No. 08-1291

ORAL ARGUMENT NOT YET SCHEDULED

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

COMCAST CORPORATION,

Petitioner,

v.

FEDERAL COMMUNICATIONS COMMISSION,
AND THE UNITED STATES OF AMERICA,

Respondents.

ON PETITION FOR REVIEW OF AN ORDER OF THE
FEDERAL COMMUNICATIONS COMMISSION

BRIEF AMICUS CURIAE OF PROFESSORS JACK M. BALKIN, JIM CHEN, LAWRENCE LESSIG, BARBARA VAN SCHEWICK, AND TIMOTHY WU URGING THAT THE FCC'S ORDER BE AFFIRMED

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October 5, 2009

CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

A. PARTIES AND AMICI.

All parties, intervenors, and amici appearing in this Court are listed in the Brief for Petitioner Comcast Corporation.

B. RULINGS UNDER REVIEW.

References to the rulings at issue appear in the Brief for Petitioner Comcast Corporation.

C. RELATED CASES.

All related cases of which Amici are aware are listed in the Brief for Respondent Federal Communications Commission.

TABLE OF CONTENTS

TABLE OF AUTHORITIES

CASES

STATUTES

ADMINISTRATIVE DECISIONS

[*] Authorities upon which we chiefly rely are marked with asterisks.

REGULATIONS

SECONDARY SOURCES

STATUTES AND REGULATIONS

All applicable statutes and regulations are contained in the Brief for Respondent Federal Communications Commission.

INTERESTS OF AMICI

Amici urge the Court to uphold the FCC's *Order*. *Comcast Order*, 23 F.C.C.R. 13,028 (2008) (*Order*). Amici are law professors who have written, spoken, and testified extensively on communications policy and regulatory issues. Our interest is to ensure that the Internet will continue to generate maximum levels of innovation and economic growth in the future. Because other parties have addressed jurisdictional and procedural questions, we write to explain more fully why deference to the *Order* is warranted. While the *Order* takes only modest steps that are consistent with past Congressional and FCC policies, vacating the *Order* would have harmful consequences that extend well beyond this individual litigation. We write, therefore, to help put the *Order* in historical and economic context, and to illustrate precisely why reversing the *Order* would interfere with the Internet's ability to foster innovation, economic growth, and new forms of democratic discourse.

Jack M. Balkin is the Knight Professor of Constitutional Law and the First Amendment at Yale Law School. He is the founder and director of Yale's Information Society Project, an interdisciplinary center that studies law and new information technologies. He has written extensively on the role of new technologies such as the Internet in facilitating free speech. *See,*

e.g., Digital Speech and Democratic Culture: A Theory of Freedom of Expression for the Information Society, 79 N.Y.U. L. REV. 1 (2004).

James Ming ("Jim") Chen is Dean of the Louis D. Brandeis School of Law at the University of Louisville. He has written extensively on communications regulatory issues, and is the founder of the Jurisdynamics Network, a website that depicts the law's interaction with societal and technological change. *See, e.g., The Echoes of Forgotten Footfalls: Telecommunications Mergers at the Dawn of the Digital Millennium*, 43 HOUSTON L. REV. 1311 (2007). His institutional affiliation is provided only for identification purposes, and his signing of this brief indicates solely his personal views and not those of the University of Louisville or its law school.

Lawrence Lessig is a Professor of Law at Harvard Law School, and is the director of the Edmond J. Safra Foundation Center for Ethics at Harvard University. Previously, he was a Professor of Law at Stanford Law School, where he founded the Center for Internet and Society. He has written numerous books and articles on the intersection of law with the Internet and other new technologies. *See, e.g.*, THE FUTURE OF IDEAS (2001); CODE AND OTHER LAWS OF CYBERSPACE (1999).

Barbara van Schewick is Assistant Professor of Law at Stanford Law School and Assistant Professor (by courtesy) of Electrical Engineering at Stanford University. She is also Director of Stanford's Center for Internet and Society. Her work explores how changes in the architecture of computer networks affect the economic environment for innovation and competition on the Internet. *See, e.g.,* INTERNET ARCHITECTURE AND INNOVATION (forthcoming 2010).

Timothy Wu is a Professor of Law at Columbia University Law School. He has written and testified extensively on the Internet's open architecture, and has documented efforts that other countries such as China have taken to "close" the Internet. *See, e.g.,* WHO CONTROLS THE INTERNET? (2006) (co-written with Jack Goldsmith). Professor Wu is currently Chair of Intervenor Free Press's Board of Directors.

The Court has granted all amici authority to file this brief. On November 3, 2008, Professors Lessig and van Schewick filed notice of their intention to participate as amici. On July 16, 2009, Professors Balkin, Chen, and Wu moved to participate as amici, and the Court granted this unopposed motion on August 14, 2009.

SUMMARY OF ARGUMENT

The FCC's bipartisan *Order* is a modest step that reaffirms decades-long policies that promote the "dynamic benefits of an open and accessible Internet." *Order*, at 13,028. The *Order* is consistent with the open network policy goals included both in the 1996 Telecommunications Act and in multiple other actions by the FCC and Congress, including the recent federal stimulus legislation.

Although the *Order* takes only modest steps, reversing the *Order* could pose significant threats to the Internet as we have always known it, and to its features that federal policy has sought to promote. Specifically, reversing the *Order* would reduce the Internet's ability to serve as an open platform for innovation, economic growth, and democratic discourse. Indeed, one purpose of our brief is to illustrate that the consequences of reversing the *Order* would extend far beyond this individual dispute. Reversing the *Order* would, among other things, grant network owners almost complete impunity to block traffic for any reason (including anticompetitive reasons), as they alone see fit, and with no regard to the harms caused to other network users. Accordingly, we argue that the *Order* should be upheld for two distinct reasons:

First, Comcast's actions reduce the Internet's ability to create innovation and economic growth. With respect to innovation, practices such as Comcast's—which could be widely adopted and expanded if the Court vacates the *Order*—would threaten application innovation by raising its costs. In particular, by singling out—and secretly discriminating against—individual applications, these practices will introduce significant new uncertainties that will harm application developers and make it more difficult for them to obtain funding. Comcast's behavior would also distort markets by picking "winners and losers," and by stifling emerging competitive threats to Comcast's video distribution business. In doing so, Comcast would preempt the consumer and user-driven market forces that should determine an application's success or failure. Finally, Comcast's behavior would prevent the Internet—a general-purpose technology such as electricity grids—from being used in ways that best foster economic growth.

Second, Comcast's actions threaten new forms of democratic speech in today's digital age. In contrast to traditional mass media technologies, the Internet supports two-way, collaborative speech among many speakers and among associations of speakers. Peer-to-peer technologies—the kind Comcast unilaterally singled out for blocking—enable these new forms of speech by providing drastically cheaper distribution mechanisms for new

forms of content, particularly *video* content. Not only did Comcast's actions directly stifle users' ability to share their speech, these actions could ultimately force users to adopt more expensive means of content distribution. Similar actions by other Internet access providers could similarly undermine the wide diversity of emerging online speech.

In this case, this Court need not gather the evidence on innovation, speech, or technical network management. This Court has played an important historical role in protecting the openness of the Internet at critical junctures by properly deferring to the expert agency. It can protect that openness—and the innovation and democratic participation it supports—again, through appropriate deference.

BACKGROUND

The "Internet" is not one network but an aggregation of millions of smaller networks that interconnect (*i.e.,* communicate) with one another. In short, it is a "network of networks." No one person or company controls the Internet's operations—and no one entity created it. It is possible, however, for one entity to inflict damage on the Internet, and thus to inflict economic and social harm on all its users. In this section, we briefly describe three aspects of the Internet's network architecture that are the most directly affected by Comcast's actions. As we show, these architectural features

were the source of the Internet's ability to generate innovation and economic growth:

Adherence to common standards. The Internet—as a network of networks—is based upon standards. All entities in the Internet operate according to these standards, also known as "protocols." Adherence to these shared standardized protocols is the only reason why so many different types of networks can operate together so seamlessly.[1] These standardized protocols also help create an open platform that facilitates enormous innovation. As long as a new application complies with these protocols, the application will be able to run over any network attached to the Internet, upon any device (computer, cell phone, television), and through any type of transmission medium (*e.g.*, wireless spectrum; telephone lines).

Level Playing Field. The Internet also provides a level playing field for competition among the applications and content that run over it. Specifically, applications and content travel over the Internet in standardized digital data "packets." Throughout much of the Internet's history, network providers were unable to see which application a data packet belonged to.

[1] One of the original designers of the Internet, MIT Professor David P. Reed, testified: "[P]roviding Internet Access implies adherence to a set of standard technical protocols and technical practices that are essential for the world-wide Internet to work for all its users." *Opening Statement of David P. Reed*. JA __.

To get this information, they would have to look "inside" the packet. For instance, just as the post office would have to look inside a packet or letter to know what content is inside, network providers would similarly have to look into the data packet to find out which application it belongs to. Under the Internet's original architecture, they were not supposed to do so.

This "application-blindness" stems directly from the Internet's "end-to-end" network design.[2] Networks designed under end-to-end principles are general (not optimized for the needs of specific applications), and are therefore open to new applications.[3] In more technical terms, application-specific functionality (*i.e.*, the technology that is needed only by some applications and the technology that makes up the application itself) is concentrated within the *end users*' computers rather than within the network. The network, by contrast, only has the most general functionality, such as moving packets from one place to another. As a consequence of this end-to-

[2] *See* Mark Lemley & Lawrence Lessig*, The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925 (2001).

[3] In this brief, we refer only to the "broad" version of the end-to-end principle of architectural design. Under this principle, lower layers of the network should only provide general services all applications can use. Application-specific functions, by contrast, should be concentrated at higher layers on end users' computers. For a detailed analysis of the two versions and their relationship to the architecture of the Internet, see Barbara van Schewick, INTERNET ARCHITECTURE AND INNOVATION (forthcoming 2010) (manuscript at ch. 3-4, on file with author).

end design, the network is "application-blind," meaning that it cannot distinguish among applications that run over it. This feature has traditionally made it impossible for the network provider to distort competition by discriminating among applications and content.

User Choice. On the Internet, users—rather than network providers—decide how they want to use the network. The Internet's open platform for diverse uses stands in marked contrast to the modern cable network. The latter represents a more "closed" platform in which a centralized gatekeeper, rather than the user, ultimately decides how the network will be used, in terms of both applications and content.

The Internet's ability to facilitate user choice also stems directly from its end-to-end network design.[4] In this type of network, installing a new application only requires changes to the users' computers—not to the entire underlying network. Because the network is open and general, it can support all new applications that come along. At the same time, the Internet's application-blindness prevents the network provider from interfering with users' preferred network uses.

Understanding the benefits of these features of the Internet's architecture, federal policymakers have repeatedly affirmed the policy goal

[4] van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at ch. 8.

of open platforms, as discussed in the FCC's brief. These affirmations include the 1996 Telecommunications Act's endorsement of a national policy of maximizing user control, 47 U.S.C. §230(b); the FCC's *2005 Policy Statement*, 20 F.C.C.R. 14,986 (2005); the *2005 Wireline Broadband Order*, 20 F.C.C.R. 14,853, 14,904 (2005); the MCI/Verizon, AT&T/SBC, and AT&T/BellSouth mergers, *AT&T/BellSouth Merger Order*, 22 F.C.C.R. 5662, Appx. F (2007); the *700 MHz Spectrum Auction Order*, 22 F.C.C.R. 15,289, 15,361 (2007); and the American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, §6001(j), 123 Stat. 115 (2009) (requiring that recipients of broadband stimulus grants comply with "non-discrimination and network interconnection obligations . . . including, at a minimum, adherence to the principles contained in the [FCC]'s broadband policy statement.").

ARGUMENT

Other parties have addressed the jurisdictional and procedural questions raised in this appeal. Our purpose, by contrast, is to help illustrate how Comcast's actions reduce the Internet's ability to serve as a platform for (1) innovation and economic growth, and (2) democratic discourse. For these reasons, we respectfully urge the Court to uphold the *Order*.

I. COMCAST'S ACTIONS THREATEN INNOVATION AND ECONOMIC GROWTH.

The Internet's ability to spur such high levels of economic growth stems directly from the specific aspects of its network architecture described above. As the *Order* correctly concluded, Comcast's behavior interfered with these features of the Internet's architecture in harmful ways. *Order*, at 13,028 ("[W]e conclude that the company's discriminatory and arbitrary practice unduly squelches the dynamic benefits of an open and accessible Internet"). Here, we illustrate why Comcast's actions threatened the Internet's ability to generate both innovation and economic growth.

A. Comcast's Actions Interfere with the Internet's Ability to Generate Innovation.

1. Comcast's Actions Reduce Innovation by Undermining Adherence to Shared Protocols.

In blocking BitTorrent, Comcast was using methods that deviate from the Internet standards. More precisely, using "reset" packets to terminate BitTorrent connections represent *non-standard means of managing traffic*. By adopting these strategies—and doing so in secret—Comcast is undermining the shared standardized practices and protocols that provide the foundation of the Internet's ability to spur innovation. *Opening Statement of David P. Reed* ("[V]ariance from [these] standard protocols and practices

damages the Internet as a whole, and all of its users.") (co-designer of the protocols). JA __.

Specifically, Comcast's use of non-standard ways of managing traffic raises the costs of innovation. If Comcast's actions were to become common among network providers, aspiring innovators would be forced to adapt their new applications to the various idiosyncratic traffic management rules of various network providers. This tailoring of application-to-network would dramatically increase the technical and engineering knowledge required to introduce new applications, thus increasing costs and uncertainty. It would also increase the sheer amount of effort required for even the most sophisticated of application developers—in the worst case, developers would have to write different versions of applications for each provider's network.

Imagine, for instance, if the local electricity provider varied the amounts of voltage in its own discretion for any purpose.[5] In this hypothetical world, innovators of new devices would be required to make expensive modifications to ensure that their products could accommodate these uncertain variations.

Comcast's *non-disclosure* exacerbates these problems by further increasing these already formidable new costs. Rather than being able to

[5] Letter from Lawrence Lessig to FCC (Aug. 20, 2008), *available at* http://lessig.org/blog/2FCC.pdf.

rely on shared transparent protocols whose behavior is common knowledge, aspiring innovators would have to engage in expensive tests to determine how the network operates so that they can adapt their innovation. Indeed, innovators would have to "reverse engineer" Comcast's Internet access service—a service that had been advertised as a standard general connection—before they could introduce their new applications.[6]

This non-disclosure also disproportionately harms *new* innovators who have not yet had the chance to establish their reputation. For instance, if a new application fails, users are likely to attribute the bad performance to the application itself, rather than to the network provider who is secretly blocking the application. Indeed, the instant case illustrates this problem. Most everyday users of BitTorrent services who experienced blocking lacked the technical sophistication to know that Comcast rather than BitTorrent caused the application's failure, especially considering that Comcast consistently denied the interference.

2. Comcast's Actions Reduce Innovation by Undermining Non-Discrimination and User Choice.

Comcast singled out specific applications for blocking on its network. In doing so, Comcast *deviated from the principle of non-discrimination* that

[6] *Id*.

has governed the Internet since its inception. This deviation reduces the Internet's ability to generate innovation in several respects.

First, singling out specific applications on a network reduces developers' incentives and abilities to develop new applications.[7] Most importantly, this behavior introduces new and fundamental uncertainties for these developers. *Written Testimony of Barbara van Schewick*, at 4-5. JA __.[8] For instance, developers face the risk that the network may turn against them at any time—and at the sole discretion of the network provider. Even the *threat* of blocking individual applications will reduce application developers' ability to innovate by making it more difficult to obtain venture capital and other investment funding— after all, no investor wants to fund an application that may be unable to reach its users. For example, Stanford law professor Barbara van Schewick testified in the FCC's proceeding that she recently met with a Stanford computer science graduate who was attempting to obtain venture capital for a "new video application with a peer-to-peer

[7] *See* Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. TELECOMM. & HIGH TECH. L. 329, 378-80 (2007) (describing impact of threat of discrimination on application developers' incentives to innovate); *see also* Lawrence Lessig, THE FUTURE OF IDEAS 34-44 (2001); Tim Wu, *Network Neutrality and Broadband Discrimination*, 2 J. TELECOMM. & HIGH TECH. L. 141 (2003).

[8] For a broader discussion of this innovation framework, see generally van Schewick, INTERNET ARCHITECTURE, *supra* note 3 (manuscript on file with author).

component." *Oral Testimony of Barbara van Schewick*. JA __. This individual entered into formal discussions with three different private equity firms whose investors all cited the threat of blocking or degrading by network owners as one of the application's "top risks." *Id.* Ultimately, he did not receive funding.

Actions like Comcast's would also cause transaction costs—and other wasteful costs—to skyrocket. Fearing that their application might be singled out for blocking, innovators would be required to negotiate with multiple network owners to secure access. Fears of blocking would also trigger a wasteful arms race, as programmers (and consumers) spend increasing amounts of time and money encrypting traffic, or designing or modifying software, for the sole purpose of evading the network's filters. Network companies, in turn, will divert resources to undermine this evasion.[9] None of this investment would be productive or result in socially beneficial innovations. Such waste would undermine Congress's explicit policy in Section 706(a) of the 1996 Telecommunications Act to "encourage the

[9] *See generally Vuze Petition for Rulemaking*, at ii ("[Vuze] still must waste precious resources by engaging in a 'cat-and-mouse game' in which it must stay one step ahead of network operators' attempts to degrade its traffic.") JA __; William H. Lehr, Sharon E. Gillet, Marvin A. Sirbu & Jon M. Peha, *Scenarios for the Network Neutrality Arms Race*, 1 INT'L J. COMM. 607 (2007).

deployment on a reasonable and timely basis of advanced communications capability." 47 U.S.C. §1302(a).

In addition, actions like Comcast's will further reduce innovation by distorting competition among applications. Specifically, by excluding some applications but not others, Comcast unilaterally put the excluded applications at a competitive disadvantage. In this case, for instance, Comcast's blocking put applications that distribute content via peer-to-peer applications such as BitTorrent at a competitive disadvantage with applications that use more traditional client-server architectures. These developers might respond, for instance, by abandoning peer-to-peer architectures even though these technologies often provide more efficient means for distributing data.

In addition to these harms, singling out applications for blocking can also have more direct anticompetitive effects. As the Commission concluded upon an extensive factual record, these protocols are *already* commonly used by emerging video services that compete with Comcast's traditional on-demand video offerings—and they could evolve into much more significant threats in the future. *Order*, at 13,030 ("[Peer-to-peer] video distribution poses a particular competitive threat to Comcast's video-on-demand ('VOD') service. . . . Comcast has begun incorporating its VOD

content online through sites competing directly with BitTorrent protocol sites.") (internal citations omitted).

In addition to violating traditional non-discrimination principles, Comcast's blocking also reduces innovation by *limiting user choice.*

Maximizing the ability of consumers to choose freely among applications—*i.e.,* maximizing user choice— plays a key role in increasing the amount and quality of application-level innovation.[10] The reason is that it has proven historically impossible to predict which Internet applications will be valuable—or even how new applications will ultimately be used. For instance, Tim Berners-Lee originally envisioned the World Wide Web as a tool to help physics researchers read documents.[11] Google's famous search engine was an accidental byproduct of a computer program designed for the wholly separate purpose of tracking "backlinks," which refers to other websites that link to a given website.[12] Pierre Omidyar developed the auction website eBay over a Labor Day weekend, and initially viewed it as a

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[10] *See* van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 427-29.

[11] Tim Berners-Lee & Mark Fischetti, WEAVING THE WEB: THE PAST, PRESENT AND FUTURE OF THE WORLD WIDE WEB 50-51 (2000).

[12] van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 375-76.

nighttime and weekend hobby.[13] Yahoo! grew out of efforts by two Stanford graduate students to keep track of links to research papers.[14] Another company that misunderstood the value of a disruptive innovation—AT&T—turned down the original contract for the Internet, expressing skepticism that it would ever work.[15]

Accordingly, where innovation is so unpredictable, economic theory suggests that the way to create more—and better—innovation is by having a large and diverse set of innovators experiment with new and improved applications, and by having users easily choose among the resulting applications.[16] The latter dynamic illustrates why users—and not network providers—should be the ones who decide which applications become successful. If, by contrast, network providers started unilaterally picking "winners and losers" on the Internet, innovation would suffer. Network providers lack the information to replicate the outcome of numerous users' decentralized choices (as history illustrates).

Further, as the Comcast case shows, network providers may also be

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[13] Adam Cohen, THE PERFECT STORE: INSIDE EBAY, 3-4, 20-23, 29-30 (2002).
[14] van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 244.
[15] Katie Hafner & Matthew Lyon, WHERE WIZARDS STAY UP LATE: THE ORIGINS OF THE INTERNET 62-64 (1996).
[16] van Schewick, INTERNET ARCHITECTURE *supra* note 3, manuscript at ch. 9; *see also* Tim Wu, *The Broadband Debate*, 3 J. TELECOMM. & HIGH TECH. L. 69, 83-84 (2004).

driven by motivations that are not identical to users' preferences. BitTorrent, for instance, is a popular file-sharing application. Its popularity among users, however, did not prevent Comcast from blocking it—it merely led them to do it secretly.[17] In this case, the application's fate turned not upon its popular appeal, but upon its appeal to the network provider. In short, limiting user choice makes the Internet a far less fertile ground for value-creating innovations to thrive. Indeed, this dynamic helps illustrate why Congress sought to "encourage the development of technologies" through "maximiz[ing] *user control* over what information [users] receive[]." 47 U.S.C. §230(b) (emphasis added).

An illustration of how maximizing both independent experimentation and user choice can spur innovation can be seen in the FCC's policies regarding telephone network attachments, which include the agency's famous *Carterfone* decision. Until *Carterfone*, the incumbent telephone carrier—which was AT&T for most of the nation—dictated what devices could be attached to the telephone network. AT&T adopted the position that even plastic funnels attached to handsets (called "Hush-A-Phones") were "deleterious to the telephone system." *Hush-A-Phone v. United States*, 238 F.2d 266, 268 (D.C. Cir. 1956).

[17] van Schewick, INTERNET ARCHITECTURE *supra* note 3, manuscript at 318, 428.

In 1956, this Court held that banning such non-harmful network attachments was unreasonable. *Id*. at 269. Following the D.C. Circuit's lead, the FCC eventually struck down AT&T tariffs limiting users' ability to use non-harmful devices. *Carterfone Order*, 13 F.C.C.2d 420 (1968). Subsequently, it enacted regulations allowing users to attach any non-harmful device to the network so long as the device complied with standardized specifications and interfaces. *See generally* 47 C.F.R. Part 68.

In short, the FCC's regulations maximized independent innovation and user choice by transferring control over the introduction of new devices from network providers to innovators and users. Permission from the network provider was no longer required. Instead, innovators were free to create, and users were free to buy, any new device that could be plugged into a common phone jack. This dynamic led to significant unpredicted innovation, including the creation of stylized cheeseburger phones, cordless devices, answering machines, fax machines, and even the modems that helped spur deployment of Internet access. It is unlikely, to say the least, that similar levels of innovation would have occurred if network providers had retained control over what innovations could be used.

B. By Reducing Innovation, Comcast Reduces the Internet's Ability to Create Economic Growth.

Innovation is "is the principal source of economic growth,"[18] as the Department of Justice (DOJ) and Federal Trade Commission (FTC) recently noted. Indeed, the economic importance of innovation to growth is now central to our economic understanding.[19] The FTC and DOJ agree increased competition, not concentration, "stimulates product and process innovation."[20]

Innovation on the Internet, however, plays a particularly important role in increasing economic growth because of the Internet's role as a *general-purpose technology*.[21] More precisely, because the Internet is a

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[18] U.S. Dep't of Justice & Fed. Trade Comm'n, COMPETITION AND MONOPOLY: SINGLE-FIRM CONDUCT UNDER SECTION 2 OF THE SHERMAN ACT, at vii (2008) (now withdrawn by the DOJ for other reasons) (*DOJ/FTC Report*).

[19] David Warsh, KNOWLEDGE AND THE WEALTH OF NATIONS (2006). *See also* Joseph Schumpeter, CAPITALISM, SOCIALISM AND DEMOCRACY (1942); Robert M. Solow, *Technical Change and the Aggregate Production Function*, THE REVIEW OF ECONOMICS AND STATISTICS, Vol. 39, No. 3. (Aug., 1957), pp. 312-320; Paul Romer, *Endogenous Technological Change*, JOURNAL OF POLITICAL ECONOMY, Vol. 98, No. 5, Part 2, pp. S71-S102, October 1990.

[20] *DOJ/FTC Report* at 1. *See also id.* at 7 ("Competition … works because firms strive to attract sales by innovating"); *id.* at 8 ("[M]onopoly has long been recognized as having the harmful effects of higher prices, curtailed output, lowered quality, and reduced innovation.").

[21] The following three paragraphs are based on van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 435-443; van Schewick, *Towards an Economic Framework*, *supra* note 7, at 385-86.

general-purpose technology, it has the potential to contribute disproportionately to economic growth—largely by increasing productivity.

By "general-purpose," we mean that the Internet is a generic technology that can be usefully applied in a large number of sectors in the economy. As the technology spreads, economic growth occurs as the technology increases productivity across these various economic sectors. At the same time, however, that these productivity increases are occurring, new application innovation may *expand* the sectors in which general-purpose technology may be applied—or may *improve* the way the technology is currently being applied. These innovations make the technology even more attractive, which may in turn trigger uses in altogether new areas. In this way, application innovation can trigger a cascading cycle of new potential uses. These ongoing dynamic interactions can *collectively*—and quickly—create enormous increases in economic growth.

For this reason, the *rate of application innovation* is a key factor that determines how much economic growth general-purpose technologies like the Internet can create. The faster that new applications are developed, the more quickly the resulting productivity gains can be reaped—and thus the faster the general-purpose technology can spread throughout the economy and trigger even more applications and productivity gains. Comcast's

behavior, however, *slows* the rate of application innovation. In doing so, it limits the Internet's ability—as a general-purpose technology—to contribute to economic growth. Indeed, these limitations are particularly problematic given the unpredictability of knowing the potential value that services like BitTorrent may provide in the future.

In addition, Comcast's blocking further limits the Internet's economic value by *interfering with user choice*. Because the Internet is a general-purpose technology, it creates value not merely by existing, but by *enabling users* to use the Internet in the way they most value or most need.[22] *See* §230(b) (declaring Congressional policy of "maximiz[ing] user control"). Network providers simply cannot replace the wisdom of the market in identifying the most valuable uses of the network.

In this case, Comcast's blocking of BitTorrent illustrates how limiting user choice reduces the economic value of the general-purpose Internet. BitTorrent is an open source technology available to any developer to incorporate in, or to otherwise facilitate, its own innovations. BitTorrent is therefore itself a relatively generic input, riding atop the general-purpose Internet. This input provides a legal, highly efficient, and scalable method of distributing large files. For this reason, it enables a wide range of diverse

[22] van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 437-443.

and valuable uses. For instance, NASA uses these protocols to distribute images from space; movie studios use them to distribute licensed video content; and computer programmers use them to share open source software. *Petition for Declaratory Ruling*, at 20-22. JA __. Thus, blocking BitTorrent affects a wide range of socially valuable uses. Specifically, it artificially makes these uses more expensive by forcing users to switch to more expensive content distribution mechanisms. In fact, for those users who cannot afford the switch, blocking would make these uses impossible.

C. Blocking Network Traffic is an Ongoing Threat.

1. Network Owners Retain Incentives to Threaten Open Networks and New Competition.

If the Court vacates the *Order*, other network owners have economic incentives to mimic Comcast's practices.

Internet access providers have claimed that such fears are unrealistic because they have no rational incentive to interfere with their customers' uses of the Internet. In more formal terms, Internet access providers may argue that they have no incentive to discriminate because they will benefit from (or "internalize") any efficiencies created by innovative new services. If, however, any Internet access provider did improperly interfere with customers' preferred uses, those customers could always switch providers.

The Internet access providers' arguments are wrong. Comcast's actions *in this case* vindicate concerns that Internet access providers have incentives to interfere with consumers and innovators' access to an open Internet. Comcast, though, is not alone in this behavior. In 2005, for instance, the Commission fined a rural telephone company, Madison River Communications, for blocking Vonage's Voice-over-Internet-Protocol (VoIP) services—an online telephone service that (unsurprisingly) competes with Madison River's voice services. *Madison River Commc'ns Order*, 20 F.C.C.R. 4295, 4297 (2005).

Incentives to interfere have also been demonstrated in theory. Recent economic literature illustrates that network owners do in fact have incentives to discriminate against innovative new competitors. Joseph Farrell,[23] Philip Weiser,[24] and Barbara van Schewick[25] have documented several "exceptions-that-swallow-the-rule" where platform providers such as

[23] Professor of Economics, University of California-Berkeley; Former Deputy Assistant Attorney General and Chief Economist, U.S. Department of Justice, Antitrust Division.

[24] Professor of Law, Colorado Law School; Deputy Assistant Attorney General, U.S. Department of Justice, Antitrust Division.

[25] Assistant Professor of Law and (by courtesy) Electrical Engineering, Stanford Law School; Director, Center for Internet and Society, Stanford Law School.

Internet access providers have incentives to discriminate against certain services on their platform.[26]

The competitive exceptions are the most intuitive. First, an Internet access provider has an incentive to discriminate when an online service competes with one of the access providers' *external* sources of revenue. This precise concern exists in the instant case given that BitTorrent video services already compete with Comcast's traditional cable video service, as the FCC concluded. *Order*, at 13,030. A related exception is that network owners may have incentives to block services that pose no current threat, but that may *one day* threaten external sources of revenue.

Similar competitive concerns exist when the network owner is offering competing *online* applications and services. For instance, Comcast happens to have an online TV service called Fancast and has announced a new online TV service called "TV Everywhere." Those Internet services compete with services offered through BitTorrent technology, such as Vuze. For similar reasons, then, Comcast will retain incentives to impair services such as Vuze that threaten other sources of revenue. Finally, even assuming the network owner believes blocking is necessary for more innocent traffic

[26] *See* van Schewick, *Towards an Economic Framework*, *supra* note 7; Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85 (2003).

management purposes, Comcast's overbroad and indiscriminate blocking creates these same anticompetitive *effects*—not to mention the effects on innovation described earlier—regardless of subjective motive.

2. The Lack of Competition in the Internet Access Market Enhances Incentives to Discriminate.

The argument that market competition would reduce the incentives to discriminate is also flawed. Because the market for broadband Internet *access* is uncompetitive, consumers cannot easily respond to misconduct by switching network providers. In most parts of the country, broadband access consists of a duopoly between the incumbent cable and the incumbent telephone company—who together control at least 95% of the market.[27] Many other regions of the country (particularly rural areas) have only one broadband provider, and thus no choice at all. According to the Commissions' most recent estimates, approximately 23% of ZIP codes have only one cable or ADSL (*i.e.*, the DSL broadband access service generally

[27] Comments of Free Press, *Inquiry Concerning the Deployment of Advanced Telecommunications Capability*, GN Docket No. 09-137, at 46-47 (Sept. 4, 2009) (*Free Press Sect. 706 Comments*) (providing estimates based on FCC and carrier-provided information).

offered by local telephone companies) provider who serves at least one subscriber living within the ZIP code.[28]

Even if there was competition, significant information costs would limit its effectiveness in disciplining providers.[29] In most instances, consumers experiencing problems lack the technical sophistication to know that the *network owner* is the source of the problem. If, for example, a service using BitTorrent protocols fails, the average user will likely blame the BitTorrent service itself rather than the network owner. Indeed, Comcast's blocking was revealed only after extremely sophisticated users noticed that their BitTorrent uploads were not working properly.

While this problem may be addressed by mandating disclosure, disclosure alone is insufficient to constrain network providers' incentives to discriminate. Most obviously, disclosure does not help if you have nowhere else to go because there is no other provider. In addition, the market for Internet access services has significant switching costs that limit the

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[28] Federal Communications Commission, *High-Speed Services for Internet Access: Status as of June 30, 2008*, Table 16 (July 2009), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-292191A1.pdf.

[29] van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 316-318; van Schewick, *Towards an Economic Framework*, *supra* note 7, at 376-377.

effectiveness of what little competition currently exists.[30] To switch providers, consumers must often endure high fees, service disruptions, and long waits for service technicians. These costs will exist regardless of whether the network provider discloses whether and how they interfere with applications and content on their network.

3. The Order Protects Incentives for Economic Growth.

The *Order*'s protection of the Internet as an open platform for innovation and growth provides better—and more economically beneficial—incentives for network providers. Specifically, the *Order* is one of many Congressional and FCC policies that will help incentivize deployment of higher-speed broadband infrastructure. *See* §706(a) (stating Congressional policy of "encourag[ing] the deployment" of "advanced communications capability" such as high-speed broadband).

Reversing the *Order*, by contrast, would create incentives for network providers to deliberately maintain congested networks. Network providers have considered adopting "prioritized" delivery services in which application or content providers would pay an additional fee to have their services transported to consumers more quickly than other competing

[30] van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 318-322; van Schewick, *Towards an Economic Framework*, *supra* note 7, at 374-376.

services are transported. This proposed business model, however, creates incentives to maintain artificial *scarcity* and to increase prices for network access. Indeed, if these new practices are adopted, network congestion will become a feature rather than a bug. Indeed, congestion could help *create the demand* for prioritized access.

Affirming the *Order*, by contrast, would help create incentives for network owners to respond instead by *increasing capacity*. These actions are not economically onerous, and would provide enormous economic benefits to society as a whole. Indeed, because of the economic "rule" of technology markets known as Moore's Law, technologies tend to become twice as fast for the same cost, or half as expensive, every 18 months, leading to exponential advances and cost-savings. It is for this reason that Internet access providers have always been able to cheaply keep up with even exponential increases in network demand—often with decreasing capital expenditures as a percentage of revenue.[31]

Creating the incentives for increased capacity would also help the United States reclaim its place among the world's leaders in broadband. Today, the United States is 22nd in the world in deployment, 14th in the world in speeds (offering speeds 5 to 10 times slower than those offered in

[31] Reply Comments of Free Press, *Petition for Declaratory Ruling*, WC Docket No. 07-52, at 9-19 (Feb. 28, 2008). JA __.

Japan, France, and South Korea), and prices per megabit that are 22nd in the world.[32] Creating incentives to delay improvements, by contrast, would only exacerbate our country's steady and inexcusable decline in global competitiveness in virtually every important metric of broadband service (speed, cost, deployment, etc.).

II. COMCAST'S ACTIONS THREATEN NEW FORMS OF DEMOCRATIC DISCOURSE IN THE DIGITAL AGE.

In addition to causing economic harm, Comcast's actions also undermine new forms of democratic speech and discourse. While critics often focus on instances of outright content discrimination, we argue that Comcast's behavior also affects democratic discourse in a more subtle way. Specifically, Comcast's actions are harmful because they limit users' ability to distribute new forms of speech using peer-to-peer services. In doing so, Comcast undermines the *structural conditions* that allow people to *create and distribute* new forms of speech.[33] By "speech" and "democratic

[32] *See Free Press Section 706 Comments*, at 29-36 (compiling recent data from Organisation for Economic Cooperation and Development (OECD) and the International Telecommunications Union (ITU)). The OECD statistics are collected for its 30 nation members, and the most recent data illustrating the United States' disappointing numbers is available at http://www.oecd.org/sti/ict/broadband.

[33] *See generally* Jack M. Balkin, *Digital Speech and Democratic Culture: A Theory of Freedom of Expression for the Information Society*, 79 N.Y.U. L. REV. 1 (2004); Yochai Benkler, THE WEALTH OF NETWORKS (2006).

discourse," we refer not merely to political advocacy, but more broadly to all types of social and cultural contributions.

A. Peer-to-Peer Services Promote New Forms of Democratic Discourse.

The traditional model for cultural production over the past century has been the centralized "one-to-many" mass media model. Entities such as movie studios, television networks, radio broadcasters, cable networks, and national political parties develop content and deliver it to a largely passive audience. Under this older mass media model, people consume the products distributed to them from a centralized source.

The Internet, however, inverts the traditional mass media model in several respects. Specifically, the Internet's openness and decentralization free end users from being passive *consumers*, and allows them to become active *producers* of it. As new services increasingly allow users to create and distribute their own thoughts and creations, the Internet blurs the "stark separation between production and consumption" that has existed for decades.[34]

[34] Yochai Benkler, *Property, Commons, and the First Amendment: Towards a Core Common Infrastructure*, at 14 (2001), available at http://www.benkler.org/WhitePaper.pdf.

This development has many names—everything from "Web 2.0" to "participatory democracy" to "read-write culture"—but the underlying concept is clear: *consumers are now creators, sharers, and commenters*. Not only can they speak more effectively, they can join and form associations, including political associations like "plumbers for Obama" or "hockey moms for McCain." These creative contributions are evident in everything from the rise of blogs, to social networking sites such as Facebook and Twitter, to amateur videomaking on sites like YouTube. In short, democratic discourse in the 21st Century relies not merely on protecting the right to speak, but upon the ability to create and distribute in new and collaborative ways.

Services like BitTorrent that rely upon peer-to-peer architectures help enable this shift by creating new methods of inexpensive content creation and distribution—methods that include new forms of *video* distribution. Lawrence Lessig, for instance, has argued that video may be the emerging lingua franca of the digital generation, comparing the art of recombining digital videos creatively to a form of "writing."[35] The increasing importance of video to democratic discourse is evident in the role that user-created video has played in recent political and world affairs, from the Iranian "Twitter"

[35] Lawrence Lessig, REMIX 68-69 (2008).

protests to this summer's town hall debates. Indeed, the *distribution* of such content also facilitated the *creation* of content by other users.

A more specific illustration of how peer-to-peer video applications facilitate new forms of speech can be seen in the online television application called Miro (formerly called the "Democracy Player"), which was developed by a non-profit group in Boston called the Participatory Culture Foundation (PCF).[36] PCF filed in this case and demonstrated its technology at the Harvard hearing on Comcast's blocking. Using peer-to-peer protocols, Miro allows anyone—from amateur high school teachers to professional television networks—to create and distribute to anyone online their own "television" channel at low cost to PCF and free to users.

Unsurprisingly, the collective set of video channels currently available on Miro exhibit an enormous diversity of subject matter—diversity that far exceeds what is available on today's cable networks. For instance, the following represents a miniscule fraction of the channels currently available on Miro's website: (1) *The Video Math Tudor* (offering math assistance); (2) *Hatak's AP Chemistry Podcast* (created by an AP Chemistry high school teacher); (3) *Cato Institute Weekly Video* (replaying events taking place at the Cato Institute); (4) *Green Party Videos* (replaying interviews with

[36] https://miroguide.com

British Green Party members); (5) *Erin's Photo Tips* (offering tutorials on photography). Miro is therefore a powerful avenue for free speech, both for speakers and listeners.

B. Comcast's Actions Reduce the Ability of Peer-to-Peer Technologies to Enable New Forms of Speech.

Comcast reduces the ability of peer-to-peer technologies to enable new forms of speech by raising the costs of using these technologies. In particular, blocking these technologies removes users' ability to adopt inexpensive content distribution mechanisms.

Distribution of content through traditional client-server applications is much different than using peer-to-peer technologies. In the former, content providers pay to use servers (essentially large "storage" computers) to "host" their content. When a user wants to view this content, they are essentially viewing content stored on, and requested from, these servers. Content providers must also pay for the bandwidth that is used when people request the content from a server. The more people that want to visit the site, the more expensive that server costs become.

With peer-to-peer applications, by contrast, content providers only have to upload their content to the file-sharing application once. From there, all users of the peer-to-peer application who have the file on their computers

participate in the distribution, and thus contribute bandwidth. In short, this distribution mechanism drastically reduces the costs of content distribution compared to client-server applications. For this reason, peer-to-peer distribution mechanisms are far more attractive to providers who would not otherwise be able to pay for distributing content through a server.

By singling out peer-to-peer technologies for blocking, Comcast is therefore reducing the ability of smaller entities like non-profit organizations and documentary filmmakers to speak and be heard. In particular, Comcast is reducing the ability of these entities to distribute video communications using these inexpensive services.[37] The precise fear is not that all video communications will be prohibited altogether. Instead, the fear is that blocking these services will artificially increase the costs of certain methods of video distribution—methods that were unilaterally selected by the network owner. Indeed, if such practices make it impossible to use these methods of video distribution, then certain types of speakers simply will not be heard.

More broadly, however, Comcast is also reducing the ability of *individual citizens* to participate in the new forms of speech and cultural collaboration that peer-to-peer technologies make possible. Testimony in

[37] van Schewick, INTERNET ARCHITECTURE, *supra* note 3, manuscript at 445.

this proceeding illustrates these harms. Networking engineer Robert Topolski—the individual who initially discovered Comcast's blocking—enjoys collecting old-time barbershop quartets online. He was at home attempting to share these barbershop harmonies using a peer-to-peer service called Gnutella. To his surprise, however, his uploads failed. Given his technical expertise, he investigated further and discovered that Comcast was blocking the uploads. (He also pinpointed the type of technology used, which unfortunately is used by the Chinese and Iranian governments specifically to block speech.) *Testimony of Robert M. Topolski*. JA __. As a result, he could not *contribute* to other network users—and those users, in turn, could not *create* their own content as effectively as they otherwise could.

By undermining the peer-to-peer services that help enable a diverse range of voices, Comcast's actions are undermining the Internet's ability to foster, in the Supreme Court's oft quoted phrase, "the widest possible dissemination of information from diverse and antagonistic sources." *Associated Press v. United States*, 326 U.S. 1, 20 (1945); *see also Order*, at 13,053 n.202. Blocking peer-to-peer services undermines wide dissemination by making it harder for people like Robert Topolski to share and download information by raising the costs of doing so. It also

undermines "diverse and antagonistic sources" because raising these costs reduces the possible number of sources on the margin.

CONCLUSION

This Court can protect the Internet's unprecedented ability to spur economic and social innovation by deferring to the expert agency and affirming the *Order*. We respectfully ask that it do so.

CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitation of Fed. R. App. P. 29(d) and 32(a)(7)(B) because this brief contains 6,997 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(a)(7)(B)(iii).

This brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6) because this brief has been prepared in a proportionally spaced typeface using the 2003 version of Microsoft Word in 14 point Times New Roman.

John Blevins

CERTIFICATE OF SERVICE

I, John Blevins, hereby certify that, on October 5, 2009, I filed the foregoing Brief Amicus Curiae electronically with the Clerk of the Court for the United States Court of Appeals for the D.C. Circuit by using the CM/ECF system. Participants in the case who are registered CM/ECF users, whose names appear without asterisks in the list below, will be served automatically by the CM/ECF system.

According to the Court's records, some of the participants in the case are not CM/ECF users. I certify further that I have directed that paper copies of the Brief be mailed by First-Class Mail to the non-CM/ECF participants, whose names are marked with an asterisk in the list below.

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