OPEN ACCESS TO CABLE MODEMS*

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What follows is an *ex parte* declaration we filed with the Federal Communications Commission (FCC) in December 1999 on the question of open access to broadband cable Internet services.[1] We filed this declaration in connection with the proposed merger of AT&T and MediaOne. In it, we suggested that the FCC condition approval of the merger on a commitment by AT&T to reverse its policy of linking cable modem service to the use of its in-house Internet service provider—@Home.

Events have moved rapidly since we filed this declaration. AT&T has tentatively agreed to open its cable modem service to competing ISPs, decoupling the provision of ISP services from the provision of broadband cable Internet access. The AT&T/MediaOne merger will shortly be resolved. However, when America Online (the nation's largest ISP) recently bought Time-Warner (the nation's second-largest cable company), new questions about AOL's commitment to open access in the broadband cable market were raised.

 This *ex parte* declaration was filed with the Federal Communications Commission regarding *In re Application for Consent to the Transfer of Control of Licenses MediaOne Group, Inc. to AT&T Corp.*, Fed. Commun. Commn., CS Docket No. 99-251 (Dec. 1999). This publication preserves the substance of the *ex parte* declaration.

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1. *In re Application for Consent to the Transfer of Control of Licenses MediaOne Group, Inc. to AT&T Corp.*, Fed. Commun. Commn., CS Docket No. 99-251 (Dec. 1999).

While the case in which our declaration was filed is no longer pending, we think the issues it raises have significance that extends far beyond that case. The rules that courts establish now regarding open access will determine the presence or absence of competition in broadband Internet services for years to come.

I. INTRODUCTION

We offer this declaration to address the question of "open access" and its relationship to the architecture of the Internet. It is our view that the extraordinary growth and innovation of the Internet depends crucially upon this architecture. Therefore, changes in the Internet's architecture should be viewed with skepticism, as they may in turn threaten its innovation and growth.

The proposed design of the merged AT&T and MediaOne entity, once allied with the existing merged AT&T and TCI,[2] threatens to compromise an important architectural principle of the Internet. As we describe in more detail below, it threatens to weaken the Internet's "End-to-End" design. In our view, this change could have profound implications for the future of growth and innovation on the Internet.

The FCC's analysis to date does not consider the principles of the Internet's design. It therefore does not adequately evaluate the potential threat that this merger presents. Neither does the FCC's approach properly account for its role in creating the conditions that made the Internet possible. Under the banner of "no regulation," the FCC threatens to permit this network to calcify as earlier telecommunications networks did. Further, and ironically, the FCC's supposed "hands off" approach will ultimately lead to more, rather than less, regulation.

We do not yet know enough about the relationship between these architectural principles and the innovation of the Internet. But, we should know enough to be skeptical of changes in its design. The strong presumption should be in favor of preserving the architectural features that have produced this extraordinary innovation. The FCC's presumption should be against approving mergers that threaten these design principles unless there is a clear showing that the threat would

2. Tele-Communications Incorporated. *See* Reuters, *FCC to Review AT&T-TCI Merger* (June 25, 1998) (available at <http://news.cnet.com/news/0-1005-200-330648.html>).

not undermine the Internet's innovation. No such showing has been made in this case.

In Part II of this declaration, we explain our background and interest in this matter. In Part III, we describe the design principles of the Internet, and how they differ from the principles animating traditional telephone networks. In Part IV, we explain why permitting AT&T to bundle ISP service with network access threatens the structure of the Internet. Finally, in Part V we respond to arguments that have been made to permit the merged AT&T/MediaOne to extend its monopoly to control ISP service.

II. BACKGROUND

Lemley is the Marrs McLean Professor of Law at the University of Texas in Austin, Texas, where he teaches intellectual property, computer law, patent law, antitrust, electronic commerce and regulation of the Internet. Beginning January 1, 2000, he will assume an appointment as Professor of Law at the Boalt Hall School of Law, University of California at Berkeley. He is of counsel to the law firm of Fish & Richardson, where he litigates and counsels clients in the areas of antitrust, intellectual property and computer law. He is the author of four books and twenty-eight articles on these and related subjects, has taught intellectual property law to federal judges at the Federal Judicial Center, and has testified before Congress and the Federal Trade Commission on patent and antitrust matters. His articles have appeared in the *Yale Law Journal*, the *Stanford Law Review*, the *California Law Review*, the *Texas Law Review*, the *Duke Law Journal*, and the *Southern California Law Review*, as well as in numerous specialty journals. He has chaired or co-chaired a dozen major conferences on intellectual property and computer law, including Computers Freedom and Privacy '98, and he was the 1997 Chair of the Association of American Law Schools Section on Law and Computers. He received his J.D. from Boalt Hall School of Law at the University of California at Berkeley, and his A.B. from Stanford University. After graduating from law school, he clerked for Judge Dorothy Nelson on the United States Court of Appeals for the Ninth Circuit, and practiced law in Silicon Valley with Brown & Bain and with Fish & Richardson before coming to Texas.

Lessig is the Jack N. and Lillian R. Berkman Professor for Entrepreneurial Legal Studies at the Harvard Law School, where he

teaches courses related to the law of cyberspace. He has just completed a book, *Code and Other Laws of Cyberspace*, which analyzes the relationship between the architecture of the Internet and the freedoms the Internet enables. Lessig has written many articles, for both scholarly and popular journals, about the Internet and its regulation. Among scholarly journals, he has published articles in the *Yale Law Journal*, *Stanford Law Journal*, *Harvard Law Review* (forthcoming), *Michigan Law Journal* (forthcoming), *Emory Law Journal*, and the *Proceedings of the IEEE* (forthcoming). Among popular journals, he has published articles in *The Industry Standard*, *The New Republic*, and *Wired Magazine*. Lessig teaches constitutional law, contracts, comparative constitutional law, and the law of cyberspace. In 1995, he taught the basic antitrust course at the Yale Law School, as well as a course on the law of cyberspace. Except for this year, he has continued to teach courses related to the Internet and its regulation, including a seminar examining *United States v. Microsoft*.[3] He graduated from Yale Law School in 1989, and clerked for Judge Richard A. Posner of the Seventh Circuit Court of Appeals, and then Justice Antonin Scalia of the Supreme Court. In 1991, he was appointed to the faculty of the University of Chicago Law School, where he received tenure in 1994. He was a visiting professor at Yale Law School in 1995. During 1996-97, he was a fellow at the Program for Ethics and the Professions at Harvard University. In 1997, he joined the Harvard Law School. He is currently a fellow at the Institute for Advanced Study in Berlin.

We are not experts in computer architecture, or in software technology. We have studied these subjects to understand their relationship to the competitive environment that the Internet has created, and to the values that we have come to recognize in the Internet. It is our view that any analysis of policy related to the Internet must explicitly consider these architectural aspects of the Internet's design. This "architecture," as the Electronic Frontier Foundation puts it, "is policy." Changing the architecture is to change that policy.

We have not been retained by any party in this matter. At the request of Bell Atlantic and GTE, Lessig attended a meeting with the Justice Department to discuss the AT&T/MediaOne merger, and

3. *U.S. v. Microsoft Corp.*, 84 F. Supp. 2d 9 (D.D.C. 1999) (findings of fact), 87 F. Supp. 2d 30 (D.D.C. 1999) (conclusions of law), 97 F. Supp. 2d 59 (D.D.C. 2000) (final judgment), *cert. denied*, ___ S. Ct. ___, 2000 WL 1052937, 69 U.S.L.W. 3111 (U.S. Sept. 26, 2000).

helped arrange a meeting with Bell Atlantic and GTE, and some in the Internet community, to discuss broadband cable access. Bell Atlantic and GTE paid for Lessig's expenses relating to those two meetings. Lemley has had no involvement with any party with an interest in this litigation.

This declaration does not address the general question of the merger of AT&T and MediaOne beyond its effects on the market for broadband Internet service. We also assume for purposes of this declaration that "residential broadband access" is properly considered a separate antitrust market. Our statements here relate solely to the question of the architecture of the resulting network under that assumption.

It is our view that it is important for the FCC to consider these matters now in the context of this merger. It is not our view that every entity that connects its network to the Internet must obey the principles that we describe below. Innovation in the Internet generally is not threatened by what any one (small) company on the Internet might do. But, when a policy of closed access covers a portion of the net as significant as AT&T's would after this merger, the FCC must consider the overall effect that AT&T's proposed change in architecture would have on innovation. More importantly, even if AT&T's policy affected the same footprint of the net before the merger as after the merger, the increased ability post merger for the actors to behave strategically increases the significance of the threat. So far, the FCC has considered only the effect its "regulations" would have on broadband investment. In our view, that is only one part of the equation. The more significant part is the effect that the FCC's *failure to regulate* will have on innovation generally.[4]

III. DESIGN PRINCIPLES OF THE INTERNET

A. *THE ARCHITECTURE OF THE INTERNET*

The Internet is the fastest growing network in history. In the thirty years of its life, its population has grown a million times over. It is currently the single largest contributor to the growth of the United

4. *See* François Bar, Stephen Cohen, Peter Cowhey, Brad DeLong, Michael Kleeman & John Zysman, *Defending the Internet Revolution in the Broadband Era: When Doing Nothing is Doing Harm* (Berkeley Roundtable on the Intl. Econ. E-conomy Working Paper No. 12, Aug. 1999) (providing an analysis similar to our own).

States economy, and has become the single most important influence linking individuals and commerce internationally.

It is not, however, the first communications network. There have been other networks before the Internet that did not experience the same extraordinary growth. These networks followed different design principles, including different principles governing how protocols would evolve and become adopted. It is our view that these differences in growth can be traced, at least in part, to these differences in design.

It is a view of many in the Internet community, and ours as well, that the extraordinary growth of the Internet rests fundamentally upon its design principles. Some of these principles relate to the openness of the Internet's standards and the openness of the software that implemented these standards. Some are engineering principles, designed to make the net function more flexibly and efficiently. But from the very beginning, these principles have been understood to have a social as well as technological significance. They have, that is, been meant to implement values as well as enable communication. In our view, one aspect of this social significance is the competition in innovation the Internet enables. The tremendous innovation that has occurred on the Internet, in other words, depends crucially on these design principles.

Among the Internet's design principles is one that is particularly relevant to these proceedings. This is the "End-to-End" design principle, which has been latent in system design for many years, but was first articulated explicitly as a principle in 1981 by Professors Jerome H. Saltzer, David P. Reed, and David D. Clark.[5]

The End-to-End principle organizes the placement of functions within a network. It counsels that that "intelligence" in a network be located at the top of a layered system—at its "ends," where users put information and applications onto the network—and that the communications protocols themselves (the "pipes" through which information flows) be as simple and general as possible.

One consequence of this design is a principle of non-discrimination among applications. Lower-level network layers should provide a broad range of resources that are not particular to or optimized for any single application—even if a more efficient design

5. *See* Jerome H. Saltzer, David P. Reed & David D. Clark, *End to End Arguments in System Design*, Second Intl. Conf. on Distributed Computing Sys. 509-12 (Apr. 8-10, 1981) (available at <http://web.mit.edu/Saltzer/www/ publications>).

for at least some applications is thereby sacrificed. As described in a subsequent paper by Reed, Saltzer, and Clark:

> End to end arguments have . . . two complimentary goals: (1) Higher-level layers, more specific to an application, are free to (and thus expected to) organize lower level network resources to achieve application-specific design goals efficiently (application autonomy); (2) lower-level layers, which support many independent applications, should provide only resources of broad utility across applications, while providing to applications useable means for effective sharing of resources and resolution of resource conflicts (network transparency).[6]

While the End-to-End design principle was first adopted for technical reasons, it has important social and competitive features as well. End-to-End expands the competitive horizon by enabling a wider variety of applications to connect and use the network. It maximizes the number of entities that can compete for the use and applications of the network. As there is no single strategic actor who can tilt the competitive environment (the network) in favor of itself, or no hierarchical entity that can favor some applications over others, an End-to-End network creates a maximally competitive environment for innovation, which by design assures competitors that they will not confront strategic network behavior.

The End-to-End design of the Internet has facilitated innovation. As Reed, Saltzer, and Clark argue: "[H]ad the original Internet design been optimized for telephony-style virtual circuits (as were its contemporaries SNA and TYMNET), it would not have enabled the experimentation that led to protocols that could support the World Wide Web, or the flexible interconnect that has led to the flowering of a million independent Internet Service Providers (ISPs). "Preserving low-cost options to innovate outside the network, while keeping the core network services and functions simple and cheap, has been shown to have very substantial value."[7]

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6. *See* David P. Reed, Jerome H. Saltzer & David D. Clark, *Comment on Active Networking and End-to-End Arguments*, 12 IEEE Network 66, 70 (May-June 1998) (available at <http://web.mit.edu/saltzer/www/ publications/endtoend/Ane2ecomment. html>).

7. *Id.* Note that the initial ARPANET did not implement End-to-End perfectly into its design. It was because of changes in the 1970s suggested by Vince Cerf and

The principle of End-to-End is not unique to computer networks. It has important analogs in American constitutional law and in other legal contexts. Vis-à-vis the states, for example, the dormant commerce clause imposes an End-to-End design on the flow of commerce: No state is to exercise a control over the flow of commerce between states; and the kind of control that a state may exercise over commerce flowing into that state is severely limited. The "network" of interstate commerce is to be influenced at its ends—by the consumer and producer—and not by intermediary actors (states) who might interfere with this flow for their own political purposes. Vis-à-vis transportation generally, End-to-End is also how the principle of common carriage works. The carrier is not to exercise power to discriminate in the carriage. So long as the toll is paid, it must accept the carriage that it is offered. In both contexts, the aim is to keep the transportation layer of intercourse simple, so as to enable the multiplication of applications at the end.

B. *THE CONSEQUENCES OF THESE ARCHITECTURAL PRINCIPLES*

The effect of these Internet design principles—including, but not exclusively, End-to-End—has been profound. By its design, the Internet has enabled an extraordinary creativity precisely because it has pushed creativity to the ends of the network. Rather than relying upon the creativity of a small group of innovators who work for the companies that control the network, the End-to-End design enables anyone with an Internet connection to design and implement a better way to use the Internet. By architecting the network to be neutral among uses, the Internet has created a competitive environment where innovators know that their inventions will be used if useful. By keeping the cost of innovation low, it has encouraged an extraordinary amount of innovation.

The contexts in which this innovation has occurred are many. By keeping the network simple, and its interaction general, the Internet has facilitated the design of applications that could not have originally been envisioned. And by keeping the cost of innovation low in the future—especially in the context of broadband media—the Internet should continue to facilitate innovation.

David P. Reed that the network we now recognize as the Internet conformed to End-to-End.

End-to-End design does not only promote innovation by creating the opportunity for innovators to offer services to the network. In our view, the effect comes as well from the expectation that innovation will not be countered by strategic actors who might control the flow of commerce. The potential of an actor in the distributional network to act strategically is a cost to innovation. The expectation that an actor can act strategically is an expected cost to innovation. Thus, to the extent an actor is structurally capable of acting strategically, the rational innovator will reckon that capacity as a cost of innovation. Compromising End-to-End will, then, tend to undermine innovation.

The End-to-End design of the Internet thus minimizes the cost of strategic behavior, while creating an extraordinary market that innovators can rely upon when developing new applications for the Internet.

C. *THE DIFFERENCE WITH THE ARCHITECTURAL PRINCIPLES OF THE OLD TELEPHONE NETWORK*

The Internet's design principles are different from the design principles that governed the telephone network prior to the series of actions by the FCC and the antitrust division of the Justice Department that resulted in the break-up of AT&T. Prior to that break-up, the telephone network was not governed by End-to-End principles. The old telephone network was not neutral about the uses to which the telephone system could be placed. For much of the history of the telephone network, it was a crime to use the network in ways not specified by AT&T. It was a crime, for example, to attach devices that performed services not offered by AT&T, or to provide services that competed with the services provided by AT&T. In the 1940s, even the telephone book was owned by AT&T.

Innovation under the old design was thus controlled by AT&T. If a person with a competing conception of how a communications network should be designed wanted to implement that competing conception, he or she would have to either work for AT&T, or convince AT&T of the merits of this alternative design. AT&T was, therefore, a bottleneck on creativity in network architecture. While no doubt AT&T did much to advance telecommunications, through Bell Labs and other research, it also decided which innovations would be deployed. No doubt its decision turned in part upon the expected effect a new technology would have on AT&T's own business model.

The early history of the Internet was affected by this control. As described by John Naughton in *A Brief History of the Future* (1999), an early design idea for the Internet was proposed to AT&T by RAND researcher, Paul Baran, in the early 1960s. Resistance to his design was strongest from AT&T. As Naughton reports, Baran recalls one particularly telling instance of AT&T's opposition:

> [AT&T's] views were once memorably summarized in an exasperated outburst from AT&T's Jack Osterman after a long discussion with Baran. "First," he said, "it can't possibly work, and if it did, damned if we are going to allow the creation of a competitor to ourselves."[8]

This resistance is perfectly understandable. From AT&T's perspective, maximizing its control over its network was no doubt profit maximizing. And we should expect corporate entities to behave in a profit-maximizing manner. But this resistance was profit maximizing only because AT&T was in control of the network uses. Or in other words, only because the network was not "End-to-End." Had the network been End-to-End, it would have had no incentive to disable one use of the network it controlled in favor of another.

The same point about the relationship between innovation and the concentration of control can be made more obviously about the Internet in foreign countries. It is no accident that the Internet was born in the United States, since in practically every other nation, the telephone architecture was controlled by state sponsored monopolies. These monopolies, no less than the AT&T, had no interest in facilitating the design of a network that would free individuals from that control. For much of the 1990s, it was a crime in parts of Europe to connect a modem to a telephone line. Even today, the franchise in Germany for public phones permits the provider to control how access to the Internet occurs.

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8. John Naughton, *A Brief History of the Future: Origins of the Internet* 107 (Weidenfeld & Nicholson 1999); *see* Katie Hafner & Matthew Lyon, *Where Wizards Stay Up Late: The Origins of the Internet* 52-66 (Simon & Schuster 1996) (recounting a similar resistance).

D. *THE GOVERNMENT'S ROLE IN CREATING THE COMPETITIVE ENVIRONMENT FOR THE INTERNET*

It is fashionable today to argue that innovation is assured if government simply stays out of the way. The FCC's hands-off policy to date appears largely to be motivated by this prevailing ideological vogue. The view is that the best way for the government to guarantee growth in Internet broadband is to let the owners of networks architect broadband as they see fit.

We believe this view is misguided. It ignores the history that gave the Internet its birth, and threatens to reproduce the calcified network design that characterized our communications network prior to the Internet. The restrictions on innovation that marked the AT&T telephone monopoly were not removed by the government doing nothing. They were removed by active intervention designed to assure the possibility for innovation. It was the FCC and the Department of Justice that cut the knot that tied innovation on the telecommunications network to the innovation favored by AT&T. It was their action that eventually freed the network from the control of a single strategic actor, and opened it up for the innovation of many.

Beginning with the *Carterfone* decision in 1968,[9] the FCC increasingly pursued a policy that forced AT&T to open its network to competing uses and providers. In a series of decisions, the FCC required that AT&T permit alternative uses of its network. In 1984, actions by the Antitrust Division forced AT&T to unbundle its long-distance service from its local telephone service. This unbundling was effected through a decree that lead to the breakup of the largest monopoly in American history.

These actions together transformed the telephone network from a network whose use was controlled by one company—AT&T—into a general-purpose network, whose ultimate use was determined by end users. In effect, they imposed a principle analogous to End-to-End design on the telephone network. Indeed, though it masquerades under a different name (open access), this design principle is part and parcel of recent efforts by Congress and the FCC to deregulate telephony. The fundamental economic goal of the FCC in deregulating telephony is to isolate the natural monopoly component of a network—the actual

9. *In re Use of the Carterfone Device in Message Toll Telephone Service*, 13 F.C.C.2d 420 (Fed. Commun. Commn. 1968).

wires—from other components in which competition can occur. By requiring the natural monopoly component at the basic network level to be open to competitors at higher levels, intelligent regulation can minimize the economic disruption caused by that natural monopoly, and permit as much competition as industry structure will allow.

It is our view that, but for these changes brought about by the government, the Internet as we know it would not have been possible. Without these changes, the trend in telecommunications was towards more centralized control over the communication network. Network theorist Robert Fano of MIT, for example, wrote in 1972 that unless there was a change in the trend in the computer-communications network, existing institutions would further isolate computer and communications technologies from broad based control.[10] But by seeding the development of a network within a different communication paradigm, and then opening the existing communication network so that it might deploy this different communication paradigm, the government created the conditions for the innovation that the Internet has realized.

This is not to say that the government created the innovation that the Internet has enjoyed. Nor is it to endorse government, rather than private, development of Internet-related technologies. Obviously, the extraordinary innovation of the Internet arises from the creativity of private actors from around the world. Some of these actors work within corporations. Some of the most important have been associated with the Free Software, and Open Source Software Movements, and some have been entrepreneurs operating outside of any specific structure. But the creativity that these innovators have produced would not have been enabled but for the opening of the communications network. Our only point is that the government had a significant role in that opening.

We do not claim that no communication network would have been possible without the government's intervention. Obviously, we have had telecommunication networks for over a hundred years; and as computers matured, we no doubt would have had more sophisticated communication-computer networks. But the design of those networks would not have been the design of Internet. The design would have been more like the French equivalent to the Internet—miniTel. But

10. *See* Robert M. Fano, *On the Social Role of Computer Communications*, 60 Proceedings of the IEEE 1249 (Nov. 1972).

miniTel is not the Internet. The miniTel is a corporate, centralized, controlled version of the Internet. It is notably less successful.

E. *THE RELEVANCE OF LEGACY MONOPOLIES*

As we have said, no one fully understands the dynamics that have made the innovation of the Internet possible. But we do have some clues. One important element of that innovation is a structure that disables the power of legacy monopolies to influence the future of a network design.

By freeing the telecommunications network from the control of one single actor, the government enabled innovation free from the influences of what one might call "legacy" business models. Companies develop core competencies, and most of them tend to stick to what they know how to do. Companies faced with a potential for radical change in the nature of their market may recoil, either because they do not know how to change to face changing conditions, or because they fear that they will lose the dominance they had in the old market as it becomes a new playing field. Their business planning is, in short, governed by the legacy of their past success. These legacy business plans often affect a company's plans about how to respond to innovation. In a competitive environment, they will often disadvantage a company that fails to respond rapidly enough to changed circumstances.

In some markets, companies have no choice but to respond to changed circumstances. They either change or die. It is a mark of Microsoft's success, for example, that its chairman, Bill Gates, succeeded in radically altering the course of the company's development in the face of changed competitive circumstances, despite the fact that such changes resulted in the termination of projects at other times deemed central to Microsoft's future (MSN, for example). In contrast, for example, commentators attribute Apple's failure during the early 1990s to its refusal to give up old models of business success. Legacy models hindered Apple's development; the refusal to be captured by legacy models was a key to Microsoft's success.

In an environment where a company has power over the competitive environment itself, however, the rational incentives of a business may be different. If the business, for example, has control over the architecture of that competitive environment, then it will often have an incentive to design that architecture to better enable its legacy

business models. As Charles R. Morris and Charles H. Ferguson describe it:

> Companies that control proprietary architectural standards have an advantage over other vendors. Since they control the architecture, they are usually better positioned to develop products that maximize its capabilities; by modifying the architecture, they can discipline competing product vendors. *In an open-systems era, the most consistently successful information technology companies will be the ones who manage to establish a proprietary architectural standard over a substantial competitive space and defend it against the assaults of both clones and rival architectural sponsors.*[11]

A company in this position can, and will, resist change in order to keep doing what it knows best.

This was the problem with the telephone company prior to its break up by the government. The telephone monopoly enjoyed substantial returns from its existing network architecture. The fear of regulators was that these returns would make it unwilling to experiment with other architectures that might better serve communication needs. As we have said, there is at least some evidence that AT&T in fact resisted the emergence of the Internet because it feared its effect on AT&T's own business model. Certainly it resisted the development and interconnection of other technologies to its telephone network. The regulators who pushed to free the telecommunication network believed that the market would choose differently from how AT&T, as controller of the network, would choose.

Time has proven these regulators correct. Once freed from the strategic control of an entity that had a particular business plan to protect, the communications network has evolved dramatically. The competitive process was enabled by making the network neutral about its uses, and by giving competitors access to the network so that they could compete about its best use. The same wires that AT&T used to send analog voice only are now being used to deliver stock quotes, music, fantasy games, reference information—in short, the whole content of the Internet.

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11. Charles R. Morris & Charles H. Ferguson, *How Architecture Wins Technology Wars*, 71 Harvard Bus. Rev. 86, 88-89 (Mar.- Apr. 1993) (emphasis added).

The lesson from this explosion of innovation is critically important. An architecture that maximizes the opportunity for innovation maximizes innovation. An architecture that creates powerful strategic actors with control over the network and what can be connected to it threatens innovation. No doubt these strategic actors *might* behave in a pro-competitive manner. There is no guarantee that they will interfere to stifle innovation. But without competition or regulation to restrict them, we should not assume that they *will* somehow decide to act in the public interest.

IV. THE PROPOSED MERGER OF AT&T/MEDIAONE

A. *THE THREAT POSED BY BUNDLING*

As we stated at the start, we do not question the merits of a merger between AT&T and MediaOne in principle. AT&T's argument that such a merger will enable much greater competition in local telephony may prove persuasive; the efficiencies of a merger for the supply of broadband access may prove persuasive as well. Our sole concern is the architecture that AT&T and MediaOne propose for broadband access. As they have described in their papers, cable broadband will prevent users from selecting an ISP of their choice. Instead, access will be technologically bundled with ISP service. The network will thus discriminate in the choice of services that it allows. This kind of discrimination may have profound consequences for the competitive future of the net.

To see the problem with this architecture, we must first understand the importance of an ISP. ISPs serve a number of functions in the existing narrowband residential market. Some ISPs focus primarily on access to the Internet. Customers, through their local telephone exchange, connect to the ISP; the ISP serves Internet access at speeds limited only by the local telephone exchange. Some ISPs supplement this access with promises of user support—both the support to assure the Internet connection is maintained, and in some cases, support with the use of certain Internet applications. Some ISPs further supplement this access with server capabilities—giving users the ability to build Web pages on the ISPs servers, or support more expansive Internet activities. And finally,, some ISPs provide, or bundle, content with access. The most famous of these is America

Online, but other ISP/content providers have included CompuServe and Prodigy.

This existing narrowband residential market is extraordinary competitive. Customers have a wide range of needs and the market responds to this range of needs with different packages of services. Nationwide there are some 6,000 ISPs. In any particular geographic region, there can be hundreds that compete to provide service.

The functions performed by ISPs, however, are not fixed. They have no inherent "nature." Hence as bandwidth changes from narrow to broadband, we should expect the range of services offered by ISPs to change. As throughput becomes more critical in video services, for example, we could imagine ISPs competing based on the caching services they would offer. Or, as the character of the content available increased, we might imagine some ISPs catering to certain content (video content) while others specialized elsewhere (new users).

The functions of ISPs, then, must not be conceived of too narrowly. Their importance, for example, has little to do with hosting "home pages" on the World Wide Web, or the portal sites they might now provide. Their importance is in the range of services they might bundle and offer competitively—from content (including video and audio services) to help functions to reference functions to special caching needs. In short, ISPs are engines for innovation in markets we do not yet imagine.

These ISPs thus could be important middle level competitors in the Internet economy. They could provide an ongoing competitive threat to actors at their borders. In the terms defined by Timothy Bresnahan, ISPs could become "vertical competitors" in an industry marked by highly concentrated markets at each horizontal level.[12] Thus AOL, a traditional online content and ISP, is now a potential threat to Microsoft in the operating system platform market. This threat could not have been predicted three years ago. But, by maintaining the fluidity of borders, the net preserves the potential for new forms of competition.

This layer of potential competition is especially important given how little we know about how the broadband market will develop. The Internet market generally has been characterized by massive shifts in

12. *See* Timothy F. Bresnahan, *New Modes of Competition: Implications for the Future Structure of the Computer Industry* (last rev. June 1998) (available at <http://www.pff.org/microsoft/bresnahan.html>).

the competitive center. Hardware companies (IBM) have been displaced by operating system companies (Microsoft); operating system companies have been threatened by browser corporations (Netscape) and by open-platform "meta"-operating systems (Sun's Java). As Bresnahan notes, we have no good way to know which layer in this chain of services will become the most crucial. Thus, multiplying the layers of competition provides a constant check on the dominance of any particular actor. Again, Bresnahan states: "Far and away the most important is that competition came . . . from another horizontal layer."[13] Thus as he recommends, "one (modest) policy goal would be to make the threat of [vertical competition] more effective."[14]

The architecture proposed by AT&T/MediaOne for their broadband cable service threatens this vertical competition. By bundling ISP service with access, and by not permitting users to select another ISP, the architecture removes ISP competition within the residential broadband cable market. By removing this competition, the architecture removes an important threat to any strategic behavior that AT&T might engage in once a merger is complete. The architecture thus represents a significant change from the existing End-to-End design for a crucial segment of the residential Internet market. Further, there is in principle no limit to what AT&T could bundle into its control of the network. As ISPs expand beyond the functions they have traditionally performed, AT&T may be in a position to foreclose all competition in an increasing range of services provided over broadband lines.

AT&T and MediaOne would achieve this change by bundling technologically. The consequence of this bundling will be that there will be no effective competition among ISPs serving residential broadband cable. The range of services available to broadband cable users will be determined by one of two ISPs—@Home and RoadRunner, both of whom would be allied with the same company. These ISPs will control the kind of use that customers might make of their broadband access. They will determine whether, for example, full length streaming video is permitted (it is presently not); they will determine whether customers might resell broadband services (as they presently may not); it will determine whether broadband customers

13. *Id.* § I.6.

14. *Id.* § IV.4.

might become providers of Web content (as they presently may not).[15] These ISPs will have the power to discriminate in the choice of Internet services they allow, and customers who want broadband access will have to accept their choice. Giving this power to discriminate to the owner of the actual network wires is fundamentally inconsistent with End-to-End design.

This technological bundling at the network level puts pressure on the principle of End-to-End. These cable-owned-ISPs would thereby influence the development and use of cable broadband technology. They would be exercising that influence not at the "ends" of the network, but at the center. They are therefore shifting control over innovation, as Dr. Jerome Saltzer has written, from a variety of users and programmers to a single network owner. This design defeats the principle that the network remain neutral, and empower the users. It is the first step to a return to the architecture of the old AT&T monopoly.

B. *THE COSTS OF VIOLATING ARCHITECTURAL PRINCIPLES*

The costs of violating this fundamental principle of the Internet's design are hard to reckon. We simply do not know enough to know how sensitive the innovation of the Internet is to changes in this competitive architecture. Obviously, in part the significance turns on how the broadband market develops. But, given trends as we can identify them now, the risks of significant consequences from this design are great. We detail some of these risks below.

The first is the cost of losing ISP competition. As we have argued, one should not think of ISPs as providing a fixed and immutable set of services. Right now, ISPs typically provide customer support, as well as an IP address that channels the customer's data. Competition among ISPs focuses on access speed, as well as some competition for content. AOL, for example, is both an access provider and content provider. Mindspring, on the other hand, simply provides access.

In the future, however, ISPs are potential vertical competitors to access providers who could provide competitive packages of content, or differently optimized caching servers, or different mixes of customer

15. *See* At Home Corp., *@Home Service Acceptable Use Policy* <http://www.home.com/support/aup/> (last modified May 8, 2000); At Home Corp., *@Home User Guide Frequently Asked Questions* <http://www.home.com/support/netscape/faq/faq.html> (accessed Oct. 14, 2000) (imposing limitations by At Home Corporation).

support, or advanced Internet services. This ISP competition would provide a constant pressure on access providers to optimize access.

The benefits from this competition in the history of the Internet so far should not be underestimated. The ISP market is extraordinarily competitive. This competition has driven providers to expand capacity and lower prices. It has also driven providers to give highly effective customer support. This extraordinary build-out of capacity has not been incented through the promise of monopoly protection. The competitive market has provided a sufficient incentive, and the market has responded.

The second cost is the risk that legacy business models will improperly affect the architecture of the net. Broadband is a potential competitor to traditional cable video services. Traditional cable providers might well view this competition as a long-term threat to its business model, and they may not want to change to face that competitive threat. By gaining control over the network architecture, however, cable providers are in a position to affect the development of the architecture so as to minimize the threat of broadband to their own video market. For example, a broadband cable provider that has control over the ISPs its customers use might be expected to restrict customers' access to streaming video from competitive content sources, in order to preserve its market of traditional cable video.

The third cost of such control by a strategic actor is the threat to innovation. Innovators are less likely to invest in a market where a powerful actor has the power to behave strategically against it. Innovation in streaming technologies, for example, is less likely when a strategic actor can affect the selection of streaming technologies, against new, and competitive systems.

One example of this cost to innovation is the uncertainty that is created for future applications of broadband technology. One specific set of such applications are those that count on the Internet being "always on." Applications are being developed, for example, that would allow the net to monitor home security, or the health of an at-risk resident. These applications would depend upon constant Internet access.

Whether, as a software designer, it makes sense to develop such applications depends in part upon the likelihood that they could be deployed in broadband cable contexts. Under the End-to-End design of the Internet, this would not be a question. The network would carry

everything; the choice about use would be made by the user. But under the design proposed by the cable broadband, AT&T affiliates would have the power to decide whether these particular services would be "permitted" on the cable broadband network. Cable has already exercised this power to discriminate against some services. They have given no guarantee of non-discrimination in the future. Thus if cable decided that such services would not be permitted, the return to an innovator would be reduced by the proportion of the residential broadband market controlled by cable.

Our point is not that cable would necessarily discriminate against such technologies. Rather, our point is that the possibility of such discrimination increases the risk an innovator faces when deciding whether to design for the net. The increasing risk is a cost to innovation, and this cost should be expected to reduce innovation.

Perhaps some of these costs could be remedied by competition from other broadband providers. If cable companies restrict the nature of ISP service for broadband cable, then to the extent there is competition from DSL, DSL might have a competitive advantage over cable.

But not all of the costs to the Internet market from this change in architectural design could be remedied by competition from other broadband providers. In particular, the cost to innovation would not be remedied by competition among providers. That cost is borne by the market as a whole, not by particular consumers in the market. Consumers individually do not feel any cost from this threat to innovation. They, therefore, have no additional incentive to move from one kind of provider (cable) to another (DSL). Thus, if the increase in strategic power dampens the willingness to invest in broadband technologies, there is no mechanism by which that effect will be felt, and remedied, by broadband consumers directly.

More importantly, given the approach that the FCC has adopted for this case in particular, there is no reason to expect that the cost will be avoided in other cases. As each new broadband technology enters the Internet market, the FCC's position in this case would imply that that new technology too could violate this principle of End-to-End design. Only DSL would be required (because of existing statutory obligations) to maintain the principle of End-to-End design with

respect to ISP choice.[16] And even if DSL does provide a competitive market for some ISPs who want to serve broadband access (discussed *infra*), it simply makes no sense as a matter of economic policy to foreclose the largest possible market for ISP competition, particularly when doing so serves no good end.

C. *THE IMPORTANCE OF ACTING NOW*

As we describe more fully below, there are those within the FCC who have expressed the view that there is no reason for the FCC to address the open access question in the context of this merger. The merger itself will not change the bundling policy of the existing AT&T Cable Services network. Thus any problem with open access, some would claim, is not exacerbated by the merger.

This view misunderstands the potential for strategic action. If there are five broadband cable networks, each acting independently, then the threat to innovation is less than if these five broadband cable networks could act in unison. If they were independent, then the decision of some networks to block certain kinds of Internet services would not necessarily influence any other networks. Thus, the threat to innovation would not be as great. Once the cable monopolies can act together, however, any decision to discriminate would affect a larger section of the market. The risk to innovation would, therefore, be much greater. Further, AT&T is implementing its bundling policy now, and a firm stance in favor of open access by the FCC could have a beneficial effect on AT&T's policy, not only regarding MediaOne, but in other markets as well.

The "wait and see" approach also discounts the cost of regulating ex post facto. In its present state, the ISPs that AT&T would rely upon are independent business units. If the merger were completed, they could easily be folded into the resulting entity. Once integrated, the regulatory costs of identifying nondiscriminatory rates would be much higher than they would be under the existing structure. Rather than the complexity that DSL regulation involves, imposing a rule of open access now would be relatively less costly. The same is even truer of independent ISPs. If the vibrant market for ISPs in narrowband access

16. Further, if bundling of broadband service is permitted for every network except those based on classic telephone wires, eventually DSL providers will have a strong moral case that they should not be subject to a restriction that does not burden any of their competitors.

is weakened or destroyed because they cannot provide broadband service, those ISPs and their innovative contributions will disappear. If they do, we will not magically get competition back by deciding later to open the broadband market to competition.

D. *A COMPARISON TO* UNITED STATES V. MICROSOFT[17]

To see the significance of the threat in the context of broadband, it is useful to compare the nature of the bundle at issue in this merger with the threat that the government has alleged in *United States v. Microsoft* that Microsoft poses. Obviously the two cases are different in many ways. Microsoft's operating system is far more dominant than is cable broadband service. But the point of the comparison is not to equate the competitive threat of the two services. It is to see the structural equivalence between the threats.

The government's primary claim against Microsoft is a charge of monopoly maintenance. The argument is that Microsoft bundled its browser with its operating system, so as to foreclose effective competition in the browser market, and thereby protect its monopoly returns in the operating system market. The threat that the government claims Microsoft was avoiding was the development of a robust application platform, built around Java technologies. As the browser was the platform within which such applications could develop, it was important, the government argues, to keep control of the browser market.

The issues in *United States v. Microsoft* are extremely complex. No fair consideration of the real issues in the case could conclude that either side has an easy argument. But what is clear is that the behavior alleged against Microsoft is far less controlling than the tie alleged here.

In this matter too, the claim of those supporting open access is that AT&T/MediaOne would be in a position to maintain monopoly power, at least over the video market. Like the *Microsoft* case, this maintenance would be affected by keeping control over the source of potential competition. In the *Microsoft* case, that was the browser; in this case, that is ISP competition.

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17. We note that Lessig served as special master in a prior proceeding between the United States and Microsoft, and Lemley has served as a consultant to the Antitrust Division of the United States Department of Justice on the current case. It is not our attention to offer any opinion on the merits of either case.

But importantly, the level of control exercised by AT&T in this case is far greater than the control Microsoft is alleged to assert. The government has never argued that Microsoft totally disabled the ability of competing browsers to be installed on client machines; the most the government alleged was that Microsoft made it difficult, or uneconomical, to load a competing browser. Once properly installed, a competitor browser on the Windows platform works just as well as Microsoft's. Or more precisely, the government has not alleged that the platform disables competitor browsers.

In the case of cable broadband, however, the architecture does disable the relevant competition. One simply cannot choose a competitor ISP as the primary ISP in the cable broadband architecture, and, thus, one cannot choose a competitor to provide the primary ISP services.

AT&T argues that this competition is not disabled by the cable broadband architecture, since a customer can always "click-through" to a non-cable ISP. But the ability to click through provides just a fraction of the services that a competitor ISP might potentially provide. It would be as if competitor browsers on the Windows platform performed just thirty percent of the functions that they performed on other platforms. Further, click-though may be economically irrational even if it is technically feasible, just as Microsoft's original "per processor" license made it nominally possible, but extremely unlikely, for an OEM to load two operating systems onto a computer. Thus, the question in this matter is not whether a user will take the time to "download" another ISP connection; there's no such download possible. The architecture ties the user to AT&T/MediaOne's ISP; users cannot cut that knot.

V. THE ARGUMENTS IN FAVOR OF BROADBAND BUNDLING

A. *A POLICY OF "REGULATORY RESTRAINT"*

It is our view that AT&T's desired design of the architecture of the emerging broadband cable market could be a significant threat to innovation in this market. We suggest a presumption that no significant portion of the broadband market be permitted to violate the "End-to-End" design, unless there is clear evidence that such a change is benign.

So far the FCC has taken a different view. In its initial consideration of this matter, and in the most recent reports from the Cable Services Bureau (Bureau), the FCC has taken the position that it would best facilitate competition in this market by simply doing nothing. In our view, this profoundly underplays the importance of the FCC's activism in assuring competition in the past, and will jeopardize the innovative prospects for broadband Internet service in the future.

The Cable Services Bureau's most recent report to Chairman William Kennard has recommended a policy of "regulatory restraint."[18] It grounds its recommendations on a number of "responses and preliminary findings," and on a straightforward cost benefit analysis of the risks, and benefits, from "regulatory restraint." The "responses and preliminary findings" are as follows:

> (1)The broadband industry is nascent;
>
> (2)Cable modem deployment spurs alternative broadband technologies;
>
> (3)Regulation or the threat of regulation ultimately slows deployment of broadband;
>
> (4)Market forces will compel cable companies to negotiate access agreements with unaffiliated ISPs, preventing cable companies from keeping systems closed and proprietary;
>
> (5)If market forces fail and cable becomes the dominant means of Internet access, regulation might then be necessary to promote competition;
>
> (6)There was no consensus on how to implement "open access" from a regulatory perspective;
>
> (7)There was no consensus on how to implement "open access" from a technical perspective;
>
> (8)Rapid nationwide broadband deployment depends on a national policy.[19]

In our view, conclusions (1) and (2) are correct. Conclusions (6), (7), and (8) may be correct, but are irrelevant to this proceeding.

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18. *See* Deborah A. Lathen, *Staff Report to William E. Kennard, Chairman Federal Communications Commission on Industry Monitoring Sessions Convened by Cable Services Bureau*, Broadband Today (Oct. 1999), <http://www.fcc.gov/Bureaus/Cable/Reports/broadbandtoday.pdf>.

19. *Id.*

Conclusions (3), (4), and (5), the heart of the policy recommendation, are both wrong and internally inconsistent.

1. *Findings (1) and (2)*

It is clearly correct that broadband services are just beginning. The vast majority of Internet users are narrowband users. The content and services that fit best with broadband are just being developed. These services are in part services that require large bandwidth to function effectively.[20] More significantly, they are also services that assume that the user is "always on" the Internet. This latter fact will, in our view, lead to the most significant change in how the Internet will be used. There are a host of applications that are just beginning to be envisioned that will depend upon the Internet constantly monitoring and responding to situations "at home." Many of these services are difficult or impossible to implement through modem-based telephone access.

It also appears correct, though we have not studied the matter independently, that cable broadband service has spurred other broadband providers, in particular DSL. We do believe the report overstates the significance of existing DSL competition. The current market share of cable in the residential broadband market is over eighty percent.[21] This lead is significant, and is unlikely to change quickly.[22]

2. *Findings (6) and (7)*

The Bureau maintains that there is neither agreement on how to implement "open access" nor agreement on what "open access" is. But this part of the report reads like a poor imitation of a Socratic dialogue. Obviously, if one gathers a collection of bright lawyers and technologists, each advancing different interests, one can create a cacophony of views about what "open access" is, just as a good law professor can create a cacophony of views about what "justice" is, or even what the "FCC" is. But a law professor cannot deny that there is an "FCC" merely because no "agreement" in definition is found. And

20. Streaming video or audio is an example.

21. *See Cable Takes the Early Lead*, The Industry Standard 119 (Oct. 11, 1999). For an earlier and higher estimate, *see* Randy Barrett, *Cable, Phone Lines in Battle for Supremacy*, Inter@ctive Week 69 <http://www.zdnet.com/intweek/stories/news/0,4164,387398,00.html> (Jan. 25, 1999).

22. *See e.g. From Dial-Up to Broadband*, Forrester Report 10 (Apr. 1999).

the Bureau should not deny the fundamental principle of "open access" that has animated telephone deregulation merely because lawyers can disagree about how it should be implemented.

This is especially true for the FCC, because the FCC mandates that DSL offer broadband under what is described as an "open access" model. How it is possible that there is no concept of "open access" in the context of cable, but a concept of open access in the context of DSL, frankly baffles us.[23] Certainly if the providers of DSL refused customers the choice of ISPs, and then cited the Bureau's findings as a defense to its actions, no court would recognize the lack of a definition as any excuse.

In our view, "open access" is simply a shorthand for a set of competitive objectives. The objectives sought in the DSL context are perfectly adequate to apply in this context, at least as a starting point. The relevant question that the agency should address is how to assure that customers have an easy choice among relevant competitors, so as to preserve competition in the broadband market. The DSL requirements assure that.

The FCC can impose open access conditions on the AT&T/MediaOne merger without replicating the complex regulatory scheme necessary to implement sections 251 and 252 of the 1996 Telecommunications Act. Interconnection to a cable modem network, even by multiple ISPs, involves nothing more than a standard Internet connection between an ISP and a router. It does not require collocation of equipment, nor would open access conditions require AT&T/MediaOne to honor requests for interconnection at special locations within its network. So long as unaffiliated ISPs are allowed to interconnect at the same place—and at the same price—as unaffiliated ISPs, the End-to-End principle will not be compromised.

The Bureau report seems to suggest that it is enough if access is open in one broadband context, and not in all. But in our view, a principle is respected if respected generally, not occasionally. And the

23. Indeed, AT&T has argued vigorously in favor of imposing open access requirements on local telephone providers. *See* Reply Comments of AT&T Corp., Fed. Commun. Commn., CC Docket No. 98-147, 37 (Oct. 16, 1998), which states: "[T]he most important action the Commission can take to speed deployment of advanced telecommunications services is to vigorously implement and enforce the market-opening obligations that Section 251 imposes on incumbent LECs." Why deployment is encouraged by open access in one context, but closed access in another, is unclear to us.

benefits of a principle come from the expectation that it will be respected. Further, it makes no sense economically to argue that competition in a small subset of the broadband market is an adequate substitute for competition in the entire broadband market. This is particularly true if (as the Bureau report itself suggests) the characteristics of the media differ.

3. *Finding (3), (4), and (5)*

The core of the Bureau's arguments, however, rest on findings (3) through (5). These findings, we submit, are internally inconsistent. On the one hand, the Bureau seems to assume that broadband cable will voluntarily adopt some form of open access. Finding (4) states that "market forces will compel cable companies to negotiate access agreements with unaffiliated ISPs." Thus the future, in the Bureau's view, will be much like DSL is (because of regulatory requirements) today. The naïve assumption that AT&T will voluntarily open the market to competition flies in the face of AT&T's established policy, compounded by the consolidation that is occurring in the broadband market. The Bureau does not explain exactly what "market forces" will compel AT&T to open this market. How exactly will customers of a certified natural monopoly exercise the power to "vote with their wallets"? The only plausible disciplining effect the market might have on AT&T's closed access policy is to slow the rate of subscription to cable modem service, because the bundled service AT&T provides is less attractive than an open alternative. But there is no reason to believe that AT&T, lacking effective competitors in the broadband business in any given city, will recognize or respond to this market threat. Further, if the Bureau's hope is that AT&T will be forced into open access because consumers will delay their switch to broadband in boycott of its closed access policy, it is a supreme piece of irony to suggest that it is the threat of *regulation* that will delay the deployment of broadband technology.

If, however, the future is not a future of open access, and if cable becomes dominant, then finding (5) suggests that "regulation might then be necessary."[24] Thus the Bureau threatens regulation if access is not open, after stating, in finding (3) that "the threat of regulation ultimately slows deployment of broadband." These three findings

24. *See* Lathen, *supra* n. 18, at 35.

cannot go together. The Bureau cannot consistently maintain it is not threatening regulation and then threaten regulation. The Bureau creates more uncertainty than it removes, by conditioning this threat of regulation on extremely vague notions of how extensive cable broadband must be, and how much open access cable must provide.

Indeed, if the Bureau does in fact decide to regulate this industry because access does not magically become open, we will end up with *more* rather than less regulation, because the Bureau will have to regulate not just access to the wires, but a whole host of industries that could have been competitive but that ended up being bundled to the network itself. We will find ourselves, in short, in a new era of regulation reminiscent of the old days of the Bell System.

The way to reduce uncertainty, and promote broadband adoption, would be for the FCC to simply state a clear policy—that cable must be architected to facilitate open access to cable customers. How quickly, and how precisely, are questions the agency can defer for now. Just as the FTC has required online merchants to deal with privacy, or face regulation, so too could the FCC require access providers with significant market power to provide open access, or face regulation if they do not. The policy—open access—should be clear, even if cable companies control how it is implemented in the first instance.

The need for this policy is pressing. The Bureau's evidence that cable will negotiate open access contracts is both slight and beside the point. The Bureau points to negotiations with America Online, which it suggests is evidence that cable will provide independent access generally. But the principle of open access, and the value preserved by End-to-End arguments, is not that the largest and most powerful have the right to access. The principle of open access, and the design of End-to-End, is that *anyone* with a better mousetrap gets access to the market to show.

B. *TECHNOLOGICAL LIMITATIONS TO OPEN ACCESS*

The Bureau repeats technological arguments about why open access is not feasible in the context of broadband cable. These arguments are misleading at best.

First, the Bureau repeats cables' claim that there is something technologically impossible about giving ISPs access to the cable lines. Cable, it is claimed, is a "shared medium," while DSL is dedicated.

This is a fundamentally misleading argument. The Internet itself is a shared medium. Its performance, as the report notes, "var[ies] depending on the number of actual subscribers using the Internet connection at the same time."[25] The only difference between DSL and cable is the place where one enters the shared pool. It is true that cable is architected to share bandwidth among local users, whereas DSL does not. But whether that difference results in a difference in performance is simply a function of how many users the cable company decides to connect, and not upon whether the users it connects have different ISPs. Given a certain profile of usage, cable broadband can guarantee an effective equivalent of unshared access simply by not overselling the access they attach at any single node. More to the point, the cable companies can control usage whether or not they also own the ISPs, merely by limiting the number and size of network subscriptions. So the shared medium argument does not justify bundling of ISP service with access to the network.

Second, the Bureau argues that security on a cable node is less effective than on a DSL connection, since data from other computers passes by all computers on a network node (as is the case, for example, with an Ethernet network). This argument too is misleading. There is a difference in the security approaches necessary to implement broadband cable securely, since users on a particular node are all exposed to the same network traffic. But cable companies are already developing technologies to eliminate that security risk. There is no reason to believe that a properly implemented cable system would be any less secure than a comparable DSL system. And again, there is no reason to believe that cable control over ISPs is necessary to achieve this goal.

Third, the Bureau makes much of AT&T's expectations that it would be permitted to run a closed network. The report sites the colorful mixed metaphor of one analyst, that an open access requirement "puts a shotgun slug through two inches of Excel spreadsheets that [cable companies] use to generate their rate-of-return calculations."[26] The argument is apparently a point about economic justice or fairness—that it would be unjust or unfair to change the rules just now.

25. *Id.* at 19.
26. *Id.* at 34.

If AT&T had these expectations, they were unreasonable. In an age that has reaped extraordinary benefits from the regulations that deregulated the telephone monopoly, and that is beginning to reap the benefits from similar regulations deregulating other local monopolies—for example, electricity—no reasonable business could believe it likely that it could sustain an old-world regulatory structure that protected monopoly. And if AT&T built its models on that assumption, doubtless Excel is quite capable of recalculating the returns on a different set of assumptions. That, after all, is what an electronic spreadsheet is for.

C. *INCENTIVES TO BUILD BROADBAND CONNECTIONS*

The Bureau repeats the threat of cable companies that they will not invest as quickly if they are forced to open access. In effect, the argument is that we must grant cable companies not just a monopoly over the wires, but a right to expand that monopoly into competitive markets, in order to give them an incentive to implement broadband access. This argument is simply wrong as a matter of economics. It is possible to grant whatever incentives are needed by setting the appropriate price for control of the wires themselves. Allowing the cable companies to gain that incentive by monopolizing a competitive market offers no guarantee of giving the appropriate incentive, and (as discussed above) poses significant risks to competition and innovation.

We also suggest that the cable companies protest too much. We have heard many times the argument that an industry will not ever develop—or will collapse—if it is not given preferential treatment by the government. Most of those arguments turn out to be illusory. In the late 1970s, Hollywood argued to Congress that the movie business would not exist in ten years unless VCRs were banned. We wisely decided not to ban VCRs, and Hollywood is doing better than ever. More recently, respected legal scholars argued, as late as 1995, that no one would ever put any valuable content on the Internet unless Congress passed special copyright protections for Internet works. The amazing variety of useful material on the Internet today, despite Congress's failure to give special perks to copyright owners, belies the argument. It may well be that cable companies will provide broadband Internet access whether or not we give them special incentives to do so. And, if we are to grant such incentives, they certainly should not take the form of the power to destroy a vibrant ISP market.

Further, the speed of investment in broadband is not the only economic and social value at stake. There is, as well, the environment for innovation, which is affected by the competitive environment of the Internet. If the cost of a faster deployment of broadband is a reduction in that competitive environment, then it is not clear the benefit is worth the cost. Again, the extraordinary returns that AT&T enjoyed before the 1984 consent decree may well have sped its investment in its conception of what a communications network should be; it does not follow that there was a net benefit to society from that increased incentive to invest.

D. *REGULATION AS A BACKSTOP*

As an alternative to its argument that the government should do nothing now, the government argues that if things turn out for the worse—if cable does in fact implement a closed system as they say they intend, and if cable becomes an important aspect of the broadband market—then the government can pursue open access to cable after the fact, through, one presumes, antitrust litigation.

This is an extraordinary argument. Whether one believes the government is justified in its suit against Microsoft or not, one cannot avoid the conclusion that the existing systems for dealing with monopoly problems in the networked economy ex post are extremely inefficient. Among the costs of using antitrust litigation to design markets are precisely the costs of uncertainty that the Bureau discusses in relation to cable. To say there is no reason to use a seatbelt because there is always the care of an emergency room is to miss the extraordinary costs of any ex post remedy. There is little evidence that the government is in a position to intervene to undo excess monopoly power in an efficient and expeditious manner.

Moreover, the costs of dislodging an existing monopoly power are always significant, and always higher ex post. This is particularly true in this context, where if we must regulate ex post we will face integrated, bundled broadband providers that will have to be broken up, and ways will have to be found to recreate the competition the FCC will have allowed to languish.

VI. CONCLUSION: THE APPROPRIATE PRESUMPTIONS IN THE INTERNET CONTEXT

The government is right about one important fact: We know very little about how this market functions. Ten years ago, no one would have predicted how the network would matter to the creation of the Internet. As late as 1995, Microsoft itself confessed it had missed the significance of the Internet. We are faced, in the Internet, with a phenomenon we do not fully understand, but which has produced an extraordinary economic boom.

In the face of such uncertainty, the question we should ask is, "What presumptions should we make about how this market is functioning?" In our view, these assumptions should reflect the design principles of the Internet. The Internet has been the fastest growing network, crucial to our economy, because it has enabled an extraordinarily innovative competition. It has enabled this competition in part because of its design. It has been architected, through the End-to-End design, to enable this competition.

This principle of the initial Internet should guide the government in evaluating changes to the Internet's architecture, or acquisitions that threaten to change this effective architecture. The presumption should be against changes that would interfere with this End-to-End design. The aim should be to keep the footprint of monopoly power as small as it can be, so as to minimize the threats to innovation.

These principles should guide the FCC in the context of mergers affecting ownership of significant aspects of the Internet. If a merger threatens an architecture that is inconsistent with the Internet's basic design, and if that merger affects a significant portion of a relevant Internet market, then the burden should be on the party making that merger to justify this deviation from the Internet's default design. The presumption should be against deviating from these principles.

As with any principle, these presumptions should apply unless there is clear evidence that displacing them in a particular case would be benign. The burden should not be upon those who would defend the existing design. The existing design has done quite enough to defend itself. If there is good reason to allow AT&T to change the cable network into a version of the old telephone network, then AT&T should bear a heavy burden in justifying this return to the past. In our view, it has not come close to meeting that burden.