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Philip J. Weiser
University of Colorado Law School

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LAW AND INFORMATION PLATFORMS

PHILIP J. WEISER*

INTRODUCTION

This symposium presents an ideal "platform" to support the launch of a new journal focused on telecommunications and high technology law. Unlike more established areas of the law, the field of telecommunications or, as more aptly termed, information law, is not easily defined. To be sure, there is an ambitious statutory code (the Communications Act of 1934, as amended, most notably by the Telecommunications Act of 1996[1]) and an agency charged with administering it (the Federal Communications Commission). There is even a leading casebook for teaching "Telecommunications Law."[2] But as the history of telecommunications makes clear, legal regulation of this industry defies easy categorization, as it strays across legal spheres—into antitrust, intellectual property, and First Amendment law—as well as into non-legal disciplines—into principles of engineering and economics, for example.

With the rise of the Internet and recent advances in information technology, businesses, lawyers, and scholars have focused on how to create and implement a new regulatory regime premised on competition and technological convergence.[3] Over time, this new regime will begin to transform telecommunications regulation into a particularized form of antitrust; that is, rather than follow its traditional role of addressing market power concerns directly, telecommunications regulation will increasingly

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* Associate Professor, University of Colorado School of Law and Department of Interdisciplinary Telecommunications. Thanks to Ken Bamberger, Dale Hatfield, Jon Nuechterlein, Daniel Ravicher, Marius Schwartz, Jim Speta and Molly van Houweling for helpful comments and encouragement.

1. Pub. L. No. 104-104, 110 Stat. 56 (codified in scattered sections of 47 U.S.C.).

2. *See* STUART M. BENJAMIN ET AL., TELECOMMUNICATIONS LAW AND POLICY (2001).

3. For a description of the substance of this model, see Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1326 (1998). For a description of the procedural framework for this model, see Philip J. Weiser, Chevron, *Cooperative Federalism, and Telecommunications Reform*, 52 VAND. L. REV. 1, 6-7 (1999); Philip J. Weiser, *Federal Common Law, Cooperative Federalism, and the Enforcement of the Telecom Act*, 76 N.Y.U. L. REV. 1692, 1736-46 (2001).

focus on addressing these concerns indirectly by facilitating competition wherever possible.[4] Moreover, because technological convergence—i.e., the provision of identical services through different technologies—will continue to blur the boundaries between the various segments of the information industries—telecommunications, computing, and entertainment—legal regulation in any of these areas will impact all of them.

We are still too close to the onset of the Internet age to determine whether it will spark a series of legal responses that can be studied and understood as part of a larger whole. More powerfully than any other legal scholar, Lawrence Lessig makes the case for how the law should understand and respond to these changes.[5] Like other notable scholars in the area, Lessig's work seeks to understand the implications of technological convergence, the Internet, and the advent of digital technology across a number of related legal areas—i.e., telecommunications regulation, intellectual property, antitrust, and First Amendment law. Each of these areas of information law, however, only addresses a particular aspect of the challenge of information platform regulation. Thus, only by pulling back the lens to see how all of these areas interact can we appreciate the entire legal context for the regulation of information platforms.

Before moving on to discuss some of the specifics of information platform regulation, let me first acknowledge that this conference will give short shrift to a set of important information law concerns that will remain potential subjects for future events. Most notably, there will be only very limited discussion of how government will regulate content and commerce on the Internet. But as recent court cases involving Yahoo's website and the Child Online Protection Act make clear,[6] these issues will keep information lawyers busy in the years to come. Second, because most information platforms relate to a network standard or physical infrastructure that underpins the delivery of Internet

4. As then-Chief Judge Breyer put it, "[e]conomic regulators seek to achieve [the goals of low prices, innovation, and efficient production methods] *directly* by controlling prices through rules and regulations; antitrust seeks to achieve them *indirectly* by promoting and preserving a [competitive] process that tends to bring [these goals] about." Town of Concord v. Boston Edison Co., 915 F.2d 17, 22 (1st Cir. 1990), *cert. denied*, 500 U.S. 930 (1991).

5. *See, e.g.*, LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE (1999); LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD (2001).

6. *See* Yahoo!, Inc. v. La Ligue Contre Le Racisme et L'Antisemitisme, 169 F. Supp. 2d 1181 (N.D. Cal. 2001); Ashcroft v. ACLU, 122 S. Ct. 1700 (2002) (evaluating constitutionality of Child Online Protection Act, Pub. L. No. 105-277, 112 Stat. 2681 (1998) (codified at 47 U.S.C. § 231 (Supp. V 1999))).

content, we will focus less on issues related to the ability of copyright holders to limit what will be accessible on the Net.[7] My expectation, however, is that even issues like content regulation will make more sense—and fit more closely with other areas of information law—when evaluated in reference to the concept of information platforms.[8]

I. INFORMATION PLATFORMS, INSTANT MESSAGING, AND THE FUTURE OF INFORMATION LAW

I expect that even many in the telecommunications field are not accustomed to thinking about information platforms. For those coming from the computer world, you will be familiar with a "platform" as a synonym for an operating system.[9] In the Internet world, there are actually a series of information platforms that build on top of one another. An instant messaging system, for example, builds on top of the basic Internet protocol, which can be accessed from any number of hardware devices connected to the Internet, including cell phones, a cable modem, or a computer that uses dial up access via an Internet Service Provider. What all of these information platforms have in common is that they rely on network standards around which complementary products must be developed. Thus, for an information platform to become successful, a sponsor of the technology must ensure "a critical mass of adopters and a critical mass of complementary software (and sometimes other components)."[10]

By directing our analysis to platforms, I believe that we can gain insight into three important themes. First, I believe that we can better understand exactly how telecommunications regulation, antitrust, intellectual property, and First Amendment law

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7. For a discussion of this issue, see LESSIG, FUTURE OF IDEAS, *supra* note 5, at 250-58. *See also, e.g.*, A&M Records, Inc. v. Napster, Inc., 239 F.3d 1004 (9th Cir. 2001).

8. For another effort to build a framework for information law around the platform concept, see François Bar & Christian Sandvig, Rules from Truth: Post-Convergence Policy for Access 21-22, *at* http://www.stanford.edu/~fbar/Publications/Rules_from_Truth.pdf (last visited July 27, 2002) (paper presented at the *28th Annual Telecommunications Policy Research Conference*, Arlington VA, Sept 23-25, 2000).

9. *See* "Platform," WEBOPEDIA, *at* http://www.webopedia.com/TERM/p/platform.html (last visited July 27, 2002). But as those familiar with the computer world understand, the platform concept is more complicated, as new middleware technologies, such as a browser, can also serve as a platform. *See* United States v. Microsoft Corp., 253 F.3d 34, 53 (D.C. Cir. 2001) (explaining "middleware").

10. Timothy F. Bresnahan, *New Modes of Competition: Implications for the Future Structure of the Computer Industry, in* COMPETITION, INNOVATION AND THE MICROSOFT MONOPOLY (Jeffrey Eisenach & Thomas Lenard, eds., 1999), *available at* http://www.pff.org/microsoft/bresnahan.html (last visited July 27, 2002).

intersect in their respective missions. Intellectual property—as well as real property—law defines the scope of a provider's control of its platform, whereas antitrust and telecommunications law regulate whether—as well as when and how—access to a platform should be granted. The First Amendment provides a judicial check on congressional and agency regulation of information platforms, both in terms of whether access can be denied to would-be fair users of a platform[11] as well as to whether government can mandate access to an information platform.[12] In this regard, only *information* platform regulation—as opposed to, say, the regulation of physical platforms like railroads—implicates intellectual property and First Amendment issues.

Second, the information platform concept also enables lawyers to better identify and appreciate the relevant relationships in a particular system of production and distribution. Some providers will offer products that "substitute" for another—say, broadband transport by a DSL telephone line as opposed to a cable modem—while others will offer products that "complement" one another—such as, a broadband music provider that relies on a high speed connection. Using the platform concept, some products or services rely on or build on top of an information platform, thereby adding value to that "network," whereas others provide an alternative platform. As a number of economists have explained, how rival platforms relate to one another and would-be complementors raises a number of competitive issues, with the issue of whether and how interoperability is managed being paramount.[13]

The final crucial distinction highlighted by the platform concept is that it reflects the Internet's layered architecture. In short, the Internet operates as a modular system, where the critical commonality lies at the logical layer, with the open Transmission Control Protocol/Internet Protocol (TCP/IP) standard, and at the physical interconnection points between backbone networks. This "end-to-end" and open architecture network design allows for diversity of the modes of physical access as well as a plethora of applications and content developed to work with the

11. *See, e.g.*, Universal City Studios, Inc. v. Corley, 273 F.3d 429 (2d Cir. 2001) (evaluating constitutionality of Digital Millenium Copyright Act's access restrictions).

12. *See, e.g.*, Turner Broad. System, Inc. v. FCC, 512 U.S. 622 (1994) (evaluating constitutionality of "must-carry" regulations).

13. For a good treatment of this subject, see Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 J. ECON. PERSP. 117 (1994).

TCP/IP standard.[14] As envisioned by the Internet's pioneers, the end-to-end principle envisions that the intelligence capabilities of the network (i.e., the ability to activate an application) will remain at the edges and that the middle of the network will function as a "dumb pipe."[15] In an era where proprietary development introduces technologies that deviate from the end-to-end principle by providing for a more intelligent network, the Internet's architecture may well come to resemble something other than the one envisioned by the leading Internet pioneers.[16]

The current state of the relevant fields that comprise "information law" reflects the legacy of regimes that have grown up without the benefit of cross-fertilization or reform efforts to ensure that they work well in tandem with one another. To be sure, there are exceptions among the relevant court cases, such as Judge Boudin's concurrence in the *Lotus* case.[17] But in terms of implementing a coherent competition policy strategy, information platform regulation is still at a fairly immature stage.

To provide a context for understanding the nature of information platform regulation, consider the instant messaging (IM) market. For those uninitiated with the product, IM provides its users with an opportunity to use the Internet for real-time communication with one's "buddies," as AOL,[18] who is credited with popularizing the system, puts it.[19] As of yet, however, the vari-

14. For this reason, the Internet's architecture can be described as having an hourglass shape, with the logical layer—the TCP/IP standard—at the middle, the physical layer below it, and applications (as well as content) riding on top of it. *See* NATIONAL RESEARCH COUNCIL, THE INTERNET'S COMING OF AGE 126-27 (2001) (describing Internet architecture); Kevin Werbach, *A Layered Model For Internet Policy*, 1 J. TELECOMMS. & HIGH TECH. L. 37, 59-65 (2002) (same).

15. *See* Dale Hatfield, *Preface*, 8 COMMLAW CONSPECTUS 1, 1 (2000). For a classic articulation of the principle, see Jerome H. Saltzer et al., *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS IN COMPUTER SYSTEMS 277 (1984), *reprinted in* INNOVATIONS IN INTERNETWORKING 195 (Craig Patridge ed., 1988).

16. For a discussion of the forces challenging the end-to-end principle, see David D. Clark & Marjory S. Blumenthal, *Rethinking the Design of the Internet: The End to End Arguments vs. the Brave New World* (Aug. 10, 2000), *at* http://www.tprc.org/abstracts00.rethinking.pdf.

17. *See* Lotus v. Borland, 49 F.3d 807, 821 (1st Cir. 1995) (Boudin, J., concurring), *aff'd by an equally divided Court*, 516 U.S. 233 (1996).

18. Technically, AOL offers two distinct instant messaging products: AOL's Instant Messager (AIM) and ICQ's instant messaging service. *See* Consent to the Transfer of Control of Licenses and Section 214 Authorizations by Time Warner Inc. and America Online, Inc., Transferors, to AOL Time Warner, Inc., Transferee, *Memorandum Opinion and Order*, 16 F.C.C.R. 6547, 6606 n.379 [hereinafter AOL Order]. For simplicity purposes, I shall refer to two products collectively as "AOL's instant messaging services."

19. For a primer on the technology, see Jeff Tyson, *How Instant Messaging Works*, HOWSTUFFWORKS.COM, *at* www.howstuffworks.com/instant-messaging.htm (last visited July 27, 2002).

ous IM providers have not made their systems—or "information platforms"—interoperable.[20] In response, Microsoft and other rivals insisted first that AOL accept an open standard promulgated by the Internet Engineering Task Force (IETF), a leading Internet standard setting body, and later requested that the FCC impose such a condition in approving the merger between AOL and Time Warner.[21] Even with the calls for "open access," IM users today, like the telephone networks of the early 1900s,[22] cannot access another system without using two separate networks.

The instant messaging example provides rich fodder for law school exams and policy debates, and I have used it for both. Because it grew up on the Internet and thus defies the usual effort to label it as an issue for telecom regulation, intellectual property, or antitrust, it provides a quintessential case study for understanding information law as focused on the regulation of information platforms. In short, IM highlights the role of intellectual property in defining the scope of the right at issue as well as how both antitrust and telecommunications regulation—subject to First Amendment limitations—can limit the scope of the relevant property right.

In a debate that dates back to the late 1970s, when Congress provided copyright protection for computer programs,[23] the intellectual property status of IM raises the issue of whether its product interfaces warrant protection.[24] The answer to this question

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20. *See* AOL Order, *supra* note 18, at 6619-20; *see also* Don Clark, *AOL and Apple Team Up to Offer Instant Messaging*, WALL ST. J., July 30, 1999, at B6 (noting that Instant Messaging could be a very important platform and discussing efforts to create open access to AOL's customer base); Don Clark, *Internet Rivals Attempt to Open Up AOL's Instant Message System*, WALL ST. J., July 26, 1999, at B2 (detailing AOL's efforts to keep other services from accessing its Instant Messaging platform); Jim Thompson, *Microsoft and AOL Wage War Over Instant Messaging*, BOARDWATCH, Dec. 1999, at 78, 78-79 (noting that AOL justified its resistance to open standards on the ground that it would compromise some of its software's features and its users' security).

21. *See* Nick Wingfield, *Changing Chat: Will Instant Messaging be the Dial Tone of the Future?*, WALL ST. J., Sept. 18, 2000, at R38 (noting efforts to lobby the FCC).

22. *See* MILTON L. MUELLER JR., UNIVERSAL SERVICE: INTERCONNECTION, COMPETITION, AND MONOPOLY IN THE MAKING OF THE AMERICAN TELEPHONE SYSTEM 45–46 (1997) (noting situation where AT&T refused to interconnect).

23. *See* FINAL REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS (July 31, 1978); *see also* H.R. Rep. No. 96-1307, Part I, 96th Cong.2d Sess. 23 U.S.C.C.A.N. 6460, 6482 (1980); Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1252 (3d Cir. 1983) (noting that Congress "wrote into law the majority's recommendations almost verbatim").

24. *See, e.g.*, Pamela Samuelson, *CONTU Revisited: The Case Against Copyright Protection for Computer Programs in Machine-Readable Form*, 1984 DUKE L.J. 663 (criticizing the basic premises and methodology of the report).

would appear to be yes, but a series of exceptions leaves the issue cloudy.[25] As of yet, the providers of IM, particularly AOL, have been able to keep rivals from accessing its Names and Presence Directory (NPD) through technological fixes.[26] Thus, unlike the record companies in the *Napster* litigation, AOL has not gone to court to enforce its proprietary rights to its IM system.[27] But in the event that AOL could not prevent a software program from facilitating interoperability,[28] it may well test its IP rights as a means of defeating interoperability.[29]

Intellectual property law actually presents a variety of puzzles related to regulating open access to rival products.[30] Significantly, the issue of interoperability will increasingly be raised in the legal arena because standard setting committees, such as the IETF, are no longer able to get out in front of the market to address the issue, as they were able to do when the Internet community was smaller and largely comprised of non-commercial actors.[31] In light of the changing nature of the Internet community, standard setting—and particularly whether a standard is open or under proprietary control—will be a compelling topic for years to come. Finally, if a provider of IM ever sues AOL for monopolistic conduct under Section 2 of the Sherman Act,[32] that

25. *See, e.g.*, Bateman v. Mnemonics, Inc., 79 F.3d 1532, 1547 (11th Cir. 1996) (stating that "[i]t is an incorrect statement of the law that interface specifications are not copyrightable as a matter of law," but then setting forth a series of exceptions, most notably, fair use and misuse).

26. *See* Rajiv Chandrasekaran, *Clash of the Titans Erupts Over AOL's Instant Messaging*, WASH. POST, July 24, 1999, at A1; Don Clark, *Microsoft Ends Row with AOL Over Instant Messaging*, WALL ST. J., Nov. 18, 1999, at B13.

27. *See* A&M Records, Inc. v. Napster, Inc., 239 F.3d 1004, 1024 (9th Cir. 2001).

28. *See* Ben Charny, *Cell Phone IM Plan Supports Interoperability*, CNET NEWS.COM, *at* http://news.cnet.com/news/0-1004-200-7866405.html (Nov. 13, 2001) (noting that some software companies have developed means of facilitating interoperability); *see also* Paul Festa, *IM Start-up on Crash Course with AOL*, CNET NEWS.COM, *at* http://news.com.com/2100-1023-840981.html (Feb. 20, 2002) (detailing clashes between AOL and PalTalk); Lisa M. Bowman, *AOL Blocks Instant Messaging Start-up*, CNET NEWS.COM, *at* http://news.com.com/2100-1023-826625.html (Jan. 30, 2002) (detailing clashes between AOL and Trillian).

29. *See, e.g.*, Am. Online, Inc. v. Nat'l Health Care Discount, Inc., 121 F. Supp. 2d 1255 (N.D. Iowa 2000) (legal action by AOL against marketers who have found ways to circumvent filtering programs and who continue to "spam" AOL customers).

30. *See* Philip J. Weiser, *The Internet, Innovation, and Intellectual Property Policy*, 102 COLUM. L. REV. (forthcoming 2003).

31. *See* Margaret Jane Radin & R. Polk Wagner, *The Myth of Private Ordering: Rediscovering Legal Realism in Cyberspace*, 73 CHI.-KENT L. REV. 1295, 1309 (1998) ("Achievement of stability in self-regulated commons is often thought to be dependent on the degree to which the cooperators are a close-knit, homogenous cultural group.").

32. Section 2 prohibits any individuals or firms from acting to: "monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to

would raise the question as to whether an intellectual property right immunizes a company from a duty to deal under antitrust.

The only existing regulation of instant messaging interoperability comes from the FCC's decision to impose a limited interconnection mandate as part of its approval of the AOL/Time Warner merger.[33] It is only appropriate that this action constitute a harbinger for the future of information law, as the merger itself presented an unambiguous commitment to a convergence between computing, entertainment, and telecommunications. As befitting of such a venture, the FCC's decision to regulate AOL's instant messaging product provides an important glimpse at some of the issues ahead in the emerging field of information law.[34]

II. DIGITAL TECHNOLOGY, TELECOMMUNICATIONS REGULATION, AND THE CHALLENGE OF INFORMATION LAW

The instant messaging case highlights how the central tool of telecommunications law—an interconnection mandate—presents regulators with a bad case of déjà vu. At the dawn of telecommunications regulation in the early 1900s, policymakers allowed AT&T to buy up competitors, declined to order interconnection, and ultimately concluded that "the network" was a natural monopoly and that a single firm should provide telecommunications service to all consumers.[35] In most cases, this company was the Bell System and, to protect consumers from this supposed natural monopoly, the federal and state governments established regulatory commissions to regulate all parts of the business. As for wireless communications, the need for coordination so as to avoid interference provided the justification for government regulation. In this case, the government not only licensed monopoly providers, but also embarked on a regime of content regulation as justified by the existence of such monopolies.[36]

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monopolize any part of the trade or commerce among the several States." 15 U.S.C. § 2 (1994).

33. *See* AOL Order, *supra* note 18.

34. For differing assessments of this theme, compare Philip J. Weiser, *Standard Setting, Internet Governance, and Self-Regulation*, 28 N. KENT. L.J. 822 (2001) (evaluating it critically) with Daniel L. Rubinfield & Hal J. Singer, *Open Access to Broadband Networks: A Case Study of the AOL/Time Warner Merger*, 16 BERKELEY. TECH. L.J. 631, 637, 674 (2001) (endorsing it).

35. For a description of this history, see MUELLER, *supra* note 22.

36. The Supreme Court upheld this regulatory regime, as consistent with the First Amendment, in *NBC v. FCC*, 319 U.S. 190, 236-37 (1942).

Given the command-and-control approach of early telecommunications law, it coexisted in an uneasy fashion with antitrust policy and First Amendment law. In terms of antitrust, the Bell System faced a continuous set of questions as to whether its commitment to "one system, one service" reflected sound economics, or merely the use of regulation to prevent competition.[37] Ultimately, antitrust—and technological change—prevailed, transforming the presumption of telecommunications law from one committed to monopoly regulation to facilitating competition.[38] The FCC's decisions along the way marked an unsteady path, but even before the Telecommunications Act of 1996 settled the question by statute, the FCC's commitment to competition (as well as that of a number of states) was well established.[39]

As to wireless communications, the prospect of the third generation wireless telephone service and the transition to digital television present the FCC with a number of intriguing opportunities. Similarly, the advent of first cable and then satellite technology put to rest—at least in the marketplace, if not in the law books[40]—the idea that spectrum was "scarce" and deserved special First Amendment treatment.[41] As different communication technologies all move to a digital architecture, telecommunications will increasingly defy classification by the particular conduit used to deliver the message. The medium will no longer, at least in terms of the "pipe" used to deliver it, be the message. Instead, a bit will be a bit will be a bit.[42]

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37. *See* James B. Speta, *Maintaining Competition in Information Platforms: Some Thoughts on Vertical Restrictions in Emerging Telecommunications Markets*, 1 J. TELECOMMS. & HIGH TECH. L. 185, 195-202 (2002) (discussing antitrust issues of Bell System).

38. *See* United States v. AT&T, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom*, Maryland v. United States, 460 U.S. 1001 (1983).

39. For a discussion of the competitive and regulatory landscape before the 1996 Telecom Act, see Craig D. Dingwall, *The Last Mile: A Race For Local Telecommunications Competition Policy*, 48 FED. COMM. L.J. 105 (1995).

40. To this day, *Red Lion Broad. Co., Inc., v. FCC*, 395 U.S. 367, 390 (1969), which set forth a lower First Amendment standard for broadcast regulation based on a scarcity rationale, remains good law. *See also* Time Warner Entm't Co. v. FCC, 105 F.3d 723 (D.C. Cir. 1997) (applying *Red Lion* in upholding regulation of direct broadcast satellite licenses). For a discussion of the different standards in First Amendment analysis, see Ellen P. Goodman, *Bargains in the Information Marketplace: The Use of Government Subsidies to Regulate New Media*, 1 J. TELECOMMS. & HIGH TECH. L. 217 (2002).

41. For a discussion of this issue, see Philip J. Weiser, *Promoting Informed Deliberation and a First Amendment Doctrine for a Digital Age: Towards a New Regulatory Regime for Broadcast Regulation, in* DELIBERATION, DEMOCRACY, AND THE MEDIA 11 (Simone Chambers ed., 2000).

42. *See* David S. Isenberg, *The Dawn of the Stupid Network*, ACM NETWORKER, Feb./Mar., 1998, at 24, 28, *available at* www.isen.com/papers/Dawnstupid.html

The two fundamental transforming dynamics of the information age appear to be the digital transformation predicted by Negroponte[43] and the networked world envisioned by Metcalfe.[44] In particular, the Internet has emerged as the "killer platform" that provides individuals and companies with an opportunity to deploy multimedia applications, constrained only by their imagination, current data processing technology, and the bandwidth available to users. Unlike proprietary networks, the Internet does not rely on a particular form of technology or belong to any individual; rather, it is a "network of networks," whose key protocols are all in the public domain. Most particularly, the Internet reflects a commitment by a series of networks to "interconnect" and use the common TCP/IP protocol.[45]

Telecommunications regulation is still in the early stages of responding to the new reality defined by the Internet. A couple of years ago, Vint Cerf and Bob Kahn, two early Internet pioneers, predicted that the Internet will overtake telecommunications usage sometime shortly after 2006.[46] At some point down the road, traditional telecommunications usage as we knew it—either through the use of fax or voice communications—may ultimately cease to exist at all, with all traffic traveling over the Internet as a digital application—be it, voice, video or data.[47] As

("Because IP makes the details of the network irrelevant, all that matters is that the bits sent by your machine are received by my machine, and vice versa.").

43. *See* NICHOLAS NEGROPONTE, BEING DIGITAL (1995).

44. Bob Metcalfe, the founder of 3Com, is credited with the insight that a network of computers grows quadratically more valuable as more individuals are connected to it. *See* George Gilder, *Metcalfe's Law and Legacy*, FORBES ASAP, Sept. 13, 1993, at 158, 160. In the economics literature, this point is often described as a "network externality" or "network effect." *See* Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERSP. 93, 94 (1994) ("Because the value of membership to one user is positively affected when another user joins and enlarges the network, such markets are said to exhibit 'network effects,' or 'network externalities.'").

45. *See* Robert E. Kahn & Vinton G. Cerf, *What is the Internet (and what Makes it Work)*, INTERNET POLICY INSTITUTE, *at* http://www.internetpolicy.org/briefing/12_99_story.html (Dec. 1999); *see also* James B. Speta, *A Common Carrier Approach To Internet Interconnection*, 54 FED. COMM. L.J. 225, 245-47 (2002).

46. As Kahn & Cerf explained:

> [T]he total numbers of host computers and users have been growing at about 33% every six months since 1988—or roughly 80% per year. The telephone service, in comparison, grows an average of about 5-10% per year. That means if the Internet keeps growing steadily the way it has been growing over the past few years, it will be nearly as big as today's telephone system by about 2006.

Kahn & Cerf, *supra* note 45.

47. *See* Werbach, *supra* note 14, at 45 ("The Internet is going to swallow telecommunications. Data traffic is growing much faster than voice, and promises to dominate future capacity demands on all major networks.").

Kevin Werbach convincingly explains, this specter haunts telecommunications regulation and requires that, at some point, telecommunications regulation will be linked inextricably with Internet regulation.[48] Put simply, it makes no sense to regulate telecommunications and leave the Internet unregulated.[49]

In the wake of the Telecommunications Act of 1996, which embraced technological convergence and sought to facilitate competition,[50] the FCC is still struggling to revise its legacy regulatory framework to better respond to technological realities. Given that the Act barely contemplated the importance of the Internet and did not disturb a category-based regulatory strategy (e.g., one with distinct approaches for broadcast, cable, and telephone networks), this should not be a surprise.[51] A classic distinction that the FCC employed to avoid regulating the computer industry was its judgment that "enhanced" services were ancillary to communications and could be left unregulated by the FCC. In the Telecom Act, Congress adopted the AT&T consent decree court's term, "information services," to replace the earlier

48. *Id* at 38 (calling on policymakers to "reformulate communications policy with the Internet at the center"); *id.* at 46 ("communications policy will be a subset of Internet policy, rather than the reverse").

49. Early commentary—and even policymakers—suggested that the Internet could exist in a hermetically sealed unregulated universe. *See, e.g.*, David R. Johnson & David G. Post, *Law and Borders—The Rise of Law in Cyberspace*, 48 STAN. L. REV. 1367 (1996); Presidential Directive on Electronic Commerce, *at* http://www.ecommerce.gov/presiden.htm (July 1997). Fortunately, the current FCC Chairman takes a different perspective. *See* Law in the Internet Age, Remarks of Michael K. Powell, FCC Commissioner, Before D.C. Bar Ass'n Computer and Telecomms. Law Section and the Fed. Comm. Bar Ass'n, (Sept. 29, 1999), *at* http://www.fcc.gov/Speeches/Powell/2000/spmkp002.html ("The important public policy question is not whether to regulate the Internet or not, as if that were a realistic choice. Rather, it is how to regulate it responsibly in a manner that maximizes consumer welfare and does not stunt its infinite growth and innovation potential.").

50. *See* Pub. L. No. 104-104, purpose statement, 110 Stat. 56, 56 (1996).

51. *See* Werbach, *supra* note 14, at 42 ("The 1996 Act did not contemplate the radical changes the Internet is bringing to the communications world."); John Nakahata, *Regulating Information Platforms: The Challenge of Rewriting Communications Regulation from the Bottom Up*, 1 J. TELECOMMS. & HIGH TECH. L. 95, 96 (2002) ("Despite all the talk of convergence, regulation in the United States has not kept pace."); *id.* at 97 ("Congress has yet to acknowledge that it has a significant role to play in addressing the implications of convergence and the rise of the Internet Protocol for today's regulatory system."); J. SCOTT MARCUS, THE POTENTIAL RELEVANCE TO THE UNITED STATES OF THE EUROPEAN UNION'S NEWLY ADOPTED FRAMEWORK FOR TELECOMMUNICATIONS 1 (FCC, OPP Working Paper No. 36, July 2002), *available at* http://www.fcc.gov/Daily_Releases/Daily_Business/2002/db0711/DOC-224213A2.pdf (the Internet decouples the application—e.g., voice or video—from the underlying method of transmission—i.e., cable or telephony); NATIONAL RESEARCH COUNCIL, BROADBAND: BRINGING HOME THE BITS 32 (2002) (Telecom Act "does not fully reflect the convergent nature of broadband"—i.e., the ability to deliver similar set of services from the Internet).

"enhanced services" definition and sought to maintain them as unregulated services.[52] Thus, how the FCC classifies and regulates services like Internet telephony that blend the two will shape profoundly the structure of the next generation regulatory regime.[53]

To protect enhanced service providers and afford them reliable vertical access to the telecommunications network, the FCC imposed on local telephone companies a series of regulations under its Computer I, Computer II, and Computer III regimes.[54] Initially, these regimes provided for structural separation between an incumbent provider's telecommunications and enhanced service operations, but ultimately allowed the incumbents to provide such services on an integrated basis. In so doing, however, the Commission took the important step of insisting on non-discriminatory access obligations to ensure that the telecommunications network could be used for a variety of services (e.g., Internet access) and that rival companies could market equipment like modems that could connect to the network. As the Internet developed, it became clear that it would be used for, among other things, voice communication in a manner similar to the circuit-switched telephone network and thus the old hard-and-fast distinction between the regulated telecommunications world and the unregulated Internet world would be difficult to maintain.[55] Even in the face of this reality, some policymakers still call for an "unregulation" of the Internet under a model consistent with the Computer inquiries.[56]

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52. 47 U.S.C. §153(20) (Supp V. 1999); *see also* Joseph D. Kearney, *From the Fall of the Bell System to the Telecommunications Act: Regulation of Telecommunications*, 50 HASTINGS L.J. 1395, 1414, n.55 (1999) (discussing term).

53. *See* Werbach, *supra* note 14, at 42-44 (discussing FCC's struggles with the issue).

54. *See* Amendment of Section 64.702 of the Commission's Rules and Regulations, *Final Decision*, 77 F.C.C.2d 384, 432–33 (1980). Numerous commentators have detailed this history. *See* Steve Bickerstaff, *Shackles on the Giant: How the Federal Government Created Microsoft, Personal Computers, and the Internet*, 78 TEX. L. REV. 1, 7–21 (1999); JASON OXMAN, THE FCC AND THE UNREGULATION OF THE INTERNET (FCC, OPP Working Paper No. 31, July 1999), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp31.pdf.

55. *See* Bar & Sandvig, *supra* note 8, at 19 (such efforts create "dysfunctional distinctions meant to reconcile new communications services with old rules"). For an example of some of the issues that challenge such distinctions, see Federal-State Joint Board on Universal Service, *Report to Congress*, 13 F.C.C.R. 11501, 11541, 11543 (1998) (adopting a "wait and see" approach to regulating Internet telephony); Speta, *supra* note 37, at 203-205 (discussing Internet backbone issue); Dale Hatfield, *supra* note 15, at 2-3 (same).

56. *See* OXMAN, *supra* note 54. A more appropriate conception along these lines would not be to call for unregulation as such, but simply to resist imposing legacy

The Internet's open architecture depends on a series of layers, each of which can potentially be controlled by a proprietary "gatekeeper." Consequently, policies for the Internet may not be able to simply assume that the gates will be at the "physical" layer, though protecting competition at that layer may be a particularly suitable job for telecommunications regulation. Depending on how the Internet evolves, an Internet portal, Internet Service Provider, or possibly a browser product, could attempt to leverage a dominant position in a manner that might discriminate against rival applications.[57] As the FCC faces requests to regulate either physical/hardware or logical/software Internet products, it will undoubtedly revisit its historic reluctance to regulate the Internet and, in order to discipline itself and guide companies, it will need to articulate a clear analytical structure for examining requests to regulate the architecture of new information platforms.[58]

In the face of the Internet's emergence and the advent of competition between information platforms that are retooling to compete to deliver digital services, different schools of thought have rushed in to provide guidance to policymakers. In an ambitious critique of agency regulation, Peter Huber contends that there is no independent role for telecommunications regulation, underscoring that questionable past decisions render doubtful any potential that the FCC would play a useful role in facilitating and safeguarding competition.[59] In an alternate course, which I think much more promising, Kevin Werbach's thoughtful essay suggests that telecommunications regulation should be viewed as an instrument of Internet policy and, additionally, view its own task in light of the architecture that defines the Internet.[60] In a similar vein, a number of commentators, most no-

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regulations lock, stock, and barrel. *See* Robert Pepper, *Policy Changes Necessary to Meet Internet Development*, 2001 L. REV. M.S.U.-D.C.L. 255, 259 (2001).

57. For a discussion of "leveraging" and the underlying economic considerations, see Joseph Farrell & Philip J. Weiser, *Modularity Vertical Integration, and Open Access Policies, Towards A Convergence of Antitrust and Regulation, available at* http://stiet.si.umich.edu/researchseminar/farrell-Sept1.pdf (forthcoming 2003).

58. *See* Weiser, *supra* note 34, at 846.

59. *See* PETER HUBER, LAW AND DISORDER IN CYBERSPACE: ABOLISH THE FCC AND LET COMMON LAW RULE THE TELECOSM 7 (1997) (arguing that the FCC "should shut its doors once and for all"); *see also* John W. Berresford, *The Future of the FCC: Promote Competition, then Relax,* 50 ADMIN. L. REV. 731, 736 (1998) (listing, among past failures of the FCC, its six year delay in allowing MCI to enter the private line long distance market and its twelve year delay in allowing entry into the mobile telephone market after it was technically feasible).

60. *See* Werbach, *supra* note 14, at 37-39. This approach also echoes the second generation Internet scholarship that rejects the non-regulation model set out by earlier commentators. *See, e.g.*, Timothy Wu, *Application-Centered Internet Analysis*,

tably Yochai Benkler, advocate using the Internet-type model of a common standard to enable spectrum to be regulated as a "commons" (in addition to, or instead of, through private property rights), where equipment providers and users are regulated through adherence to current protocols.[61] In a move that suggests that the agency is willing to experiment with such an approach, the FCC recently approved the use of "ultrawideband" technology, which will provide equipment suppliers and service providers access to free, unlicensed spectrum, provided they adhere to certain technical limitations.[62]

In evaluating the role of law in regulating information, there is a danger both of losing sight of the forest from the trees as well as getting ahead of the state of technology in evaluating appropriate policy. By developing an understanding of information law that is broader than the various technologies it is charged with regulating, the FCC can establish itself as a valued partner to antitrust and intellectual property law in regulating the converging worlds of telecommunications, computing, and entertainment.[63] In particular, the next several years will begin to reveal whether the FCC implements effectively a tripartite challenge: managing a transition from monopolized markets to competitive ones (at least as to ones where competition does develop), developing competition policy for an Internet age,[64] and protecting the public values it is charged to safeguard. To understand the scope

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85 VA. L. REV. 1163, 1183 (1999) ("[S]tudy of the Internet also works from a sufficiently general denominator: the set of standards that define the Internet.").

61. *See* Yochai Benkler, *Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment*, 11 HARV. J.L. & TECH. 287 (1998).

62. *See* Martin Reynolds, *FCC Cuts the Wires*, CNET NEWS.COM, *at* http://news.com.com/2009-1033-839110.html (Feb. 15, 2001); *see also* Amendment of Part 15 of the Commission's Rules Regarding Spread Spectrum Devices, *First Report and Order*, 15 F.C.C.R. 16244 (2000) (allowing spread spectrum technologies, which can "hop" from different frequencies to one another, to operate on an unlicensed basis under Part 15 of the FCC's rules).

63. Given the task before it, some commentators are understandably skeptical that the FCC can fulfill this role, at least in its current form. *See* Tom W. Bell, *The Common Law in Cyberspace*, 97 MICH. L. REV. 1746, 1750 (1999) ("[T]o judge from the Civil Aeronautics Board and the Interstate Commerce Commission, federal agencies that regulate networks appear uniquely vulnerable to fatal reforms."); John F. Duffy, *The FCC and the Patent System: Progressive Ideals, Jacksonian Realism, and the Technology of Regulation*, 71 U. COLO. L. REV. 1071 (2000) (arguing that the FCC should look to the Patent and Trademark Office model for guidance). For a discussion of how telecommunications regulation can evolve to work in partnership with antitrust, see Philip J. Weiser, *The Imperative of Harmonization Between Antitrust and Regulation*, 698 PLI/PAT 73 (2002).

64. Sound competition policy includes, among other things, an appreciation for how regulation will affect parties' incentives to invest in new facilities. *See* Larry F. Darby & Joseph Fuhr, *Investment Incentives and Local Competition at the FCC*, 9 FALL MEDIA L. & POLICY 1 (2000); Digital Broadband Migration Part II, Press Con-

of this mission, it is important to evaluate the complementary role played by antitrust oversight, to which this essay now turns.

III. ANTITRUST OVERSIGHT IN THE INFORMATION AGE

Over the last several years, antitrust law has begun to confront two of the most formidable obstacles it faces as a regulatory tool for the information age. The first challenge is the ability of antitrust enforcers and courts to react quickly to anticompetitive market developments and institute an effective remedial response. Like the *AT&T* case twenty years before,[65] the *Microsoft* litigation tested the ability of antitrust courts to respond to predatory conduct by a platform monopolist.[66] It is too soon to determine whether this antitrust action will serve its intended mission, but, as Lawrence Lessig suggested in recent testimony, even the flawed decree accepted by the federal government includes some important restrictions on Microsoft's conduct,[67] although the effectiveness of its enforcement regime is suspect.[68] In a second, but less high profile, challenge to antitrust, it remains to be seen whether intellectual property law will displace antitrust oversight.[69] Taken together, the development of these issues—the antitrust consequences of abusing control of a monopoly information platform and antitrust's relationship with in-

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ference by Michael Powell (Oct. 23, 2001), *available at* http://www.fcc.gov/Speeches/Powell/2001/spmkp109.html (last visited Aug. 24, 2002).

65. *See* United States v. AT&T, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom*, Maryland v. United States, 460 U.S. 1001 (1983).

66. *See* United States v. Microsoft Corp., 253 F.3d 34 (D.C. Cir. 2001).

67. In terms of its flaws, the proposed settlement, for example, does not address the Court of Appeals' conclusion that Microsoft's actions related to Java as well as its commingling of code to disadvantage competitors constituted part of its illegal course of conduct. *See id.* at 76 (discussing deception of Java developers as a means to undermine the Java standard); *id.* at 66 (concluding that Microsoft's commingling of browsing and non-browsing code had an anticompetitive effect by deterring the installation of rival browsers). For a discussion of the potential impact of the decree's restrictions, see Dan Carney, *Microsoft Could Still Lose a Lot of Yardage*, BUSINESS WEEK, Dec. 24, 2001, at 35.

68. *See The Microsoft Settlement: A Look To The Future, Hearing before the S. Comm. on the Judiciary*, 107th Cong. (Dec. 12, 2001) (statement of Lawrence Lessig, Professor of Law, Stanford Law School), *at* http://judiciary.senate.gov/testimony.cfm?id=135&wit_id=104 (last visited Aug. 1, 2002).

69. In a similar, but less well developed challenge to antitrust, the Seventh Circuit suggested the possibility that the Telecommunications Act of 1996 bars any antitrust challenges related to the market opening obligations set out by the Act. *See* Goldwasser v. Ameritech Corp., 222 F.3d 390 (7th Cir. 2000); *see also* Philip J. Weiser, Goldwasser, The Telecom Act, and Reflections on Antitrust Remedies (forthcoming 2003) (challenging position); Brief of United States as Amicus Curiae, Intermedia Communications, Inc. v. Bell South Telecomms., Inc., (11th Cir.) (No. 01-10224-JJ) (filed Mar. 28, 2001), *available at* http://www.usdoj.gov/atr/cases/f7700/7777.htm.

tellectual property—will shape how antitrust regulates other information platforms like instant messaging.

Although courts once suggested that antitrust and intellectual property worked in tension with one another,[70] both regimes now recognize the importance—and, to a lesser degree, the limits—of protecting property to encourage investment and innovation.[71] In terms of working together to foster compatibility between rival platforms, intellectual property rules can facilitate the development of a shared standard by allowing reverse engineering—i.e., using a finished product and working backwards to determine how it was actually made.[72] But there will be a number of cases where this "self-help" option is not sufficient. At present, intellectual property protection continues to protect a dominant standard—for example, patent protection for the interfaces for Microsoft's Windows operating system—because the contours of the reverse engineering doctrine have not been fully developed.[73] Moreover, even where reverse engineering is legally permissible, it may well not be practically effective—either because the interfaces will keep changing or the relevant code is just too cumbersome to replicate in an efficient manner, as is the

70. *See, e.g.,* United States v. Line Material Co., 333 U.S. 287, 308 (1948) (patent pool invalidated under antitrust laws).

71. *See* Atari Games Corp. v. Nintendo of Am., Inc., 897 F.2d 1572, 1576 (Fed. Cir. 1990) ("The aims and objectives of patent and antitrust laws . . . are actually complementary, as both are aimed at encouraging innovation, industry, and competition."); DOJ & FTC, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY, Sec. 1 (1995), *reprinted in* 4 Trade Reg. Rep. (CCH) 20,734 at P 13,132 Sec. 1 (April 1, 1995) ("The intellectual property laws and the antitrust laws share the common purpose of promoting innovation and enhancing consumer welfare."); Sheila F. Anthony, *Antitrust and Intellectual Property Law: From Adversaries to Partners*, 28 AIPLA Q. J. 1, 3 (2000) (innovation "depend[s] vitally on a legal framework that ensures a competitive market while protecting the rights of inventors and allowing innovators to profit from their ideas and inventions."); Timothy J. Muris, Chairman, FTC, Competition and Intellectual Property Policy: The Way Ahead, Remarks before A.B.A. Antitrust Section Fall Forum (Nov. 15, 2001), *at* http://www.ftc.gov/speeches/muris/intellectual.htm (explaining that "[t]he tensions between [antitrust and intellectual property doctrine] tend to obscure the fact that, properly understood, IP law and antitrust law both seek to promote innovation and enhance consumer welfare"). For recent commentary, see James B. Kobak, Jr., *Running the Gauntlet: Antitrust and Intellectual Property Pitfalls on the Two Sides of the Atlantic*, 64 ANTITRUST L.J. 341, 342-50 (1996); Maureen O'Rourke, *Striking a Delicate Balance: Intellectual Property, Antitrust, Contract, and Standardization in the Computer Industry*, 12 HARV. J.L. & TECH. 1, 3 (1998); Willard K. Tom & Joshua A. Newberg, *Antitrust and Intellectual Property: From Separate Spheres to Unified Field*, 66 ANTITRUST L.J. 167 (1997).

72. *See* Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 476 (1974) (defining term).

73. *See* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1, 16-29 (2001) (describing legal treatment of reverse engineering).

case with Microsoft's Windows operating system.[74] For such cases, a permissive intellectual property regime might not be sufficient to facilitate a competitive market; consequently, it is important that antitrust oversight remains a check on a firm's control of a dominant standard.

Despite the joint commitment to facilitate innovation and economic welfare, courts, commentators and enforcers have yet to harmonize satisfactorily antitrust and the intellectual property regime.[75] On the joint mission of antitrust and intellectual property, it is crucial to appreciate that both respect the importance of property as a means of enabling developers to appropriate rewards from risky investments. With respect to the essential facilities principle, for example, antitrust courts and commentators view this doctrine as exceptional in the same manner that intellectual property recognizes its role in protecting investment incentives and thus hesitates to impose compulsory licenses.[76] Put simply, even where an after-the-fact (ex post) regulation appears to promote competition, antitrust law teaches that imposing sharing requirements on a company's invention undermines before-the-fact (ex ante) incentives to invest. Despite this appreciation within antitrust, there is a growing movement to bar or limit Section 2 claims related to denials of access to intellectual property.[77]

As some courts and commentators would have it, intellectual property development deserves different treatment under antitrust than real property. In particular, some argue that where

74. *See* United States v. Microsoft Corp., 65 F. Supp. 2d 1, 15 (D.D.C. 1999); *see also* Jonathan Band, *Paragraph 52: A Window into Judge Jackson's Findings of Fact*, 17 COMPUTER LAWYER 3 (2000).

75. As Maureen O'Rourke put it, "[t]he goal seems simple enough—to encourage innovation—but because the two sets of laws attempt to do so in such different manners, the potential for conflict is present." O'Rourke, *supra* note 71, at 37.

76. *See* AREEDA & HOVENKAMP, ANTITRUST LAW, ¶ 707, at 180 (rev. ed. 1996) ("diminishing the inventor's reward reduces incentives for inventive activity and seems inconsistent with the premise of the patent system."); Phillip Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 ANTITRUST L.J. 841, 852 (1990) ("[c]ompulsory access, if it exists at all, is and should be very exceptional."); *see also, e.g.*, Sony Corp. v. Universal City Studios, Inc., 464 U.S. 417, 429 (1984) (explaining that the limited copyright monopoly "is intended to motivate the creative activity of authors and inventors by the provision of a special reward"); Alaska Airlines v. United Airlines, 948 F.2d 536, 545–46 (9th Cir. 1991) (holding that control over passenger reservation system is not sufficiently susceptible to abuse to constitute an essential facility).

77. *See* Image Technical Servs. v. Eastman Kodak Co., 125 F.3d 1195, 1218 (9th Cir. 1997) (viewing the possession of an intellectual property right as a presumptively valid legitimate business reason), *cert. denied*, 523 U.S. 1094 (1998); Data Gen. Corp. v. Grumman Sys. Support Corp., 36 F.3d 1147, 1187 (1st Cir. 1994) (same).

an allegedly illegal action is an anticompetitive refusal to deal in Kodak's intellectual property[78]—as opposed to Aspen Ski's developed ski slope[79]—antitrust law should refrain from assigning liability to Kodak even if the same legal standard is met in each case.[80] Presumably, advocates of this position believe that a stronger protection of property is necessary to facilitate investment in intellectual property—as opposed to real property—development, as a duty to deal requirement imposed in either case could effectuate the same type of impingement on the ability to appropriate one's investment.[81] But as a number of commentators have explained, there is no real basis for distinguishing between the two.[82] Thus, understood properly, both antitrust and intellectual property (like real property law) protect property rights to stimulate investment, but neither condone exclusionary denials of access just because the interface at issue might lay claim to intellectual property protection.[83]

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78. *See Kodak*, 125 F.3d at 1218.

79. *See* Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585 (1985).

80. For one such argument, see Carl Shapiro, *Navigating the Patent Thicket: Cross-Licenses, Patent Pools, and Standard-Setting*, in INNOVATION POLICY AND THE ECONOMY 133 (Jaffe et al., eds.) (2001), *available at* haas.berkeley.edu/~shapiro/thicket.pdf (treating intellectual property like real property is "stunn[ing]" and calling for an immunity for intellectual property holders against a duty to deal theory). Presumably, Shapiro would avoid allowing this immunity to prevent an owner of an information platform interface (say, Microsoft) from using its intellectual property right to avoid liability by maintaining that such interfaces should not be patentable or subject to copyright protection. But current intellectual property rules allow the patenting of interfaces. *See* Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479, 529 (1998) (noting that Microsoft has patented its key interfaces).

81. DOJ & FTC, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY, § 2.1 (1995), *available at* www.usdoj.gov/atr/public/guidelines/ipguide.htm (explaining that that the same antitrust principles apply to intellectual property as to real property). Admittedly, investments in intellectual property, unlike real property, are more easily appropriated by free riders, but antitrust thus must distinguish between restraints designed to protect investment versus those designed to exclude competitors. One intriguing position for resolving this difficulty is to exempt "pure" intellectual property—i.e., protected technologies—from duty to deal requirements, but to allow any products produced or deployed to be subject to such requirements. *See* Mark R. Patterson, *When is Property Intellectual? The Leveraging Problem*, 73 S. CAL. L. REV. 1133, 1134 (2000) (noting that courts have overlooked this potential solution to the issue).

82. *See* Steven Semeraro, *Regulating Information Platforms: The Convergence to Antitrust*, 1 J. TELECOMMS. & HIGH TECH. L. 143, 152-67 (2002); A. Douglas Melamed & Ali M. Stoeppelwerth, *The* CSU *Case: Facts, Formalism, and the Intersection of Antitrust and Intellectual Property Law*, 10 GEO. MASON L. REV. (forthcoming 2002); Glen Robinson, *On Refusing to Deal to Rivals*, 87 CORNELL L. REV. 1177, 1210-11 & n.148 (2002).

83. The Department of Justice recently set forth an antitrust principle to implement this point. *See* Brief for the United States as Amicus Curiae at 11-12, CSU, L.L.C. v. Xerox, 121 S. Ct. 1077 (2001) (No. 00-62), *available at* http://www.usdoj.

In defining the relationship between antitrust and intellectual property, it is important for courts to remain focused on the two regimes' shared purpose in facilitating investment, innovation, and competition. In a particularly egregious failure to do that, the Federal Circuit recently held that if a denied input (such as a part used in servicing a product) is protected under the patent laws, there is little or no room for antitrust liability related to the use or terms of sale of the input.[84] Under such a theory, a patented interface for, say, interconnection between local and long distance networks would possibly have barred antitrust liability for AT&T's discriminatory interconnection arrangements,[85] or any number of otherwise recognized antitrust claims.[86] Indeed, this ruling led some commentators to suggest that Microsoft could prevail in its case on the ground that its patented interfaces and/or copyrighted operating system were immunized from any duty to deal requirements under the antitrust laws.[87] Happily, in the *Microsoft* case, the D.C. Circuit rejected

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gov/osg/briefs/2000/2pet/6invit/2000-0062.pet.ami.inv.pdf (quoting Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585, 605 (1985) and citing ROBERT H. BORK, THE ANTITRUST PARADOX 144 (2d ed. 1993) on predatory conduct) (arguing that antitrust liability in relation to licensing IP should arise when the IP holder "sacrific[es] profit available from exercising monopoly power in order to exclude competition and thereby to create additional market power").

84. *See In re* Indep. Serv. Org. Antitrust Litigation, 203 F.3d 1322 (Fed. Cir. 2000). In particular, the ISO court suggested that antitrust liability could lie as to the exercise of IP rights only where (1) the asserted patent was obtained by fraud; (2) the infringement suit was a mere sham; or (3) the IP right was used in an illegal tie. For an example of how this principle has been applied to bar antitrust litigation, see Townshend v. Rockwell Int'l Corp., No. C99-0400, 2000 U.S. Dist LEXIS 5070 (N.D. Cal., Mar. 28, 2000) ("Because a patent owner has the legal right to refuse to license his or her patent on any terms, [and therefore] the existence of a predicate condition to a license agreement cannot state the antitrust violation"). It is plausible that the case could be defined narrowly as merely prescribing the scope of antitrust liability for actions taken in relation to the prosecution and enforcement of a patent, but it is hard to justify such a narrow reading.

85. *See* MCI v. AT&T, 708 F.2d 1081 (7th Cir. 1983), *cert. denied*, 464 U.S. 891 (1983) (holding AT&T liable for such discriminatory interconnection under an essential facilities theory); *see also* Melamed & Stoeppelwerth, *supra* note 82 (offering this example).

86. *See* Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property*, 68 ANTITRUST L.J. 913, 919-23 (2001) (criticizing decision).

87. *See, e.g.*, Linda R. Cohen & Roger G. Noll, *Intellectual Property, Antitrust and the New Economy*, 62 U. PITT. L. REV. 453, 471 (2001). While this fear is slightly exaggerated (as not all of Microsoft's challenged actions related to its intellectual property rights as such), it merits attention. If, as some commentators argue, an IP holder could not be required under antitrust to "sell or license the technology covered by [an IP right]," then a refusal by Microsoft to release patented APIs to Netscape—say, where Microsoft released such APIs to non-rivals—could not give rise to antitrust liability. David McGowan, *Networks and Intention in Antitrust and Intellectual Property*, 24 J. CORP. L. 485, 491 (1999).

this type of argument, responding with the analogy that intellectual property no more confers such a right than the argument "that use of one's personal property, such as a baseball bat" is immunized from tort liability.[88] Presumably, this ruling not only governs liability questions, but also remedial ones, such as the requirement in the proposed consent decree that Microsoft disclose its application programming interfaces for middleware products in the same fashion it does for its own.[89]

The three most obvious defenses of the immunization position strike me as fatally flawed. First, advocates of this view may well oppose the imposition of any duty to deal in a product market defined strictly as an "aftermarket" in one company's products and use the intellectual property defense to eviscerate this claim.[90] To be sure, it is questionable whether "aftermarket" access claims properly sound in antitrust—as opposed to contract[91]—but the better approach is to reject or narrow this claim,

88. United States v. Microsoft Corp., 253 F.3d 34, 63 (D.C. Cir. 2001); *see id.* (terming Microsoft's argument that it has an "absolute and unfettered right to use its intellectual property as it wishes" as "border[ing] on the frivolous"); *see also id.* (balancing interest in maintaining control of desktop interface with marginal anticompetitive impact).

89. Sections III. D & E of the proposed decree do just that. *See* United States v. Microsoft, Revised Proposed Final Judgment, *available at* http://www.usdoj.gov/atr/cases/f9400/9495.pdf (last visited Aug. 2, 2002); *see also The Microsoft Settlement: A Look To The Future, Hearing before the S. Comm. on the Judiciary*, 107th Cong. (Dec. 12, 2001) (statement of Charles James, Assistant Attorney Gen. for the Antitrust Div., U.S. Dep't of Justice), *available at* http://judiciary.senate.gov/print_testimony.cfm?id=135&wit_id=98 (terming this aspect of the remedy "the most effective avenue for restoring the competitive potential of middleware").

90. *See* Eastman Kodak Corp. v. Image Technical Services, 504 U.S. 451 (1992) (recognizing this claim); *see also* Thomas C. Arthur, *Formalistic Line Drawing: Exclusion of Unauthorized Services from Single Brand Aftermarkets Under* Kodak *and* Sylvania, 24 J. CORP. L. 603 (1999) (criticizing claim). Notably, the courts have narrowed this claim—thereby sidestepping some potential objections to it—by making clear that only a party subject to a "bait and switch" tactic can challenge a primary market platform's treatment of competition in an aftermarket. *See* Digital Equip. Corp. v. Uniq Digital Techs., Inc., 73 F.3d 756, 763 (7th Cir. 1996) (Easterbrook, J.) (emphasizing that if Kodak had not facilitated aftermarket competition and/or had informed its customers that it might cease to do so, it would not have been liable); PSI Repair Servs., Inc. v. Honeywell, Inc., 104 F.3d 811, 820 (6th Cir. 1997) (highlighting the unanticipated change in policy as basis of antitrust liability), *cert. denied*, 117 S. Ct. 2434 (1997); Lee v. Life Ins. Co. of N. Am., 23 F.3d 14, 20 (1st Cir. 1994) (same). Indeed, this might explain how some commentators like Carl Shapiro, who criticize the imposition of a duty to deal on Kodak's intellectual property, also advocate the imposition of such duties on Microsoft's protected software code. To this end, Shapiro criticizes the aftermarket doctrine and the imposition of antitrust duties on IP with equal vigor. *See* CARL SHAPIRO & HAL VARIAN, INFORMATION RULES 146-47 (1999).

91. Steven C. Salop, *The First Principles Approach to Antitrust*, Kodak, *and Antitrust at the Millennium*, 68 ANTITRUST L.J. 187, 188 (2000) (making this point); *see also* Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of* Kodak, 63

not to invent a defense for it that could have negative consequences in other contexts. Second, this defense may stem from a fear over administerability concerns for courts that must mandate the licensing of intellectual property.[92] Admittedly, courts must be careful in this area not to engage in agency-type rate of return regulation, but the long history of compulsory licensing in antitrust decrees suggests that this concern is not fatal.[93] Finally, given the joint purposes of intellectual property and antitrust, as noted above, it does not make sense to construe intellectual property laws, such as the one creating the Federal Circuit Court of Appeals to hear all patent appeals, as limiting the scope of antitrust liability in the IP area.[94]

In short, there is no more warrant for insisting that intellectual property should trump antitrust duties to deal than there is for demanding complete protection over user and product interfaces, lifting all duty to deal requirements imposed by antitrust for real property, or barring any open access regime under telecommunications regulation. All of these forms of regulation must balance the need to protect investment incentives while allowing for the access necessary to facilitate innovation.[95] Recognizing the need to harmonize the relevant legal regimes, the

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ANTITRUST L.J. 483, 491-92 (1995) ("Ultimately, interbrand competition, contractual protections, and manufacturing commitments, and the manufacturer's reputation are likely to be far stronger forces protecting buyers than a legal duty to deal with its aftermarket rivals.").

92. *See* AREEDA & HOVENKAMP, *supra* note 76, at 295; PHILLIP AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW (Supplement 2001) at para. 704.1. It should be noted that the institution of this immunity rule actually creates an administrative difficulty of its own: courts are forced to evaluate alleged anticompetitive conduct that naturally implicated the withholding of patented parts without examining actions regarding the patented parts themselves. *See In re* Indep. Serv. Org. Antitrust Litigation, 964 F. Supp. 1479, 1490 (D. Kan. 1997) ("The court's ruling does not preclude a finding of antitrust liability against Xerox based on CSU's other allegations of exclusionary conduct.").

93. *See, e.g.*, F.M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 456-57 (2d ed. 1980) ("All in all, the substantial amount of evidence now available suggests that compulsory patent licensing, judiciously confined to cases in which patent-based monopoly power has been abused . . . would have little or no adverse impact on the rate of technological progress.").

94. For just such an argument, see Michelle M. Burtis & Bruce H. Kobayashi, *Why an Original can be Better than a Copy: Intellectual Property, the Antitrust Refusal to Deal, and ISO Antitrust Litigation*, 9 SUP. CT. ECON. REV. 143 (2001).

95. For an example of how commentators attempt to distinguish between these areas, compare Lemley & McGowan, *supra* note 80, at 525 ("In network industries, there is a strong economic argument in favor of permitting reverse engineering in the limited set of cases in which it promotes either vertical or horizontal compatibility with an industry standard.") with McGowan, *supra* note 87, at 525 (opposing mandatory dealing arrangements under antitrust as inconsistent with intellectual property statutes and "the rate of return structure they create").

Federal Trade Commission and Antitrust Division of the Justice Department have emphasized that "[i]t is increasingly important that competition and intellectual property law work in tandem to support and encourage ongoing innovation" and have scheduled a set of hearings to develop a harmonious approach to the issue.[96] Ideally, this effort will help put to rest the argument that the presence of an intellectual property right can displace the role of antitrust oversight. As in other areas, antitrust needs to take account of legitimate pro-competitive restraints—such as those designed to safeguard against the pirating of intellectual property—but a categorical rule against antitrust oversight could give rise to considerable mischief, as firms would seek to benefit from it by, among other things, trying to cloak anticompetitive conduct within the protection of intellectual property.

IV. INTELLECTUAL PROPERTY, PRIVATE ORDERING, AND THE PROMISE OF THE OPEN SOURCE MOVEMENT

The Internet created a uniquely suitable platform for innovation. In an important sense, the basic standards that constitute the Internet, such as the Internet's transport protocol (e.g., TCP/IP) are classic public goods that would have not been provided by the market itself.[97] As others have explained, the government's support for the Internet, whose standards were all open and managed by standard setting committees like the IETF, constituted a masterful stroke of competition policy.[98] Many information platforms built for the Internet, like most Internet browsers and instant messaging systems, were produced by private companies and protected by intellectual property. Nonetheless, some "open source" advocates suggest that proprietary development and ownership of software will be a dinosaur that will not survive the Internet age, rendering worries about information platform regulation irrelevant. But as outlined below, there are good reasons to believe that proprietary develop-

96. Notice of Public Hearings, Competition and Intellectual Property Law in the Knowledge-Based Economy, 66 Fed. Reg. 58,146 (2001) (Notice of FTC/DOJ hearings on antitrust and IP policy).

97. *See* Michael Katz & Carl Shapiro, *Systems Competition and Network Effects*, J. ECON. PERSP., Spring 1994, at 93, 102-03 (noting that "a communication network shares many features with a public good; small users may free-ride on the large users who may bear the costs necessary to create and market the network"); *see also* RICHARD CORNES & TODD SANDLER, THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS (2d ed. 1996) (describing the public good concept).

98. *See* Edward L. Rubin, *Computer Languages as Networks and Power Structures: Governing the Development of XML*, 53 SMU L. REV. 1447, 1449-52 (2000) (describing history of government support for the Internet).

ment will continue to thrive and must be subject to government regulation.

During the 1980s, alongside the government's efforts to support the Internet, Richard Stallman initiated a private sector collaborative development project called the GNU project—which stands for "GNU's Not Unix"—that would create an alternative operating system to UNIX.[99] To do so, he created the General Public License (GPL)[100] to govern access to the GNU project and to facilitate the non-proprietary development of software products. In a sense, open source development (or "free software," as Stallman calls it[101]) relies on a "virtual firm," uniting a disparate array of computer programmers in the development and maintenance of a product through online communication and access to the source code for the software product.

For the true believers, the advent of open source development threatens to displace proprietary development and thus render irrelevant most debates about whether and how intellectual property law governs software. More modestly, some point to viability of open source as suggestive of the potential for managing a commons of information without the need for proprietary ownership. In terms of evidence to support either the stronger or weaker claims regarding open source, consider the success of the Linux-GNU operating system. This system continues to pick up market share at the expense of Microsoft's Windows NT, suggesting that the open source phenomenon, while not necessarily superior to proprietary development, is no fluke.[102] In terms of the legal issues regarding the GPL license that governs the use of the Linux-GNU system, it is somewhat ironic that this effort to displace traditional proprietary development backed by intellectual property protection itself relies on intellectual property law—specifically, the rules governing the licensing of

99. For a history of this project, see THE GNU PROJECT, *at* www.gnu.org.

100. For a description and analysis of the license, see Ira V. Heffan, Note, *Copyleft: Licensing Collaborative Works in the Digital Age*, 49 STAN. L. REV. 1487, 1508 (1997) (setting out conditions of GPL).

101. Stallman insists on the term "free software," as opposed to "open source," in order to underscore the ethical value of non-proprietary development. *See* Richard M. Stallman, *Why "Free Software" is Better than "Open Source," at* http://www.gnu.org/philosophy/free-software-for-freedom.html (last modified March 9, 2002).

102. *See, e.g.*, Craig Smith, *Fearing Control by Microsoft, China Backs the Linux System*, N.Y. TIMES, July 8, 2000, at A1 (noting Linux's popularity); Red Hat Inc. Amendment No. 5 to Form S-1, 6 (Aug. 11, 1999), *available at* http://www.sec.gov/Archives/edgar/data/1087423/0001047469-99-030827.txt [hereinafter, Red Hat S-1] (Red Hat's acknowledgement, in a securities disclosure, that "[w]e have not demonstrated the success of our open source business model").

software.[103] Putting aside the legal issues, which remain unsettled, it is quite clear that the vision embodied in the license offers an important alternative to proprietary development, both in the marketplace and as a norm for software development.[104]

The essential quality of open source development is that, unlike proprietary code, all users (and would-be improvers) have access to the source code itself. Put simply, source code constitutes the human readable version of a program whereas object code (i.e., machine-readable code) contains the 1s and 0s that are actually used by the computer to "execute" the program.[105] To translate source code into object code, programmers use compiling software. By distributing the program in a format that users (and improvers) can examine, open source code allows for others to correct any errors and identify possible improvements. In so doing, it provides a model of software development that parallels an academic, peer review-like model and, not surprisingly, enlists considerable support from academics and students.[106]

The most ambitious form of open source, as enforced by the GPL, requires all developers using such software to also contribute any extensions—or, in copyright terms, "derivative works"—of the standard back to the original licensor.[107] In this sense, an open source license of the GPL variety (i.e., one that is "viral") seeks to ensure, through copyright law itself, a system of private ordering that provides for continuous open code development. The significant advantage that open source software enjoys over proprietary software is that, because the underlying source code is made public, developers and users working with open source

103. For a discussion of this issue, see Patrick K. Bobko, *Linux and General Public Licenses: Can Copyright Keep "Open Source" Software Free?* 28 AIPLA Q.J. 81 (2000) (arguing that the GPL is enforceable).

104. *See* David McGowan, *Legal Implications of Open Source Software*, 2001 U. ILL. L. REV. 241, 287-302 (examining enforceability and concluding that, regardless of its legal merit, the licenses should be appreciated for embodying a powerful social norm).

105. For a discussion of the relevant computer technology, see A. Johnson Laird, *Software Reverse Engineering in the Real World*, 19 U. DAYTON L. REV. 843 (1994).

106. *See* Marcus Maher, *Open Source Software: The Success of an Alternative Intellectual Property Incentive Paradigm*, 10 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 619, 641-42 (2000). In this respect, the contemporary open source model follows the development of Unix during the 1970s, which relied greatly on universities for important feedback. *See* STEVE LOHR, GO TO: THE STORY OF THE MATH MAJORS, BRIDGE PLAYERS, ENGINEERS, CHESS WIZARDS, MAVERICK SCIENTISTS AND ICONOCLASTS, THE PROGRAMMERS WHO CREATED THE SOFTWARE REVOLUTION 78 (2001).

107. For a copy of the GPL, see Free Software Foundation, GNU Public License (version 1.7, June 1991), *available at* http://www.fsf.org/licenses/gpl.html. For the provision addressing "derivative works," see Section 2(b) (providing that licensees must "cause any work that [they] distribute or publish . . . to be licensed as a whole at no charge to all third parties under the terms of this License.").

software can evaluate potential changes for themselves and can fix any bugs in the code itself, thereby leading to a rich positive feedback effect.[108] As Linus Torvalds, the founder of Linux put it, "[g]iven enough eyeballs, all bugs are shallow."[109]

The advent of open source development is a significant development and supports the viability of some significant technologies, but there are important reasons to question whether this model will emerge as the dominant one for software development. As an initial matter, the success of open source development depends on some formal or informal consensus, often coordinated by a champion (and potential funding source), and that consensus may not always emerge.[110] Where there is such a champion, as in the cases of the development of the Internet itself,[111] the World Wide Web,[112] and the GNU-Linux operating system,[113] open standards can emerge and sometimes thrive

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108. In its S-1 securities filing, Red Hat, a leading distributor of Linux operating system software explained how this model works:

> under the open source software model, software is created through the collaborative efforts of large communities of independent developers. Developers work alone or in groups to write code, make the code available over the internet, solicit feedback on it from other developers, then modify it and share it with others for general use. This continuous process results in the rapid evolution and improvements of open source software.

Red Hat S-1, *supra* note 102, at 2. Famously, Eric Raymond contrasts the free-wheeling nature of open source development's repeated beta-testing and multiple versions (which he likens to a "bazaar") with the tightly controlled method of proprietary development (which he compares to a "cathedral"). *See* ERIC S. RAYMOND, THE CATHEDRAL & THE BAZAAR, MUSINGS ON LINUX AND OPEN SOURCE BY AN ACCIDENTAL REVOLUTIONARY 30 (1999). Raymond views this bazaar model as akin to the scientific method, whereby the ultimate product comes with a peer review stamp of approval. *See id.* at 38.

109. RAYMOND, *supra* note 108, at 41 (terming this as "Linus's law"); *see also id.* at 62 (noting that Linux uses "the entire *world* as its talent pool"); *id.* at 66 ("No closed source developer can match the pool of talent the Linux community can bring to bear on a problem."). Carol Rose, noting a similar phenomenon in property theory, terms it "the comedy of the commons." Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 769 (1986).

110. For an argument that open source development can prosper under a purely decentralized regime, see Christopher Browne, Linux and Decentralized Development, *available at* http://vip.hex.net/~cbbrowne/lsf.html (last visited Sept. 1, 2002).

111. For a brief description of the role played by the National Science Foundation and the Advanced Research Projects Administration (ARPA), see Rubin, *supra* note 98, at 1449-52. *See also* Marcus Maher, *An Analysis of Internet Standardization*, 3 VA. J.L. & TECH. 5, 6-7 (1998).

112. Tim Berners-Lee, the inventor of the basic software for the Web, established the World Wide Web Consortium (W3C) to ensure that the basic Web standards could be maintained as open. *See* Rubin, *supra* note 98, at 1452-54 (discussing W3C and its workings, including the critical role of Berners-Lee, who is its Director).

113. In that case, the critical leadership of Linus Torvalds, the inventor of the Linux kernel, played—and continued to play—a facilitating role in enabling the sys-

under the oversight of a respected champion. Without such a champion, coordinating body, and/or a dedicated source of funding,[114] it may well be the case that open standards will fragment as different providers of the product "fork" from the original version.[115] In particular, the splintering of the Unix operating system—which stems from the right of developers to "fork" from prior versions—is perhaps the classic example of how an open standard can ultimately fragment into a number of incompatible operating systems (e.g., HP-UX and Sun's Solaris).[116] By contrast, where there are effective persuasive pressures and leadership (as in the case of both Linux and Apache (another open source product used for web servers), for example), open source products have maintained a coherent common standard and have not splintered in the way that UNIX did.[117]

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tem to develop. *See* Raymond, *supra* note 108, at 89-90, 122-26; Red Hat S-1, *supra* note 102, at 6-7 (Red Hat's acknowledgement of the challenges if Torvalds were to discontinue his role as coordinator of the standard); Interview by Hiroo Yamagata with Linus Torvalds, The Pragmatist of Free Software: Linus Torvalds Interview, *at* http://www.netshooter.com/linux/linus-interview.html (last visited Aug. 8, 2002) (Torvald's acknowledgement of the importance that "there is one person who everybody agrees is in charge (me) allows me to do [sic] more radical decisions than most other projects can allow."); *see also* Russ Mitchell, *Open War*, WIRED, October 2001, at 135, 136, 139 (listing, in addition to Torvalds, the keepers of the kernel). More recently, in what may become a very significant development, IBM has decided to support Linux rather than develop an alternative to the existing proprietary versions of UNIX. *See id.* at 138-39; *see also* LOHR, *supra* note 106, at 215-16. Finally, the development of a standards-setting body focused primarily on preserving the compatibility of Linux, the Free Standards Group, should aid its development. *See* Stephen Shankland, *Standards Help Linux Avoid Unix Fate*, CNET NEWS.COM, *at* http://news.com.com/2100-1001-950180.html (Aug. 16, 2002).

114. *See* McGowan, *supra* note 104, at 284 (noting how government and university support for the Internet and open source projects has been key; thus, "[t]he viability of large, unsubsidized open-source projects is an open question").

115. The fragmentation issue is one of a number of possible "tragedy of the commons" problems that might befall an open standard not supported through some institutionalized effort. For the classic explanation of the "tragedy of the commons," see Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

116. *See* Michael J. Schallop, *The IPR Paradox: Leveraging Intellectual Property Rights to Encourage Interoperability in the Network Computing Age*, 28 AIPLA Q.J. 195, 263 n.233 (2000); Mitchell, *supra* note 113, at 138 ("[I]n the past 30 years, Unix has split into different flavors, most of them closed and proprietary."). In particular, the so-called "Berkeley UNIX" originated as a single standard, but, after several "forks" by different sponsors, the standard splintered into different versions. *See* MARTIN C. LIBICKI, INFORMATION TECHNOLOGY STANDARDS: QUEST FOR THE COMMON BYTE 47-56 (1995) (detailing fragmentation of UNIX).

117. LOHR, *supra* note 106, at 208; *see also* Eric S. Raymond, Homesteading the Noosphere: Causes of Conflict, *at* http://www.tuxedo.org/~esr/writings/cathedral-bazaar/homesteading/ (last modified Nov. 21, 1998) (highlighting the importance of leadership to prevent "forking" from a common standard). In a move to prevent a fragmentation of the Linux standard, Linus Torvalds endorsed the Linux Standards Base (LSB) project as a means of maintaining a common platform for all Linux users. *See* Nicholas Petreley, *Linux Road Map Needed*, COMPUTERWORLD, Sept. 24,

To maintain a coherent standard, some companies have attempted to develop a "quasi-open source" license. Most famously, Sun's Java technology allows users and developers access to the source code for a standard that it maintains will provide for a platform-independent, "write once, run anywhere" environment.[118] Nonetheless, Sun does impose certain restrictions as part of its "community source license."[119] In particular, Sun has maintained its trademark over Java, which it uses to ensure that its licensees maintain the standard, as evidenced by its action against Microsoft to prevent Microsoft from fragmenting the Java standard.[120] Ironically, its decision to retain control over the standard, even if merely to ensure compatibility and to prevent the fragmentation that plagued Unix, highlights Sun's un-

2001, *available at* http://www.computerworld.com/storyba/0,4125,NAV47_STO 64104,00.html; *see also* Free Standards Group, *at* www.freestandards.org (last visited Aug. 8, 2002).

118. For an overview of the Java platform, see Java[tm] Technology Overview, *at* http://www.sun.com/java/overview.html (last visited Aug. 8, 2002) (explaining significance of "write once, run anywhere" slogan). *See also* Michael P. Doerr, Note, *Java: An Innovation in Software Development and a Dilemma in Copyright Law*, 7 J. INTELL. PROP. L. 127, 130-32 (1999) (explaining how the Java Virtual Machine, which is tailored for each computing environment, can facilitate a platform-independent standard and its impact on the software industry).

119. For a discussion of this license, comparing it to open source and other proprietary licenses, see Richard P. Gabriel & William N. Joy, Sun Community Source License Principles, *at* http://www.sun.com/981208/scsl/principles.html (last visited Aug. 8, 2002). Over time, Sun eased some of the relevant restrictions, including a six-digit fee for a commercial source license, and focused primarily on using the licensing restrictions to ensure compatibility. *See* Stig Hackvan, *Not Quite Open Source, But Closer*, LINUXWORLD.COM, *available at* www.linuxworld.com/linuxworld/lw-1998-12/lw-12-java.html (last visited Aug. 24, 2002). Nonetheless, by keeping some such restrictions, the Java standard fits within a proprietary code model much more so than an open source one. *See* Mark A. Lemley & David McGowan, *Could Java Change Everything? The Competitive Propriety of a Proprietary Standard*, 43 ANTITRUST BULL. 715, 753-54 (1998). As such the ISO, an international standards setting organization, refused to certify Java as a de jure standard. *See id.* at 755-56.

120. The Ninth Circuit reversed the district court decision's initial award of a preliminary injunction to Sun against Microsoft. *See* Sun Microsystems, Inc. v. Microsoft Corp., 21 F. Supp. 2d 1109, 1126 (N.D. Cal. 1998) (granting preliminary relief to Sun), *rev'd and remanded*, 188 F.3d 1115 (1999) (questioning whether compatibility requirements were license restrictions or separate covenants). On remand, the district court concluded that the compatibility requirements did not inhere in the copyright license themselves, *see* Sun Microsystems, Inc. v. Microsoft Corp., 81 F. Supp. 2d 1026, 1031-32 (N.D. Cal. 2000), but did grant preliminary relief to Sun on unfair competition grounds, *see* Sun Microsystems, Inc. v. Microsoft Corp., 87 F. Supp. 2d 992, 998-1004 (N.D. Cal. 2000). *See also* Steven Shankland et al., *Sun, Microsoft Settle Java Suit*, CNET NEWS.COM, *at* http://news.com.com/2100-1001-251401.html?legacy=cnet (Jan. 23, 2001) (detailing settlement of case). The issue of whether Microsoft sought to "pollute" Java to protect its position in the operating systems market emerged as a critical question in the monopolization case brought by the United States against Microsoft. *See* United States v. Microsoft, 253 F.3d 34, 74-78 (D.C. Cir. 2001) (discussing issue).

easiness with making Java a truly open standard.[121] Moreover, Sun's stewardship of Java also retains for itself the right to exert greater restrictions on its licenses should it choose to do so.[122]

The second critical challenge for open source standards is that, without a strong champion, it can be extraordinarily difficult for the standard to evolve. With respect to the modern Internet community (i.e., one that lacks strong government leadership), the effort to deploy a next generation Internet protocol capable of enhanced functionality (IP version 6) continues to stall, as it is very difficult to coordinate the transition of an open standard.[123] In significant part, the difficulty in this area stems from the increasing number of companies now taking part in open standard setting efforts, resulting in a considerably slower process.[124] By contrast, in markets where more than one network standard battle it out in the marketplace, users can benefit from a greater degree of dynamism.[125]

The final challenge for the open source movement is perhaps the most fundamental: the claim that proprietary ownership is necessary to provide developers with an incentive to invest time and money in creating new technologies.[126] Two examples of this

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121. To be fair, Java's license does represent a quasi-open source one in that its restrictions regarding contributing back fixes to any bugs in Java and its requirement that any proprietary extensions have published Application Programming Interfaces (APIs) are consistent with the open source model. *See* Hackvan, *supra* note 119.

122. *See* Lemley & McGowan, *supra* note 119, at 751 (expressing concern on this score). As Lemley and McGowan explain, Sun's statements about keeping their standard open may give rise to an implied license—or equitable estoppel—defense should it seek to restrict access to the standard in a fashion to benefit their own proprietary interests. *Id.* at 771.

123. *See* Scott Tyler Shafer, *IPv6 Aims to Score the Always-on Goal*, RED HERRING, Aug. 15, 2001, at 70.

124. *See* Robert J. Aiken & John S. Cavallini, *When are Standards too Much of a Good Thing? Will they Provide Interoperability for the National Information Infrastructure, in* STANDARDS POLICY FOR INFORMATION INFRASTRUCTURE 253, 259 (Brian Kahin & Janet Abbate eds., 1995) ("[T]he growth of the Internet Engineering Task Force (IETF) has recently strained the capability of its consensus process to resolve major standards issues in a timely fashion"); Martin Libicki et al., *Scaffolding the New Web: Standards and Standards Policy for the Digital Economy* 22 (2000), *available at* www.rand.org/publications/MR/MR1215 (noting how the theoretical timetable from draft to standard of 10 months has become 8 years); CARL F. CARGILL, OPEN SYSTEMS STANDARDIZATION: A BUSINESS APPROACH 57 (1997) (highlighting the difficulty in setting such standards); *id.* at 77-78 (noting that defining technical standards can move from a technological activity to a political one).

125. *See* Mark A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 CONN. L. REV. 1041, 1055 (1996) ("[C]ompetition to set the standard for the next generation of products may still serve a valuable purpose if it drives innovation in the market.").

126. For a sense of the debate, compare Mathias Strasser, *A New Paradigm in Intellectual Property Law? The Case Against Open Sources*, 2001 STAN. TECH. L.

challenge bear notice. First, the use of open source models that embrace proprietary extensions—i.e., ones unlike the GPL—suggest concerns about the basic model called for by the GPL license, which does not allow for any proprietary extensions. In that regard, firms that once embraced open sources as a viable business model are now having second thoughts and some efforts by commercial firms to use such strategies have failed.[127] Second, reflecting the market realities of patenting in the software industry, most standard setting bodies, including the IETF, have adopted policies that allow patented technologies to be included in official standards, provided that they are licensed on reasonable and non-discriminatory terms.[128]

In a sign of how the Internet's traditional skepticism towards proprietary development continues to evolve, the current debates at the World Wide Web Consortium (W3C) regarding the institution of a patent policy highlight how the old model of committing to royalty free licensing is under tremendous pressure.[129] The W3C, in evaluating an appropriate patent policy, initially proposed a policy that would permit, but not encourage, the use of patented technologies in official standards.[130] After an uproar in the Web community, however, the W3C put forward a revised proposal that requires all patents that are used in official stan-

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REV. 4, 85 ("Stallman's vision suffers from the fact that, as with any communist ideology, its appeal is likely not to be powerful enough to attract sufficient manpower to develop enough free software to make it a feasible alternative to proprietary code.") with RAYMOND, *supra* note 108, at 64, 79-135 (suggesting the prevalence of a hacker culture that is motivated more by non-monetary rewards, such as the intrinsic pleasure and reputational benefits from crafting good code).

127. *See* Stephen Shankland, *Open-Source Approach Fades In Tough Times*, CNET NEWS.COM, *at* http://news.cnet.com/news/0-1003-200-7926260093.html (Nov. 20, 2001) (reporting on failures of firms dedicated to open source); Paul Festa, *Will Real Feast Where Apple Failed?*, CNET NEWS.COM, *at* http://news.com.com/2100-1023-947094.html (July 30, 2002) (reporting on Apple and Netscape's failed open source initiatives); *see also* Stephen Shankland, *Unix Pioneer an Open-Source Killjoy*, CNET NEWS.COM, *at* http://news.com.com/2100-1001-949812.html (Aug. 14, 2002) ("The open source business model hasn't worked very well.") (quoting Bill Joy, Chief Scientist of Sun Microsystems and Unix pioneer).

128. *See* Lisa M. Bowman, *Industry Group Hones Patent Standards*, CNET NEWS.COM, *at* http://news.com.com/2100-1023-948206.html (Aug. 2, 2002) (noting move to allow patented technologies in official standards).

129. *See* Wade Roush, *Web Tolls Ahead?*, INNOVATION 20 (January/February 2002).

130. *See* Margaret Kane, *W3C Publishes Patent Policy*, CNET NEWS.COM, *at* http://news.com.com/2100-1023-824334.html (Jan. 28, 2002) (detailing proposed policy); Michael Champion, *Patents and Web Standards Town Hall Meeting*, XML.COM, *at* http://www.xml.com/pub/a/2001/12/19/patents.html (Dec. 19, 2001) (discussing emergence of issue and likely adoption of policy that would prefer, but not commit exclusively to, royalty free standards by May 2002).

dards to be available for royalty free licensing.[131] Even under this new policy, there are still unanswered questions about how the W3C could enforce such a policy, leading W3C officials to acknowledge that the organization does not know how it would deal with exceptional cases where patented technologies were only available for a fee.[132] This uncertainty underscores both that proprietary development is an important reality that will impact the Internet's future development and that standard setting bodies can play an important role in ensuring open standards and disciplining licensing policies.

The importance of standard setting and the dynamics of network markets are lessons that intellectual property law and antitrust law will continue to assimilate in moving towards a sensible information law regime. One important dimension of the emerging scholarship in this area—like in the open source area—is to highlight how the norms of the Internet world, as sometimes embodied by standard setting bodies, can constrain private self-interested action by creating an enlightened self-interest ethic that leaves all participants better off. In the standard setting arena, for example, the insistence on "reasonable and non-discriminatory" licensing terms for patented technologies included in a standard ensures that parties are compensated for their inventions, but are not able to extract extra rents for their invention by withholding permission to use an individual component of a larger standard.[133] Legal commentators and policymakers have only begun to appreciate such points,[134] but given the lack of coherence between the relevant legal regimes and limited caselaw,[135] the legal regulation of standard set-

131. *See* Margaret Kane, *W3C Retreats from Royalty Policy*, CNET NEWS.COM, *at* http://news.com.com/2100-1023-845023.html (Feb. 26, 2002).

132. *Id.* (quoting Daniel J. Weitzner, chair of the patent policy working group at the W3C).

133. *See* Joseph Farrell & Carl Shapiro, *Standard Setting in High-Definition Television*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 1992 at 42 (discussing this practice of the American National Standards Institute).

134. Mark Lemley is the clear leader in this field. *See* Mark A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 CONN. L. REV. 1041 (1996); Lemley & McGowan, *supra* note 80.

135. For some of the leading cases, see Press Release, F.T.C., Dell Computer Settles FTC Charges; Won't Enforce Patent Rights for Widely Used Computer Feature (Nov. 2, 1995), *available at* www.ftc.gov/opa/1995/9511/dell.htm (describing FTC action to prevent Dell from enforcing patent not disclosed during standard setting). *See also* Wang Lab., Inc. v. Mitsubishi Elecs., Inc., 103 F.3d 1571, 1578-82 (Fed. Cir. 1997) (patent not disclosed during standard setting gives rise to implied license under patent law); Addamax Corp. v. Open Software Found., Inc., 888 F. Supp. 274 (D. Mass. 1995) (allowing action against standard setting organization to proceed past summary judgment phase).

ting remains an under appreciated, important, and murky topic.[136]

Finally, let me note that there may well be a important role for non-commercial development and preservation of intellectual property that is distinct from open source development on a commercial basis. First, despite the Bayh-Dole Act's support for university patenting and commercialization of inventions,[137] there is still a strong ethic for university development of ideas that can be dedicated to the public domain.[138] Second, as Molly van Houweling explains, there is also a role for non-profit preservation of inventions in the public domain on a similar model for what conservationists have used for real property—i.e., the development of a land trust-type model.[139]

V. THE FIRST AMENDMENT AND THE INFORMATION AGE

The information age presents a number of puzzles for First Amendment law. Most basically, there are two sides of the First Amendment information law coin, each of which suggest a different role for government regulation of information platforms. On one side, the First Amendment supports the development of measures, such as the imposition of access obligations on communication companies, to ensure "the widest possible dissemination of information from diverse and antagonistic sources."[140] On the other side, the First Amendment calls for constitutional scrutiny of such regulations, making it the "preferred constitutional assault vehicle for . . . challenging government regulation."[141] The future of information platform regulation will ultimately need to harmonize these two roles. In a very preliminary attempt to do so, I will outline how the First Amendment can work both as a constitutional norm that calls for supporting public access to the

136. *See* Mark A. Lemley, Antitrust, Intellectual Property, and Standard Setting Organizations (April 2002) (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=310122).

137. Pub. L. No. 96-517, 94 Stat. 3015, 3019-28 (codified as amended at 35 U.S.C. §§200-12 (1994)).

138. For a sense of the debate on the impact of patenting on scientific and university-based research, compare Arti Kaur Rai, *Regulating Scientific Research: Rights and the Norms of Science in Biotechnology Research*, 94 NW. U. L. REV. 77 (1999) with F. Scott Kieff, *Facilitating Scientific Research: Intellectual Property Rights and the Norms of Science—A Reply to Rai and Eisenberg*, 95 NW. U. L. REV. 691 (2001).

139. *See* Molly Shaffer Van Houweling, *Cultivating Open Information Platforms: A Land Trust Model*, 1 J. TELECOMMS. & HIGH TECH. L. 309 (2002).

140. United States v. Associated Press, 326 U.S. 1, 20 (1945); *see also* New York Times Co. v. Sullivan, 376 U.S. 254, 270 (1964) (emphasizing First Amendment commitment to public debate that should be "uninhibited, robust, and wide-open").

141. Kearney & Merrill, *supra* note 3, at 1370.

media as well as a check on the imposition of unreasonable access obligations.

A. The First Amendment as a Constitutional Norm

A major thrust of telecommunications policy, alongside of competition policy and consumer protection, is to ensure that citizens benefit from a healthy marketplace of ideas. As such, the FCC's enabling legislation as well as its regulations continue to address the value of preserving a diversity of voices in the marketplace of ideas. Nonetheless, the FCC's efforts over the years to foster a diverse marketplace of ideas—from the Fairness Doctrine's insistence on rights of reply on broadcast television to creating public, educational, and governmental cable channels—have not exactly been thriving success stories.

The First Amendment envisions a robust marketplace of ideas, but as the Supreme Court held in the *Tornillo* case, it does not provide would-be speakers with any guarantees of access.[142] One explanation for the one way ratchet of First Amendment enforcement—for rights of information providers, but not for rights of receivers to talk back—is to view the need for affirmative access obligations as "underenforced" constitutional norms—i.e., those enforced by branches of the government other than the federal judiciary.[143] A salutary benefit of this perspective is that it underscores the benefits of subsidizing speaking opportunities and opportunities for public debate directly rather than relying on private parties to act according to government regulation, and against their own interest, to provide such opportunities. Put simply, PBS is in, the Fairness Doctrine is out.[144]

By appreciating the government's responsibility to facilitate democratic participation, policymakers may begin to take a broader look at the tools available to realize the First Amendment's aspiration for robust public debate. Among other things, we might begin to shift our focus from mandating that cable companies devote valuable spectrum for public access channels to instead shifting the value of the spectrum to support Internet-centered efforts that would create much richer opportunities for

142. *See* Miami Herald Publ'g Co. v. Tornillo, 418 U.S. 241 (1974).

143. *See* Lawrence Gene Sager, *Fair Measure: The Legal Status of Underenforced Constitutional Norms*, 91 HARV. L. REV. 1212 (1978); Lawrence G. Sager, *Justice in Plain Clothes: Reflections on the Thinness of Constitutional Law*, 88 NW. U. L. REV. 410 (1993).

144. For such an argument, see Henry Geller, *Public Interest Regulation in the Digital TV Era*, 16 CARDOZO ARTS & ENT. L.J. 341, 362-66 (1998).

public debate.[145] The goal of such efforts, as Yochai Benkler has eloquently explained, would be to empower consumers to become users of media technology and producers of information.[146] In so doing, the government would reinforce an amazing part of the Internet: its nature as a many-to-many medium that enables millions of individuals to become publishers.[147] Moreover, as Ellen Goodman explains, a communications policy based on subsidizing certain forms of speech through access to spectrum or conditioned benefits can move away from relying on "scarcity" to justify efforts to ensure a diverse marketplace of ideas and pave the way for a more sensible First Amendment doctrine.[148]

B. The First Amendment as a Constraint on Regulation

In evaluating how the government can regulate information platforms either through conferring intellectual property rights or mandating access, the First Amendment will be an area where the courts will need to develop a sensible framework for allowing sufficient leeway for sound regulation while at the same time safeguarding the public interest. Thus, it should not be a surprise that the debate over the role of First Amendment in the digital age will often pit claims of the need to scrutinize interest-group legislation that is designed to preserve the status quo and/or address phantom competitive concerns against a concern that an overly intrusive standard would create a form of a First Amendment Lochnerism.[149]

On the interest group regulation point, it is clear that some accountability for the validity of restrictions on the use of infor-

145. *See, e.g.*, Neil Weinstock Netanel, *Cyberspace 2.0+*, 79 TEX. L. REV. 447, 471-75 (2000) (reviewing ANDREW L. SHAPIRO, THE CONTROL REVOLUTION (1999)) (discussing Andrew Shapiro's conception of a "PublicNet").

146. *See* 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) (making this point).

147. *See* Kevin Kelly, *The Web Runs on Love, Not Greed*, WALL ST. J., Jan. 3, 2002, at A8 (noting that 70% of the 3 billion web pages are built by individuals for the desire to share ideas, not to make money).

148. *See* Goodman, *supra* note 40; *see also* Weiser, *supra* note 41, at 13-15 (calling for a shift in First Amendment doctrine away from the *Red Lion* regime).

149. *Compare* Turner Broad. Sys., Inc. v. FCC, 819 F. Supp. 32, 65 (D.D.C. 1993) (Williams, J.) (without a clear showing of the need for regulation, "the door is open—even in the area of First Amendment rights—to exercise of the most naked interest-group preferences"), *with* Respondents' Oral Argument, 1995 WL 733396, at 34-35 (Dec. 6, 1995), United States v. Chesapeake & Potomac Tel. Co., 516 U.S. 415 (1996) (Justice Breyer's comparison of greater First Amendment scrutiny to "Lochnerism"), *and* United States et al. v. United Foods, Inc., 121 S. Ct. 2334, 2348 (2001) ("I do not believe the First Amendment seeks to limit the Government's economic regulatory choices . . . any more than does the Due Process Clause.") (Breyer, J., dissenting).

mation platforms can increase the quality of lawmaking and regulation. With regard to the limitations on telephone company provision of video services, for example, the line of business restrictions in place before the Telecom Act rested on little or no reasoned basis. Not surprisingly, every court to consider the issue concluded that these regulations could not pass First Amendment muster before the Telecom Act rendered the issue moot.[150] By insisting on an intermediate standard of review in the *Turner* case, the Supreme Court sought to encourage such careful reviews, but also to ensure that Congress, state agencies, and the FCC enjoyed discretion in implementing economic regulation that governs the information industries.[151]

Recent events confirm that firms in the information industries will eagerly invoke First Amendment arguments to challenge governmental regulation and that courts may be too willing to second guess reasonable public policies. With respect to the open access regulation of cable modems in Broward County, Florida, for example, one court invalidated such regulations on First Amendment grounds because they were "adopted at the behest of a telephone company seeking to eliminate or hamper a competitor."[152] To be sure, many telephone companies have championed open access as a means of obtaining "regulatory parity" with cable broadband providers, but this fact alone should not suggest that such regulations are impermissible on First Amendment grounds. Rather, as the Fourth Circuit sensibly held in *Satellite Broadcasting and Communications Ass'n v. FCC*, a regime premised on ensuring regulatory parity is a legitimate policy concern.[153] Nonetheless, in the face of rulings like that from the *Broward County* case as well as lingering questions about what level of detail must be developed to justify prophylactic regulation on information platforms,[154] it seems likely that

150. *See* Chesapeake & Potomac Tel. Co. v. United States, 42 F.3d 181 (4th Cir. 1994), *cert. granted*, 515 U.S. 1157 (1995), *judgment vacated as moot*, 516 U.S. 415 (1996); US West, Inc. v. United States, 48 F.3d 1092 (9th Cir. 1995); S. New England Tel. Co. v. United States, 886 F. Supp. 211 (D. Conn. 1995); NYNEX Corp. v. United States, Civil No. 93-323-C, 1994 WL 779761 (D. Me. 1994); Bellsouth Corp. v. United States, 868 F. Supp. 1335 (N.D. Ala. 1994); Ameritech Corp. v. United States, 867 F. Supp. 721 (N.D. Ill. 1994).

151. *See* Turner Broad. Sys., Inc. v. FCC, 512 U.S. 622 (1994).

152. Comcast Cablevision of Broward County, Inc. v. Broward County, Florida, 124 F. Supp. 2d 685, 696 (S.D. Fla. 2000).

153. *See* Satellite Broad. and Communications Ass'n v. FCC, 275 F.3d 337 (4th. Cir. 2001); *see also* H.R. Rep. No. 106-79, pt. 1, at 11 (1999) (legislative history highlighting concerns with regulatory parity); Goodman, *supra* note 43, at 264-65 (explaining how SHVIA took account of regulatory parity concerns).

154. *See* Time Warner Entm't Co., L.P. v. FCC, 240 F.3d 1126 (D.C. Cir. 2001).

such litigation will be a growth industry among lawyers and will become a growing concern among policymakers.

CONCLUSION

The regulatory regime for information platforms is only beginning to take shape. In this emerging legal environment, somewhat like that presented by the advent of the progressive era of regulatory statutes during the early part of the 1900s, policymakers and commentators are going to continue to debate the virtues and pitfalls of different forms of regulation—statutory, common law-like, agency-generated rulemakings, self-regulation by standard setting bodies, or private ordering by contract. Where courts must act—say, in the First Amendment area—they are often humbled by the concern that overreaching for categorical rules will backfire as technology and the market quickly overruns even today's sensible rules.[155] Eventually, policymakers will settle on a more stable regime for information law, but not before a period of "muddling through."

The effort to harmonize the goals of the relevant legal tools—starting with the basic rights and control provided by the intellectual property laws, as limited by telecommunications regulation and antitrust—presents commentators, lawyers, and judges with a very formidable challenge.[156] Happily, the papers and participation at this conference suggest a strong set of voices and appetite for tackling the difficult issues ahead. I look forward to more discussions of these issues in the Journal of Telecommunications and High Tech Law in the years to come, which I hope will inspire future lawyers and technologists to enter the field with new passion and perspective.

155. *See, e.g.*, Denver Area Educ. Telecomms. Consortium, Inc. v. FCC, 518 U.S. 727, 778 (1996) (Souter, J., concurring) (in the dynamic world of telecommunications, judges should "'[f]irst, do no harm'" (quoting the Hippocratic Oath)); Name.Space, Inc. v. Network Solutions, 202 F.3d 573, 584 n.11 (2d Cir. 2000) (taking an "evolutionary" approach that favors "narrow" holdings that allow for "case-by-case" adjudication).

156. Phil Weiser, *Paradigm Changes in Telecommunications Regulation*, 71 U. COL. L. REV. 819, 847 (2000).