moving away from the old structure. In 1983 it ordered that a portion of the local plant costs in the interstate jurisdiction should be recovered through flat, monthly per-line charges assessed on all local telephone subscribers.\textsuperscript{53} This, the agency

\textsuperscript{48} See 282 U.S. at 148-51.

\textsuperscript{49} See National Ass’n of Regulatory Util. Comm’rs, 737 F.2d at 1104 n.3. Where the local carrier was not affiliated with AT&T, AT&T remitted to it the amounts necessary to recover its allocated interstate costs, including a return on investment. See Access Charge Reform, 12 F.C.C.R. 15,982, ¶ 18, at 15,990-91 (1997).

\textsuperscript{50} Before the mid-1970s, one could place ordinary long-distance telephone calls only through AT&T. MCI filed tariffs for its own service in 1974; the D.C. Circuit twice reversed FCC rulings that would have shut that competition down. See MCI Telecomms. Corp. v. FCC, 580 F.2d 590 (D.C. Cir. 1978); MCI Telecomms. Corp. v. FCC, 561 F.2d 365 (D.C. Cir. 1977).

\textsuperscript{51} These were referred to as ENFIA (Exchange Network Facilities for Interstate Access) payments. See Exchange Network Facilities for Interstate Access, 71 F.C.C.2d 440 (1997); see also Access Charge Reform, 12 F.C.C.R. 15,982, ¶¶ 20-21, at 15,991 (1997).


\textsuperscript{53} Id.
reasoned, would be more economically efficient: non-traffic sensitive costs would be recovered through non-traffic sensitive fees, so that prices would be based on the true cost characteristics of telephone company plant. At the same time, the FCC established a Universal Service Fund, to be supported by the long distance carriers, to subsidize rates in high cost areas. The agency contemplated that over time, it would increase the monthly per-line charges paid by local telephone subscribers until those charges covered all local plant costs in the interstate jurisdiction, with the exception of the costs reimbursed by the Universal Service Fund. This goal proved unrealistic, as the Commission faced complaints that allowing the flat charges to rise might cause low-income customers to disconnect their telephone service. Instead, local costs assigned to the interstate jurisdiction ended up being recovered partly through subscriber line charges and partly through interstate carriers’ access payments.

2. Computer II

In the meantime, the FCC was forced to revamp the regulatory structure in an entirely different respect, to confront the growing interdependence of communication and data processing technologies. In the early days of telecommunications, customers buying telephone or telegraph service received an integrated communication offering managed from top to bottom by a service provider. That changed: “In providing a communications service, carriers [increasingly] no longer control the use to which the transmission medium is put.” Instead, carriers came to offer transparent communications channels that subscribers could use as they chose, for the transmission of voice, data, fax or other information. Users were able to combine the communications paths provided by telephone companies with computing power, and thus create new services, such as voice mail or database access, that they could sell to others. The FCC

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54 In addition, in 1985, the Commission established the Lifeline and Link Up programs, designed to make telephone service affordable for low-income consumers. Subscribers eligible for Lifeline need not pay the federal subscriber line charge and certain intrastate end-user charges; until 1996, the federal portion of Lifeline was funded through a charge assessed on interexchange carriers. Link Up pays a portion of eligible subscribers' installation charges and was funded, before 1996, by an expense adjustment allocating its costs to the interstate jurisdiction. See Universal Service Order, supra note 9, ¶¶ 326-45, at 8952-60.

55 See Rural Tel. Coalition v. FCC, 838 F.2d 1307, 1311-12 (D.C. Cir. 1988); National Ass'n of Regulatory Util. Comm'rs, 737 F.2d at 1129-30.


57 See id.


60 See id.
recognized, in a landmark 1980 proceeding known as *Computer II*, that it would be undesirable to subject these new services to the tariffing and other requirements that were the concomitants of traditional telephone regulation. Imposing those regulatory burdens would discourage innovation and distort the new marketplace, as vendors sought to structure their services so as to avoid coming under the regulatory umbrella. And, because the markets for the new services were competitive, regulations primarily intended to restrain market power were unnecessary.  

Accordingly, the Commission announced that it would distinguish between “basic” and “enhanced” services. 62 It limited “basic” transmission services to the offering of “pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information.” 63 By contrast, “any offering over the telecommunications network which is more than a basic transmission service” was deemed an “enhanced” service. 64 Enhanced services included services “offered over common carrier transmission facilities” that “employ computer processing applications that act on the format, content, code, protocol or similar aspects of the subscriber’s transmitted information; provide the subscriber additional, different, or restructured information; or involve subscriber interaction with stored information.” 65 Thus, for example, any service featuring “voice or data storage and retrieval applications, such as a ‘mail box’ service,” was enhanced. 66

Enhanced service providers, the Commission continued, should not be subject to regulation under Title II of the Communications Act. 67 Notwithstanding that any enhanced service by definition had a communications component, the Commission found that no regulatory scheme could “rationally distinguish and classify enhanced services as either communications or data processing,” 68 and that any attempt to impose regulation on enhanced services would lead to arbitrage, inconsistency, and/or inappropriate regulation. 69 (There was one major caveat: Ma Bell and her descendants, when seeking to offer enhanced services, were subject to a set of rules designed to ensure that they did not

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61 *See id. ¶ 129*, at 434.  
62 *See id. ¶¶ 86-118*, at 417-30.  
63 *Id. ¶ 96*, at 420.  
64 *Id. ¶ 97*, at 420.  
65 47 C.F.R. § 64.702(a) (1993).  
67 The agency reasoned that enhanced services involve “communications and data processing technologies . . . intertwined so thoroughly as to produce a form different from any explicitly recognized in the Communications Act [of 1934],” and that enhanced service providers were not “common carriers” within the meaning of the Act. *Id. ¶¶ 121-25*, at 430-32.  
68 *Id. ¶ 113*, at 428.  
69 *See id. ¶¶ 102-13*, at 423-28.
leverage their monopoly power.)  
That approach was wildly successful in spurring innovation and competition in the enhanced-services marketplace: Government maintained its control of the underlying transport, sold primarily by regulated monopolies, while eschewing any control over the newfangled, competitive "enhancements."

When the FCC revamped access payments in 1983, it initially took the position that both basic and enhanced service providers should pay access charges. Both were "users of access service," in that they "obtain[ed] local exchange services or facilities which are used . . . for the purpose of completing interstate calls." On reconsideration, though, the agency abandoned that view. Enhanced service providers, it reasoned, would experience severe rate shocks if they were to pay the same access charges as long-distance carriers. Accordingly, it exempted enhanced service providers from any access-charge obligations. Instead, those charges fell solely on firms offering basic, interexchange services on a common-carrier basis.

3. The 1996 Telecommunications Act

Three years ago, Congress passed the Telecommunications Act of 1996. This enactment, which significantly rewrote United States telecommunications law, did not refer to basic and enhanced services at all; instead, it characterized communications services as either "telecommunications" or "information service." Congress defined "telecommunications," though, in a manner strongly reminiscent of the basic services category, as "the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received." It defined "information services," in a manner reminiscent of enhanced services, to include "the offering of a capability for generating, acquiring, generating, and acquiring, and offering to render, information for communication between points specified by the user, without change in the form or content of the information as sent and received."
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storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications . . . .” The FCC concluded that Congress in the 1996 Act intended “telecommunications” and “information service” to parallel basic and enhanced services, respectively.77

At the heart of the 1996 Act are provisions intended to enable, for the first time, competition in the provision of local telecommunications service. Local telecommunications competition is problematic because the incumbents already own the key facilities—most importantly, the lines running from telephone company central offices into every home and business. Accordingly, section 251 of the 1996 Act requires incumbent local exchange carriers to make those lines and other facilities available to competitors at cost, and to allow competitors to place their own equipment in the incumbents’ central offices.78

Robust competition, though, calls for reform of the subsidy system. Under the pre-1996 status quo, local service was subsidized both explicitly, through the Universal Service Fund, and implicitly, through subsidies built into long-distance carriers’ access payments. The 1996 Act directed the FCC to move towards a system under which implicit subsidies would be eliminated: All federal subsidy support would be distributed through “specific, predictable and sufficient” explicit mechanisms.79

The FCC, accordingly, announced that it would seek to reduce access charges so that they would cover only the traffic-sensitive costs of interconnection with the local network (and thus were cost-justified).80 All other local plant costs in the interstate jurisdiction, it continued, should be covered either through flat, per-line charges or through explicit, portable subsidies provided by a larger, revamped Universal Service Fund. This fund, by the terms of the 1996 Act, would be supported by equitable and nondiscriminatory “contributions” (as the statute put it) from interstate telecommunications carriers.81

As the FCC has implemented the 1996 Act, the Universal Service Fund has several components. The largest component is the “high cost” fund. This mechanism subsidizes telephone companies in rural and other high-cost areas where the costs of the local loop—that “last mile” of the telephone network running to the individual home or business—are so

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76 Id. at § 153(20).
77 Report to Congress on Universal Service, supra note 73, ¶ 21, at 11,511.
81 See 47 U.S.C. § 254(d) (Supp. II 1996). The statute requires all common-carrier providers of “telecommunications services,” as defined in 47 U.S.C. § 153(46), to contribute, and authorizes the FCC to require contributions from other interstate telecommunications providers.
high that many users would drop off the network rather than shoulder the full costs themselves. In the second quarter of 1999, interstate telecommunications carriers will pay about 2.4% of their interstate and international end-user revenues for that purpose. The Universal Service Fund also supports the Lifeline and Link Up programs, targeted towards low-income consumers, and a program designed to connect schools, libraries, and rural health care providers to the Internet.

The FCC’s reorganization of the Universal Service Fund following the 1996 Act greatly increased the scope of explicit federal telephone subsidies, but it did not increase total support. By imposing a charge to long-distance carriers that went to a centrally managed fund for disbursement to local exchange carriers, rather than setting the ratemaking boundary between federal and state jurisdictions so that long-distance carriers paid local carriers’ inflated fees, the agency simply made explicit what had previously been implicit. For the most part, the same entities, interstate telecommunications carriers, still paid the monies in question, and the same entities, local exchange carriers, still received them. Congress gave no serious thought to funding universal service from some other source—for example, out of general tax revenues.

Universal service support mechanisms, under the 1996 Act, may

82 The purposes of high-cost support are contested. When the FCC first created an explicit universal service fund in 1983, it characterized its universal service policymaking as seeking to avoid situations in which the price of local telephone service “cause[s] a significant number of local exchange service subscribers to cancel that service.” See MTS & WATS Mkt. Structure, 93 F.C.C.2d 241, 266 (1983) (third report & order). This suggests that subsidies in high-cost areas should be high enough to prevent rural users from dropping off the network, but need not be so high as to equalize rates in urban and rural areas.

The Telecommunications Act of 1996, though, asserts a broader goal, legislating the principle that universal service support should give rural consumers telecommunications services at rates comparable to those charged in urban areas. See 47 U.S.C. § 254(b)(3) (Supp. II 1996). Policymakers in Europe also appear to treat geographical equality of rates as an independent universal service goal. See, e.g., Barbara Bardski & John Taylor, Understanding Universal Service: A European Perspective 5 (Oct. 3-5, 1998) (unpublished manuscript, on file with author) (it is a central universal service objective in Europe that telecommunications services, in the early stages of network diffusion, be available at uniform prices throughout the country).

It is not clear, though, why it should be desirable for government to equalize rural and urban telecommunications costs, to the extent that unequal costs are consistent with high telephone penetration in high-cost areas. A wide variety of goods and services, after all, have different costs in different parts of the country. Achieving a goal of equal prices requires a higher level of subsidies than would be necessary if government sought to enable high penetration without more.

83 More precisely, they will pay 3% of those revenues to fund the high-cost program together with the Lifeline and Link Up programs. See FCC Proposed Second Quarter 1999 Universal Service Contribution Factors, CC Docket No. 96-45 (released Mar. 4, 1999) <http://www.fcc.gov/Daily_Releases/Daily_Business/1999/db990305/da990455.wp>. About 79% of that money will go to the high-cost program, and about 21% to the low-income programs. Id.

84 See supra note 54.

85 For the second quarter of 1999, the Universal Service Administrative Company has estimated $433,300,000 demand (excluding administrative overhead) for the high cost program, amounting to 49% of all Universal Service Fund expenses. The schools and libraries fund is projected to make up 36%, and the Lifeline and Linkup programs 14%. See supra note 83.
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support only “telecommunications [that is, basic] services.” The Act directs the Commission periodically to reevaluate the definition of supported telecommunications services in light of “advances in telecommunications and information technologies and services [taking into account] the extent to which such telecommunications services are essential to education, public health, or public safety; have . . . been subscribed to by a substantial majority of residential customers; [and] are being deployed in public telecommunications networks by telecommunications carriers.” The services supported by the Universal Service Fund today, as defined by the FCC, are no more than single-party voice grade access to the public switched telephone network, with touch-tone signaling and access to emergency services, operator services, and directory assistance.

II. The Internet and Universal Service Mechanisms

This section begins by describing the FCC’s April 1998 report to Congress on universal service, which sought to characterize IP-based service offerings as “telecommunications” or “information service” in order to assess their regulatory obligations. It urges that that distinction cannot coherently be applied to IP-based services, and tries to explain why. It then suggests, and evaluates, an alternative approach.

A. The Report to Congress on Universal Service

After the passage of the 1996 Act, the FCC consistently characterized IP-based services as information services rather than telecommunications. This meant that the providers of such services were required neither to pay a percentage of their end-user revenues as a contribution to the Universal Service Fund nor to comply with any other Title II obligations. The agency was forced to reexamine that judgment, though, in 1998. Opponents, including Senators Stevens and Burns, were urging that all IP-based services should be deemed to involve

86 47 U.S.C. § 254(c)(1) (Supp. II 1996); see also Universal Service Order, supra note 9, ¶ 83, at 8822-33 (1997). However, the FCC has interpreted section 254(c)(3) to allow support of other services in connection with the Schools and Libraries program. See id. ¶¶ 437-40, at 9009-11.
87 § 254(c)(1).
88 See Universal Service Order, supra note 9, ¶ 61, at 8809-10. But see supra note 86 (noting that other services are supported in connection with the Schools and Libraries program).
89 Report to Congress on Universal Service, supra note 74, ¶ 32, at 11,511.
91 See Report to Congress on Universal Service, supra note 74, ¶ 32, at 11,515-16.
"telecommunications." Those Senators expressed concern that, as telephone traffic shifted from conventional to IP networks, a failure to impose universal service charges on IP-based services would endanger universal service. They crafted an appropriations rider directing the agency to undertake a detailed review of its definitions of the terms "information service," "telecommunications," and "telecommunications service" (among others) in the Telecommunications Act of 1996; the application of those definitions to "mixed or hybrid services" (referring in part to Internet access services and IP telephony); and "the impact of such application on universal service definitions and support." 

The FCC duly wrote a report responsive to the appropriations rider. It reaffirmed its conclusion that Internet access services were information services, and the providers of such services therefore were under no obligation to make direct payments to the universal service fund. By contrast, the Commission classified the provision of pure transmission capacity to Internet access and backbone providers as telecommunications.

But the agency ran into some difficulty when it sought to classify IP telephony services, which enable real-time voice transmission using Internet protocols. The FCC first addressed "computer-to-computer" IP telephony, in which individuals use software and hardware at their premises to place calls between two computers connected to the public Internet. In that context, the FCC stated, it need not decide whether there was "telecommunications" taking place. Title II requirements, including universal service payment obligations, would not apply in any event because they apply only to the "provision" or "offering" of telecommunications. When a user, with an ordinary Internet connection through her ISP, uses Internet telephony software to enable real-time voice communication between her computer and that of a fellow enthusiast, the

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92 The gist of their argument was that a service should be deemed both telecommunications and information service if it involved both transmission and manipulation of information. Such a "hybrid" service, Senators Stevens and Burns argued, should be subject to all Title II obligations, including those relating to universal service. See Letter from Senators Conrad Burns and Ted Stevens to William E. Kennard, Chairman, Federal Communications Commission (Jan. 26, 1998) (on file with author); See also Report to Congress on Universal Service, supra note 74, ¶¶ 34-36, at 11,517-19.
93 See Letter from Senators Conrad Burns and Ted Stevens to William E. Kennard, supra note 92. It is useful to remember that the main function of the universal service fund today is to make possible the provision of low-cost telephone service in rural and other high-cost areas — a function to which one would expect Senators Stevens and Burns, who hail from Alaska and Montana respectively, to be sensitive. See supra note 82 and accompanying text.
95 Report to Congress on Universal Service, supra note 74.
96 See Id. ¶¶ 73-79, at 11,536-40.
97 See Id. ¶¶ 66-71, at 11,532-36.
98 See id. ¶ 87, at 11,543.
Internet service provider may not even know that the subscriber’s packets are carrying voice communications. The ISP is not, in any meaningful sense, “provid[ing]” the voice telephony to that subscriber, and cannot be made subject to Title II on that basis.\footnote{See Report to Congress on Universal Service, supra note 74, \S 87, at 11,543. If the user is reaching her ISP over a dial-up telephone connection, then the telephone company is providing her with telecommunications, but that service is wholly distinct from the IP telephony functionality. See id. \S 43, at 11,523 n.87.}

The agency was unable to be so definite, though, with respect to “phone-to-phone” IP telephony services. These are services in which a customer places an ordinary call to a gateway device that packetizes the voice signal and transmits it via IP to a second gateway, which reverses the processing and sends the signal back over the public switched network to be received by a normal telephone at the terminating end.\footnote{See id. \S 84 at 11,541-42, \S 89 at 11,541-42 & n.188, 11,544.} The Commission was unable to reach a conclusion as to the proper classification of such services, stating only that “[t]he record currently before us suggests that certain forms of ‘phone-to-phone’ IP telephony lack the characteristics that would render them ‘information services’ within the meaning of the statute, and instead bear the characteristics of ‘telecommunications services.’”\footnote{Id. \S 14, at 11,508.} It deferred any “definitive pronouncements” on phone-to-phone IP telephony to an unspecified later proceeding.

The \textit{Report to Congress on Universal Service} stressed the FCC’s position that the growth of IP-based services would buttress universal service, not undercut it. Notwithstanding that Internet access providers are not required to make universal service payments, they are major \textit{users} of telecommunications, and thus make “substantial indirect contributions to universal service” in the prices they pay to purchase telecommunications.\footnote{Id. \S 3, at 11503-04.} The agency did express concern that exemption of IP telephony providers from universal service contribution requirements might create an incentive to shift traffic to IP networks, increasing the burden on the remaining contribution base and undermining universal service; it found no evidence, however, of “an immediate threat to the sufficiency of universal service support” at this time.\footnote{Id. \S 98, at 11,548-49.}

\textbf{B. The Breakdown of the Telecommunications/Information Service Distinction.}

It should not be surprising that the FCC had trouble with the characterization and regulatory obligations of IP telephony providers. On
one hand, the agency was surely correct that Title II obligations should not leap into existence simply because a consumer transmits voice, rather than, say, graphics, over an IP connection. It would be highly problematic to treat packets differently just because they carried voice rather than some other sort of information. More importantly, as the Commission noted, in the simplest "computer-to-computer" case, the customer is buying only Internet access, rather than an IP telephony service as such. In other IP telephony services, by contrast, the customer will receive enhanced functionality that goes beyond the plain-vanilla transmission that constitutes "telecommunications."

On the other hand, it is also problematic if the provider of a service that looks and feels to the user just like conventional telephony is subject to regulation far different from that imposed on conventional telephony providers. In particular, it would be odd and unhelpful if huge regulatory distinctions should turn on the question of whether a vendor transports an intermediate leg of its telephone calls via IP or via some other packet-oriented technology. Conventional telecommunications carriers are increasingly using Asynchronous Transfer Mode (ATM), a different packet-oriented communications technology, in their networks, and it is completely accepted that the use of ATM to transmit a telephone call does not render the carrier an information service provider.

To accommodate both of these concerns, one must devise a way to distinguish those forms of IP telephony that should be subject to regulation from those that should not. That turns out to be troublesome. The FCC in the Report to Congress on Universal Service suggested the possibility of subjecting to Title II regulation IP telephony services in which the provider

1) ... holds itself out as providing voice telephony or facsimile transmission service; 2) ... does not require the customer to use CPE [customer premises equipment] different from that CPE necessary to place an ordinary touch-tone call (or facsimile transmission) over the public switched telephone network; 3) ... allows the customer to call telephone numbers assigned in accordance with the North American Numbering Plan, and associated international agreements; and 4) ... transmits customer information without net change in form or content.  

The effect of these requirements would be to regulate an IP telephony service as telecommunications if the customer’s signal travels in unpacketized form over the public switched network to a gateway (as in

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105 Id. ¶ 88, at 11,543-44.
conventional phone-to-phone service), but not if it is packetized in the
customer premises equipment (as in computer-to-computer service).

It is doubtful that this approach would work very well. Consider a
telephone handset that packetizes the customer's voice signal and sends
the packets via IP to an Internet telephony service provider, but that
nonetheless looks and acts, from the user's perspective, like a conventional
telephone. If a service should rely on such equipment, it is not obvious
what policy goals would be served by treating that service differently from
phone-to-phone IP telephony as defined.\textsuperscript{106} Indeed, consider business
telephone users served by switchboard or Centrex systems. Should the
policymaker apply one regulatory paradigm if calls from the business's
telephones are directed to an IP gateway on the public switched network,
but another if the switchboard serving the business itself serves as such a
gateway? If so, why?\textsuperscript{107}

This difficulty extends beyond the particular definition suggested in
the \textit{Report to Congress on Universal Service}. What if the phone-to-phone
IP telephony provider adds just a dab of functionality, such as
automatically recording a conversation and making it available via
streaming audio on a Web site? Or—so as to enable anybody to be a talk
show host—it allows the originator to conduct a conference call with three
or four people, while allowing any member of the public to dial in and
listen?\textsuperscript{108} Looking to the 1996 Act definitions, it seems plain that the
recording, storage and rebroadcast of the conversation in the first example
involves enhanced functionality and constitutes an "information service;"
the more difficult question is whether we have one service or two. That is,
does the example involve a single information service, or a plain-vanilla
telephony service (telecommunications) \textit{combined} with a separate
transcription service (information service)? Similarly, the service in the
second example doesn't appear to qualify as "telecommunications," which
the 1996 Act defines as "the transmission, between points specified by the
user, of information of the user's choosing, without change in the form or
content of the information as sent and received," because the transmission
doesn't seem to be "among points specified by the user."\textsuperscript{109} Yet should we
therefore characterize the overall service as an "information service," or
can one again find a regulated telecommunications service by dividing the
offering into two?

The anomaly here is that it is easy to build functionality into IP-based

\textsuperscript{106} See \textit{id.} at 11,636-37 (dissenting statement of Commissioner Furchgott-Roth).

\textsuperscript{107} Or imagine technology that sets up an IP telephony call from a person's computer to a
corporate call center when that person clicks on a button on the corporation's Web page; whether the
call is characterized as computer-to-phone or computer-to-computer will depend on the fortuitous
consideration of whether the IP gateway serving the call is on- or off-site.

\textsuperscript{108} These examples are Mike Nelson's.


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services, yet under the "telecommunications"/"information service" dichotomy, an IP-based service will be deemed "telecommunications," and thus subject to regulation and universal service obligations, only if it offers sufficiently cramped functionality. If the same service gets a software upgrade, and offers a little more functionality, it becomes an information service and escapes regulation—unless the new functionality is deemed a separate service—but we don't have any rules for deciding when that should be so.\textsuperscript{110} It is hard to see why any of this makes sense.

IP telephony, further, presents another puzzle: Under the FCC's current definitions, phone-to-computer and computer-to-phone IP telephony both appear to be information services. In each case, the gateway is providing protocol conversion and processing (translating from unprocessed voice to a series of IP packets, or vice versa); under established rules, that enhanced functionality pulls the service out of the realm of simple telecommunications.\textsuperscript{111} Yet if you put those two services together, what do you have? Any protocol conversion taking place at one point in the call is undone at another; established law suggests that the concatenated services are mere "telecommunications."\textsuperscript{112} It is hard to know what to do with that, since the firms providing the two services may not, in a distributed environment, even be aware of one another.\textsuperscript{113} Ultimately, the telecommunications / information service boundary does not seem to divide up the world of IP-based services in any especially useful way.

Nor are these problems limited to IP telephony. Consider a rather more important finding of the Report to Congress on Universal Service: that Internet access is an information service.\textsuperscript{114} That conclusion seems

\textsuperscript{110} The genius of Computer II was the recognition that it is difficult to disentangle communications and computing functionality, and that therefore, at least where the provider does not own transmission facilities, "offerings . . . combining communications and computing components" should be treated as unitary services and exempted from regulation. Report to Congress on Universal Service, supra note 74, ¶ 60, at 11, 530. This approach had salutary effects. Yet it has its limits: "It is plain, for example, that an incumbent local exchange carrier cannot escape Title II regulation of its residential local exchange service simply by packaging that service with voice mail." Id.


\textsuperscript{113} I am indebted to Stagg Newman for his emphasis of this point.

\textsuperscript{114} See Report to Congress on Universal Service, supra note 74, ¶ 74, at 11,537.
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vulnerable, outside the dial-up context. One of the defining characteristics of IP is that an IP network itself displays no intelligence; it only passes information transparently from one edge to another. In a phrase, the network provides only "commodity connectivity." All of the intelligence and enhanced functionality—the storage and manipulation of user information—takes place at the edges of the networks (that is, either before or after the information is transmitted from origin to destination).

Thus, simple IP transmission seems like a classic example of "transmission, between or among points specified by the user, of information of the user's choice, without change in the form or content" that is, telecommunications. Indeed, the Commission has said essentially that about other packet-based services.

The Report to Congress on Universal Service grounds its finding that Internet access is an information service largely on the fact that Internet service providers run mail servers, host Web pages, offer Usenet news feeds, operate caches, and engage in other computer-mediated activities that go beyond simple transmission of packets. But not all customers require these services. Where the customer is a corporate intranet, it will maintain its own mail and Web servers. The Internet access provider likely will provide nothing except pure transmission and routing of packets within its internal network and connection to the larger Internet. In such a case, it seems hard to avoid the conclusion that the ISP is offering telecommunications: It is providing transport and nothing else.

This suggests some really silly accounting problems. Imagine that an ISP leases a fat digital transmission link to a network access point. The carrier leasing that line to the ISP is liable for universal service payments to the extent the ISP uses that connection to serve dial-up customers, because the ISP is providing those customers with an information service, and thus is itself a telecommunications "end user" for universal service purposes. At the same time, if the analysis in the preceding paragraph is correct, the carrier need not pay into the universal service fund to the extent the ISP uses the same connection to serve corporate customers, for the ISP is providing telecommunications to those customers and thus is not an "end user." If nothing else, such a system is administratively unworkable.

The notion that pure Internet connectivity is "telecommunications"

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115 See Isenberg, supra note 4, at 28 ("[A]ll that matters is that the bits sent by your machine are received by my machine, and vice versa.").
116 See id.
117 See Independent Data Communications Mfrs. Ass'n, 10 F.C.C.R. 13,717 (1995); see also Deployment of Wireline Servs., ¶ 35, at 24,029 & n.56 (citing cases).
119 Universal service contributions are calculated as a percentage of end user revenues. See 47 CFR § 54.709 (1998).
within the meaning of the 1996 Act, though, is troubling on a more fundamental level. It expands the scope of services subject to universal service fund exactions without any policy-oriented understanding of why that should be necessary or desirable. Put another way, it extends old rules to the Net without adequate consideration of whether that is a good thing.\footnote{There are surely good arguments that we should not increase the cost of Internet service in order to subsidize telephone service. \textit{See}, \textit{e.g.}, Michael Riordan, Conundrums for Telecommunications Policy, Remarks to the National Economists Club (May 28, 1998) (transcript on file with author).}

C. \textit{Why the Telecommunications/Information Service Distinction Doesn't Work}

To understand why the "telecommunications"/"information service" distinction doesn't work in the IP context, it's useful to look back to Computer II. The Computer II categories, like their 1996 Act cognates, focused on service offerings. That is, the things being categorized were services, rather than (say) equipment or capabilities.\footnote{See Amendment of Section 64.702 of the Commission's Rules and Regulations (Computer II), 77 F.C.C.2d at 419-20; 47 U.S.C. § 153(20), (43), (46) (Supp. II 1996).} That's a natural way to divide up the world from a conventional telephony perspective; those in the world of computer-to-computer communications, though, tend to use a different set of categories.

The computing world, in thinking about the communications process, tends to rely on the Open Systems Interconnection (OSI) model, which organizes that process into "layers."\footnote{The OSI model was developed by the International Standards Organization to provide a common design framework for communications networks. While the specific protocols developed as part of the OSI model were not widely adopted (and particular implementations may not follow the model rigorously), the concepts underlying the model are dominant in the computing world. The National Research Council followed a similar approach in devising its Open Data Network architecture: that conceptual model incorporates a "bearer service" layer (sitting on top of the "network technology" substrate), a "transport" layer, a "middleware" layer, and an "application" layer. \textit{See} NATIONAL RESEARCH COUNCIL, REALIZING THE INFORMATION FUTURE 47-51 (1994).} The \textit{physical} layer is concerned with the physical infrastructure over which the information travels; immediately above that are the \textit{data link} layer, concerned with the procedures for transmitting data using a particular technology, and the \textit{network} layer, concerned with routing and the transfer of data among computers.\footnote{See NEWTON, supra note 1, at 519-20.} The \textit{transport} layer defines the rules for information exchange and manages the reliable end-to-end delivery of information.\footnote{See id.} The \textit{session}, \textit{presentation}, and \textit{applications} layers focus on user applications; in particular, the applications layer contains the functionality...
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for specific services.\textsuperscript{125}

The service offerings contemplated by Computer II cut across the layers of the OSI model. For example, the paradigmatic example of basic service (or “telecommunications”) is plain old telephone service (POTS), designed to enable ordinary voice communication. POTS constitutes a vertically-integrated intertwining of components from various layers. It relies on a copper twisted pair infrastructure (the physical layer), organized into a circuit-switched architecture, with 64-Kbps channels set aside for each voice signal (data link, network and transport layers).\textsuperscript{126} Applications such as flash hook signaling rely on elements ranging from the bottom (physical) to the top (applications) layers.\textsuperscript{127}

The Computer II model in fact contemplated that enhanced services would be constructed in a layered manner, but it relied on an entirely different set of layers; its fundamental assumption was that POTS was the foundation on which enhanced services were built. One created an enhanced service by taking POTS (or a similar but higher-bandwidth service provided by the telephone company), using that service to transmit data, and adding data processing (and thus enhanced functionality). The underlying POTS transport was subject to regulation; the enhanced service—which was “enhanced” in the most literal sense—was not. That made perfect sense in the world of Computer II, back in 1980, and for years to come; it was perfectly natural for government to seek to regulate the underlying transport (which was, after all, offered for the most part by regulated monopolies) while eschewing any control over the “enhancements.” The 1996 Act, as interpreted by the FCC, carried forward the same model.\textsuperscript{128}

But that key assumption doesn’t work in the IP world. IP maintains sharp separations between the various layers of the OSI model. Different components of the network are responsible for the physical infrastructure, the transport of the underlying bits (using Internet protocol), and the applications (or services) that ride on top. One can write applications without having to worry at all about the lower layers; one’s service will work over any physical infrastructure and any transport protocol with IP on it. That means, though, that the foundational assumption of Computer II—that an enhanced service is a basic service “plus”—no longer holds true.

In the IP world, there are no vertically-integrated service offerings such as POTS that can be seen as the “foundation” of more elaborate

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\textsuperscript{125} See id.
\textsuperscript{126} See supra text following note 2.
\textsuperscript{127} I owe this point to Stagg Newman.
\textsuperscript{128} As the 1996 Act put it, a firm offers information services “via telecommunications.” 47 U.S.C. § 153(20) (Supp. II 1996).
offerings. An IP-based service offering that transmits information transparently does not play the same role in the IP world as POTS does in the conventional telephony world, because it does not provide transport for other, more elaborate IP-based service offerings. Rather, the only foundation of any IP-based service offering is the underlying IP transport.

As applied to the IP world, the basic/enhanced distinction does not serve the goal of allowing government to regulate underlying transport while leaving the "enhancements" to the marketplace. Instead, it creates the anomalous result that a service is subject to regulation if it offers little functionality, but free from regulation if it offers somewhat more. It creates the anomalous result that two services, each deemed information services when viewed in isolation, may combine in a distributed environment to form an end-to-end offering magically deemed telecommunications. If regulators wish to carry forward into the IP world Computer II's goal of attaching regulatory obligations to underlying transport, they need to aim those obligations more precisely.

D. Universal Service Redux

How should we rethink universal service support in the modern telecommunications world? The simplest and best way to fund universal service would be to take the money from general tax revenues. That would eliminate any arbitrage or distortions caused by taxing one class of communications activity and not another. That approach, though, would not be politically feasible. One alternative approach might be to revise the universal service payment obligation so as to associate it not with service provision, but with the physical facilities along which the information moves. Computer II, after all, sought to impose regulatory obligations on the underlying transport, and it is the physical layer that is associated with underlying transport in the most fundamental sense. A payment obligation tied to the ownership of qualifying facilities could apply without regard to whether the information moving via those facilities was in digital or analog form, or was packet- or circuit-switched.
Such an approach would have a variety of advantages. We could avoid the problems associated with determining which providers are providing “telecommunications,” making them subject to the assessment, and which are providing “information services,” leaving them exempt. Ownership of facilities would trigger the obligation without regard to the nature of the traffic moving over those facilities. Such a rule might be able to do what the Computer II distinction itself can no longer do: It might effectuate Computer II’s goal of imposing regulatory obligations on underlying transport, without burdening the service components higher up the protocol stack. It would thus vindicate Computer II’s still-valid judgment that, in order not to retard innovation, we should not impose regulatory costs on the new, still unfolding functionalities made possible by the marriage of silicon to data transmission.\(^\text{132}\)

Such an approach would be aesthetically appealing: To the extent that the high-cost fund is designed to support the availability of physical infrastructure throughout the nation,\(^\text{133}\) it provides a nice symmetry to impose the associated costs on physical infrastructure. More consequentially, the approach would be technology-neutral. Based on the assumption that a bit is a bit is a bit, no matter how transmitted, it would address the concerns of those who fear that a shift of telephone traffic away from circuit-switched voice to packet-switched data will undermine the entire subsidy structure. This seems important; in the ultimate analysis, it is hard to justify a regulatory scheme that assigns different consequences to provision of the same transport using different technologies. Such a scheme leads providers to make technology choices on the basis of regulatory arbitrage, not on the basis of which technology is most efficient, powerful, or inexpensive in a particular context.

Under a facilities-based approach, the facilities owners (telephone companies and others) from which Internet service providers and backbone providers lease data lines, as well as any Internet service providers and backbone providers owning their own transmission facilities, would make payments to the Universal Service Fund. One would expect facilities owners to pass on costs to Internet service providers and backbone providers leasing capacity from them; backbone providers to pass on costs to Internet service providers paying them for transit; and Internet service providers to pass on costs to their subscribers.\(^\text{134}\) All this

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132 A facilities-based approach, however, would not be appropriate in connection with all Title II obligations. Most importantly, one could not sensibly apply a facilities-based approach to the tariffing rules carried over from railroad regulation. Similarly, one could not apply a facilities-based approach to the requirement that carriers safeguard customer privacy.

133 See supra text accompanying note 82.

134 In suggesting this approach, I am assuming that facilities owners would in fact be able to pass on their costs. To the extent that they could not—so that the obligation would weigh heavily on facilities owners but only lightly on lessors—the proposal would have the effect of singling out a
would likely increase the share of universal service obligations ultimately paid by consumers of Internet-based services. That without more, though, should not be a dispositive objection. Conventional and IP networks are merging, so that it will no longer work simply to seek to insulate IP networks from regulation.\textsuperscript{135} Rather, the goal should be to find ways to recast existing regulation (where it should not simply be jettisoned for circuit-switched and packet-switched networks alike) to be technology-neutral and IP-friendly, to make sense in an increasingly packet-switched world.\textsuperscript{136}

The FCC would have to overcome considerable practical difficulties, though, before it could adopt a facilities-based approach. How would the agency determine the amount of the fee paid by facilities owners? The agency currently sets universal service assessments as a percentage of the revenues a firm receives from end users for telecommunications.\textsuperscript{137} If the agency tied the fact of the payment obligation to physical facilities ownership, then it could logically tie the amount of the assessment to revenues only by looking to that limited set of revenues corresponding to physical transmission. Yet typically, a telecommunications (or information service) provider provides its customers with a combination of physical infrastructure, transport, and associated features and services, not just physical facilities. The revenues it receives are for the combination. Where a provider itself owns transmission facilities (rather than purchasing raw transmission from a third party) and provides its customers with an integrated service, it is not clear how one can isolate that portion of its revenues that correspond to raw transmission.\textsuperscript{138}

Tying universal service obligations to a metric other than revenues could be at least as precarious. One possibility might be to make the fee...
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proportional to the raw bandwidth of a firm's transmission facilities. Increasingly, however, carriers are creating bandwidth through improved multiplexing techniques rather than laying new fiber. It would be undesirable if a firm's implementation of such techniques led to a massive jump in its universal service obligations; that might discourage desirable experimentation and capacity expansion. Nor would it always be clear, in the case of innovative technologies, how much bandwidth to associate with a given facility. Indeed, for some technologies (say, unlicensed wireless spread spectrum), the notion of the bandwidth associated with a facility seems essentially meaningless.

These difficulties might push us back to a solution based on actual or imputed revenues. Conceivably, a second-best solution might limit the universal service assessment to owners of transmission facilities; require those entities to make payments based on actual revenues in cases in which they provide leased lines or the equivalent; and require them to make payments based on the imputed value of the raw transmission they provide to themselves when they offer other services.

In the end, though, any attempt to vindicate Computer II principles in the context of universal service obligations may be misdirected. The universal service obligation, after all, is today essentially a tax supporting a particular government program. Under current rules, a firm may

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141 I have not so far, in this Article, addressed the legal constraints on these approaches; any solution the FCC adopts, absent statutory amendment, would have to be consistent with the Telecommunications Act, which mandates that "[e]very telecommunications carrier... providing interstate telecommunications services" contribute to universal service mechanisms "on an equitable and nondiscriminatory basis." 47 U.S.C. §254(d) (Supp. II 1996). A facilities-based approach would be vulnerable to the legal challenge that it did not require "every" carrier to contribute. Alternatively, one might argue that under this approach non-facilities-based carriers would contribute (albeit indirectly) through the prices they would pay for transmission, since those prices would reflect the facilities-based carriers' direct payments. Indeed, if the statute were read to impose an inflexible requirement that all carriers contribute directly, the current approach would not comply, since it is only the provision of telecommunications to end users that triggers the payment obligation. A carrier that does not serve end users is not required to contribute today. The approach described in text might also be vulnerable to the argument that the Commission has no authority to impose payment obligations on facilities-based information service providers. Here, though, the Report to Congress on Universal Service provides the answer: Such a firm should be deemed to be providing telecommunications to itself, thus it should fall within the FCC's authority to require "[a]ny ... provider of interstate telecommunications ... to contribute to the preservation and advancement of universal service if the public interest so requires." 47 U.S.C. § 254(d); see Report to Congress on Universal Service, supra note 75, at 11,534-535.
142 The Fifth Circuit is now considering whether the USF contribution obligation (or any part of it) is inconsistent with the constitutional command that "[a]ll bills for raising Revenue shall originate in the House of Representatives." U.S. CONST., art. I, § 7, cl. 1. It would be incongruous,
receive universal service support for serving customers in high-cost areas, if it provides access to the public switched telephone network sufficient to support analog voice transmission, with touch-tone signaling and access to emergency services, operator services and directory assistance. This reflects the conventional understanding of universal service: Voice access to the public switched telephone network is seen as essential to public safety and participation in society and democracy, and every network subscriber benefits when that network is expanded. 

For historical and political reasons, we have chosen to fund this program not out of general tax revenues, but through exactions from a class of communications service providers. We should nonetheless be guided by tax policy considerations. Those considerations suggest that in defining the class of contributors, our lodestar should not be Computer II, but rather these more general principles: Any definition (1) should be adequately broad; (2) should not discourage development and deployment of new technology; and (3) should not introduce obvious distortions—which is to say, that it should treat substitutable services similarly.

It would not make sense, therefore, to limit the universe of universal service contributors to providers of supported services. Such a rule would tax the provision of conventional analog voice telephony connections while leaving untouched other data pathways that consumers could use to secure similar functionality. Indeed, there is no obvious reason to limit the universe of contributors to actors regulated under Title II. Under the current regulatory structure, only telecommunications carriers need contribute to the universal service fund. Providers of cable service need not make payments to the fund, because cable service is not defined as "telecommunications"—it is governed by Title VI, rather than Title II, of the Communications Act. Yet if the FCC is not to pose distortions, statutory pigeonholes should not overcome considerations of functionality and market substitutability. Under a technology-neutral approach, all services functionally similar to those subject to a USF obligation (or the facilities used to provide them) should be in play.

however, if the FCC were found to have overstepped constitutional boundaries merely by following Congress's direction to refashion existing implicit subsidies into explicit ones.

143 See supra text accompanying note 88.
145 See generally BARBARA ESBIN, INTERNET OVER CABLE: DEFINING THE FUTURE IN TERMS OF THE PAST (Federal Communications Commission OPP Working Paper No. 30, 1998) (discussing the potential classification of Internet-based services provided by cable operators as "cable services").
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III. The Internet and Access Charges

The Universal Service Fund is not the only—or even the most important—federal subsidy mechanism. Telephone pricing today is characterized by a tangle of implicit as well as explicit cross subsidies, and the implicit subsidies are larger than the explicit. The most important such subsidy mechanism, on the federal level, is interstate access pricing. In part, as noted above, those charges are designed to compensate the local telephone companies for the costs the call imposes on their networks. Historically, however, they have also included a substantial implicit subsidy component. As a result, access charges today are an opaque blend of forward-looking economic cost, historic costs, and subsidies intended to depress local rates. The FCC is seeking to remove the subsidy element from access charges, and to drive those charges down to a level more nearly approximating forward-looking cost.

Where should the Internet, and IP networks generally, fit within the access-charge structure? As in the universal service context, I suggest that access-charge obligations need not turn on the telecommunications/information service distinction in the long run at all. While universal service payments are pure subsidy, access charges include a cost-recovery element. There is no compelling reason why, in the long run, information service providers should not pay charges tied to the costs they impose on the local exchange. Rather, it makes sense to move access charges towards cost for telecommunications and information service providers alike.

A. The Status Quo

Currently, information service providers do not pay access charges. That exemption should continue. As the FCC has explained, it would make little sense to require Internet service providers to pay interstate access charges as currently constituted:

The access charge system includes non-cost-based rates and

146  See supra notes 9-12 and accompanying text.
147  See Universal Service Order, supra note 9, ¶ 10-11, at 8784.
148  See supra text accompanying note 79.
149  See id.
150  See Universal Service Order, supra note 9 ¶¶ 12-14, at 8785.
151  See Access Charge Reform, 12 F.C.C.R. 15,982, ¶¶ 5-9, at 15,986-87 (1997) (first report and order), aff’d Southwestern Bell Tel. Co. v. FCC, 153 F.3d 523 (8th Cir. 1998); supra note 80 and accompanying text.
152  See supra notes 71-75 and accompanying text.
inefficient rate structures. . . . [There is] no reason to extend this regime to an additional class of users. . . . The mere fact that providers of information services use incumbent [local exchange carrier] networks to receive calls from their customers does not mean that such providers should be subject to an interstate regulatory system designed for circuit-switched interexchange voice telephony.\textsuperscript{153}

I suggested in the previous section of this Article that attempts simply to insulate IP networks from regulation are doomed to fail. But that is not to say that one should blindly extend old rules to IP networks, no matter how inefficient or ill-advised the regulation is. The FCC is currently seeking to remove implicit universal service subsidies from interstate access charges.\textsuperscript{154} Against that backdrop, it would not be sensible to extend those subsidies to a new class of users, imposing distortions and inefficiencies on IP networks.

B. Beyond the Status Quo

But the current exemption is not the end of the story—access charges, after all, recover costs as well as generate subsidies. In the absence of access charges or some comparable payment, there is no mechanism to cause Internet service providers to pay any congestion costs they impose on the local exchange. Any traffic-sensitive costs they impose, rather than being reflected in their own rates, are assigned to the local jurisdiction and spread among all local ratepayers.\textsuperscript{155}

The extent to which Internet service providers impose costs on the local exchange is hotly debated.\textsuperscript{156} The FCC’s \textit{Local Competition Order}, though, estimated a cost of .2 to .4 cents ($0.002 to $0.004) per minute as a default proxy for the traffic-sensitive component of local switching.\textsuperscript{157} This figure, small as it is, suggests the potential for a mismatch between prices and economic costs where ISPs receive huge numbers of calls over the public switched network, since typically such a call is free to both caller (paying flat residential rates) and ISP (under standard local business rates, paying a flat fee for incoming calls). The matter is not simple—local


\textsuperscript{154} See Access Charge Reform, 12 F.C.C.R. ¶¶ 5-8, at 15,986.


\textsuperscript{156} See id. at 58-61.

switching costs appear to be essentially congestion costs,158 and the interested parties fiercely dispute the degree to which Internet access in fact generates congestion on the local network.159 The associated costs may well be zero except during peak periods.160 But it seems plausible that Internet access may impose some costs on the local exchange not reflected in the rates ISPs pay.161

The legitimacy of any mismatch between prices and economic costs in this area is usually debated in federalism terms. ISPs insist that the local lines they buy fall within the intrastate jurisdiction, so that it is up to state regulatory commissions to decide whether there is an impermissible disparity between prices and costs. They argue that, in receiving large numbers of incoming calls while making few outgoing calls, ISPs are situated no differently from a variety of other local businesses (pizza parlors, say), and should not be singled out for different treatment.162

That argument seems unsatisfactory, though, on a variety of levels. To the extent that the bulk of the inefficiencies and subsidies that characterize conventional telephony are built into the intrastate pricing structure, we should be wary of too quick a finding that any IP-based service is properly regulated as part of that structure. Moreover, the

158 See WERBACH, supra note 155, at 58-63.
159 Local exchange carriers have asserted that Internet traffic commonly gives rise to congestion at the telephone switch serving the Internet service provider. See id. at 58. A local exchange carrier switch cannot simultaneously support connections for all users of the switch. Id. Rather, there is one call path through the switch for every four to eight users. Because calls by users to Internet service providers tend to be longer than voice calls, but still—like all calls on the circuit-switched public telephone network—tie up an end-to-end call path for the duration of the call, local exchange carriers claim that heavy Internet usage will increasingly lead to situations in which all available paths through the switch are in use and additional calls seeking a call path through the switch will be blocked. See id. at 58-60.

Internet service providers, however, sharply dispute the extent to which switch congestion is a serious problem. See id. at 60. A study commissioned by the Internet Access Coalition concludes that incidents of congestion have been localized, are easily corrected, and are primarily attributable to inadequate planning and inefficient engineering by the local exchange carriers. See id.

161 The question whether ISPs impose uncompensated costs on the local exchange is different from the question whether they impose uncompensated costs on local exchange carriers. In Access Charge Reform, the Commission found insufficient evidence that local exchange carriers suffered losses by virtue of Internet use. See Access Charge Reform, 12 F.C.C.R. 15,982, ¶ 346, at 16, 133-34 (1997) (first report and order), aff'd, Southwest Bell Tel. Co. v. FCC, 153 F.3d 523 (8th Cir. 1998). It noted that the carriers received revenue not only from ISPs' connections to the local exchange, but also from consumers' purchases of second lines and ISPs' purchases of leased lines to provision their internal networks. Moreover, the popularity of the Internet generated revenue through subscriptions to incumbent local exchange carriers own Internet access services. Id. These considerations suggest that uncompensated costs in one area are balanced by monopoly profits in another. They do not speak to whether the rates paid by ISPs are related to the costs they impose (much less to whether either the profits local exchange carriers earn or the costs they incur are passed on to the ratepaying public).

162 See id. ¶ 345, at 16,133. ("[C]ommenters point out [that] many of the characteristics of ISP traffic (such as large numbers of incoming calls to Internet service providers) may be shared by other classes of business customers."). Id.
The federalism argument seems wrong: ISPs provide what is in predominant part an interstate information service. Customers use ISP facilities to exchange traffic with e-mail correspondents, Usenet news participants, Web sites, FTP servers and other persons or devices without regard to jurisdictional boundaries. Indeed, the entire point of Internet access is to enable communication with persons and sites ranged across the globe.

Dialup Internet access, to be sure, is an information service under the definitions discussed earlier in this paper, not a telecommunications service like long-distance POTS. But it is by no means clear why that should be relevant to a charge designed to recover actual costs imposed on the local exchange. As noted above, when the FCC established the access charge system in 1983, it initially contemplated that both basic and enhanced service providers would pay access charges. Even in reversing that initial judgment, it had no doubt that enhanced service providers "employ exchange service for jurisdictionally interstate communications." Because the Internet traffic passing over the local phone lines connecting end users and ISPs is predominantly jurisdictionally interstate, federal policy should govern how the costs

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164 That traffic is sometimes stored on ISP computers along the way, but that storage (in a web cache, Usenet news feed, or mail queue) is simply an intermediate step in a larger journey. See Implementation of the Local Competition Provisions in the Telecomms. Act of 1996, CC Docket Nos. 96-98 & 99-68, 1998 F.C.C. LEXIS 821, ¶ 12-13, at *19-23 (Feb. 26, 1999). The Comm'n has stated that it "analyses the totality of the communication when determining [it's] jurisdictional nature ..." Id ¶ 13, at *22.
165 The "key to [federal] jurisdiction" is the interstate movement of communications traffic. Petition for Emergency Relief & Declaratory Ruling Filed by the BellSouth Corp., 7 F.C.C.R. 1619, 1621 (1992) (quoting New York Telephone Co. v. FCC, 631 F.2d 1059, 1066 (2d Cir. 1980)). In characterizing a service as interstate or intrastate, thus, we look to the nature of the traffic, or "the actual uses to which the property is put." Smith v. Illinois Bell Tel. Co., 282 U.S. 133, 151 (1930); see also, e.g., California v. FCC, 567 F.2d 84, 86 (D.C. Cir. 1977) (explaining that the regulatory characterization depends on "the nature of the communications that pass through the facilities"); MTS & WATS Mkt. Structure, 97 F.C.C.2d 682, 713 n.58 (1983) (memorandum and order), aff'd in relevant part sub nom. National Ass'n of Regulatory Util. Comm'r's v. FCC, 737 F.2d 1095 (1984) (explaining that the nature of communication determines jurisdiction).

In important respects, Internet access traffic is best characterized as jurisdictionally mixed. Not all ISP services are necessarily interstate; some users may make such limited use of the Internet that they never interact with data bits that have crossed, or will cross, a state line. It is impossible, however, to identify those users, or to separate them out, by examining Internet traffic; packet-switched networks by their nature are less amenable than circuit-switched networks to such partition. The status of the traffic as jurisdictionally mixed gives the FCC some discretion over its jurisdictional and separations treatment. See Southwestern Bell Tel. Co. v. FCC, 153 F.3d 523, 543 (8th Cir. 1998).

166 Both basic and enhanced service providers were "users of access service," in that they obtained "local exchange services or facilities which are used ... for the purpose of completing interstate calls. ..." MTS & WATS Mkt. Structure, 97 F.C.C.2d ¶¶ 77-78, at 711. The FCC's initial order defined "access service" to include "services and facilities ... provided for the origination or termination of any interstate or foreign enhanced service ... ." MTS & WATS Mkt. Structure, 93 F.C.C.2d 241, 344 (third report and order) (emphasis added), aff'd in relevant part sub nom. National Ass'n of Regulatory Util. Comm'r's v. FCC, 737 F.2d 1095 (1984).

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associated with that traffic are allocated.\textsuperscript{168}

It has been suggested that the fact that ISPs need not pay all of the
costs they incur may lead to concrete distortions. Specifically, the most
efficient way to move bits from end users to ISPs may well be over digital,
packet-switched links that bypass the public switched telephone network
entirely (or that use customers’ local loops, but leave the network before
hitting a telephone switch). Yet ISPs’ freedom from access charges could
motivate them to stay on the circuit-switched network even where that is
the less efficient solution. If ISPs were required to pay the economic costs
of their connections to the circuit-switched network, the argument runs,
then competitive local exchange carriers would have incentives to offer,
and ISPs to buy, more efficient packet-switched connections. Incumbent
local exchange carriers might well then roll out their own comparable
services in response.\textsuperscript{169}

On the other hand, the scenario just sketched out is vulnerable to a
variety of objections. First, it appears that end-user demand for Digital
Subscriber Line and other packet-switched services, and competition from
ISPs affiliated with incumbent local exchange carriers and cable operators,
are driving ISPs to seek packet-switched connections in any event. It is by
no means clear that ISPs’ low rates for connection to the local exchange
are significantly affecting ISP’s and consumers’ choices in this regard.

Second, the reasoning set out above assumes the existence of local
competition. That is, it assumes that some firm is in fact offering packet-
switched access in competition with the incumbent local exchange carrier.
In the absence of local competition, reforming the rates paid by ISPs
accomplishes nothing except that ISPs pay higher prices and incumbent
local exchange carriers keep the money, because the monopoly providers
have little incentive to develop ways to move the Internet traffic off the
circuit-switched network.

Nor would it suffice simply to postpone the imposition of any new
charges on ISPs until after local competition emerges. There is a chicken-
and-egg problem: One of the most important factors affecting the
willingness of local exchange carriers (competitive or incumbent) to roll
out packet-switched connectivity for ISPs is ISPs’ willingness to buy that
connectivity. Yet current regulation diminishes ISPs’ incentive to do so.
One answer might be for the FCC to announce now that ISPs will be
required to pay a federally-tariffed charge for connectivity to the circuit-

\textsuperscript{168} But see Implementation of the Local Competition Provisions in the Telecomms. Act of
1996, ¶ 28-30, at *44-47 (explaining that traffic passing from an end user to an originating local
exchange carrier (LEC), to a second local exchange carrier, to an Internet service provider, bound for
the Internet, is largely jurisdictionally interstate, and that any inter-LEC compensation in connection
with that traffic should be governed by a federal rule, but that the best rule would simply effectuate
negotiated agreements between the carriers).

\textsuperscript{169} See WERBACH, supra note 155, at 72.
switched network, reflecting actual economic costs, upon the emergence of local competition in the relevant market. This would encourage competitive local exchange carriers to roll out packet-switched services directed at ISPs, knowing that the imposition of the federally tariffed charge on circuit-switched connectivity would level the playing field and make those services more attractive. The FCC’s actual moves, though, have been in the opposite direction. The agency has stressed that “the FCC has no intention of assessing per-minute charges on Internet traffic or changing the way consumers obtain and pay for access to the Internet.”

Finally, tying the new charge to the existence of competition might be difficult in other ways. How could the agency determine the actual economic costs imposed by ISP circuit-switched connections on the local network? To the extent that it required local competition as a prerequisite for any regulatory change, how would it measure competition? The FCC’s experience with the 1996 Act’s famously problematic directive that the Bell Operating Companies may provide in-region long-distance services only after they open up their local markets to competition, offers no grounds for optimism that this process would be any easier.

Conclusion

The distinction between regulated “telecommunications” and unregulated “information services” is at the center of the 1996 Telecommunications Act. That distinction, though, is rooted in the conventional telephone network; it doesn’t work in the IP world. We need to develop new ways of reconciling old telephone regulation with new IP networks. For example, regulators might consider associating universal service payment obligations not with the provision of “telecommunications,” but with the ownership of transmission facilities. While the exemption of information service providers from access charges should continue, it may make sense in the long run for information service providers to pay charges tied to any costs they impose on the local exchange. Ultimately, we will have to reshape the rules governing both old and new technology if we are to find a structure that works.

171 The 1996 Act provides that a Bell Operating Company may provide in-region long-distance service only when it satisfies a fourteen-point checklist demonstrating that it has opened its local market to competition. See 47 U.S.C. § 271(c)(2)(B). So far, the FCC has rejected every such petition filed with it, finding that the checklist was not yet satisfied. The process has been highly complex, and highly contentious.