THE INTERNET AND THE PROJECT OF COMMUNICATIONS LAW

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The Internet offers the potential for economic growth stemming from online human communications. But recent industry and government actions have disfavored these possibilities by treating the Internet like a content-delivery supply chain. This Article recommends that the Internet be at the center of communications policy. It criticizes the nearly exclusive focus of communications policy on the private economic success of infrastructure and application providers, and suggests that communications policy be focused on facilitating communications themselves.

INTRODUCTION 360
I. THE FIRST GENERATION OF COMMUNICATIONS LAW AND SCHOLARSHIP 365
A. The Internet Sweeps Aside Silos 366
B. The Incumbents Respond 370
C. The Scholars Respond at the Application Layer 374
D. The Incumbents Adopt the Scholars' Layered Approach 376
II. THE COMMUNICATIONS CONCEPTION OF COMMUNICATIONS LAW 380
A. Economic Growth Theory 381
1. Nonrival Ideas 383
2. Specialization and Scale 385
3. The United States and Economic Growth 385
B. Growth Theory and the Internet 387
III. RETHEORIZING THE CURRENT DEBATE 390
A. Telecommunications Scholars and the Internet 390
B. Implications for Policy: Universal Service 392
C. Implications for Policy: Network Neutrality 393
1. Discrimination Defined 393
2. Market Concentration 393
3. What Happens to Human Online Communications? 393
D. Implications for Policy: Divestiture 393
CONCLUSION 393

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INTRODUCTION

"I think the next century will be the century of complexity."[1]
—Stephen Hawking

Anyone with a substantial amount of Internet experience thinks of the Internet as a thriving conversation pit, news source, and job resource, access to which is nearly as necessary as oxygen. The Internet's value to people does not come from the nature of the connections we use to access it but, rather, from the human communications and relationships made possible by its universal interconnectivity and flexibility. Because no particular use of the Internet is embedded in its design, new ideas and new forms of human relationships constantly emerge from its use. Both the FCC and the companies that provide high-speed access to the Internet in the United States, however, assume that the Internet is a content-delivery supply chain—much like a railroad—that is a souped-up version of earlier communications modalities.

The first generation of Internet scholars made strong arguments about the importance of the "end-to-end" principle of the Internet, set forth in a classic paper by Jerome Saltzer, David Reed, and David Clark.[2] That principle suggests that the transport functions of the Internet should not be involved in fine-grained operations on messages because an intelligent network will impose costs that would be much more efficiently dealt with at the end-user edge.[3] In colloquial terms, the end-to-end argument is that the network should be stupid and its edges should be smart.[4] Yochai Benkler, Mark Lemley, Larry Lessig, Lawrence Solum, Kevin Werbach, Richard Whitt, Tim Wu, and many others have linked the end-to-end principle to future innovation, noting that transport nondiscrimination allows new

1. Glenda Chui, *'Unified Theory' Is Getting Closer, Hawking Predicts*, SAN JOSE MERCURY NEWS, Jan. 23, 2000, at 29A (quoting Stephen Hawking).

2. Jerome H. Saltzer et al., *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS ON COMPUTER SYSTEMS 277 (1984), *available at* http://web.mit.edu/Saltzer/www/publications/endtoend/endtoend.pdf.

3. *See infra* note 41. The Internet's layered architecture separates transport (the lowest layer) from the packetizing and addressing protocol (the TCP/IP suite or logical layer) used by computing devices. TCP/IP can work across (above) any form of transport and is, in turn, used by applications running above TCP/IP, such as the domain name system, email, and the World Wide Web.

4. *See* David S. Isenberg, *The Dawn of the Stupid Network*, NETWORKER, Feb.–Mar. 1998, at 24, 27–28, *available at* http://portal.acm.org/dl.cfm (search "Isenberg"; follow "Dawn of the Stupid Network" hyperlink).

applications (like email or the World Wide Web) to be introduced by anyone without their having to ask permission.[5]

This focus on the application-layer view—celebrating the advent of Wikipedia, YouTube, eBay, Second Life, blogging software, and other new substitutes for the delivery-chain applications of the pre-Internet era—provides an impoverished (or at least incomplete) perspective on communications. The landscape of the Internet can usefully be perceived differently: Human online communications are best captured intellectually as a complex adaptive system that can generate economic growth. New forms of persistent social interaction (often crossing application boundaries) are quickly evolving in direct reaction to collective human attention, and these communications are creating opportunities for the development of new ideas and new ways of making a living. This has never happened before at the same rate, with the same directness, or with similarly persistent results.[6]

Although the application-focused view of the Internet landscape prompts observers to see the Internet as a content-delivery supply chain, communications online are much more than arranged chunks of remixed content or new category-destroying applications. Online communications coalesce into dynamic human relationships made possible by a globally addressable

5. *See, e.g.*, LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD 34–35 (2001); Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 562 (2000); Brett Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 294 (2007); Mark Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 970 (2001); Lawrence B. Solum & Minn Chung, *The Layers Principle: Internet Architecture and the Law*, 79 NOTRE DAME L. REV. 815 (2004); Philip J. Weiser, *Law and Information Platforms*, 1 J. ON TELECOMM. & HIGH-TECH. L. 1, 4–5 (2002); Kevin Werbach, *Breaking the Ice: Rethinking Telecommunications Law for the Digital Age*, 4 J. ON TELECOMM. & HIGH TECH. L. 59, 95 (2005) [hereinafter Werbach, *Breaking the Ice*]; Kevin Werbach, *A Layered Model for Internet Policy*, 1 J. ON TELECOMM. & HIGH-TECH. L. 37 (2002) [hereinafter Werbach, *Layered*]; Richard S. Whitt, *A Horizontal Leap Forward: Formulating a New Communications Public Policy Framework Based on the Network Layers Model*, 56 FED. COMM. L.J. 587 (2004); Tim Wu, *The Broadband Debate, A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69 (2004) [hereinafter Wu, *User's Guide*]; Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. ON TELECOMM. & HIGH TECH. L. 141 (2003) [hereinafter Wu, *Broadband Discrimination*]; Tim Wu, *Application-Centered Internet Analysis*, 85 VA. L. REV. 1163 (1999) [hereinafter Wu, *Application*]; Kevin Werbach, *The Architecture of Internet 2.0*, RELEASE 1.0, Feb. 1999, at 1, *available at* http://www.myrtle.co.uk/cle06.html; Letter from Tim Wu, Assoc. Professor, Univ. of Va. Sch. of Law, and Lawrence Lessig, Professor of Law, Stanford Law Sch., to Marlene H. Dortch, Sec'y, FCC 5 (Aug. 22, 2003), *available at* http://faculty.virginia.edu/timwu/wu_lessig_fcc.pdf ("The Internet has long functioned as a figurative 'platform' for a fierce and highly innovative competition between applications.").

6. By contrast, telephone communications allow for quick one-to-one reactions, but the resulting patterns vanish as soon as the connection is ended. Broadcast is slightly more complex than telephony, but viewers' reactions to what they see have a very attenuated relationship to what is eventually shown.

network of computers that evolve unpredictably in response to their environment. These relationships are sometimes rendered visible by particular applications (for example, MySpace and eBay show visually which group of actors is interested in a particular object or person), but more often are like the invisible human groupings made possible by a great city. These relationships, pulled together by interest and accident and characterized by shifting boundaries and unpredictable dynamics, are what is so attractive about the Internet.[7] So although "innovation" is indeed supported when an inventor of a new form of telephony or television does not have to ask permission to introduce her new service online (and the application-layer perspective helpfully illuminates why this is so), new and innovative applications (or "services") are not the central story of the Internet. The central story is a deeply human one about unpredictably complex relationships.

Scholars and policymakers continue to be focused on the application-layer view. Many telecommunications law scholars have suggested that communications regulation should be tailored to the layered architecture of the Internet (and thus should treat transport differently than applications), but their primary justification for such tailoring has been that it will "track[ ] the reality of convergence"—in other words, that regulation should recognize that former broadcast and telephony "services" are now being delivered online.[8] They see the interest of the Internet in application-layer terms.[9] This same supply-chain, application-layer perspective is now being adopted by *opponents* of end-to-end, "stupid network" connectivity, most

7. J.C.R. Licklider, who led the Advanced Research Projects Agency (now known as the Defense Advanced Research Projects Agency, or DARPA) and encouraged the networking that led to the Internet, predicted this development in 1968: "What will on-line interactive communities be like? In most fields they will consist of geographically separated members, sometimes grouped in small clusters and sometimes working individually. They will be communities not of common location, but of *common interest*." J.C.R. Licklider & Robert W. Taylor, *The Computer as a Communication Device*, SCI. & TECH., Apr. 1968, at 21, 37–38, *available at* http://gatekeeper.dec.com/pub/DEC/SRC/publications/taylor/licklider-taylor.pdf.

8. *E.g.*, Werbach, *Breaking the Ice*, *supra* note 5, at 69 ("By shifting regulatory structures from vertical silos based on network platform to horizontal layers, the layered approach tracks the reality of convergence.").

9. Tim Wu has often argued that what is important about the Internet is the competition it allows among applications. Wu also assumes that distinguishing between different categories of online "services" (telephony-speak for "applications") is appropriate. *See, e.g.*, Tim Wu, *Why Have a Telecommunications Law? Anti-Discrimination Norms in Communications*, 5 J. ON TELECOMM. & HIGH TECH. L. 15 (2006) [hereinafter Wu, *Telecommunications Law*]; Wu, *Broadband Discrimination*, *supra* note 5. This is a strong claim that is only possible if one is firmly within the application-layer perspective. In an important early article, Mark Lemley and Larry Lessig suggested that the crucial differentiator of Internet architecture was that it "enabl[ed] a wider variety of applications to connect and use the network." Lemley & Lessig, *supra* note 5, at 931. Kevin Werbach has continued this approach. *See* Werbach, *Breaking the Ice*, *supra* note 5, at 95; Werbach, *Layered*, *supra* note 5, at 38–40.

famously Christopher Yoo, who has argued that the negative effects of requiring nondiscrimination by Internet access providers would include narrowing of "consumer choice" by disfavoring applications that require quality of service guarantees.[10] From the application-competition perspective, network operators can appeal to consumers' intuitions that entities like Google providing online "services" should pay the carriers for the privilege of reaching carrier subscribers, and Google and others can argue that nascent applications will be stifled by this kind of discrimination.[11] These arguments present zero-sum games and are likely perceived by non-techies as abacus beads moving back and forth on a single wire of money-making zeal. From the complex-systems perspective, something much more interesting than supply-chain delivery is occurring. Use of the Internet is changing in unpredictable and complex ways as people discover increased degrees of freedom of human connection made possible online.[12]

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10. Christopher S. Yoo, *Beyond Network Neutrality*, 19 HARV. J.L. & TECH. 1, 12 (2005) [hereinafter Yoo, *Beyond*]; *see id.* at 13–18; Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847, 1907–08 (2006) [hereinafter Yoo, *Economics of Congestion*].

11. AT&T chief executive officer Ed Whitacre has said that Google and other companies "'use my lines for free—and that's bull.'" Spencer E. Ante & Roger O. Crockett, *Rewired and Ready for Combat: SBC and Verizon Are Spending Billions to Stay Competitive in the Broadband Era*, BUS. WK., Nov. 7, 2005, at 110, 110 (quoting Ed Whitacre). Vinton Cerf, on behalf of Google, has testified that "[w]e care passionately about the future of the Net, not just for ourselves, but because of all the other potential Googles out there." *Network Neutrality: Hearing Before the U.S. S. Comm. on Commerce, Sci., and Transp.*, 109th Cong. 2 (2006) (prepared statement of Vinton G. Cerf, Vice President and Chief Internet Evangelist, Google Inc.), *available at* http://commerce.senate.gov/pdf/cerf-020706.pdf.

12. Perhaps the most striking (and concrete) example of this kind of complex human connection online is found in the astonishing growth of "social network" platforms, many of which offer standard forms of instant messaging, group-forming, posting profiles of yourself, commenting, and "friending" (visual indications of connection), but are being used for all conceivable (and inconceivable) forms of social interaction. This is a global phenomenon. As of October 2007, large social network platforms included MySpace (mostly United States, 206 million), Orkut (mostly Brazil and India, almost 68 million), Facebook (mostly United States, 48 million), Bebo (mostly United Kingdom, 34 million), Cyworld (mostly Korea, 21 million accounts), LinkedIn (mostly United States, 15 million), and MIXI.jp (mostly Japan, almost 10 million). Wikipedia, List of Social Networking Websites, http://en.wikipedia.org/wiki/List_of_social_networking_websites (last visited Oct. 31, 2007). David Orban recently asserted that of the 2,000,000 residents of Budapest, 668,000 belong to Iwiw.hu. Posting of David Orban to Apophenia blog, http://www.zephoria.org/thoughts/archives/2007/06/02/list_of_nonengl.html#comment-248464 (June 4, 2007, 05:25 PST). People are literally "writ[ing] themselves and their community into being," in the words of danah boyd. *See* danah boyd, *Why Youth (Heart) Social Network Sites: The Role of Networked Publics in Teenage Social Life*, *in* MACARTHUR FOUNDATION SERIES ON DIGITAL LEARNING, IDENTITY VOLUME (David Buckingham ed., forthcoming 2007), *available at* http://www.danah.org/papers/WhyYouthHeart.pdf. These are "networked publics," lightly mediated by application providers. *Id.* We are likely at the very beginning of our online communications ability.

Network operators want to control and monetize high-speed access to the Internet.[13] They believe that they can and should control this complex system by slowing down its evolution and keeping its adaptation attached to old "service" understandings. They believe that it is appropriate to dumb down users' relationships to this complex system by, among other things, deliberately degrading upload speeds and keeping high-speed access for their own content.[14]

Other countries (most vividly Korea and Japan) have taken a hard look at their communications policies, and have understood that communications and economic growth are tightly intertwined.[15] Economists understand that economic growth is driven by new ideas creating ever newer goods and services.[16] The human relations made possible by the Internet are capable of producing enormously diverse ideas (ideas in the form of new niches, new roles, and new understandings of information) and allowing them to be disseminated on a large scale, thus triggering crucial economic growth that will benefit society as a whole. Conversely, the cost to the U.S. economy of adopting a taming, constraining approach to complex online communications by making them simple and predictable may be great. We are at risk of encouraging the development of a sclerotic, dumbed-down, cable television version of the Internet for U.S. users.

This Article seeks to change the perspective from which we examine the landscape of the Internet and the project of communications law. The Internet should be at the center of communications policy in this country, and the highest priority of communications policy should be to facilitate human online *communications* (and thus new ideas) rather than to optimize conditions for particular private infrastructure providers. This facilitation will very likely speed economic growth.[17]

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13. *See infra* Part III.C.

14. *See infra* Part III.C.

15. *See* Susan P. Crawford, *Network Rules*, LAW & CONTEMP. PROBS., Spring 2007, at 51, 62 n.51 (comparing Japanese and South Korean policy to U.S. policy); Kenji Kushida & Seung-Youn Oh, *Understanding South Korea and Japan's Spectacular Broadband Development: Strategic Liberalization of the Telecommunications Sectors* (Berkeley Roundtable on the Int'l Econ., Working Paper No. 175, 2006), *available at* http://socrates.berkeley.edu/~briewww/publications/wp175.pdf (comparing Japanese and South Korean policy).

16. *See, e.g.*, DAVID WARSH, KNOWLEDGE AND THE WEALTH OF NATIONS 399–408 (2006); Paul Romer, *Endogenous Technological Change* (Nat'l Bureau of Econ. Research, Working Paper No. 3210, 1989) [hereinafter Romer, *Endogenous*]; Paul Romer, *Increasing Returns and New Developments in the Theory of Growth* (Nat'l Bureau of Econ. Research, Working Paper No. 3098, 1989) [hereinafter Romer, *Increasing*].

17. *See* Julie E. Cohen, *Cyberspace as/and Space*, 107 COLUM. L. REV. 210, 213 (2007) ("The production of networked space, including cyberspace, should proceed in ways that promote the well-being of the embodied, situated beings who inhabit it.").

Part I lays out the background for this project. The story of how the Internet has unseated core assumptions about basic features of the communications landscape is a familiar one. However, applications are secondary to the human communications and relationships they facilitate. Part II begins to develop a theoretical grounding for a changed approach to communications law as a whole, focusing on the complexity of human communications online and the increasing returns associated with these communications. The economic growth-based theory is straightforward: The greatest possible diversity of new ideas that will support our country in the future will come from the online world because of its special affordances of interactivity, interconnectivity, and unpredictable evolution. Communications law and policy should therefore have the Internet at its core. Part III briefly explores current debates about universal access and network neutrality in light of this reconception of communications law. If, as this Article suggests, human online communications comprise a complex system that is creating value for human beings, then attempts by network operators to transform the Internet into something resembling older telephony and broadcast models pose great risks to our collective future.

Current communications law has drifted very far from the experience of actual end users. The time has come to explore new theories. We need a new understanding of "optimizing" and a new subject for "optimization": communications themselves.

I. THE FIRST GENERATION OF COMMUNICATIONS LAW AND SCHOLARSHIP

In the first generation of communications law, technical infrastructure and function were closely associated. This approach shaped the siloed telecommunications acts of 1934[18] and 1996,[19] which featured separate titles for separate infrastructures—telephony, broadcast, and (later) cable.[20] The first generation of Internet scholars made clear that the commercial Internet fundamentally undermined core assumptions about basic features

18. Communications Act of 1934, 47 U.S.C. §§ 151–612 (1994).

19. Pub. L. No. 104-104, 110 Stat. 56. Most, but not all, sections of the 1996 Act amended the Communications Act of 1934.

20. 47 U.S.C. §§ 151–612; 110 Stat. at 56–57; *see also* Douglas C. Sicker, Further Defining a Layered Model for Telecommunications Policy 4 (unpublished paper presented at the 30th Telecommunications Policy Research Conference, Alexandria, Va., Sept. 29–30, 2002), *available at* http://intel.si.umich.edu/tprc/papers/2002/95/LayeredTelecomPolicy.pdf (explaining that in the U.S. silo model, each network and service is regulated separately from the other, and "the top defines the regulatory Title").

of this communications landscape. This Part briefly describes the changes caused by the advent of the Internet, outlines the incumbents' responses to these changes, and reveals the scholars' application-layer perspective on this sequence of events.

A. The Internet Sweeps Aside Silos

From the media theorist perspective, communications traditionally have been made up of three broadly different modalities: (1) postal and telephony (one-to-one, often having to do with the daily events of human life); (2) the press (one-to-many, often having to do with expert views as to trends revealed by the daily events of human life); and (3) cinema and broadcasting (also one-to-many, but often having to do with entertainment for its own sake, and including literary communication).[21] From the perspective of traditional telecommunications law, communications have been divided into two large categories: (1) regulated telephony, radio, and broadcast (dependent on radio or wired communications, and subject to "public trustee"[22] or common carriage[23] obligations); and (2) largely unregulated newspaper and cinema (the "print" model, not dependent on radio or wired communications).[24] The U.S. Congress has delegated to the FCC statutory authority over telecommunications providers, wireless carriers, satellite and cable providers, and broadcasters.

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21. *See, e.g.*, PAUL STARR, THE CREATION OF THE MEDIA: POLITICAL ORIGINS OF MODERN COMMUNICATION (2004).

22. *See* Daniel Patrick Graham, *Public Interest Regulation in the Digital Age*, 11 COMMLAW CONSPECTUS 97, 97 (2003) (outlining public trustee obligations of broadcasters).

23. Title II of the Telecommunications Act of 1996 continues to define common carriers (in a circular fashion) as companies "engaged as a common carrier for hire, in interstate or foreign communication by wire or radio or interstate or foreign radio transmission of energy." 47 U.S.C. § 153(10). A common carrier is a company that "makes a public offering to provide [communications facilities] whereby all members of the public who choose to employ such facilities may communicate or transmit intelligence of their own design and choosing." FCC v. Midwest Video Corp., 440 U.S. 689, 701 (1979); *see also* 47 U.S.C. § 202 (prohibiting common carriers from engaging in unjust or unreasonable discrimination, including making or giving any undue or unreasonable preference, or imposing any undue or unreasonable prejudice or disadvantage on any person, class of persons, or locality).

24. *Compare* Miami Herald Publ'g Co. v. Tornillo, 418 U.S. 241 (1974) (supporting the value of editorial autonomy for the print model), *with* Red Lion Broad. Co. v. FCC, 395 U.S. 367 (1969) (finding that the government can intervene in licensed broadcasting to promote public values). *See generally* ITHIEL DE SOLA POOL, TECHNOLOGIES OF FREEDOM 2 (1983) ("The principles of common carriage and of the First Amendment have been applied to broadcasting in only atrophied form. For broadcasting, a politically managed system has been invented.").

For all of these actors, the nature of the "services" they provide has been tightly tied to the hardware or infrastructure on which they are based. Indeed, the first generation of communications law assumed that there was a necessary association between a particular form of infrastructure and a particular functional capacity. Each of the traditional modalities of communication has had its preferred use embedded in its design, and a key goal of current law is to produce the optimal level of investment in each of several independent types of infrastructure: telephony, broadcast, cable, and wireless. And from the perspective of past "users" of communications, all of these activities (postal services, newspaper, telephony, radio, cinema, broadcast television, and cable) were, until recently, seen as separate.

Now, given the advent of the Internet, none of these categorizations works. Connections to the Internet provide access to online activities that are the functional equivalents of all of these former modalities, and are not necessarily tied to the hardware used to reach them.[25] Use of old-style, specialized communications mechanics is diminishing. For example, long-time Internet users say they spend less time watching television than they used to.[26] The U.S. Postal Service has had to retrench by removing underused mailboxes from city streets.[27] Telephone companies are losing money quickly on their traditional wireline businesses as cable companies threaten both their telephone and Internet access revenues, and are moving into the provision of

25. *See generally* YOCHAI BENKLER, THE WEALTH OF NETWORKS (2006).

26. Anick Jesdanun, *More Parents Worried About Internet Use*, ASSOCIATED PRESS, Nov. 29, 2006, http://www.signonsandiego.com/uniontrib/20061129/news_1n29internet.html (reporting that 41 percent of veteran Internet users say they spend less time watching television); Press Release, Univ. of S. Cal. Ctr. for the Digital Future, Online World as Important to Internet Users as Real World? (Nov. 2006) [hereinafter USC Press Release], *available at* http://www.digitalcenter.org/pdf/2007-Digital-Future-Report-Press-Release-112906.pdf. For an analysis of the demise of broadcasting, see Stuart Minor Benjamin, *Evaluating the Federal Communications Commission's National Television Ownership Cap: What's Bad for Broadcasting Is Good for the Country*, 46 WM. & MARY L. REV. 439, 483 (2004) (noting a decline in the percentage share of the television market of broadcast content and the substitution of Internet content for broadcast media). *See also* John T. Nakahata, *Regulating Information Platforms: The Challenge of Rewriting Communications Regulation From the Bottom Up*, 1 J. ON TELECOMM. & HIGH TECH. L. 95, 96 (2002) ("Digital television, digital cable, internet telephony, and the internet itself all take a communication, convert it into a series of digital signals, transmit those digital signals between distant points, and then allow a computer at the distant point (whether a PC, TV, telephone, Personal Video Recorder or some other device) to reconstruct the digital bits into high quality copies of the original images, information or sounds.").

27. Katie Hafner, *Postal Service Finds a Friend in the Internet*, N.Y. TIMES, Aug. 2, 2006, at A1 ("In 2005, revenue from first-class mail like cards and letters, which still made up more than half the Postal Service's total sales of $66.6 billion, dropped nearly 1 percent from 2004.").

cable-television-like services.[28] Cable companies, for their part, are beginning to provide voice services. Indeed, many mainstream Internet companies are joining the Voice over Internet Protocol (VoIP) marketplace (AOL, Google, Microsoft, and Yahoo! all have their own VoIP applications), and VoIP is increasingly substituted for phone usage. As of the preparation of this Article, there has been a 153 percent increase in VoIP subscribers in 2006 over 2005, with almost seven million subscribers in the United States.[29]

The Internet's effect on mainstream press activities has been even more dramatic. According to the *New York Times*, the U.S. newspaper industry "appears to be in a free fall."[30] The last six months of 2006 saw an unequaled decline in circulation for U.S. papers.[31] Meanwhile, however, the readership of online newspaper websites in 2006 was nearly one-third higher than in 2005.[32] A recent Pew Internet & American Life Project study found that almost 20 percent of American adult Internet users were obtaining political news online on a typical day.[33] After Hurricane Katrina, half of all Internet users in the United States looked for news online about the event.[34] Now that broadband access to the Internet is growing quickly, already more than half of online users in the United States are able to

28. Marguerite Reardon, *Wireless Driving Profits for Big Phone Carriers*, NEWS.COM, Oct. 30, 2006, http://news.com.com/Wireless+driving+profits+for+big+phone+carriers/2100-1036_3-6130688.html?tag=item (calling their wireless businesses the "saving grace" for phone companies in the face of increased competition from cable companies); *see* Tom Standage, *Your Television Is Ringing*, ECONOMIST, Oct. 14, 2006, at 4–5 ("During 2005, for example, the number of fixed telephone lines operated by Verizon, America's second-largest telecoms firm, declined by 8%."); *Swamp Things*, ECONOMIST, Sept. 23, 2006, at 71 ("Deutsche Telekom lost 1m fixed-line subscribers in the first half of the year, and of the 400,000 broadband lines it activated in the past 12 months, over 95% were for its rivals to resell.").

29. Cable providers control 60 percent of this market, and Vonage serves about 40 percent of it. *VoIP Subscriber Base Grows 21% in Second Quarter-Report*, AMERICA'S NETWORK, Aug. 10, 2006, http://www.americasnetwork.com/americasnetwork/article/articleDetail.jsp?id=364860. Devices are now being introduced that are more like PCs than phones, and allow developers to create their own applications—including, most obviously, Voice over Internet Protocol (VoIP) applications—without the permission of the mobile carriers. *See* Charlie Demerjian, *A Truly Open Linux Phone With GPS Debuts: Openmoko Opens Up the Airwaves*, INQUIRER, Nov. 7, 2006, http://www.theinquirer.net/default.aspx?article=35590.

30. Andrew Ross Sorkin & Katharine Q. Seelye, *Ex-Chief of G.E. May Want Newspaper*, N.Y. TIMES, Oct. 26, 2006, at C3.

31. Jeff Jarvis, *Time for the Free-Fall Press to Get Down to Earth*, GUARDIAN (London), Nov. 6, 2006, at 6.

32. *Id.*

33. Memorandum from John B. Horrigan, Assoc. Dir., Pew Internet & Am. Life Project, Politics Online (Aug. 2006), *available at* http://www.pewinternet.org/pdfs/PIP_Politics%20Aug06_Memo.pdf.

34. Memorandum from John B. Horrigan, Assoc. Dir., Pew Internet & Am. Life Project, Relief Donations After Hurricanes Katrina and Rita and Use of the Internet to Get Disaster News (Nov. 2005), *available at* http://www.pewinternet.org/pdfs/PIP_Katrina.DateMemo.pdf.

watch video online.[35] This is having a great effect on traditional one-to-many cinema and broadcasting communications modalities. The obvious example is YouTube, named Invention of the Year by *Time* magazine for 2006, and recently purchased by Google for more than $1.6 billion.[36] The access-equipped personal computer now makes it possible for anyone to be Benjamin Franklin in an era of digital video: providing access to the mail, printing newspapers, and broadcasting views. From the perspective of current users of the Internet, the boundaries between these old modalities are disappearing, and these modalities are becoming indistinguishable bit-based activities online.

But more than mere substitution is occurring. The important thing to users—the thing that is so attractive about the Internet—is that it connects them to other people (and groups of other people) in dynamic ways.[37] The Internet can do more than just transport bits and facilitate momentary person-to-person communications. It can also provide a substrate for new forms of social relationships created by many different decisions to pay attention.[38] The Internet, and the graphical networked screen, allow for the

35. Brian Morrissey, *Half of Internet Users Watch Video*, ADWEEK, Oct. 13, 2005, http://www.adweek.com/aw/iq_interactive/article_display.jsp?vnu_content_id=1001305999.

36. *Best Inventions 2006*, TIME, http://www.time.com/time/2006/techguide/bestinventions/inventions/youtube2.html (last visited Aug. 24, 2007) ("YouTube had tapped into something that appears on no business plan: the lonely, pressurized, pent-up video subconscious of America. Having started with a single video of a trip to the zoo in April of last year, YouTube now airs 100 million videos—and its users add 70,000 more—every day.").

37. *See, e.g.*, JOHN B. HORRIGAN, PEW INTERNET & AM. LIFE PROJECT, THE INTERNET AS A RESOURCE FOR NEWS AND INFORMATION ABOUT SCIENCE: THE CONVENIENCE OF GETTING SCIENTIFIC MATERIAL ON THE WEB OPENS DOORS TO BETTER ATTITUDES AND UNDERSTANDING OF SCIENCE 3 (2006), http://www.pewinternet.org/pdfs/PIP_Exploratorium_Science.pdf (reporting that 87 percent of online users have at one time used the Internet to carry out research on a scientific topic or concept); USC Press Release, *supra* note 26, at 1 ("Internet use is growing and evolving as an instrument for personal engagement—through blogs, personal Web sites, and online communities."); Memorandum from Amanda Lenhart & Mary Madden, Senior Research Specialists, Pew Internet & Am. Life Project, Social Networking Websites and Teens: An Overview 1 (Jan. 7, 2007), *available at* http://www.pewinternet.org/pdfs/PIP_SNS_Data_Memo_Jan_2007.pdf ("[M]ore than half . . . of all online American youths ages 12–17 use . . . online social networking sites. . . ."); Lee Rainee, Pew Internet & Am. Life Project, 28% of Online Americans Have Used the Internet to Tag Content (Jan. 31, 2007), http://www.pewinternet.org/pdfs/PIP_Tagging.pdf (almost a third of Internet users have tagged or categorized content online such as photos, news stories, or blog posts); *see also supra* note 12 (discussing the global social networking phenomenon).

38. Early examples of such social groups include World of Warcraft (WoW) guilds that meet outside the boundaries of the WoW application, and Second Life businesses that provide a living in real-world dollars, *see* Daniel Terdiman, *Business Consulting Comes to 'Second Life,'* NEWS.COM, Aug. 19, 2006, http://news.com.com/2100-1043_3-6107513.html, and innumerable online collaborating groups, *see, e.g.*, Michael J. Madison, *Social Software, Groups, and Governance*, 2006 MICH. ST. L. REV. 153, 158; Beth Simone Noveck, *A Democracy of Groups*, 10 FIRST MONDAY (Nov. 2005), http://firstmonday.org/issues/issue10_11/noveck/index.html; Posting of Penelope Tronk to Brazen Careerist, Consider a Virtual Company to Get a Flexible Work Life, http://blog.penelopetrunk.com/2006/10/01/consider-a-virtual-company-to-get-a-flexible-work-life (Oct. 1, 2006).

formation of persistent human connections and relationships that fail or flourish depending on whether people pay attention to them. The identity of the particular pipes or wires used to access the Internet means nothing to users—no more, at least, than the driver of a bus cares about the concrete used in building the road over which the bus travels.

In the first, and still dominant, generation of communications law, technical infrastructure and function were thought to be necessarily (and appropriately) associated. But the Internet, by disassociating infrastructure from function, threatens incumbent network-access providers (formerly known as telephony, cable, and wireless companies). Those that are threatened are fighting back because their economic stake in the first-generation approach is great.[39] The FCC, accustomed to the first-generation approach, is responding to the changes caused by the advent of the Internet by protecting old-style communications modalities even as they become indistinguishable online bits.[40]

B. The Incumbents Respond

The Internet was introduced into a sphere of communications that was completely controlled by predivestiture AT&T and, later, by the Bell telephone companies. The connectivity required to allow computers to send data to each other—the physical transport layer—was initially made up of phone lines.[41] The original engineers who designed the simple

39. This Article focuses on the defensive activities of incumbent network-access providers. A complete discussion of all the incumbent-protective activity with respect to the Internet is beyond the scope of this Article. *See* Susan P. Crawford, *The Ambulance, The Squad Car, and the Internet*, 21 BERKELEY TECH. L.J. 873 (2006) [hereinafter Crawford, *Ambulance*] (describing how law enforcement and telephone companies have struck back, aided by third-party vendors of services to law enforcement and telephone companies, as well as the FCC); Susan P. Crawford, *The Biology of the Broadcast Flag*, 25 HASTINGS COMM. & ENT. L.J. 603, 635–36 (2003) [hereinafter Crawford, *Biology*] (documenting the resurgence of the content industry); Crawford, *supra* note 15 (illustrating how telephone companies and cable companies fight back by using the image of the Romantic Builder). Although this Part deals briefly with newspapers and post offices, as well as telephones and broadcast networks, the remaining Parts focus entirely on Internet access provision.

40. The development of the FCC as an institution has arguably led to a path-dependent pattern of treating new technologies like revised versions of old ones. Regulatory convenience and bureaucratic necessity both drive in this direction. *See* DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE, AND ECONOMIC PERFORMANCE (THE POLITICAL ECONOMY OF INSTITUTIONS AND DECISIONS) (1990).

41. The principle behind the logical architecture of the Internet can be visualized as an hourglass standing flat on a table. The narrow neck itself is made up of the simple network protocols that represent precise agreements to do certain tasks in a certain way—to chunk information into packets of particular sizes, to label them in particular ways, and to send them

network protocols that created the layer independence that drove the development of the Internet did not spend much time thinking about connectivity. They just tried to find it. Larry Roberts, the director of the Advanced Research Projects Agency's (ARPA) networking project in the late 1960s, leased high-capacity phone lines from AT&T that linked the ARPA sites at all times.[42] Doug Engelbart, the Stanford Research Institute researcher who gave a world-changing demonstration of human-computer interaction in December 1968, leased telephone and video links to make interactive computing visible to his audience.[43] Connectivity was always an issue. Tim Berners-Lee, the inventor of the World Wide Web application, has written about going to a key conference in Texas (Hypertext '91) and trying to demonstrate the World Wide Web for the first time. He had to persuade a hotel manager to string a phone line into the hall outside the main meeting room, persuade a local university to give him dial-in service to the Internet, and get his Swiss modem to work with the American electrical system by taking the modem apart, borrowing a soldering gun, and wiring the modem directly to a power adapter.[44]

These engineers were using telephone lines for connectivity but not for the lines' embedded architecture. At the outset of the ARPA networking project, Larry Roberts deliberately rejected the telephone system's circuit-switched method of routing, which leads messages straight to their destination. Instead, he adopted an open-highway model of routing, in which computers at each site would locally route messages that they received by reading the digital addresses on each packet.[45] It is this packet-switching method that defines the modern-day Internet.[46] AT&T's engineers scoffed at the idea of packet switching when Paul Baran suggested it to them in 1964.[47] Baran remembers an engineer telling him, "Son, this is how a telephone

along their (indeterminate) way toward globally unique addresses. Below the neck are physical transport links (copper telephone lines, coaxial cable television wires, fiberoptic cable, satellite transmission channels), and above the neck are "applications," or programs that structure information so as to make it useful for humans and machines.

42. M. MITCHELL WALDROP, THE DREAM MACHINE 272 (2001).

43. *Id.* at 289. See Susan P. Crawford, *Internet Think*, 6 J. ON TELECOMM. & HIGH TECH L. 467, 479 (2007), for a description of this demonstration.

44. TIM BERNERS-LEE, WEAVING THE WEB: THE ORIGINAL DESIGN AND ULTIMATE DESTINY OF THE WORLD WIDE WEB, BY ITS INVENTOR 50–51 (1999).

45. Barry Leiner et al., *The Past and Future History of the Internet*, 40 COMM. ACM 102, 102–08 (1997).

46. *See* INFO. SCIS. INST., UNIV. OF S. CAL., INTERNET PROTOCOL: DARPA INTERNET PROGRAM PROTOCOL SPECIFICATION (1981), http://www.faqs.org/ftp/rfc/pdf/rfc791.txt.pdf.

47. WALDROP, *supra* note 42, at 277.

works," with heavy-handed patience.[48] AT&T wanted no part of the ARPA project and remained completely committed to circuit switching well into the 1980s.[49] Indeed, offered the chance to take over the ARPA Network (ARPANET) in the 1970s, AT&T formed a committee, studied the idea for months, and concluded (in Larry Robert's words) "that the packet technology was incompatible with the AT&T network."[50]

Exponential growth in Internet use initially happened in the United States because the telephone companies were required by common carriage regulation to provide flat-rate, dial-up access via a host of Internet service providers (ISPs)—and ISPs were exempt from access charges.[51] Those ISPs, in turn, made arrangements with backbone providers (also controlled by the telephone companies), which interconnect by means of "transit" and "peering" relationships with other network providers. People used modems to transmit digital data across ordinary analog copper voice lines at rates of (in the early days) 28.8 kilobytes per second.[52] Without the authority to extract consumer surplus through charging for particular uses of their telephone networks, the telephone companies were relegated to the role of commodity bit-transport providers. And without the need to ask for permission from network providers to launch new services or connect people in new ways, individuals and entrepreneurs went to work and Internet use skyrocketed.

Both telephony and cable companies have become anxious to ensure that they have the ability to "monetize" their Internet access networks by discriminating in favor of the voice and other applications they provide.[53] They do not want to be relegated to commodity-transport status, and so

48. *Id.*

49. *Id.* at 69; *see also* KATIE HAFNER & MATTHEW LYON, WHERE WIZARDS STAY UP LATE: THE ORIGINS OF THE INTERNET 52 (1996).

50. HAFNER & LYON, *supra* note 49, at 232.

51. *See* Jason Oxman, *The FCC and the Unregulation of the Internet* 3, 16 (FCC Office of Plans and Policy, Working Paper No. 31, 1999), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp31.pdf.

52. As Jason Oxman, Kevin Werbach, and many other scholars have pointed out, attachment of modems to telephone networks was only possible because of FCC insistence that the network providers permit them. *See id.* at 14; Werbach, *Breaking the Ice*, *supra* note 5, at 84 ("The consumer Internet could not have happened if users didn't have the ability to attach devices to their telephone lines that transformed the phone network into a channel for data communications."); Kevin Werbach, *The Federal Computer Commission*, 84 N.C. L. REV. 1, 19–20 (2005) [hereinafter Werbach, *Computer Commission*] (describing the key role of Part 68 regulation).

53. *See infra* Part III.C.

they are fighting back against the Internet on a number of fronts.[54] First, broadband DSL and cable modem Internet access providers succeeded during 2005 in persuading the FCC (and the U.S. Supreme Court) that broadband access is not a Title II service subject to nondiscrimination and tariffing rules.[55] Second, network providers have been working for the past eight years on standards that will enable them to preserve controls "over user signaling and usage-based billing, [and] also generate new revenue via deep packet inspection" of the packets passing through their routers.[56] Work on these standards is proceeding slowly, and so the telcos have lobbied for protective laws that would allow other proprietary forms of deep packet inspection to be put in place for Internet access that, in general, would protect their plans to offer broadband services that are *not* the "Internet" as either engineers or social historians of the Internet would describe it.[57]

This is standard incumbent behavior. As Paul Starr has noted, incumbents that dominate networks often try to stay ahead by exploiting their existing position rather than by innovating or adapting.[58] Telecommunications incumbents, in particular, tend to spend little money on research and

54. *See, e.g.*, John G. Waclawsky, *Where Do System Standards Go From Here*, BUS. COMM. REV., Mar. 2005, at 38, 40 ("Commoditization is the biggest fear haunting both telcos and equipment vendors.").

55. *See* Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Serv., 545 U.S. 967 (2005), *aff'g* Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, 17 F.C.C.R. 4798 (2002); *see also* Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, 20 F.C.C.R. 14,853 (2005) (reclassifying DSL from a common carrier provided telecommunications service to a largely unregulated information service). In March 2006, a Verizon petition requesting that high-capacity business broadband services be exempt from Title II common carriage regulations was granted through inaction on the part of the FCC. Press Release, FCC, Verizon Telephone Companies' Petition for Forbearance From Title II and *Computer Inquiry* Rules With Respect to Their Broadband Services Is Granted by Operation of Law, WC Docket No. 04-440 (Mar. 20, 2006), *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/DOC-264436A1.doc.

56. John G. Waclawsky, *IMS 101: What You Need to Know*, BUS. COMM. REV., June 2005, at 18. IMS stands for "IP (or Internet) Multimedia Subsystem." *Id.*

57. *See, e.g.*, Draft Barton-Dingell Bill, H.R., 109th Cong., (unnumbered and unintroduced in 2005), *available at* http://scrawford.net/courses/Draft_Barton-Dingell.pdf (defining "broadband Internet transmission services" and providing that there will be no nondiscrimination requirements in the context of special service plans, video services, protection of providers' networks, or the need to provide quality of service guarantees); Crawford, *supra* note 43 (describing the mindsets of engineers, telcos, and netizens); The Day the Internet Became Cable Television: Dec. 29, 2006, http://scrawford.blogware.com/blog/_archives/2006/12/29/2604993.html (Dec. 29, 2006, 11:49 EST) [hereinafter The Day the Internet] (describing "AT&T Yahoo! Highspeed Internet U-Verse Enabled" service as exempt from neutrality requirements).

58. PAUL STARR, THE CREATION OF THE MEDIA 193 (2005). As Doug Melamed has pointed out, participants in network industries have greater incentives to carry out predatory strategies that raise entry barriers. *See* A. Douglas Melamed, *Network Industries and Antitrust*, 23 HARV. J.L. & PUB. POL'Y 147, 149–52 (1999).

development and instead "invest more in politics than in technology—indeed, they are downright frightened by innovation, whose ultimate effects they can't control."[59] Indeed, the goal of these industries is to *reinstantiate* the connection between infrastructure and the sharply delimited "services" they provide, even as these "services" move into an online environment in which "services" are arbitrary distinctions between bits.[60]

C. The Scholars Respond at the Application Layer

These incumbent activities have not gone unnoticed by the academy. Since 1999, many key law review articles and several books, including Larry Lessig's *The Future of Ideas*[61] and Yochai Benkler's *The Wealth of Networks*,[62] have explored the conflict between incumbent access providers and the Internet. Internet scholars have been quick to reveal the monopolistic tendencies of the carriers and have pointed out that the Internet's entrepreneurial energy is greatly facilitated by the end-to-end principle.[63] Mark Lemley and Larry Lessig have noted that the end-to-end principle was central to the Internet's success because "[it] expands the competitive horizon by enabling a wider variety of applications to connect to and to use the network."[64] Tim Wu has argued that Internet "openists" embrace the end-to-end principle because it "puts as many players in the contest as possible to ensure the true champion emerges."[65] Kevin Werbach has pointed out that the end-to-end principle allows a "new service [to] be deployed simply by connecting two client devices capable of talking to one another, without requiring any approval or technical configuration

59. Wade Roush, *Net Neutrality: Lessons From the Past*, MIT TECH. REV., Aug. 3, 2006, http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=social&id=17245); *see also* Waclawsky, *supra* note 54, at 41 ("The truth is that the incumbents are struggling to maintain their legacy, monopoly-based telephony business model, while they reinvent themselves as wireless, data and TV services providers under the umbrella of monopoly protection. It's obvious: They want to own it all!").

60. *See infra* note 186 and accompanying text (concerning quadruple-play bundles).

61. LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMON IN A CONNECTED WORLD (2001).

62. BENKLER, *supra* note 25.

63. *See, e.g.*, LESSIG, *supra* note 61, at 34–35; Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 562 (2000); Lemley & Lessig, *supra* note 5, at 970; Timothy Wu, *Application-Centered Internet Analysis*, 85 VA. L. REV. 1163 (1999).

64. Lemley & Lessig, *supra* note 5, at 931; *see also* David P. Reed et al., Commentary, *Active Networking and End-to-End Arguments*, IEEE NETWORK, May–June 1998, at 69, 69–71 (1998).

65. Wu, *User's Guide*, *supra* note 5, at 74.

inside the network."[66] All of these writers have strenuously argued that innovation at the application layer will be facilitated by continuing to support the end-to-end principle.

This focus on the end-to-end principle has led to discussions of tailoring Internet regulation to the various layers of the Internet protocol stack so that, for example, transport (arguably insufficiently competitive and requiring continued common carriage treatment) could be treated differently from applications (arguably wildly competitive) by regulators.[67] A central article written by Richard Whitt in 2004 advocated regulatory intervention at the physical layer.[68] Whitt's article provides a useful distillation of the application-layer perspective. He pointed out that the silo approach of regulation does not map to what is occurring online, and that the resulting clash is creating regulatory gridlock.[69] He stated that "[b]y tracking the architectural model of the Internet—with IP at the center—we can develop a powerful analytical tool providing granular market analysis within each layer, which in turn puts public policy on a more sure empirical footing."[70] He approvingly recites the history of the development of the TCP/IP protocol, and notes that "[t]he resulting explosion of innovative applications on the Internet likely would never have happened but for the incorporation of the end-to-end design into the network."[71]

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66. Werbach, *Layered*, *supra* note 5, at 58.

67. Douglas Sicker, now an assistant professor in computer science and telecommunications at the University of Colorado at Boulder, has noted that he originated the discussion of layered approaches to policy in an unpublished paper written in 1999 with Joshua Mindel and Cameron Cooper, while Sicker was at the FCC. *See* Douglas C. Sicker & Lisa Blumensaadt, *Misunderstanding the Layered Model(s)*, 4 J. ON TELECOMM. & HIGH TECH. L. 299, 300 n.3 (2006) (citing Douglas C. Sicker et al., *The Internet Connection Conundrum* (FCC Office of Plans and Policy, Working Paper, 1999)). As stated in the paper:

> [Sicker's] goal was to move toward technical neutrality and therefore, consistent treatment. This could be achieved through regulation based on the service, rather than of the network infrastructure that carries the service. An additional objective was to define a model where the application layer could continue to innovate by avoiding unintentional regulation.

Id. at 302. Sicker's unpublished paper appears to have been the original application-layer academic perspective. Many more academics have followed in his footsteps. *See* sources cited *supra* note 5. Arguably, the FCC started the entire layer-regulatory discussion by treating "telecommunications services" and "information services" differently in the Computer Inquiries, and later in the 1996 Act. Whitt, *supra* note 5, at 600.

68. Whitt, *supra* note 5, at 592 ("[T]he [MCI] Network Layers Model targets the lower network layers for discrete regulation based on the existence of significant market power, rather than legacy service or industry labels. This framework concomitantly fosters maximum innovation by leaving otherwise competitive content and applications markets unfettered by regulation.").

69. *Id.* at 590–91.

70. *Id.* at 591–92.

71. *Id.* at 605.

Whitt's fundamental claim was that the applications (and "content") marketplaces are competitive and can be left unregulated.[72] He was unquestionably right, and his seminal article (along with work by Werbach and Wu and others) has been cited and discussed widely.[73] But the economic and cultural justifications that he provided for the layers approach were limited to two: (1) the explosive innovation that competition among applications would produce; and (2) the mapping between the "actual" architecture of the Internet and the regulatory approach to be taken to it.[74] Both of these justifications have proven to be easy targets for anti-openness and anti-neutrality advocates, and may not reflect the true human value of the Internet's architecture.

D. The Incumbents Adopt the Scholars' Layered Approach

The scholars' particular version of a layered approach to Internet regulation has been coopted by the carriers, who have been quick to depict their industry detractors as well-funded providers of "services" that free-ride on the carriers' networks. One man's explosive innovation is another man's missed opportunity, and the incumbent network providers have complained that it is unfair for rich companies like Google (and, implicitly, less rich providers of applications) to free-ride on their pipes, providing services without paying. Indeed, they have transformed the argument that competition among applications will lead to innovation into one about fairness and equity: If they have done all the work to invest in their networks, why should others be allowed to take advantage of this investment without ensuring the network owner some share of their revenues? In the words of Ivan Seidenberg, chief executive officer of Verizon, the Bells "'have to make sure that [application providers] don't sit on our network

72. *Id.* at 592.

73. A group called the New Millennium Research Council sponsored an entire collection of essays criticizing Richard Whitt's article. WAYNE T. BROUGH ET AL., FREE RIDE: DEFICIENCIES OF THE MCI 'LAYERS' POLICY MODEL AND THE NEED FOR PRINCIPLES THAT ENCOURAGE COMPETITION IN THE NEW IP WORLD (2004), http://newmillenniumresearch.org/news/071304_report.pdf. Other layered approaches include Douglas C. Sicker & Joshua L. Mindel, *Refinements of a Layered Model for Telecommunications Policy*, 1 J. ON TELECOMM. & HIGH TECH. L. 69 (2002), and Tim Wu, *Application-Centered Internet Analysis*, 85 VA. L. REV. 1163 (1999).

74. Whitt, *supra* note 5, at 615–21. Many other writers have made this same applications "innovation" argument. *See, e.g.*, PATRICIA L. BELLIA ET AL., CYBERLAW: PROBLEMS OF POLICY AND JURISPRUDENCE IN THE INFORMATION AGE 19 (2007) ("End-to-end design has profound implications for the Internet's growth and utilization. It grants the maximum possible autonomy to applications running 'on top' of the basic network protocols themselves, giving application-writers the freedom to achieve their goals in whatever manner they see fit, and to innovate whenever and however they like. . . . Innovation comes in the form of new applications . . . .").

and chew up bandwidth. We need to pay for the pipe.'"[75] Similarly, Verizon deputy general counsel John Thorne has said that Google is "enjoying a free lunch that should, by any rational account, be the lunch of the facilities providers."[76]

Network neutrality[77] supporters and detractors are both using the same application-layer perspective. For example, Wu (a well-known supporter of neutrality) has made the point that "the attractiveness of broadband service is a function of the applications it offers the consumer."[78] In two recent articles, he has presented his view that the goal of regulation of Internet access should be to promote the availability of the best products or applications for end-user use.[79] His assumptions along these lines—the Internet as a content-delivery mechanism—are strikingly similar to those of Christopher Yoo (a well-known opponent of neutrality), who has focused on facilitating the development of vertically integrated networks.[80]

Negative effects of network neutrality, for Yoo, would include narrowing of "consumer choice" and disfavoring applications that require quality of service guarantees.[81] Yoo sees broadband access providers as the "retail" stage in a chain of distribution, taking "content" manufactured by companies and getting it to consumers.[82] He has suggested that a vertical chain of production "will

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75. Paul Kapustka, *Verizon Says Google, Microsoft Should Pay for Internet Apps*, INFO. WK., Jan. 5, 2006, http://www.informationweek.com/showArticle.jhtml;jsessionid=2HB44T45OJ230QSNDLOSKH0CJUNN2JVN?articleID=175801854&queryText=Paul+Kapustka (quoting Ivan Seidenberg); *see also* Dionne Searcey & Amy Schatz, *Phone Companies Set Off a Battle Over Internet Fees*, WALL ST. J., Jan. 6, 2006, at A1 (reporting a slightly different version of Seidenberg's remarks).

76. Arshad Mohammed, *Verizon Executive Calls for End to Google's "Free Lunch,"* WASH. POST, Feb. 7, 2006, at D1.

77. "Network neutrality," a term coined by Tim Wu, *see* Wu, *Broadband Discrimination*, *supra* note 5, at 145, generally means nondiscrimination by network providers against (or in favor of) the transport of particular packets, *see infra* Part III.C.

78. Wu, *Broadband Discrimination*, *supra* note 5, at 155.

79. Wu, *User's Guide*, *supra* note 5; Wu, *Broadband Discrimination*, *supra* note 5.

80. Yoo, *Beyond*, *supra* note 10, at 35 ("[S]tandardization [of protocols] is an equilibrium only if the utility created by network economic effects exceeds the utility created by network diversity for both groups.").

81. *Id.* at 12, 34–35.

82. *Id.* at 14. Christopher Yoo's devotion to the "chain of production" model runs through *Beyond Network Neutrality*. Yoo, *Beyond*, *supra* note 10. He suggested that when products are differentiated, consumers can "obtain goods that fit better with their ideal preferences." *Id.* at 20. Standardization (as with the TCP/IP protocol suite) cuts against differentiation, and may cause consumer welfare loss. His idea is that a differentiated firm can create new equilibria if it is allowed to compete "by tailoring its network towards services that a subsegment of the market values particularly highly." *Id.* at 29. The result is "an equilibrium in which multiple players co-exist despite the presence of unexhausted economies of scale." *Id.* at 30. Therefore, Yoo believes that allowing the use of nonstandard protocols and exclusive deals would facilitate competition in the last mile.

only be efficient if every link is competitive."[83] Yoo's underlying assumption is that the Internet is like a newspaper or a magazine over which centralized publishers should have control; he says that "[t]he fact that telecommunications networks now serve as the conduit for mass communications and not just person-to-person communications greatly expands the justification for allowing them to exercise editorial control over the information they convey."[84] Common carriage precedents are therefore, in Yoo's view, completely inapposite—he thinks the Internet is "conveying media content."[85] Yoo's fundamental assumption is that end users of the Internet are purchasing a product from the end of a chain of distribution.[86]

Both Wu, with his narrow focus on application innovation, and Yoo, with his absorption with the perquisites of network managers and the management of supply chains,[87] largely ignore human communications. Both of them could be writing about train networks into which it is possible to introduce new models of cars. For Wu, cutting off innovation in car design would be a negative economic step; for Yoo, allowing track or bridge owners to vertically integrate and control the design of cars would be a positive move that would deliver customers safely to their doorsteps. Or these writers could be discussing broadcast networks on which it is possible to introduce new shows without the permission of the network owner. Wu, again, would want Darwinian competition among new shows to flourish, while Yoo would want the network providers to be able to control content so as to encourage competition among networks.

Yoo and Wu take different approaches to the regulation of Internet access. Yoo claims that there is "congestion" that will only be resolved by lifting all regulatory requirements from potentially competing network providers,[88] while Wu wants a nondiscrimination rule to be put in place that would allow discrimination between different "services," but would not allow discrimination between providers of the same "service."[89] Both of

83. *Id.* at 15.

84. *Id.* at 47–48.

85. *Id.* at 45. In Yoo's words, "[w]hen content is involved, policymakers have long recognized the importance of giving the conduit editorial control over the information being conveyed." *Id.*

86. *Id.* at 38. Yoo suggested that these end users, like purchasers of any product, should expect "periodic changes in terms under which they are able to obtain access to the network." *Id.*

87. *See* Yoo, *Beyond*, *supra* note 10; Yoo, *Economics of Congestion*, *supra* note 10.

88. *See* Yoo, *Economics of Congestion*, *supra* note 10.

89. *See* Wu, *Telecommunications Law*, *supra* note 9, at 42 ("[T]he discrimination undertaken must be related to the content in question, and not the source of the information. For example, an internet carrier might decide to speed up the delivery of all video packets on the network, a difference in treatment driven by the differences in the underlying information type.

them, however, see the human-communications layer of the Internet as merely substituting for old models of communications products that were necessarily intertwined with their infrastructures, providing "content delivery" and other "services."

The application-layer perspective has troubling implications. The assumption that online activities can be neatly categorized into simply defined "services" leads easily (given the network providers' claims that it is unfair to let applications from other providers "ride on their pipes") to a world that reserves great discretion in the incumbent network providers and allows them to discriminate against uses that they dislike for their own business reasons—including peer-to-peer, BitTorrent, and other new forms of distributed file sharing as well as yet-to-be invented forms of interactions.[90] Arguments that application-layer competition is the chief social good to be achieved by network neutrality thus can easily be morphed into arguments that support the network providers' worldview.

Also helpful to the network providers is the faith of some scholars in the original, almost religiously important initial architecture of the Internet, and the appropriate neatness of mapping regulation to its structure. On this view, we should regulate transport differently from other Internet layers *because* that is the way the Internet has traditionally worked.

The architecture of the Internet could always change; there is an is-ought fallacy, as Lessig has noted, in assuming that its pure state will stay in place.[91] For this reason, claims that regulation should be mapped to this structure are easy to knock down. Academic supporters of the network providers' views have pointed out that unchanging Internet network architecture,

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But what the carrier may not do under this approach is to choose favorites, to treat similarly situated packets differently."); *see also* Tim Wu, *AT&T: The Mechanics of the Deal*, SAVE THE INTERNET.COM, http://www.savetheinternet.com/=wu (last visited Sept. 1, 2007) (supporting the language of the recent AT&T and BellSouth merger, stating, "[i]nterestingly, the agreement does not prevent AT&T from treating different media carried on the Internet differently, so long as the carrier does not discriminate between who is providing the content. AT&T, under this agreement, may speed all the Internet video traffic on its network (to compete, for example, with cable). But it cannot pick and choose whose video traffic to speed up. In short, AT&T must treat like traffic alike—that is the essence of the agreement. 'Like-treatment' is not a pure ban on bit-discrimination, and the theory behind the 'like-treatment' approach merits discussion. It is, on the one hand, meant to preserve a basic parity and meritocracy as between competing Internet application and content providers. For example, the video providers Yahoo-video and YouTube must be accorded like treatment"). This is a clear statement of the application-layer perspective.

90. For a list of Internet service providers (ISPs) around the world that constrain BitTorrent and other peer-to-peer traffic, see Azureuswiki.com, Bad ISP's, http://www.azureuswiki.com/index.php/Bad_ISPs (last visited July 21, 2007).

91. LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE 24–25 (1999).

if frozen into place, may discriminate against network providers' applications in the future.[92] Past Internet visionaries have argued that the Internet is broken and that we must start again.[93] It is true that the explosive growth of the Internet can be attributed to the way it now works, but there need to be better reasons for a particular form of regulation of the Internet than merely the existing Internet's past success. Most centrally, however, the application-layer perspective misses what is most important about online communications: complex human relationships.

II. THE COMMUNICATIONS CONCEPTION OF COMMUNICATIONS LAW

At the moment, federal telecommunications policy seems to have no coherent set of goals. We have complex, separate, and wildly outdated regulatory structures covering telephony, broadcasting, cable television, and satellites.[94] Although there is arguably no express delegation by Congress to the FCC to regulate the Internet,[95] the FCC sometimes imposes heavy-handed rules (E911 and CALEA for VoIP),[96] and sometimes claims that its chief goal is to be deregulatory.[97] The various policy aims identified by FCC watchers are certainly multiple and sometimes in conflict.[98]

92. *See, e.g.*, Adam D. Thierer, *"Net Neutrality": Digital Discrimination or Regulatory Gamesmanship in Cyberspace?*, 507 CATO INST. POL'Y ANALYSIS 1 (2004), *available at* http://www.cato.org/pubs/pas/pa507.pdf (advocating for vertical integration); Yoo, *Beyond*, *supra* note 10, at 8 (advocating for vertical integration, claiming that TCP/IP "is poorly suited to applications that are less tolerant of variations in throughput rates, such as streaming media and VoIP").

93. Robert Kahn, co-inventor of TCP/IP, has argued against net neutrality. Andrew Orlowski, *Father of Internet Warns Against Net Neutrality*, REGISTER, Jan. 18, 2007, http://www.theregister.com/2007/01/18/kahn_net_neutrality_warning; *see also* David Talbot, *The Internet Is Broken*, MIT TECH. REV., Dec. 2005–Jan. 2006, at 63 (documenting an interview with David Clark, Internet elder statesman and onetime chief protocol architect).

94. *See, e.g.*, Philip J. Weiser, *Law and Information Platforms*, 1 J. ON TELECOMM. & HIGH TECH L. 1, 4–5 (2002); Whitt, *supra* note 5.

95. *See* Susan P. Crawford, *Shortness of Vision: Regulatory Ambition in the Digital Age*, 74 FORDHAM L. REV. 695, 698 (2005); James B. Speta, *Deregulating Telecommunications in Internet Time*, 61 WASH. & LEE L. REV. 1063 (2004).

96. Crawford, *Ambulance*, *supra* note 39, at 893–94. "E911" refers to requiring telephone service providers to give access to emergency services by automatically forwarding location information from any caller who dials 911. *Id.* "CALEA" stands for the Communications Assistance to Law Enforcement Act, which generally requires communications infrastructure providers to design their systems so as to be easily tappable by law enforcement authorities. *Id.*

97. *Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities*, 20 F.C.C.R. 14,853, 14,855–56 (2005) (reclassifying DSL from a common carrier providing telecommunications service to a largely unregulated information service).

98. *See, e.g.*, Nakahata, *supra* note 26, at 98–100 (identifying five policy aims: (1) limiting market power; (2) protecting consumers from abusive practices; (3) promoting a multiplicity of

Congress spasmodically takes up indecent speech, gambling, spam, spyware, and privacy, among other online topics, without, it seems, an underlying theory that would help prioritize or rationalize Internet regulation. Even without a clear goal, these regulatory actions affect outcomes and create controversies about which economic and social benefits should be preferred or can be attained. We are stumbling forward, tinkering blindly with the greatest value-creation system we have ever seen.

An accurate description of the reality of the Internet is generally absent from current communications law theory. The application-layer perspective described in Part I does not capture what is valuable about the Internet to people. As users of the Internet, we know that its transformative effect on economic and cultural life in this country cannot fully be explained by competition among different applications. If we adopt a changed perspective on the Internet that takes as central the evolution of human connections and relationships online, economic growth theory can assist in explaining the impact of the Internet, and can help us create an optimal regulatory structure for the future.

A. Economic Growth Theory

Traditional economics implicitly assumes that the economy as a whole is a closed system that will eventually reach a market equilibrium. It predefines the configuration space by assuming perfect competition, constant returns, and rational behavior. On this view, the most efficient allocation of resources is the best ("optimal") one because it will maximize overall wealth for society. Markets can regulate themselves, led by an "invisible hand" to price commodities at their natural price—"whatever may be the obstacles which hinder [the prices of all commodities] in settling in this center of repose and continuance, they are constantly tending towards it."[99] (This is a description of negative, thermostat-like feedback, dampening attempts of any one manufacturer to raise his prices above the "natural" level.[100]) Given increasing population growth and limited resources of land, labor, and capital, mankind will always be running up against limits.[101]

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speakers; (4) promoting universal service; and (5) promoting miscellaneous societal objectives, including wiretap capability, 911 service, and disabilities access).

99. WARSH, *supra* note 16, at 44 (quoting ADAM SMITH, WEALTH OF NATIONS 165 (Edwin Cannan ed., Modern Library 1937) (1776)).

100. *See infra* note 134 (describing "feedback").

101. *See* Vernon W. Ruttan, *Can Economic Growth Be Sustained? A Post-Malthusian Perspective*, 28 POPULATION & DEV. REV. 1, 1 (2002) ("In the classical model of Malthus and Ricardo, growth is constrained by an inelastic supply of natural resources.").

These diminishing returns ensure that firms cannot grow excessively large, permitting the invisible hand to do its work in a competitive marketplace. Accordingly, the steady state is the optimal goal, just sufficient to survive efficiently in an environment of scarcity and diminishing returns.[102]

To cope with the arrival of monopoly industries charging prices above the "natural" price, economists developed the idea of "externalities," or "spillovers" that benefit (or harm) others without money changing hands.[103] These externalities would somehow loosen the control of monopolists—their competitors would find out their secrets, or come up with neighboring ideas, because ideas were seen as completely nonexcludable—and all would sink toward equilibrium and perfect competition once again. On the view of an equilibrium economist, ideas are exogenous to this system. To cope with the arrival of depressions, neoclassical economists developed the idea that markets could not always be counted on to operate perfectly and might need stimulation by government, creating artificial demand or supply to smooth out business cycle disruptions and move toward a steady state.[104] They developed abstractions and mathematical demonstrations to fill out their assertion that innovation (or investments) by autonomous economic agents did not really matter.

Economists have noticed for a long time that the rate of economic growth has been accelerating in industrial nations, not slowing down as the law of diminishing returns might predict.[105] Robert Solow's breakthrough work fifty years ago showed that "technological progress" allows economies to add to their outputs without the addition of more

102. In perhaps the clearest expression of this competition-obsessed view of economic growth, Robert Solow is said to have asserted in 1956 that "changes in the savings rate have no lasting effect on the rate of growth of output per worker." Romer, *supra* note 16, at 2 (describing Robert M. Solow, *A Contribution to the Theory of Economic Growth*, 70 Q.J. OF ECON. 65 (1956)). Solow's work implied that private firms and other actors simply did not devote resources to research and development and that, even if they did, economics would be unchanged if these actors had incentives to do so. *Id.* at 7–8.

103. Brett Frischmann and Mark Lemley have noted that the term "externalities" has been a "contested concept in economics for many years." Frischmann & Lemley, *supra* note 5, at 262. They have defined externalities as "benefits (costs) realized by one person as a result of another person's activity without payment (compensation)." *Id.*

104. David Warsh tells the story of John Maynard Keynes's impact in WARSH, *supra* note 16, at 88–89.

105. Americans today are many times richer than they were in 1900. J. Bradford DeLong, *Cornucopia: The Pace of Economic Growth in the Twentieth Century* 10–13 (Nat'l Bureau of Econ. Research, Working Paper No. 7602, 2000), *available at* http://econ161.berkeley.edu/TCEH/2000/TCEH_2.html.

labor and capital.[106] But Solow called this key technological-change element, responsible for 80 percent or more of economic growth, the "residual," and dealt with it as an unexplained exogenous influence.[107]

Beginning in the mid-1980s, Paul Romer seized the challenge of transforming the "residual" of technological change into an endogenous element in his model explaining economic growth.[108] Since then, Romer has pointed out in a series of papers that (1) nonrival but (2) partially excludable ideas can prompt increasing returns when they are (3) exploited on a large scale.[109] We are beginning to understand that the growth in social wealth per capita, in terms of real income per person over the last millennium, is deeply related to the increase in diversity of new ideas that has occurred over the same time.[110]

1. Nonrival Ideas

Economic growth happens whenever people are able to take resources, or inputs, and arrange them in ways that are more valuable. New ways of doing things are, in a sense, new recipes for these arrangements. In the words of Paul Romer, "[e]conomic growth arises from the discovery of new recipes [ideas] and the transformation of things from low to

106. Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 REV. ECON. & STAT. 312 (1957).

107. WARSH, *supra* note 16, at 146–47.

108. *Id.*

109. *See, e.g.*, Romer, *Endogenous*, *supra* note 16, at 71–72 ("Technological change. . . lies at the heart of economic growth. . . . Technological change provides the incentive for continued capital accumulation, and together, capital accumulation and technological change account for much of the increase in output per hour worked.").

110. *See* Paul Romer, *Why, Indeed, in America?: Theory, History, and the Origins of Modern Economic Growth* (Nat'l Bureau of Econ. Res., Working Paper No. 5443, 1996), *available at* http://www.nber.org/papers/w5443.v5.pdf; ERIC D. BEINHOCKER, THE ORIGIN OF WEALTH: EVOLUTION, COMPLEXITY, AND THE RADICAL REMAKING OF ECONOMICS 215 (2006). This makes sense in a deep way. In the beginning, the universe was simple, and now it is vastly complex and full of novel structures. STUART A. KAUFFMANN, INVESTIGATIONS 143 (2000) ("[T]he . . . diversity of species in the biosphere has . . . increased over the last 4.8 billion years . . . [while] the diversity of ways of making a living has increased dramatically over the past 3 million years."); *cf.* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 81–87 (Harper & Row 1975) (1942) (listing mechanisms that trigger economic growth). Some have criticized new growth theory for being nothing more than a market imperfections theory of technological change. *See* Ben Fine, *Endogenous Growth Theory: A Critical Assessment*, 24 CAMBRIDGE J. ECON. 245, 249 (2000) ("This is a simple result of the externalities or socially increasing returns to scale involved. Generally, it follows that the competitive outcome induces a level of saving that is below the optimum, since private agents take no account of the knock-on effects of corresponding levels of investment. Once there is an endogenous growth mechanism in place, however, attention can focus on any market imperfection that affects the saving rate and, hence, long-run prospects.").

high-value configurations."[111] In the last two hundred years or so, technological progress and concomitant economic growth have been particularly dramatic.[112] Romer and others have suggested that this may be happening because more people and more (and better) institutions are out looking for new ideas and new technologies.[113] The freedom to look for these ideas is fundamental to economic growth.[114] Bad ideas really do lead to good ideas, in that the diversity of ideas as a whole allows exploration to discover what is useful.[115] Ideas, or the stock of knowledge, can grow without bound on a per-person basis, and can prompt a better quality of life for everyone.

Thus, economic growth comes from better recipes—better new ideas for dealing with finite resources. New ideas are nonrival in that they can be used by anyone without diminishing their value. And new nonrival ideas that lead to goods and services being introduced on a broad scale trigger

111. Romer, *supra* note 110, at 6.

112. DeLong, *supra* note 105, at 2–4.

113. Ronald Bailey, *Post-Scarcity Prophet: Economist Paul Romer on Growth, Technological Change, and an Unlimited Human Future*, REASON, Dec. 2001, at 53, *available at* http://www.reason.com/news/show/28243.html.

114. *Id.* Economic growth theory was inspired, in part, by Joseph Schumpeter's insistence that "creative destruction" is "[t]he fundamental impulse that sets and keeps the capitalist engine in motion." SCHUMPETER, *supra* note 110, at 82–85; *see also* CLAYTON M. CHRISTENSEN, THE INNOVATOR'S DILEMMA (2001).

115. *See* Paul Romer, *Should the Government Subsidize Supply or Demand in the Market for Scientists and Engineers?* 14 (Nat'l Bureau of Econ. Research, Working Paper No. W7723, 2000), *available at* http://ssrn.com/abstract=230163 ("To speed up growth, it is not enough to increase *spending* on research and development. Instead, an economy must increase the total quantity of inputs that go into the process of research and development."). The "diversity" argued for in this Article is different from the FCC's version of "diversity." *See* Metro Broad., Inc. v. FCC, 497 U.S. 547, 566–67 (1990) ("'[B]ecause of the scarcity of [electromagnetic] frequencies, the Government is permitted to put restraints on licensees in favor of others whose views should be expressed on this unique medium.'" (second alteration in original) (quoting Red Lion Broad. Co. v. FCC, 395 U.S. 367, 390 (1969))); 1998 Biennial Regulatory Review, 13 F.C.C.R. 11,276 (1998) ("For more than a half century, the Commission's regulation of broadcast service has been guided by the goals of promoting competition and diversity."). The kind of diversity suggested in this Article is not affirmative content-based diversity—"the fostering of programming that reflects minority viewpoints or appeals to minority tastes." Lutheran Church—Mo. Synod v. FCC, 141 F.3d 344, 354 (D.C. Cir. 1998) (rejecting as unconstitutional FCC equal employment opportunity regulations as not serving a compelling interest and therefore not capable of surviving strict scrutiny review). Rather, the diversity encouraged by this Article is the difference that comes from ensuring that people with a range of experiences, training, perspectives, predictive models, interpretations, and tools are online. This kind of diversity—cognitive diversity—can be facilitated by simply ensuring that the most people possible have Internet access. *See infra* Part III.B. For a fascinating exploration of diversity, see SCOTT E. PAGE, THE DIFFERENCE: HOW THE POWER OF DIVERSITY CREATES BETTER GROUPS, FIRMS, SCHOOLS, AND SOCIETIES 13 (2007) ("Diverse perspectives and tools enable collections of people to find more and better solutions and contribute to overall productivity." (italics omitted)).

increasing returns (lower costs and higher profits based on the use of finite resources), and push economies onward. In Romer's words, "it is ideas, not objects, that poor countries lack."[116]

2. Specialization and Scale

The United States experienced explosive economic growth in the nineteenth century because it had abundant resources, a national transportation system, and a large population.[117] Market size increases incentives for invention by supporting the provision of many specialized inputs, and cheap transportation helps inventors make their new ideas available. With technological convergence pushing toward the use of standard machines to produce many kinds of goods, an integrated market, and a large group of people to sell to, the United States took the technological lead over the rest of the world, and held it through much of the twentieth century.[118] Technological change and new ideas introduced in the United States caused this country to surge ahead of Britain in terms of economic growth.[119]

The new growth theorists put scale in the foreground as a fundamental aspect of modern economic understanding, because larger markets induce the creation of more new ideas and hence faster growth.[120] The human communications made possible by the Internet have the greatest scale of any communications modality we have known thus far.

3. The United States and Economic Growth

Nations have different economic growth rates. From 1950 to 2000, growth in income per person in the United States was about 2.3 percent per year, but the growth rate in China was almost 6 percent per year—meaning that income per capita in China was doubling every twelve years.[121] India, meanwhile, is quickly becoming a third pillar of the world economy,

116. Paul M. Romer, *Economic Growth*, *in* THE CONCISE ENCYCLOPEDIA OF ECONOMICS, http://www.econlib.org/Library/Enc/EconomicGrowth.html (last visited Sept. 27, 2007) [hereinafter Romer, *Growth*]. Much of the value to society of any given new idea is not captured by its individual inventor. Frischmann & Lemley, *supra* note 5, at 259; Romer, *Endogenous*, *supra* note 16, at 22.

117. WARSH, *supra* note 16, at 37.

118. *See* Richard R. Nelson & Gavin Wright, *The Rise and Fall of American Technological Leadership: The Postwar Era in Historical Perspective*, 30 J. ECON. LITERATURE 1931 (1992).

119. Paul Romer estimated that U.S. income per capita grew at a rate of 1.8 percent per year from 1870 to 1992; in Britain, it grew at a rate of 1.3 percent per year. Romer, *supra* note 115, at 9.

120. Romer, *Endogenous*, *supra* note 16, at 2.

121. Romer, *Growth*, *supra* note 116.

along with China and the United States, as its economy has been growing at an average of 5.7 percent yearly since 1979.[122] Some sources predict that India's economy will continue to grow at the same rate for the next fifteen years.[123] This year, the growth rate in Europe is estimated to be 2.6 percent, and the United States is said to be experiencing a "soft landing" in 2007, meaning less economic growth.[124] No nation remains truly innovative for very long, and the torch of technological process and economic growth may have been passed to Asia.

The average rate of economic growth (growth in value, not growth in the number of objects or people) is extremely important for an economy, and encouraging income to increase more quickly in a shorter amount of time is arguably the central economic policy task of any nation.[125] If the rate of economic growth in the United States over the next forty-five years or so were to increase by 0.5 percent per year, it could "resolve all of the budget difficulties associated with the aging of the Baby Boom generation, and still leave ample resources for dealing with any number of other pressing social problems."[126] Better growth policy could have implications for the standard of living of all Americans that are so enormous that they are hard to understand.

The problem for the United States is that it will not be able to stay ahead in terms of its economic growth rate by importing ideas from elsewhere. Given its technological history, the United States is still a place from which new ideas come. (Until recently, by contrast, India's economic growth stemmed from simply opening itself up to new ideas from other countries.[127]) This means that the United States must strongly support discovering new ideas within its own borders. Romer's work, in particular, supports investments in infrastructure that are likely to produce new ideas: graduate education, research

122. Economywatch.com, India Economy Overview, http://www.economywatch.com/indianeconomy/indian-economy-overview.html (last visited July 23, 2007).

123. ECONOMIST INTELLIGENCE UNIT, FORESIGHT 2020: ECONOMIC, INDUSTRY AND CORPORATE TRENDS 9 (2006), http://www.eiu.com/site_info.asp?info_name=eiu_Cisco_Foresight_2020.

124. Steven Jen, *Re-rating Euroland*, MORGAN STANLEY GLOBAL ECON. F., Nov. 24, 2006, http://www.morganstanley.com/views/gef/archive/2006/20061124-Fri.html.

125. Amartya Sen, and others, have argued persuasively that income enhancement should not be the sole goal of economic policy. *See generally* AMARTYA SEN, DEVELOPMENT AS FREEDOM (2000) (arguing for enhancing capabilities rather than only income). My thesis here is that growth in ideas, productivity, and engagement can enhance capabilities as well as income. Our society is one in which the ability to manipulate and visualize information, and the ability to take advantage of new ideas about this manipulation, are central.

126. Romer, *supra* note 115, at 11–12.

127. Romer, *Growth*, *supra* note 116.

subsidies, and engagement with other economies.[128] As a country, we are in urgent need of meta-ideas about the generation of new ideas.[129]

B. Growth Theory and the Internet

Thus, in recent years, traditional economics has had to open its doors to work that rigorously examines the sources of increased productivity and focuses on the centrality of new ideas to economic growth.[130] This research has transformed economics from a dismal science preoccupied with the scarcity of land, labor, and capital (and concerned with the diminishing returns these resources will generate as markets perfect themselves) into a field that spends much of its time focusing on abundance, increasing returns, and the power of new ideas.

The work of growth theorists reveals that choices made by governments to stimulate the production of new ideas can have a significant effect on economic growth.[131] Compared to a country with restraints on idea-generation diversity, a country supporting free trade in ideas should tend to have a greater amount of resources devoted to idea generation and thus a higher rate of economic growth.[132]

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128. *See* Romer, *supra* note 115, at 1–7; *see also* Thomas L. Friedman, *Learning to Keep Learning*, N.Y. TIMES, Dec. 13, 2006, at A33 (supporting a report "titled 'Tough Choices or Tough Times,' which proposes a radical overhaul of the U.S. education system, with one goal in mind: producing more workers—from the U.P.S. driver to the software engineer—who can think creatively"); *The Growth of Growth Theory*, ECONOMIST, May 18, 2006, at 80.

129. Romer, *supra* note 115, at 4 ("[I]n the advanced countries of the world, progress in macroeconomic stabilization policy has reduced the threat of a paralyzing economic collapse and even reduced the frequency of mild recessions. In this environment, the lure of better growth policy is compelling. If an economy can increase its trend rate of growth by even a small amount, the cumulative effect on standards of living is too big to ignore.").

130. Within ten years of the publication of Romer's 1990 paper, *Endogenous Technological Change*, *see* Romer, *Endogenous*, *supra* note 16, "the number of articles explicitly drawing upon endogenous growth theory almost certainly border[ed] on a thousand . . . spread over 50 or more economics journals" and also textbooks, surveys, and special issues, Fine, *supra* note 110, at 246.

131. Development economists in 1990 came up with the Washington Consensus, which suggested that "growth was a matter of getting national policies right." Roberto Zagha et al., *Rethinking Growth*, FIN. & DEV., Mar. 2006, at 7, 7.

132. Romer, *Increasing*, *supra* note 16, at 28. This is undoubtedly a gross simplification of economic growth theory, but Romer's popularizing language makes such a simplification and application to pending policy questions inevitable. Indeed, diversity of new ideas (which leads to diversity of economic goods and services) does not just generate fodder for selection; the differences provided by diversity generate further diversity. KAUFFMANN, *supra* note 110, at 85. The diversity of the economy increases consistently because

> the more objects there are in the economy, the more complement and substitute relations exist among those objects, as well as potential new objects in the adjacent possible . . . . Thus, as the diversity of the objects in the web increases, the diversity of prospective niches for new goods and services increases even more rapidly! The very diversity of the economic web is autocatalytic.

Id. at 226.

The Internet provides a particularly fertile environment for the development of these diverse new thoughts that will drive growth. It supports the development of groups and other forms of online communication that are potentially highly responsive to the feedback of human beings and highly likely (given the enormous scale and connectivity of the Internet) to trigger exponential development of unpredictably diverse new ideas that are nonrivalrous.[133] Indeed, the Internet makes it possible for humans to enter into forms of relationships that were systematically constrained before 1995: potentially persistent, potentially visible, asynchronous niche arrangements across great distances that are based on interest and attention. Emerging from this freedom of human connection are dynamic forms of human affiliation (groups, teams, collaborations of all kinds) that create opportunities for exponential growth in value. These affiliations are a form of self-generated order, and these human online communications are themselves a complex system (or system of complex systems).[134] The possibility space ("the adjacent possible" in Stuart Kauffman's terms[135]) for the most diverse developments is being created by human communications online, in particular, in those areas in which collective interactivity is facilitated and can be selected through the feedback loop of our own attention. Connection to many persons, rather than mere availability for communication, is now at the center.

133. "[E]conomic returns to telecommunications infrastructure investment are much greater than the returns on just the telecommunication investment itself." Lars-Hendrik Röller & Leonard Waverman, *Telecommunications Infrastructure and Economic Development, A Simultaneous Approach*, 91 AM. ECON. REV. 909, 909–10 (2001) (finding a "significant positive causal link" between telecommunications developments and economic growth). These returns are similar to the tremendous returns to public infrastructure investment such as transportation, sewer systems, water, and electricity. *See* David Alan Aschauer, *Genuine Economic Returns to Infrastructure Investment*, 21 POL'Y STUD. J. 380, 388–89 (1993) (opining that returns to public infrastructure capital are probably higher than returns to private capital). David Aschauer also suggests a strong relationship between U.S. productivity slowdown and decline in the growth rate of public capital stock. *Id.* at 381–82.

134. "Complex" does not mean "complicated." Rather, the science of complex adaptive systems tells us that complex systems feature autonomous agents whose microlevel interactions result in unpredictable yet persistent patterns of "fit" order, reflecting the desires of agents and their reactions ("feedback") to their local environment. M. MITCHELL WALDROP, COMPLEXITY: THE EMERGING SCIENCE AT THE EDGE OF ORDER AND CHAOS (1992), is a useful introduction to the study of complex systems. *See also* JAMES GLEICK, CHAOS: MAKING A NEW SCIENCE (1987); STUART KAUFFMANN, AT HOME IN THE UNIVERSE: THE SEARCH FOR THE LAWS OF SELF-ORGANIZATION AND COMPLEXITY (1995). In a complex system, the whole is continually greater than the sum of its parts because agents are able to give positive feedback in light of the environment of the system. KAUFFMANN, *supra*, at 24. This positive feedback can amplify and nudge a system to change in system-level, unpredictable ways. *Id.* at 23. The science of complex systems provides us with new tools for understanding and facilitating online communications, and sheds new light on what people value about the Internet.

135. KAUFFMANN, *supra* note 110, at 22, 142.

Thus, there is something new about the Internet that separates online communications from all former communications modalities. Traditional broadcast does not have actors providing feedback who are also providing the content, and does not make it possible for interesting new species and new ways to make a living to emerge (without permission from the broadcast operator). Broadcast does not provide a social "place"—it is not persistent, and it does not have attributes that allow individuals to play roles and thus create diverse new ideas. Telephony provides one-to-one communications, but no persisting diversity of entities is directly facilitated by telephony against which some selection algorithm can operate. The Internet can do more than just transport bits and facilitate momentary person-to-person communications. It can also provide a substrate that enables new ideas and new forms of social organisms to emerge, created by many different decisions to pay attention. As David Reed has made clear, the great value of the Internet is not so much that it connects more people and devices (and allows more applications to flourish), but that it supports the construction of communicating groups.[136]

The complexity of online communications is capable of producing an enormous diversity of human relationships. And investment of our attention in these collaborative efforts has a greater payoff than investment of attention in either the one-to-many transactions made possible by broadcast or the one-to-one (peer) transactions made possible by telephony.[137] It is true that the complex perspective, taken alone, has little normative

136. David P. Reed, That Sneaky Exponential—Beyond Metcalfe's Law to the Power of Community Building, http://www.reed.com/Papers/GFN/reedslaw.html (last visited Oct. 31, 2007) (concluding that Group Forming Networks (GFN) "create a new kind of connectivity value that scales *exponentially* with *N* [where *N* = the number of subscribers]. Briefly, the number of non-trivial subsets that can be formed from a set of *N* members is 2^N–*N*–*1*, which grows as 2^N. Thus, a network that supports easy group communication has a potential number of groups that can form that grows exponentially with *N*").

137. *Id.* ("Once *N* [the number of subscribers to a network] grows sufficiently large, GFN transactions create more value per unit of network investment than do broadcast transactions. So what tends to happen is that as networks grow, peer transactions out-compete broadcast content in the arena of attention and return on investment. And remarkably, once *N* gets sufficiently large, GFN transactions will out-compete both of the other categories."). This notion is distinguishable from (although related to) the idea of "peer production" about which Yochai Benkler has written. *See* Yochai Benkler, *Coase's Penguin, or, Linux and the Nature of the Firm*, 112 YALE. L.J. 369 (2002). It is not so much that complex interactions online are producing particular forms of visible entertainment or advances in technology, but that the complex relationships experienced online are themselves valuable to people. Benkler is unquestionably correct that peer production is replacing former employer-driven modalities of development. *Id.* at 377–78. But his is fundamentally an application-layer perspective; he asks how the Internet enables new ways of producing particular forms of output. My suggestion is that complex online relationships and self-generated order are providing innovation in social relationships at a system level, and that this social innovation is not adequately captured by the peer-production idea, as transformative as it has been.

direction and gives us, as individual actors, little to do. Each of us can only hope to contribute to increased complexity through our personal engagement, and we cannot say either that our efforts will make any predictable difference or that increased complexity will necessarily help the world in an identifiable way. But economic growth theory, with its emphasis on new ideas, diversity, and scale producing increasing returns, combines with our newfound understanding of communications complexity in a fruitful way. Our national economic policy, which looks for opportunities for increased economic growth, should be closely tied to communications policy that facilitates the interactive, group-forming attributes of the Internet.

III. RETHEORIZING THE CURRENT DEBATE

Many telecommunications scholars are focused on the economic efficiency (or not) of a particular legal regime for broadband network management from a traditional economics, nonsystemic point of view. Several scholars fundamentally view the Internet as a broadcast, supply-chain medium. As a result, the debate over the future of the Internet in the telecommunications literature has been defined in terms of control over content delivery, with skirmishes over who should be able to charge whom for access to particular pipes through which this content will be pumped. Reconceiving communications law to put the Internet at the center and to focus on facilitating human communications themselves will have important implications for U.S. policy.

A. Telecommunications Scholars and the Internet

The exceptional nature of online human communications, and their capacity to foster economic growth, have not been adequately addressed in the telecommunications literature. Although Daniel Spulber and Christopher Yoo have written about complexity theory in assessing network congestion, their work assumes a closed network managed by a traditional telephone company.[138] Kevin Werbach and Richard Whitt have done pathbreaking work on understanding the layers of the Internet and mapping regulation to these layers,[139] but they generally describe the social layer of the Internet as the "content" layer, without grappling with its complex nature or its

138. *See* Daniel F. Spulber & Christopher S. Yoo, *On the Regulation of Networks as Complex Systems: A Graph Theory Approach*, 99 NW. U. L. REV. 1687 (2005).

139. *See* Werbach, *Computer Commission*, *supra* note 52, at 68–74; Whitt, *supra* note 5, at 614–36.

potential for the encouragement of economic growth.[140] Joseph Farrell and Philip Weiser have written about the conflict between Chicago School views of vertical integration and the Internet model of modularity.[141] James Speta has focused on facilitating intermodal competition for access networks.[142] These contributions, significant as they are, are largely concerned with how to regulate telecommunications network providers in a presumably closed equilibrium economic world. No one is focused on the role of positive human feedback in the communications layer of the Internet, the capacity of the Internet's communications layer to foster diverse new forms of relationships that can lead to new ideas, or the importance of new ideas to increasing returns and overall economic growth.

Other scholars take a broader view of online communications, but have trouble assigning any particular value to them. For example, Brett Frischmann and Barbara van Schewick argue that both innovation and valuable uses of the Internet will be cut off in the absence of a network neutrality mandate, but become (understandably) vague when it comes to comparing those outputs to the benefits to network providers that would accrue if a neutrality mandate did not exist.[143] Frischmann's independent study of lakes and roads as infrastructures comes the closest to appreciating the systemic value of the Internet,[144] but even he has difficulty asserting that one approach to Internet access regulation will create any greater value than another.

Online communications are not just like any other form of economic activity. Ideas are not like goods; they are potentially far more valuable. The online world enables the creation of new relationships and thus new ideas that are key to our future economic growth. Communications law can no longer afford to ignore this central fact and its radical implications for policy.

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140. Indeed, the very common use of the word "content" signals that there will be authoritative "content deliverers" as in a static broadcast system; no feedback loops are implied.

141. Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85 (2003) (discussing the pros and cons of internalizing complementary efficiencies).

142. James B. Speta, *Deregulating Telecommunications in Internet Time*, 61 WASH. & LEE L. REV. 1063 (2004) (proposing telecommunications deregulation that is flexible enough to encourage competition among multiple types of Internet technologies).

143. Brett Frischmann & Barbara van Schewick, *Yoo's Frame and What It Ignores: Network Neutrality and the Economics of an Information Superhighway*, 47 JURIMETICS J. (forthcoming 2007) (manuscript on file with author).

144. Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917, 958–61, 981–90 (2005).

B. Implications for Policy: Universal Service

The key organizing principle for communications law must be to support the emergence of diverse new ideas online as this is where economic growth for society as a whole will come from. This form of diversity support is not the same as the kind of quota-driven, artificial diversity that has been used to force broadcast content regulation to reflect minority viewpoints.[145] Rather, this kind of online diversity stems from allowing the end-to-end, content-neutral, layer-independent functions of the Internet to flourish, and allowing groups and human attention to pick and choose from among the ideas presented online, enabling good ideas to persist and replicate.

This principle for future communications regulation—encouraging diversity—has immediate practical implications. We have not made access to the Internet's system of human communications sufficiently universal. The FCC requires traditional dial-up wireline telecommunications carriers, wireless carriers (and, now, providers of "interconnected VoIP"), but not providers of high-speed DSL or cable modem Internet access services, to subsidize high-cost local telephone service and basic lifeline telephone service for a wide variety of people and entities, under the general requirement of universal service.[146] In 2005, universal service cost these companies and their subscribers $6.5 billion.[147] The basic idea behind universal service is to subsidize the cost of some basic telephony services to serve particular (and sometimes differing) policy ends.[148] Although there are a number of different universal service programs, none is focused on facilitating high-speed access to the Internet per se.[149]

145. *See supra* note 115 (discussing diversity). Having the FCC support diversity in generating new ideas that the Internet makes possible is akin to the FCC's role in radio formats, as demonstrated by *FCC v. WNCN Listeners Guild*, 450 U.S. 582, 585 (1981), in which the Commission relies on the market to serve the public interest in diversity. *See* PAGE, *supra* note 115, at xix ("[D]iverse groups of problem solvers—groups of people with diverse tools—consistently outperformed groups of the best and the brightest."). Diversity trumps ability.

146. *See, e.g.*, Federal-State Joint Board on Universal Service; IP-Enabled Services, 71 Fed. Reg. 38,781, 38,796–97 (July 10, 2006) (to be codified at 47 C.F.R. pts. 1, 54) (extending universal service obligations to interconnected VoIP); Rob Frieden, *Killing With Kindness: Fatal Flaws in the $6.5 Billion Universal Service Funding Mission and What Should Be Done to Narrow the Digital Divide*, 24 CARDOZO ARTS & ENT. L.J. 447, 448–49 (2006).

147. Federal-State Joint Board on Universal Service, 71 Fed. Reg. at 38,782.

148. For a brief outline of the history of universal service, see STUART MINOR BENJAMIN ET AL., TELECOMMUNICATIONS LAW AND POLICY 763–64 (2d ed. 2006). Universal service has several purposes, including making access to safety and law enforcement services ubiquitous.

149. The Lifeline Program reduces telephony costs for low-income households; Federal Linkup reduces initial hookup charges for telephone service for low-income households; both the FCC and the states have high-cost fund subsidy programs that support companies that provide services "in areas where the cost of providing service exceeds a national or state average by at

The universal service program has been widely acknowledged to be both baffling and broken. The contributions required of carriers (and now interconnected VoIP providers) are steep, amounting to more than 10 percent of long distance revenues.[150] The many different programs and cross-subsidies that make up the universal service package may not be helping the people they were designed to help, while they may be helping other people that do not need assistance. This may be particularly true of the high-cost subsidies for rural areas, which flow directly to carriers. Square-state rural senators support universal service subsidies that companies within their states receive. There are routine allegations of fraud and abuse, particularly in connection with the school and library programs. Because the programs assume that basic telephone service is the end goal, there is no support given for training in the use of the Internet.[151] The programs seem designed to freeze a basic telephony model in place, without adequately taking account of the ways in which the world of communications has changed.

Universal access policy should be closely linked with this country's general economic policy. The questions of who should pay for universal service, what services should be subsidized, and how the system should be reformed have dogged policy discussion for years. Reform is essential, but principles will likely give way to the desires of the many carriers, vendors, and senators who benefit directly and indirectly from the status quo. Given the importance to economic growth of the facilitation of new ideas via new technologies, universal access to the Internet should be at the center of communications policy. The more people are online, the more likely it is that we will find the new ideas that will spur economic growth, just as it is true that the more science and technology graduate students we support, the more likely that economic growth will be spurred. Traditional voice telephone services are quickly being taken over by much less expensive Internet services, so it makes little sense to continue funding the former as a national policy matter. The goal

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least 115 to 135%." Frieden, *supra* note 146, at 459. Except for schools, libraries, and rural medical facilities, universal service support is not provided for high-speed Internet access.

150. Public Notice, FCC, Proposed Third Quarter 2007 Universal Service Contribution Factor (June 14, 2007), http://fjallfoss.fcc.gov/edocs_public/attachmatch/DA-07-2639A1.pdf. Inclusion of software-based VoIP providers is a dramatic step, designed in part to raise barriers to entry for services that challenge the existing wireline telephony revenue stream for the existing carriers. *See* Frieden, *supra* note 146, at 461.

151. Rob Frieden notes that the "FCC expressly deems ineligible for e-rate funding 'training in the use of the Internet,' 'costs for training provided via the Internet,' and 'services that go beyond basic conduit access to the Internet.'" Frieden, *supra* note 146, at 469 n. 79 (quoting Public Notice, FCC, Pleading Cycle Established for Eligible Services List for Universal Service Mechanism for Schools and Libraries 12 (July 21, 2006), http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-06-109A1.pdf).

of universal service, after all, is to make communications technologies available to every citizen, and the relevant technology at the moment is high-speed access.[152] There is a strong correlation between high-speed Internet access penetration (the number of high-speed subscribers per a set group of inhabitants) and per capita gross domestic product, the benchmark against which economic growth is measured.[153] To carry out this national priority, the funding mechanism for universal access should be through general tax revenue, rather than the imposition of fees on nascent VoIP services. I am not the first to suggest a common fund mechanism for universal service.[154] Using general taxation as a funding mechanism would prompt recognition that providing universal service is a social good that benefits everyone. In addition, funding universal service through actual taxation would provide helpful auditing incentives that would keep the fund in check and clarify its mission. What is new in this Article is the suggestion that the continued economic growth of this country is likely tied to far-seeing communications policy, and the notion that we can use the universal service system as a vessel for articulating and implementing this policy on a nationwide scale. Other countries, including South Korea and Japan, have taken this approach.[155]

Diverse new ideas whose development is made easier by the advent of the Internet and its special characteristics are likely to emerge at a greater pace once high-speed access is widely available in this country. Participating in this ecology is becoming more important to the economic and cultural success of Americans and the overall economic growth of this country. We should tie universal service programs to the principle that funding high-speed access to the Internet for all should be a top social priority.[156]

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152. Milton Mueller, *Universal Service in Telephone History: A Reconstruction*, 17 TELECOMM. POL'Y 352, 353 (1993) (discussing the meaning of universal service as applied to telephone service). Of course, those who do not want such things as universal service often propose that they be paid for out of general tax revenues rather than cross-subsidy arrangements because they then become much easier to defeat politically. I am indebted to C. Edwin Baker for this observation.

153. *See* Org. for Econ. Co-Operation & Dev., OECD Broadband Penetration and GDP per Capita, http://www.oecd.org/sti/ict/broadband (follow hyperlink for "OECD Broadband Penetration and GDP per Capita") (last visited Sept. 27, 2007) (showing correlation of 0.62).

154. *See, e.g.*, Gregory L. Rosston & Bradley S. Wimmer, *The ABCs of Universal Service: Arbitrage, Big Bucks, and Competition*, 50 HASTINGS L.J. 1585, 1606 (1999).

155. *See* MINISTRY OF INFO. & COMMC'NS, REPUBLIC OF KOREA, BROADBAND IT KOREA VISION 2007 (2004), *available at* http://eng.mic.go.kr/eng/index.jsp; *see also* Takanori Ida, *Broadband, Information Society, and the National System in Japan*, *in* GLOBAL BROADBAND BATTLES 68–69 (2005); David H. Deans, *Access: Wisdom of the East*, TELEPHONY ONLINE, Nov. 17, 2003, http://telephonyonline.com/ar/telecom_access_wisdom_east.

156. Americans are willing to fund public infrastructure if (1) it has a visible effect; and (2) the money is going directly into funding that visible effect. For the Tennessee Valley Authority,

C. Implications for Policy: Network Neutrality

Once we get involved in public funding of high-speed access, we will need to turn to the social policies that should be embodied in that access. The high-speed wires in our homes are just transport to the Internet. We put packets of data onto those wires and they get to their global destinations through the use of IP addresses processed by various network interfaces. But network providers in this country—the actors who provide this transport to the Internet—would like to ensure that they can monetize these connections by discriminating against particular packets. The network providers' desires are deeply troubling. They must think that they can take this system of complex systems and dumb it down to their own advantage. This simplifying approach is more than short-sighted; if it is enacted into law, it is destructive of our economic future.[157]

1. Discrimination Defined

By "discrimination," I mean allowing network-access providers to treat some traffic or some users differently. The protocols designed to make end-to-end universal connectivity work online call for information to be chunked into standardized packets. Those packets, in turn, are made up of headers (addressing information) and payload (content). The header information allows the packets to be separately forwarded by routers along "best-effort" paths (without any guarantee that they will be delivered) and reassembled by a destination computer. The header for each packet may include information about the sender and the recipient (their addresses on the network), as well as the length of the packet (which may reveal something about what kind of application is being used), the port used by the source and destination computers (which also may reveal something about the application being used), and the address of the source and

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the visible effect was electricity and an improved quality of life. Tva.gov, From the New Deal to a New Century, http://www.tva.gov/abouttva/history.htm (last visited July 25, 2007). A similar, strong national program may be needed to fund high-speed Internet access in this country. *See* Michael J. Copps, Op-Ed., *America's Internet Disconnect*, WASH. POST, Nov. 8, 2006, at A27 ("The solution to our broadband crisis must ultimately involve public-private initiatives like those that built the railroad, highway and telephone systems. Combined with an overhaul of our universal service system to make sure it is focusing on the needs of broadband, this represents our best chance at recapturing our leadership position.").

157. *See generally* REED HUNDT, IN CHINA'S SHADOW: THE CRISIS OF AMERICAN ENTREPRENEURSHIP (2006) (arguing that the United States needs to reform its legal, technological, and leadership architecture in order to renew American cultural commitment to entrepreneurship).

destination (which may reveal the manufacturer of the device).[158] The payload information includes an indication of what application is being used, and also chunks of content.

A nondiscriminatory network provider will send each packet on its way using the header addressing information, without prioritizing any packet and without inspecting or using the rest of the information in the header or payload of the packet. Packets are treated by their routers on a first-in, first-out basis. This best-effort, nondiscriminatory approach has worked very well so far. Although a telco provider may feel that the Internet is broken because it cannot guarantee particular levels of service, there is excess capacity on the Internet and packets, by and large, are not dropped.[159] And even if they were, for most uses and most users, a few dropped packets would not appreciably diminish the Internet experience, and with increasing bandwidth, all packets will travel faster through last-mile networks.[160]

New technologies have emerged that make it possible for network providers to use this header information as well as information inside packets (deep packet inspection) to selectively prioritize packets and thus charge different prices for different kinds of information being routed through their networks. For example, Cisco Systems, one of the world's largest manufacturers of routers, is selling services that assist network providers in deep packet and content inspection.[161] This service will allow network providers to know what applications (such as VoIP)

158. *See generally* Jon M. Peha, The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy 4–5 (unpublished paper presented at the 34th Telecommunications Policy Research Conference, George Mason Univ. Sch. of Law, Sept. 29–Oct. 1, 2006), *available at* http://web.si.umich.edu/tprc/papers/2006/574/Peha_balanced_net_neutrality_policy.pdf.

159. Jens Prüfer & Eric Jahn, *Dark Clouds Over the Internet?*, 31 TELECOMM. POL'Y 144, 145 & n.6 (2007).

160. Note that no single network provider can control the quality of service across multiple networks unless there is a commitment by all network providers to treat particular packets in a particular way. There are deep debates over whether quality of service guarantees are worth the expense of installing them. *See, e.g.*, Ben Teitelbaum, Internet2 QoS: Is Less More?, Slideshow for Seminar at Columbia University (Oct. 29, 2001), *available at* http://people.internet2.edu/~ben/talks/columbiaSeminar-10.01.pdf; *see also* Ben Teitelbaum & Stanislov Shalunov, Why Premium IP Service Has Not Deployed (and Probably Never Will) (Jan. 9, 2006), http://qos.internet2.edu/wg/documents-informational/20020503-premium-problems-non-architectural.html.

161. CISCO.COM, SOLUTION OVERVIEW: DEPLOYING PREMIUM SERVICES USING CISCO SERVICE CONTROL TECHNOLOGY (2005), http://www.cisco.com/application/pdf/en/us/guest/products/ps6150/c1031/cdccont_0900aecd8025258e.pdf; CISCO.COM, CORE ELEMENTS OF THE CISCO SELF-DEFENDING NETWORK STRATEGY 8 (2005), http://www.cisco.com/application/pdf/en/us/guest/netsol/ns413/c654/cdccont_0900aecd80247914.pdf.

are being used by end users, and which end users are using their routers (such as an IP address of a competitor). Information gleaned from this service can then be used in combination with traffic-shaping commands to dictate, for example, that packets stemming from particular applications or particular users always be placed in the back of the queue for forwarding, or dropped entirely.[162] Prioritization can occur through logical and physical routing techniques that allocate particular types of communications to different channels, some more congested than others.[163] Alternatively, network providers can use their powers of deep packet inspection to detect "unauthorized" video and other applications, and charge for their use.[164] This is the origin of the network neutrality debate in the United States over whether telcos and cablecos should be permitted to charge fees for preferred handling of Internet traffic.[165]

Network providers have ample reasons to discriminate in this way in favor of their own applications.[166] They are often providers of traditional telephony services, are trying to introduce their own VoIP services, or simply want to ensure that they get a cut of the revenue of any applications riding on "their" network. As Edward Felten has pointed out, causing delay for particular applications such as nonprovider VoIP applications "could be an

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162. *See generally* Edward W. Felten, *Nuts and Bolts of Network Neutrality*, *in* 24TH ANNUAL INSTITUTE ON TELECOMMUNICATIONS POLICY & REGULATION 317 (2006), *available at* http://itpolicy.princeton.edu/pub/neutrality.pdf.

163. Peha, *supra* note 158, at 6.

164. *Id.* at 7, 9 (citing Sandvine.com, Sandvine Network Demographic Management, http://www.sandvine.com/general/getfile.asp?FILEID=15).

165. *See, e.g.*, John G. Waclawsky, *IMS: A Critique of the Grand Plan*, BUS. COMM. REV., Oct. 2005, at 54 (explaining ten reasons why technologies that allow network providers to control and bill for certain content are a bad idea). As Ed Whitacre of AT&T famously said:

> Now what [Google, MSN, Vonage and others] would like to do is use my pipes for free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it. So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using.

At SBC, It's All About "Scale and Scope," BUS. WK. ONLINE, Nov. 7, 2005 [hereinafter *Scale and Scope*], http://www.businessweek.com/magazine/content/05_45/b3958092.htm; *see also* Comments of the National Cable Television Association at 49–53, Nondiscrimination in the Distribution of Interactive Television Servs. Over Cable, 16 F.C.C.R. 1321 (Mar. 19, 2001), *available at* http://www.ncta.com/ContentView.aspx?hidenavlink=true&type=1pubtp5&contentId=3146 (arguing that mandatory nondiscriminatory access policy is unconstitutional). There are different flavors of neutrality. Tim Wu, for example, appears to believe that network providers should be permitted to discriminate in favor of particular categories of applications, such as video. Wu, *Telecommunications Law*, *supra* note 9, at 41–42. Wu's conception could be categorized as a weak form of network neutrality. The strong form of network neutrality suggests that network providers should not be allowed to discriminate against (or in favor of) any packets other than for security-related reasons.

166. *See* Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. ON TELECOMM. & HIGH TECH. L. 329, 342–68 (2007).

effective tactic for an ISP that wants to drive customers away from independent Internet telephone services."[167] Even deprioritization of packets that does no more than cause them to experience delay in transit can have substantial effects on user experience ("jitter"). Using unprioritized "services" online could become a miserable pastime if there were constant delay.

These simple network-discrimination abilities of network providers are part of a larger approach to extend cell phone standards to the Internet through a grand collection of processes labeled IMS, for IP (or Internet) Multimedia Subsystem.[168] The idea behind this longstanding standards-creation effort (in process since 1998) is to wrap IP packets into a centralized signaling system that mimics traditional telephony approaches to networking and allows for fine-grained billing for particular uses of the network.[169] In essence, online communications would be labeled as particular services and would be billed for accordingly. The IMS billing vision is in turn part of the United Nation's International Telecommunication Union's Next Generation Network (NGN) effort, which seeks to internationalize and standardize Internet governance practices generally.[170]

2. Market Concentration

These network discrimination practices and plans would be irrelevant to our national economic policy if there were ample competition in the market for broadband access in the United States. But such competition does not exist. Although President Bush has made speeches about the importance of competitive broadband access in the United States (declaring that universal access to broadband should be achieved by 2007, for example[171]), the marketplace

167. Felten, *supra* note 162, at 4.

168. *See* Waclawsky, *supra* note 56.

169. *Id.*; *see also* Waclawsky, *supra* note 54, at 38–39 (describing IMS-like approaches "slowly grinding out a series of elaborate, mostly stillborn solutions to the *participants'* rather than the *end-users'* problems"); CISCO SYSTEMS, WHITE PAPER: CISCO SERVICE CONTROL: A GUIDE TO SUSTAINED BROADBAND PROFITABILITY 6 (2005), http://www.democraticmedia.org/PDFs/CiscoBroadbandProfit.pdf.

170. *See* International Telecommunications Union, Next Generation Network—Global Standards Initiative Introduction, http://www.itu.int/ITU-T/ngn/introduction.html (last visited Sept. 27, 2007).

171. Press Release, The White House, President Bush Meets With First-Time Homebuyers in NM and AZ (March 26, 2004), *available at* http://www.whitehouse.gov/news/releases/2004/03/20040326-9.html ("We ought to have a universal, affordable access for broadband technology by the year 2007, and then we ought to make sure as soon as possible thereafter, consumers have got plenty of choices when it comes to purchasing the broadband carrier. See, the more choices there are, the more the price will go down. And the more the price goes down, the more users there will be. And the more users there will be, the more likely it is America will stay on the competitive edge of world trade.").

is controlled by regional cable-telco duopolies.[172] More than 98 percent of home broadband users obtain Internet access from either a telephone company's DSL service or a cable company's cable modem service.[173] The top ten broadband access providers, each of which has a monopoly on network-access provision in its own region, control over 83 percent of the market for broadband access in the United States (and the top two cable companies and the top two DSL companies together control more than 50 percent of that market).[174] Over 40 percent of homes in the United States have access to no more than one provider of broadband (either cable or DSL).[175] In sum, broadband access in the United States is controlled by regional duopolists, despite FCC Chairman Kevin Martin's statements characterizing this market as fiercely competitive.[176]

This regional duopoly structure has led to a complete lack of price competition for standalone broadband access.[177] It has also led to a complete lack of desire on either cable or DSL providers' parts to provide access to their competitors—either access to competitive ISPs who might use their

172. S. DEREK TURNER, BROADBAND REALITY CHECK II: THE TRUTH BEHIND AMERICA'S DIGITAL DECLINE 19–22 (2006), *available at* http://www.freepress.net/docs/bbrc2-final.pdf (describing regional duopolies controlled by cable and telephone providers).

173. INDUS. ANALYSIS & TECH. DIV., FCC, HIGH-SPEED SERVICES FOR INTERNET ACCESS, STATUS AS OF DECEMBER 31, 2005, at 6 (2006), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-266596A1.pdf.

174. TURNER, *supra* note 172, at 20 (citing Press Release, Leichtman Research Group, Over 3 Million Add Broadband in the First Quarter of 2006 (May 15, 2006), *available at* http://www/leichtmanresearch.com/press/051506release.pdf). The top five broadband providers in the United States are Comcast, AT&T, Verizon, Time Warner, and Cox. *Id.*

175. INDUS. ANALYSIS & TECH. DIV., *supra* note 173, at 22.

176. TURNER, *supra* note 172, at 19 ("[B]roadband platforms are engaged in fierce competition. In addition to telephone and cable providers, broadband access is increasingly being delivered to consumers via satellite, wireless, and fiber or powerline providers . . . . This competition is leading to broadband providers offering customers faster and faster connections at lower and lower prices." (citing Kevin Martin, Op-Ed, *United States of Broadband*, WALL ST. J., July 7, 2005, at A12)). In fact, the U.S. Government Accountability Office (GAO) has found that access is provided by regional duopolies of cable and DSL providers. U.S. GOV'T ACCOUNTABILITY OFF., TELECOMMUNICATIONS: BROADBAND DEPLOYMENT IS EXTENSIVE THROUGHOUT THE UNITED STATES, BUT IT IS DIFFICULT TO ASSESS THE EXTENT OF DEPLOYMENT GAPS IN RURAL AREAS (2006), http://www.gao.gov/new.items/d06426.pdf. Prices for broadband access are going up, rather than down, and wireless, powerline, and satellite together account for less than 2 percent of broadband access services in the United States.

177. *See, e.g.*, Robert Marich, Cable Modem vs. DSL: Rivals Side-Step Big Price Wars So Far (July 6, 2006), http://web.archive.org/web/20060815132827http://www.kagan.com/ContentDetail.aspx?group=5&id=216. Kagan Research conducted a national survey of the top five cable operators and the top four telephone companies for the first quarter of 2006. The average price for cable modem service was $39.45 per month. For DSL, it was $35.38. Verizon was the lowest, averaging $31.62 per month, while BellSouth was the highest, with a monthly rate of $42.25. Prices for standalone broadband access "show little sign of price competition." *Id.*

wholesale lines to sell retail services to others, or access to their new perceived competitors in the online content-delivery marketplace. None of the large network providers in the United States arguably is under any competitive or regulatory pressure to open up. All of these actors appear to be focused on vertical integration, monetization, and discrimination.[178]

At the same time, the telephony and cable players in the United States are consolidating. The old AT&T monopoly of the predivestiture 1970s is reforming.[179] In 2005, SBC Communications acquired AT&T

178. *See, e.g.*, BellSouth Corp., Overview of Net Neutrality, Media Kit (Apr. 3, 2006), http://web.archive.org/web/20061011104728/bellsouth.mediaroom.com/file.php/308/Net+Neutrality+Overview.pdf ("Broadband network providers should be able to offer different plans that feature enhanced levels of service or that promote their own brand names and products or the services of selected vendors. For example, BellSouth should be able to enter into arrangements with content providers by which the content provider pays for special treatment, such as preferential listing or faster downloads from that provider's website or receiving higher quality of service."); *see also* Searcey & Schatz, *supra* note 75, at A1 ("'We have to make sure [content providers] don't sit on our network and chew up our capacity.'" (quoting Verizon's Ivan Seidenberg)); Vince Vittore, *Cable Flying Under Net Neutrality Radar*, TELEPHONY ONLINE, Mar. 6, 2006, http://telephonyonline.com/mag/telecom_cable_flying_net (noting the introduction of products that will allow cable network managers to prioritize their own content while relegating other material to best-effort status); Joseph Waz, Vice President, External Affairs and Pub. Policy Counsel, Comcast Corp., Keynote Remarks at the Broadband Policy Summit (May 10, 2006) (calling for freedom for "network builders"); *All Things Considered: Internet Debate: Preserving User Parity* (NPR radio broadcast Apr. 25, 2006), *available at* http://www.npr.org/templates/story/story.php?storyId=5362403 (Dan Brenner of the National Cable & Telecommunications Association commented that "[c]ompanies that have spent money and have not been rewarded by Wall Street . . . . [like cable] allow[ ] companies like Google to thrive. . . . Let's say someone wanted to get a broadband delivery of a wedding," and implied companies should be able to charge for this). In the past ten years, telecommunications, broadcasting, and cable companies have spent more than half a billion dollars on lobbying efforts. *See* COMMON CAUSE, SPECIAL INTERESTS HAVE INVESTED HALF A BILLION DOLLARS IN TELECOMMUNICATIONS POLICY 2 (2006), http://www.commoncause.org/atf/cf/%7BFB3C17E2-CDD1-4DF6-92BE-BD4429893665%7D/TELECOM-LOBBYING-DATA.PDF.

179. As of January 1, 1984, AT&T's local operations were split into seven independent Regional Bell Operating Companies known as "Baby Bells." The resulting Baby Bells were originally Ameritech (now part of AT&T), Bell Atlantic (now part of Verizon), BellSouth (now part of AT&T), NYNEX (now part of Verizon), Pacific Telesis Group (now part of AT&T), Southwestern Bell Corporation (now part of AT&T), and US West (now part of Qwest). This separation of competitive long distance services from monopoly local exchange services was driven by "skepticism that regulatory authorities could otherwise stop an integrated monopoly from engaging in predatory conduct (such as discriminatory interconnection) in adjacent markets." Farrell & Weiser, *supra* note 141, at 94. Because there has been fierce litigation over what rates an incumbent should be able to charge for use of its equipment, the interconnection/unbundling regime prescribed by the Telecommunications Act of 1996 has failed. Meanwhile, competitive (nonincumbent) local exchange telephone companies are going out of business, as are Internet service providers, and the Bell Operating Companies are recombining. According to Wikipedia, "[o]f the twenty-two Bell Operating Companies which AT&T owned prior to the 1984 agreement to divest, ten have become a part of the new AT&T Inc. with the completion of their acquisition of BellSouth Corporation on December 29, 2006." Wikipedia, AT&T, http://en.wikipedia.org/wiki/AT&T#Creation_of_AT.26T.2CInc (last visited Aug. 25, 2007).

and decided to use the AT&T name for the combined company.[180] In response, Verizon acquired MCI, which in the past was AT&T's competitor for long distance services.[181] Now, the new AT&T and BellSouth have merged, bringing control of wireless carrier Cingular within a single company.[182] Comcast, the largest cable operator in the United States, and Time Warner, the second largest operator, jointly acquired Adelphia (the fifth largest operator) in 2006.[183] In general, Internet access infrastructure is dominated in the west by AT&T and in the east by Verizon, with cable companies Comcast and Time Warner operating nationally. The Internet access services market is unquestionably highly concentrated.[184]

As part of their campaign to fight back against the undermining influences of human online communications, telephony and cable incumbents would like to reinstantiate their prior services online. As stated in an recent *Economist* article, "they are combining services—fixed and mobile telephony, broadband internet access and television—to sell as a single 'converged' bundle."[185] This is the triple play (or, sometimes, quadruple play) so enamored by Wall Street and telecommunications executives.[186] These network providers claim that they will have no incentive to improve the penetration of broadband services in the United States if they are not given the power to control their networks and sell separately prioritized,

180. SBC Commc'ns Inc., 20 F.C.C.R. 18,290, 18,297 (2005).

181. Verizon Commc'ns Inc. and MCI, Inc., 200 F.C.C.R. 18,433, 18,439 (2005).

182. BellSouth Corp., 22 F.C.C.R. 5662 (2007).

183. Adelphia Commc'ns Corp., 21 F.C.C.R. 8203, 8205–07 (2006) (*erratum* released July 27, 2006).

184. *See* Marguerite Reardon, *AT&T and BellSouth: Why You Should Care*, NEWS.COM, Nov. 7, 2006, http://news.com.com/ATT+and+BellSouth+why+you+should+care/2100-1036_3-6133058.html. AT&T now controls half the telephone and Internet access lines in the United States, as well as all of Cingular Wireless. *Id*.

185. *Swamp Things*, *supra* note 28, at 71.

186. But perhaps not a consumer's favorite option. *See* Yuki Noguchi, *No Bundle of Joy*, WASH. POST, Mar. 22, 2006, at D1. The telephone incumbents are pleasing Wall Street with their bundling plans. *See* Verizon FIOS Briefing Session Conference Call Transcript 25 (Sept. 27, 2006) [hereinafter Verizon FIOS Briefing Session], *available at* http://investor.verizon.com/news/20060927_transcript.pdf ("We have a lot of things going on to win the hearts and minds of our customers . . . including convergence, which we don't actually think is easily replicated by some of our competitors. We are building the network. We are offering differentiated products at competitive prices with good returns."). During this same briefing, Verizon representatives discussed the revenue opportunities associated with interactive advertising embedded in IP-enabled television shows. *Id*. at 8. This kind of IP-enabled transactional relationship requires deep control over, and information about, who is watching what.

guaranteed services.[187] But because the transport layer for Internet access is not competitive, deregulation of that layer is inappropriate.[188]

In particular, newly renewed behemoth AT&T has been active in at least three ways with regard to its desire to dumb down and monetize online human interactions. First, AT&T chief executive officer Ed Whitacre's remarks began the network neutrality uproar, and provide evidence that AT&T intends to discriminate.[189] Second, AT&T has been careful to ensure that upload speeds (access speeds that allow people to add to the complex system of human communications) are far slower than download speeds, even though there is no technical reason for this asymmetry.[190] And third, in a recent AT&T–BellSouth merger agreement, AT&T was careful to exclude from any network neutrality agreement its high-speed fiber access networks—the connections that will define Internet access into the future.[191]

187. The United States ranks sixteenth in the world in terms of its broadband penetration. Itu.com, Economies by Broadband Penetration (2005), http://www.itu.int/ITU-D/ict/statistics/at_glance/top20_broad_2005.html (giving December 2005 figures). For an example of a network provider's assertion that without guaranteed control it will not improve broadband penetration in this country, see Tom Tauke, Executive Vice President, Verizon EVP, Remarks at Media Institute Luncheon 10–11 (July 11, 2006) (transcript available at http://www.mediainstitute.org/Speeches/Tauke_07112006.pdf) ("Improving the Internet will require the investment of substantial amounts of risk capital. If government policies reduce the opportunity to earn a return on that investment, network operators simply won't be able to deploy them.").

188. *See* U.S. TRADE REPRESENTATIVE, RESULTS OF THE 2006 SECTION 1377 REVIEW OF TELECOMMUNICATIONS TRADE AGREEMENTS 10 (2006) (commenting on Deutsche Telekom's request for a "regulatory holiday": "While the United States strongly supports deregulation as an important element of promoting facilities-based competition, the promotion of deregulation before competitive conditions warrant such steps may undermine the development of an efficient and competitive market").

189. *See* Ante & Crockett, *supra* note 11, at 110; *Scale and Scope*, *supra* note 165.

190. AT&T is not alone in this. All high-speed Internet access providers in the United States provide slow upload speeds. These networks were designed on the assumption that people would be downloading, not uploading. In particular, cablecos and telcos want to have enough bandwidth to sell their own movies; this was cited by Cisco's chief cable architect as the reason DOCSIS 3.0 is designed for 1 gig down, 100 meg up, where the technical constraints are irrelevant—the cablecos make money on various downloaded services (such as Video On Demand), but not on anything consumers upload. Because the backhaul (the Internet backbones) are symmetric and more traffic goes downstream, the additional cost of giving every customer greater upload speeds is negligible. So every customer could get symmetric service at no cost, except the opportunity cost of the customer in not upgrading to the more expensive service. Verizon currently charges $19.95 for 768K/128K and AT&T charges a similar amount. For the same operational cost, they could provide symmetric 768K service. *See* E-mail from David Burstein to Susan P. Crawford, Assoc. Professor, Cardozo Sch. of Law (Jan. 15, 2007) (on file with author).

191. *See* The Day the Internet, *supra* note 57.

3. What Happens to Human Online Communications?

The Internet of the present day is characterized (as far as we know[192]) by nondiscriminatory transport of packets by routers that are indifferent to the application being used, the source or destination of the packet, or the content of the communication. If this set of practices changes in favor of network-provider-run discrimination (much less replacement of the Internet by wholly proprietary IP broadband networks), we will see a dramatic change in the communication patterns of the last ten years. It is not just that application or content providers will need to pay a toll for prioritized routing; it is also that all nonprioritized communications will become instantly second-rate and undesirable because of their slow speed and doubtful transmission.

To generations accustomed to centrally controlled entertainment modalities like television and cable, this limitation to "channels" provided by network providers may not seem important. Surely, there will be vast amounts of digitized material to absorb online. Why should it matter whether some of it is prioritized? The reason this prioritization matters is that we do not know what new forms of group-oriented collaborative interactions (social, commercial, or cultural), or what kinds of new ideas, will emerge from this network of networks. Prioritization will make a difference because network providers will cease to be commodity-transport providers, and will instead become gatekeepers, pickers-of-winners, and controllers-of-experiences on a massive scale. The diversity of online experiences, and thus the range of freedom of human connection, human relationships, and the diverse generation of new ideas, will diminish.[193] Neutrality of symmetric high-speed access is important for a host of reasons—it will enable diverse new applications to emerge that are not controlled by network providers; it will cause new forms of interaction to grow, even apart from the introduction of applications; and it will enable diversity in various real-time communications that otherwise would be controlled and monetized by the network providers. All of this diversity has great potential to be positively associated with economic growth.

192. We have no data about what is actually happening inside incumbent network providers' networks, because they are privately run. *See* SASCHA MEINRATH, COOP. ASS'N FOR INTERNET DATA ANALYSIS, COMMONS WORKSHOP FINAL REPORT (2007), http://www.caida.org/workshops/commons/0612/final_report.xml (noting the Internet "data acquisition crisis which has deeply stunted the field of network science").

193. *See* HUNDT, *supra* note 157, at 58 ("In the face of incumbent power, the United States should emphasize change, experimentation, high tolerance for failure, and rapidity of capital turnover as the key characteristics of its economy.").

One frequent argument against network neutrality is that users want simplicity. Verizon representatives talk animatedly about the need for an interface for online broadcasts that can be controlled in the dark with one hand—because the other hand will be busy holding a beer.[194] But this conception of user behavior shows a lack of imagination. People do want to relax and be entertained (and Americans have great strengths in this domain), but network neutrality is not incompatible with either simplicity or high entertainment value. The key question is who will be in a position to control access to simple and highly entertaining activities and engagements provided online. If network providers act as gatekeepers, deciding which new ideas will fail and which will succeed, then they will be artificially amplifying particular ideas. Instead of the Internet, we will have a broadcast television network, in which success is decided from above, rather than emerging independently from the interaction of agents.

D. Implications for Policy: Divestiture

Because the incumbent telcos have obtained from states the video franchise relief that drove them to seek legislative help in 2006, network neutrality will need to be a federal-level, standalone effort.[195] We need to treat high-speed access to the Internet as utility connectivity and basic infrastructure, so that users can choose what they want to do with the access they are provided. We are one of very few countries whose communications infrastructure is privately owned, and therefore, to us, the idea of treating these pipes and wires as a utility, like electricity or gas service, seems radical. But because our future economic growth could be so greatly affected by the policies we apply to this pipe, we should take the long view. We have no greater opportunity to increase our nation's economic growth rate than by encouraging the emergence of new ideas via the human-communications layer of the Internet.

For nearly eighty years, between 1900 and 1980, AT&T successfully fended off interconnection with its facilities by its competitors, and prevented the attachment to its networks of devices made by independent manufacturers. AT&T was a collection of fully integrated functions and services—Bell Labs

194. *See* Verizon FIOS Briefing Session, *supra* note 186, at 9.

195. *Id.* at 35 ("Q: What are the regulatory assumptions underlying all of this? . . . A: We have Virginia, we have Texas, we have Florida, we have California, we have New Jersey. We have almost all of Maryland, because they are very big counties, and so what we don't have is teeny . . . . I feel that the franchising is not holding us back . . . . I really don't see that as a necessity to have a nationwide relief on that.").

designed equipment, Western Electric made all the equipment, the Bell Operating Companies provided local telephone service, and AT&T provided long distance service. People were confident that having a single integrated system was simply efficient; local and long distance service were viewed as natural monopolies.[196] AT&T, then the world's largest corporation, claimed that competitors' "cream skimming" would threaten AT&T's ability to provide universal service, result in higher prices for local telephone service, and harm consumers.[197] During the 1960s and 1970s, the FCC seemed unable to control AT&T's behavior in markets for long distance service and telecommunications products, and the AT&T name began to stand for abusive monopolistic behavior—high-priced, insufficient service and avoidance of competition—assisted by government action.[198] Courts, the FCC, and legislators went along, unconvinced that competition was in the public interest when it came to the "natural monopoly" of telecommunications.[199]

Just as AT&T is now being recreated through merger, Ma Bell's predivestiture views as to how best to serve the public good are enjoying a renaissance in the high-speed Internet access era. The key arguments made long ago by Theodore Vail (who served as president of AT&T in the late 1800s and early 1900s)—that universal service, local access abilities, and overall consumer welfare would best be served by unconstrained and vertically integrated providers[200]—are reappearing. Given the political power, great wealth, and market position of the current network owners, nothing short of quarantine—or divestiture[201]—will protect us from either

196. Lawrence A. Sullivan & Ellen Hertz, *The AT&T Antitrust Consent Decree: Should Congress Change the Rules?*, 5 HIGH TECH. L.J. 233, 235 (1990).

197. *See* Jean-Jacques Laffont & Jean Tirole, *Optimal Bypass and Cream Skimming*, 80 AM. ECON. REV. 1042, 1042 (1990).

198. Here is Lily Tomlin, as Ernestine the phone operator, in 1976:

> We handle eighty-four billion calls a year. Serving everyone from presidents and kings to the scum of the earth. We realize that every so often you can't get an operator, for no apparent reason your phone goes out of order, or perhaps you get charged for a call you didn't make. We don't care. Watch this . . . [she hits buttons maniacally] . . . just lost Peoria. [voiceover: We don't care. We don't have to. We're the Phone Company.]

Saturday Night Live: Lily Tomlin/James Taylor (NBC television broadcast Sept. 18, 1976), *available at* http://snltranscripts.jt.org/76/76aphonecompany.phtml.

199. *See generally* BENJAMIN ET AL., *supra* note 148, at 701–03.

200. *Id.*

201. *See* Joseph D. Kearney, *From the Fall of the Bell System to the Telecommunications Act: Regulation of Telecommunications Under Judge Greene*, 50 HASTINGS L.J. 1395, 1403 (1999) ("The [Modification of Final Judgment's] lasting lesson for public policy is that, at least in the antitrust context, reliance on a structural consent decree that is premised on an articulable economic theory and is administered by a court committed to that theory can be a defensible judicial enterprise.").

predictably predatory actions by the operators or endless efforts by them to undermine, through litigation, whatever lesser rules are put in place.[202]

The risks involved in letting private regional monopolies control access to the idea-generation facilities of the human-communications layer of the Internet are far greater than the risks of getting government involved in ensuring divestiture, network neutrality, and universal access. These monopoly access providers arguably have much greater incentives to stifle the generation of new ideas than our government does, and whatever flurry of Internet regulation is prompted by government involvement in access provision (a subject that is beyond the scope of this Article) will be extremely difficult to enforce. It is likely that the network architecture capable of making high-speed access possible is already in place.[203] That transport needs to be separated from all decisions about which particular packets to favor.

CONCLUSION

Scholars and industry spokespeople arguing against network neutrality present their claims in support of vertical integration as the logical outputs of neutral, mathematical algorithms. On a closer look, however, the arguments they are making are neither neutral nor persuasive. They are based on a supply-chain view of communications that dictates optimizing infrastructure for a particular kind of use, and that takes the systemic, human reality of communications as exogenous. Stripped of unrealistic economic justifications, their acceptance of duopoly control over high-speed access in this country is nothing less than a signal that Ma Bell has indeed been reconstituted. This approach is sharply undermined by the arrival of the Internet, which teaches us that infrastructure need not be inextricably intertwined with communication, and by new developments in economic growth theory. It is high time we recognized the importance of new ideas to economic growth in our approach to communications law.

My central point is that, given that economic growth is created by the emergence of new ideas, the proper role of government should be to support the diversity of complex social interactions online. Scholars who argue

202. For a description of the various strategies available to legislators and regulators faced with vertically integrated, concentrated infrastructure industries, see Farrell & Weiser, *supra* note 141, at 120–22 (discussing mandated unbundling, structural separation, and divestiture). For an argument in favor of separating transport from content, see C. Edwin Baker, *Merging Phone and Cable*, 17 HASTINGS COMM. & ENT L.J. 97 (1994).

203. *See generally* BRUCE KUSHNIK, THE $200 BILLION BROADBAND SCANDAL (2006).

about the wealth effects of particular regimes on telecommunications providers are focused on a small subset of the story. It is the large and diverse online world of interactions and ideas that matters, and simplifying (decomplexifying) that ecosystem is a step toward economic peril.

Congress now has the opportunity to adopt a coherent approach to the Internet that takes proper account of the importance of the diversity of the communications carried across it—in part, by acting decisively to separate control over transport from control over provision of communications. We need to reframe communications law to support what matters. What matters are communications themselves, and the increasingly diverse and valuable ideas they produce.