Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of the Petitions of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management"	)	RM- _____
and Vuze, Inc. to Establish Rules Governing Network Management Practices by Broadband Network Operators	)	RM- _____
Broadband Industry Practices	)	WC Docket No. 07-52
Commercial Availability of Navigation Devices	)	CS Docket No. 97-80

REPLY COMMENTS

of

Free Press; Public Knowledge; Media Access Project; Consumer Federation of America; Consumers Union; New America Foundation; Participatory Culture Foundation

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Summary of Reply Comments

The initial Comments filed on our Petition and on the Vuze Petition demonstrate that opponents of our Petition don't have a leg to stand on. All their responses either painfully misconstrue our arguments or rely on technical-sounding nonsense and "father-knows-best" claims, which are either irrelevant or invalid.

These Reply Comments restate our request and reject arguments against our Petition, notably the arguments that discrimination against applications is somehow necessary and that the FCC lacks jurisdiction.

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REPLY COMMENTS

Free Press; Public Knowledge; Media Access Project; Consumer Federation of America; Consumers Union; New America Foundation; Participatory Culture Foundation[1] ("Free Press et al.") respectfully submit these Reply Comments.

This Reply refutes arguments made by commenters opposing our petition ("Opposing Commenters"). The Opposing Commenters generally mischaracterize our arguments and then attack those mischaracterized arguments (such as their malware arguments) and primarily make complicated technical-sounding arguments, that, when you cut through the jargon, are illogical and untrue.

[1] A description of the Commenters is attached at Appendix 1 of our initial Comments.

The Reply has six parts. First, we clarify what we're asking for, as many of the Opposing Commenters suggest we oppose all network management. Second, we refute certain more recent economic and technical-sounding arguments made by Opposing Commenters. Third, we discuss the economic harm of network discrimination. Fourth, we reject many of the arguments advanced by several of the Opposing Commenters. Fifth, we discuss Comcast's deception specifically. Sixth, we reject the argument that the Commission lacks jurisdiction to deal with this Petition and complaints based on the Policy Statement.

Summary of Initial Comments

The Commission noticed the Free Press et al. and Vuze petitions on January 14, 2008.[2] Numerous consumer groups and Internet users have filed in support of the petitions. The groups filing these Reply Comments with Free Press represent millions of consumers; our Comments advanced the legal, economic, and policy grounds for granting the Free Press et al. Petition. In addition, supporting Commenters include the New York State Department of Public Service,[3] National Association of State Consumers Advocates,[4] American Library Association,[5] Center for Democracy & Technology,[6] Educause, American Association of Law Libraries, Association of Research Libraries, Internet 2, US PIRG, and the Future of Music Coalition.[7]

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[2] http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-08-91A1.pdf; http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-08-92A1.pdf.

[3] Comments of State of New York Public Service, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519840888.

[4] Comments of The National Association of State Utility Consumer Advocates, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841110.

[5] Comments of American Library Association, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841088.

[6] Comments of Center for Democracy & Technology, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841074.

[7] Comments of Open Internet Coalition, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841177.

Industry groups also filed in support of the Petitions, including the National Association of Realtors, Sony, the Computer & Communications Industry Association (which includes Yahoo!, Sun Microsystems, Redhat, Oracle, and the Linux Foundation), Vonage, and the Open Internet Coalition, whose corporate members including eBay, Google, IAC, Sling Media, TiVo, Earthlink, Electronic Retailing Association, NetCoalition, Skype, and TechNet.

Hundreds have filed their own individual comments. The overwhelming majority of individual comments supports the petition and praises the FCC's Internet Policy Statement while condemning Comcast's actions[8]--commenters range from a group of business school students at Northwestern University[9] to medical researchers.[10]

Opposing the major consumer groups, these industry representatives, and individual consumers were the major network providers (Comcast, Time Warner Cable, Verizon, AT&T, and Qwest), several groups funded by them to varying degrees (Hands Off the Internet), and perhaps a few groups not funded by them, most of which vaguely refer to the antiseptic action of "managing networks."

I. Our Request

We have a nondiscrimination request and a disclosure request.

A. Policy Statement: Nondiscrimination

We are asking, simply, that the FCC clarify what should be already be obvious from FCC and Congressional precedent and policy: when network providers discriminate against, delay, degrade, or block particular applications of a consumer's choice, the network providers violate the Policy Statement and should be punished.

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[8] Free Press et al. Comments at 10.

[9] Northwestern University Students for Net Neutrality, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841145.

We ask that the Commission issue a narrow clarification of what reasonable network management is "not"; discriminating against applications is not reasonable network management. As the Commission said in its 700 MHz Order, this is true even when providers claim to have bandwidth issues or discriminate against applications based on bandwidth.

We believe the Commission can act in a case-by-case method to flesh out the Policy Statement's meaning, as it does in other areas (such as indecency), but should impose significant penalties and act swiftly so network providers cannot game the system through experimenting with discriminatory practices that harm consumer welfare until the end of each adjudication. The standard for a temporary injunction, thus, should be low.

We have never asked the Commission to state that all "network management" is bad or that network providers cannot manage spyware or malware or prioritize emergency traffic.[11] These actions are reasonable network management. The Opposing Commenters point to clearly reasonable management, like blocking denial of service attacks, as evidence that blocking competitors or consumer applications should be acceptable. That is like Tony Soprano arguing he can kill in cold blood—or that murder should not be illegal—because sometimes killing could be justified, such as an old woman acting in self-defense. The argument is an irrelevant, off-point red herring. We agree there is some reasonable network management, including blocking denial of service attacks;[12] reasonable network management just does not include discrimination against particular lawful applications of consumers' choice.

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[10] Comments of Brock M. Tice, Available at http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519837883.

[11] Free Press et al. Comments at 15; Free Press et al. Complaint at 24.

[12] Free Press et al. Comments at n. 145.

B. Policy Statement: Disclosure

In addition to the declaration on network discrimination, the FCC should declare that network providers must disclose their network practices to consumers, application providers, and the FCC. The FCC may consider a rule on this matter; unlike network management practices, which may be better subject to case-by-case adjudication, disclosure may be better suited to a rule. The FCC should issue a rule that requires full disclosure to consumers of what services and applications are being affected when and in what ways. This should be in plain English. Network providers should also provide disclosure aimed at the programmer community, explaining their network management activities with sufficient detail for a programmer reasonably skilled in the field to write applications meeting and taking advantage of these management activities. This disclosure should be adequate for competitors and consumers to determine if network providers are effectively discriminating, delaying, degrading, or blocking certain applications or protocols, and provide enough information for individuals to file complaints to the Commission on network practices.

The penalties for violating these disclosure rules should be enormous. Network providers will perform a calculation of the likelihood of getting caught multiplied by the expected penalty.[13] The likelihood of getting caught is low, because network providers control almost all information about their networks and treat it as proprietary. They also have access to tools to secretly engage in shaping and blocking. Since it is difficult to detect disclosure violations, the expected penalty must be very high to ensure deterrence from disclosure-violations.

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[13] Gary S. Becker, Crime and Punishment: An Economic Approach, The Journal of Political Economy, Vol. 76, No. 2 (Mar. - Apr., 1968), pp. 169-217.

C. Disclosure is Not Enough

Disclosure alone is not enough, nor is it what the FCC or network providers promised, as we demonstrated in our Comments.

Disclosure is not enough for other reasons. Even in a competitive market, disclosure must be meaningful and understandable. Mandating disclosure alone does not take into account that most American consumers do not take the time to read through these policies, due to a number of factors including the legal verbiage and small text size. Disclosures can also be confusing or extremely vague, such as Comcast's terms of service regarding how and when it manages peer-to-peer protocols. Providers place unnecessary restrictions on their customers, and assert a disconcerting level of control over their customer's online activities, such as against criticizing network providers, and consumers do not read these restrictions.[14] Customers should be provided enough undisguised information to have the ability to know when to expect that network management practices are taking place.

Disclosure is not enough because of lack of competition. Given the duopoly nature of the broadband marketplace and Comcast's dominant position in that marketplace (as well as the multichannel video and on demand marketplace), simple disclosure of its deceptive network management practices are not enough. There is not enough competition to enable consumers to use their power of choice to discipline Comcast's bad behavior. Switching costs are too high, broadband products are bundled, and Comcast (and other cable providers) are not engaging in head-to-head competition with incumbent telecom providers.

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[14] Free Press performed a full review of the terms of service of the major U.S. Internet service providers in Appendix E of the Comments of Consumer Federation of America, Consumers Union and Free Press, June 15, 2007, WC Docket No. 07-52, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519529522.

Much of Comcast's defense of their discriminatory anticompetitive behavior is predicated on their assertion that the U.S. broadband market is highly competitive, and that their market power is too insignificant to have an impact on their video competitors or on the wider economy.[15] This assertion is simply absurd. By all measures, the U.S. broadband marketplace is concentrated[16], and local broadband markets are at best duopolies -- a fact confirmed by the GAO,[17] which criticized the FCC's data-gathering on which several Opposing Commenters rely. Assertions that mobile wireless offerings provide "third-pipe" competitors are without merit, as these connections offer far slower speeds than wireline broadband at a higher monthly cost. All of this was recently summed up quite succinctly by a JP Morgan analyst who stated, "The broadband market is a duopoly."[18]

Simply put, there is market failure. Thus enforceable non-discrimination principles must be applied to the owners of broadband infrastructure. If the Commission ignores this very real problem, it will have long lasting negative consequences for the U.S. economy and U.S. consumers.

II. Rejecting Technical-Sounding Nonsense

Comcast and other network providers use technical-sounding arguments to mask their anticompetitive and anti-consumer actions. When they lobbied to eliminate intramodal

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[15] Comcast Comments at 10. Many other industry commenters made similar claims, Verizon Comments at 11-12, Time Warner at 4-9, AT&T at 29-30.

[16] The nationwide HHI for the U.S. broadband market is above 1,400 (see http://www.leichtmanresearch.com/press/021908release.html). However, the nationwide HHI is misleading, as broadband DSL and cable providers are regionally based incumbents, and do not compete against each other. According to FCC Form 477 Data, non-incumbent broadband providers account for no more than 8 percent of all residential and business high-speed connections (assuming cable connections are provided by incumbent cable operators, except for those provided by RCN). This corresponds to an HHI well above 4,300. This level of market concentration is considered (by DOJ *Merger Guidelines*) a highly concentrated duopoly.

[17] "Broadband Deployment is Extensive throughout the United Sates, but it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas", United States Government Accountability Office, Report to Congressional Committees, GAO-06-426, May 2006.

competition, they promised that they would keep the Internet free and that they would increasingly invest in their networks without intramodal competition.[19] Now, they claim they can't—or shouldn't have to—keep the Internet free; they claim that investing in their networks just means throwing money at "needless" upgrades consumers want. Restricting the Internet and disinvesting in networks saps our economy and democracy, and this FCC should not bless or encourage these potentially devastating outcomes.

Comcast's repeatedly claims that it is just congestion management to target and degrade certain applications—even innovative applications directly threatening their main revenue sources. This argument is foreclosed by policy. Just as there are policy limits to "managing" a business in hotels (no discrimination based on race), car companies (no exploding gas tanks or roll-over tires), and all businesses (no child labor, minimum wages), there are policy limits to how network providers can provide access online. Because of the threat to innovation, economic growth, and individual liberty, network providers cannot block and degrade access to content or applications, even based on "congestion," as the FCC has made clear in its Internet Policy Statement, its 700 MHz precedent specifically addressing a network with shared architecture, its orders eliminating intramodal competition, as well as Congress's 1996 Act.[20]

Beyond clear policy, Comcast's argument is also technical-sounding nonsense. First, nothing requires Comcast to block or degrade applications to manage congestion. Second, there are obvious alternatives for managing congestion.

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[18] "Providers Face Slowing Growth For Broadband," *Investor's Business Daily*, Feb. 20, 2008, Available at http://money.cnn.com/news/newsfeeds/articles/newstex/IBD-0001-23137290.htm.

[19] Free Press et al. Comments at 25.

[20] Free Press et al. Comments at 22-25; Ex Parte of Free Press, Nov. 20, 2007, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519814407.

A. Network Upgrades Are Not An Implausible Option: Providers Should Consistently Invest In Better Networks

The Opposing Commenters complain that adopting the petition will reduce investment in networks[21] and argue—at the same time, despite "investment"—that upgrades are "needless," "expensive," and will be ineffective to handle bandwidth growth.[22] All these arguments are false.

1. Granting the Petition Will Increase Investment in our Broadband Networks

If network providers begin "managing" bandwidth by degrading applications, investment in better networks and "bigger pipes" will predictably decrease.

First, providers admit as much. They complain that upgrades are expensive and "needless" and they don't want to invest in them. They'd rather buy equipment to ratchet traffic down to some predetermined 2007 level and not let the Internet expand and grow in the US, though the Internet and network capacity will continue to grow abroad. Our networks are already many years behind those of Japan and France.[23] Comcast predicts it's capital expenditures to drop to 18% of revenue in 2008.[24] What's more, a recent study notes "the capacity growth rate dropped from 124% year-to-year in 2001 down to a low of 26% year-to-year in 2004."[25]

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[21] Comcast Comments at 54; Verizon Comments at 7-8.

[22] Time Warner Cable at 2, AT&T Comments at 3; Comcast Comments at 14; NCTA Comments at 8.

[23] Blaine Harden, "Japan's Warp-Speed Ride to Internet Future," Washington Post, Page A01, August 29, 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/08/28/AR2007082801990.html; "100 Mbps for 30 Euros in Paris," August 31, 2007. Muni Wireless, Available at http://www.muniwireless.com/article/articleview/6367/1/2.

[24] Comcast, "Comcast Reports 2007 Results and Provides Outlook for 2008," Feb. 14, 2008, Available at http://library.corporate-ir.net/library/11/118/118591/items/279702/Q407_PR.pdf.

[25] Nemertes Research, "The Internet Singularity, Delayed: Why Limits in Internet Capacity Will Stifle Innovation on the Web," Fall 2007.

Second, as consumers have almost nowhere else to turn, network providers can create new revenue opportunities by *disinvesting* in its networks and blocking/degrading applications to extort carriage fees. A recent article on the industry notes, "Services tailored to promote own-brand or partner services have already emerged, and services tailored per application, per subscriber, can be expected to emerge soon."[26] One equipment manufacturer has created a tool to "project potential revenues and profits from setting up a tiered service infrastructure, using DPI to deliver different quality of service grades depending on the application and customer subscription."[27] Abandoning investment for discrimination and extortion would harm consumers and undermine our global competitiveness.

Third, the predictable effect of denying our Petition is for network providers to invest in more blocking and degrading, rather than to shift their investment to upgrades. Blocking/degrading methods have existed for years and appear to be continuing to gain in popularity.[28] "Management" allows the providers to invest *one time* and keep bandwidth at a constant 2007 level, whereas upgrades would require network providers to invest every year in new innovation—just as companies do in other sectors, such as computing, entertainment, software, pharmaceuticals, etc. Predictably, network operators who manage bandwidth end up "letting themselves go," with networks that have not been upgraded to handle today's traffic. If

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[26] Simon Sherrington, "The Greening of DPI," *Light Reading*, November 19, 2007, Available at http://www.lightreading.com/document.asp?doc_id=139389.

[27] Carol Wilson, "DPI gets ROI tool," *TelephonyOnline*, Oct. 22, 2007, Available at http://telephonyonline.com/broadband/technology/dpi_allot_yankee_102207/index.html.

[28] Sandvine announced it's tool for discrimination in 2002, See http://www.sandvine.com/news/pr_detail.asp?ID=18; Sandvine recently reported that revenue grew by "133% to $73.7 million for the fiscal year ended November 30, 2007, compared to $31.7 million for fiscal 2006." [Canadian Dollars], see http://www.sandvine.com/news/pr_detail.asp?ID=147; Sandvine recently announced a contract with a "North American WiMAX carrier," See http://www.sandvine.com/news/pr_detail.asp?ID=146; See Comcast Comments at p. 20, n. 54.

the management tools were "turned off," on a lot of systems, the network would not be able to handle the traffic.

Fourth, another predictable effect is reduced investment in networks because demand will decrease. Because Comcast has asserted the right to degrade any popular application,[29] applications-providers will invest less in innovation,[30] so consumers will have fewer options of applications, hence their demand for broadband will decrease. Comcast has asserted the right to degrade peer-to-peer applications, and they are a major driver of broadband demand. As a result of reduced demand, network providers will have less incentive to invest in their networks.

Fifth, investment will shift not only to blocking/degrading tools, but also to encryption and other tools, away from network upgrades. By targeting peer-to-peer applications, providers prompt an "arms race" with consumers and applications-providers.[31] When universities began targeting the common P2P ports, P2P companies responded by changing the port,[32] allowing users to choose the port, and picking random ports on each startup.[33] With Comcast now resetting connections, P2P companies have responded by encrypting or making their traffic "dark".[34] Soon after Comcast was exposed, one UK ISP has reported a ten-fold increase in the

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[29] Comcast Comments at 36 n. 98.

[30] See Barbara van Schewick, "Towards an Economic Framework for Network Neutrality Regulation," 5 J. Telecom. & High Tech. Law 329, 368-378 (2007); Mark A. Lemley and Lawrence Lessig, "The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era" (April 1, 2000). *Berkeley Program in Law & Economics, Working Paper Series*. Paper 37.

[31] Sharon Gillett, William Lehr, Jon Peha and Marvin Sirbu, "Scenarios for the Network Neutrality Arms Race," August 31, 2006, Presented at the 34th Research Conference on Communications, Information, and Internet Policy (TPRC), Available at http://web.si.umich.edu/tprc/papers/2006/561/TPRC2006_Lehr%20Sirbu%20Peha%20Gillett%20Net%20Neutrality%20Arms%20Race.pdf.

[32] Clinton Boulton, "Security Firms Move to Combat File-Swapping Tools," *InternetNews*, June 16, 2000, Available at http://www.internetnews.com/bus-news/article.php/9_396371; Jason Levitt, "Peer-To-Peer Anarchy: The Next Big Thing?" *InformationWeek*, May, 15, 2000, Available at http://www.informationweek.com/author/internet35.htm.

[33] See http://www.azureuswiki.com/index.php/PortIsBlacklisted; http://wiki.themixingbowl.org/UTorrent.

[34] Cade Metz, "BitTorrent busts Comcast BitTorrent busting," *The Register*, Feb. 19, 2008, Available at http://www.theregister.co.uk/2008/02/19/bittorrent_developers_hit_back_at_comcast/.

amount of encrypted traffic.[35] Blogs have advised consumers on how to encrypt their traffic and avoid Comcast's actions.[36] The FCC should not adopt a policy that encourages application providers to invest their time and resources in encryption and arms-race countermeasures rather than in creating innovative new consumer products;[37] that requires consumers to invest time and resources in evolving counter-measures; and that encourages network providers to invest in counter-measures, not upgrades.

Sixth, predictably, Comcast's actions will require other providers to similarly invest funds in blocking/degrading tools that could go towards upgrades. When Comcast blocks uploads on its network, its users upload less. Peer-to-peer services will seek out users who are able to upload, and those users are on other networks, including foreign networks.[38] So Comcast's action increases upload congestion on other networks. Every network provider will then have an incentive to block uploads and shift congestion back to other networks. Network providers may begin blocking or degrading to avoid a second round of upgrades before the bad actors, like Comcast, have had to perform the first.

So denying the Petitions will lead to less investment in networks, and fewer upgrades, not more.

2. Upgrades are Needed, not Needless

The network providers hope to exploit their weak duopoly into the ability to slow investment in their networks. In competitive markets, especially high-tech markets, investment

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[35] See http://www.dslreports.com/shownews/TenFold-Jump-In-Encrypted-BitTorrent-Traffic-89260.
[36] See http://torrentfreak.com/comcast-throttles-bittorrent-traffic-seeding-impossible/.
[37] Comcast apparently sees this a positive sign, "As Vuze concedes, it "has been able to minimize any serious impact on its service." Comcast Comments at 35.
[38] Comcast touts this fact, Comcast Comments at 32.

is brisk and continues year after year.[39] The cost of equipment decreases rapidly, generally in keeping with a principle called Moore's Law.[40] And consumers benefit from the investment, innovation, and price decreases. In the US, the technological bottleneck is not end-user devices like computers,[41] but the last-mile facilities.

Upgrades are necessary for two reasons. First, consumers want upgrades, and a competitive market would provide such upgrades. Second, without investment in upgrades, we'll continue to fall behind our global competitors.

First, consumers want upgrades. Nobody denies the following: consumers want more speed[42] and they want to use the applications of their choice, not those chosen by network providers.[43] In a competitive market, network providers would invest in their networks and provide consumers with higher speeds and openness—similar to competition-induced networks in Japan and France.[44] In the US, the competition in DSL provision, supported by the 1996 Act's

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[39] See, e.g., Charles Ferguson, *The Broadband Problem: Anatomy of a Market Failure and a Policy Dilemma*, Brookings Institution Press, 2004.

[40] Windhausen is wrong that bandwidth has followed Moore's Law. As Eric Klinker, CTO of BitTorrent and former cable network engineer, noted, "In 1998 when, somewhat ironically, I was building network management systems for @Home Network, the same network Comcast later took over and operates today, DOCSIS 1.0 was a new standard that offered a neighborhood of 500 households or so the opportunity to share a 5Mbps upstream channel. Ten years later, the dominant technology used by most cable operators is DOCSIS 1.1, which offers that same neighborhood a mere 10Mbps. Ten years is an eternity in Internet time, and these networks have made very little progress since 1998, cable companies offer merely twice the capacity, 10 years later." Testimony of Eric Klinker, At the FCC En Banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, Second Panel.

[41] Mark Windhausen, "A Blueprint for Big Broadband," Educause, Available at http://www.educause.edu/ir/library/pdf/EPO0801.pdf; See Cite at 39.

[42] For example, consumers pay more for speed and continue to migrate to broadband.

[43] This increases consumer welfare, of course. See Barbara van Schewick, "Towards an Economic Framework for Network Neutrality Regulation," 5 J. Telecom. & High Tech. Law 329, 368-378 (2007).

[44] Jennifer L. Schenker, "Vive la High-Speed Internet!" *BusinessWeek*, July 18, 2007, Available at http://www.businessweek.com/print/globalbiz/content/jul2007/gb20070718_387052.htm; "Open up those highways," *The Economist*, Jan. 17, 2008, Available at http://www.economist.com/research/articlesBySubject/displaystory.cfm?subjectid=348963&story_id=10534573.

unbundling provisions, resulted in phone companies finally investing in and rolling out DSL service, to meet the consumer demand for faster, open networks.[45]

Second, without upgrades, we'll continue to fall behind our global competitors, which is a massive problem because broadband is an input into so many different businesses and endeavors. Brett Frischmann has argued that broadband acts like basic infrastructure, as it is a basic input to many different industries and investment in broadband produces considerable positive externalities.[46] Numerous studies have attempted to quantify the benefits of increased broadband deployment and better networks, and all pin the number in the hundreds of billions, the job increases in the hundreds of thousands or millions, and the contribution to economic growth as a significant percentage of overall growth.[47]

3. Upgrades are Not "Too Expensive"

Because network providers want to avoid investment, and the existing duopoly market permits the providers to respond to consumer demand slowly if at all, network providers complain that upgrades are too expensive.

First, consumers want upgrades. In a competitive market, providers would have to invest. In foreign markets, providers do invest. In competitive high-tech industries, companies do invest to improve their products. Competition is not requiring providers to meet consumers' demand

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[45] Howard Shelanski, "Competition and Deployment of New Technology in U.S. Teleocommunications," *University of Chicago Legal Forum*, 111 (2000).

[46] Brett M. Frischmann, An Economic Theory of Infrastructure and Commons Management, 89 Minn. L. Rev. 917 (2005).

[47] Stephen Pociask "Building a Nationwide Broadband Network: Speeding Job Growth," TeleNomic Research, LLC, February 25, 2002; Robert W. Crandall, Charles L. Jackson, and Hal J. Singer, "The Effect of Ubiquitous Broadband Adoption on Investment, Jobs, and the U.S. Economy," Criterion Economics, September 2003; Wayne T. Borough, "State Economies Can Benefit from Broadband Deployment," CSE Freedom Works Foundation, Dec. 1, 2003; Robert W. Crandall and Charles L. Jackson, "The $500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access," Criterion Economics, July 2001; Dataquest Inc, "Implementation of 'true' broadband could bolster U.S. GDP by $500 billion a year," September 9, 2002.

for investments so providers want to profit from scarcity and block their emerging video competitors.

Second, as a matter of policy, it doesn't matter if investment is slightly more expensive than throttling traffic. It doesn't matter that cars with airbags are more expensive than those without or drugs with child-proof tops are more expensive than those without. Consumer welfare and our global competitiveness requires open, high-capacity networks, and government encourages investment in such ends, not in tools that block and discriminate against innovation and competition. The government policy here is unmistakable: embodied by section 706 of the 1996 Act (that networks must enable permit two-way origination and reception of high-quality video and data), by 230(b) of the Communications Act (that networks should maximize user, not network-provider, control), the Policy Statement, and the 700 MHz gloss on reasonable network management (to exclude discrimination against applications based on bandwidth). Network providers should not be permitted, unconstrained by competition, to cut corners, violate these important government policies, and undermine free speech and innovation, just to save a few dollars.

Third, it appears that upgrades aren't that expensive; they're just more expensive than not upgrading and letting our networks remain third-world networks. There is very little information on the costs of upgrades, so the best numbers rely on many assumptions. But DSL Prime, a leading trade publication, puts the number at somewhere between dimes and one dollar.[48] The numbers cited by Hands of the Internet, which is 40-400 times larger. The FCC should be

[48] DSL Prime makes the point in several different ways: "Traffic shaping just doesn't save enough money to go to war, perhaps ten cents/month/subscriber."; "[C]arrier's cost of bandwidth has been flat to down for five years. The total bandwidth cost is typically $1/month/customer. Multiple sources"; "My opinion is grounded on my research that almost any likely scenario puts the maximum cost of upgrading to a neutral network less than

skeptical of numbers that deviate so wildly from Clark's and Burstein's numbers. They should also be skeptical of numbers that suggest no other country could have such networks, as providers in other countries have found it economical to upgrade their networks. Indeed, here, HOTI's numbers come from an AT&T executive with an agenda arguing against upgrades, who ignores cost-savings going forward based on technical advancement and Moore's law, and assumes that companies build the entire network (backhaul and last mile) from scratch, rather than (infinitely more plausibly) upgrading existing networks.[49]

So, the best available numbers suggest that network providers would have to spend no more than a dollar a month per subscriber —which may increase but will likely decrease with technological advances—on upgrades.

4. Upgrades will handle bandwidth growth, despite claims of an "exaflood"

The network providers are wrong to imply that upgrades cannot handle bandwidth growth.[50] The providers only imply this with their citations to the predictions about "exafloods" and the need for so much bandwidth that the Internet will collapse. Both the premise and the conclusion are hogwash.

The premise is likely wrong, or at least highly uncertain. Bandwidth growth rate has remained surprisingly predictable and constant. This flies in the face of claims that we have seen an unpredictable surge in traffic traveling across the Internet, due to the increase in video.[51] All the empirical studies show little change in the rate of Internet growth for the last five years, and

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$1/month, and it's easy to project costs of a few dimes on a $30-50 month service." DSL Prime, February 26, 2008, http://dslprime.com/News_Articles/news_articles.htm.

[49] Hands Off The Internet Comments at 11.

[50] Comcast Comments at 14; Time Warner Comments at 2; NCTA Comments at 8.

[51] Comcast Comments at 13; AT&T Comments at 6; Time Warner Comments at 10; Verizon Comments at 28.

do not project a major change in the future.[52] A University of Minnesota website that aggregates data from over 100 different sources and demonstrates the growth rate hasn't changed significantly for five years.[53] Comcast own data, put forth in the filing are in line with these studies—its consumers used 40% more bandwidth in the last year.[54] Cisco predicts a future growth rate of 42 percent.[55] Given these numbers, the FCC should have a significant degree of skepticism towards the doomsday scenarios put forth by "exaflood" proponents.[56]

The conclusion is wrong too. Companies can handle bandwidth growth. Of course, bandwidth use will continue to grow, but so should investment. Growth rates have remained at 40% for several years and providers have been able to keep up with growth. Technological advances seen in network equipment and compression technology will likely allow network providers to handle traffic increases. If network providers can't handle these upgrades, some sort of limited open access/unbundling may be necessary.[57]

5. Upgrades will handle additional traffic, despite false claims that P2P absorbs "all available" traffic

Peer-to-peer traffic will not "absorb" all upgraded capacity. A widely voiced claim in the initial round of comments was that peer-to-peer protocols are designed to consume all available

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[52] For instance, "consumer Internet will grow at a rate of 42 percent," Cisco, "Global IP Traffic Forecast and Methodology, 2006-2011," White Paper, January 14, 2008, Available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/net_implementation_white_paper0900aecd806a81aa.pdf; "for forward looking projections, we projected a total capacity growth of 50% per year" Nemertes Research, "The Internet Singularity, Delayed: Why Limits in Internet Capacity Will Stifle Innovation on the Web," Fall 2007; "recently even that growth rate has declined towards 50-60% per year" Andrew Odlyzko, See http://www.dtc.umn.edu/mints/home.html.

[53] For a discussion of these studies and the UM project, See http://www.dtc.umn.edu/mints/home.html.

[54] "On average, each Comcast High-Speed Internet customer uses more than 40% more bandwidth today than one year ago." Comcast Comments at 13 n. 31.

[55] See Cite in n. 52.

[56] The "exaflood" refers to the assumed unprecedented explosion in traffic stemming from online video, among others. Cited in Comments of Verizon at 29, Comments of AT&T at 10, Comments of Time Warner at 10.

[57] Testimony of Yochai Benkler. At the FCC En Banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, Second Panel.

bandwidth on the network.[58] Time Warner asserts further that P2P makes "peak usage a constant state of affairs."[59] This myth has been widespread but has not been backed by a solid defense. Comcast cites Representative Mary Bono on this point.[60] In short, if this were the case we would see everyone's Internet in a neighborhood stop altogether or slow to a crawl when a single person uploaded a single file. Clearly this has not occurred since P2P usage became mainstream almost 10 years ago. What's more, if this were true all carriers would have no choice but to slow down P2P, which we have been assured is not the case.[61]

Quite simply, peer-to-peer does not act like that. Any P2P application running over TCP will automatically slow down in the face of congestion, as will any other traffic using TCP.[62] Some commenters have contended that P2P applications do not adhere to TCP, and speeds up when other traffic slows down.[63] This is not true. As Dr. David J. Reed noted in his testimony, "Responsibility for indicating priority and slowing down traffic is part of the standard end-to-end protocols, in particular TCP. TCP responds to such notification by rapidly slowing down its transmission. All file transfers, including BitTorrent, use TCP, so when congestion is detected, the senders slow down.[64]

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[58] Comcast Comments at 16, Time Warner Comments at 12, Verizon Comments at 41; Comments of Richard Bennett.

[59] Time Warner at 13.

[60] Comcast Comments at 14-15; Also cited on this point was William Norton of Equinox. Time Warner Comments at 12, AT&T Comments at 14.

[61] "AT&T does not treat P2P traffic any differently than other Internet traffic." Om Malik, "Why Traffic Shaping Isn't Just a Comcast Issue," October 25, 2007, Available at http://gigaom.com/2007/10/25/why-shaping-traffic-isnt-just-a-comcast-issue/; "we see no need at the current time to slow peer-to-peer traffic" Anne Broache, "Verizon: No 'need' to degrade P2P traffic…yet," *CNet News*, Feb. 11, 2008, Available at http://www.news.com/8301-10784_3-9869327-7.html.

[62] This is true for multiplayer games and Slingbox, see Verizon Comments at 31.

[63] Id. at 30-31; Time Warner Comments at 12.

[64] Testimony of Dr, David J. Reed, FCC En Banc Hearing, Feb. 25, 2008, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519843517.

Furthermore, as was noted in the FCC En Banc Hearing, no more bandwidth is used than what the cable company allows the cable modem to use.[65] The tier of service the customer has purchased sets this.

Lastly, it is strange that those that are using a service the most are seen as enemies, unlike those heavy Comcast On Demand users.

B. Comcast Need Not Block or Degrade Applications or Content to Manage Bandwidth

The network providers claim one way of managing bandwidth is to block or degrade applications, including their competitors'. But blocking or degrading applications is not necessary, despite the implicit suggestions of Opposing Commenters.

First, congestion is not new and TCP has its own methods for handling congestion, even if network providers did not manage congestion, as technical experts like Professor David Clark and Dr. David J. Reed explained to the Commission on Feb. 25.

Second, providers need not use applications as proxies for bandwidth. The providers have not been able to refute the argument, made in our petition, to the contrary. The transaction costs do not require using applications as proxies to block[66]--especially using applications that compete with network providers' core offerings.

Third, Comcast is not even managing bandwidth by targeting an application. Comcast blocks and degrades transfers of small files by people who otherwise use little bandwidth.[67]

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[65] "this is my cable modem. They download a configuration to it that says this user cannot under any circumstances at any time transmit more than, in my case it's 384 kilobits per second, so, no application that sits behind that cable modem could ever transmit more whether they were using bit torrent or any other application." Commentary of Eric Klinker, At the FCC En Banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, Second Panel, Video stream available at http://www.fcc.gov/realaudio/mt022508v.ram.

[66] Free Press et al. Petition at 31.

[67] Free Press et al. Comments at 10.

Fourth, no respectable technological expert has said that Comcast's actions are acceptable network management. The Electronic Frontier refuted claims by Comcast's "apologists" that Comcast's P2P throttling was necessary because of a technical reason.[68] During the En Banc Hearing, some of the most authoritative voices and key actors in creating the Internet unequivocally stated this action was not acceptable.[69] Professor David Clark stated:

> If this was a response to a problem to which they could not otherwise control, I would say that it is a signal that their anticipation of congestion and the tools that they put in place to deal with congestion were entirely inadequate. … I actually am very uncomfortable with the idea, that the network in the middle is creating a message to you that appears to come from me. I just, I have a lot of trouble with that."

Dr. David J. Reed stated that he couldn't find a single academic paper endorsing using RST packets against applications to manage congestion.[70] He noted that the "only recorded IETF[71] discussion I am aware of that discusses RST Injection," which is Comcast's particular technique, "is a paper by a respected Internet expert, Sally Floyd,

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[68] Peter Eckersley, "Scrutinizing Comcast's Apologists," EFF Blog, Feb. 20, 2008, Available at http://www.eff.org/related/3499/blog.

[69] Commentary at the FCC en banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, Second Panel, Video stream available at http://www.fcc.gov/realaudio/mt022508v.ram; For a brief review of their sterling credentials see, http://en.wikipedia.org/wiki/David_D._Clark; http://en.wikipedia.org/wiki/David_P._Reed.

[70] "I repeated the experiment that AP did and so forth and I convinced myself of two things one is that they were indeed sending resets that were very careful, you have to understand that resets are carefully validated by the endpoint because hackers were using them before and they were sort of spraying them around and causing everyone to be disrupted. So you have to synthesize a very careful packet in order to cause that to happen and I discovered yes indeed by recording at both ends I could validate that they were going both ways. The second thing I discovered was that in order to do that they had to generate information that was coming from inside the envelope. Ok, they had to read what was inside that envelope in order to fool me into thinking that it came from my counter party…but they did synthesize something based on data that is not supposed to be used on the Internet. Now I would view of that as pragmatic…if someone had actually analyzed this technique and published a paper saying that reset is a good way to solve congestion. There is no published paper in the lierature on this topic. In fact, I have asked several people if they are aware of any literature and I know a lots of people in this community and they are not aware of any literature. So there is a brightline very clear to me of people who act unilaterally, impulsively and without data. And the without data is clearly on the side of Comcast" See Cite at n. 69.

[71] IETF is the Internet Engineering Task Force and is the body determining Internet protocols. See http://www.ietf.org/.

which strongly rejects the notion that using RST's for congestion control is a good design."[72]

Comcast's main defender, who testified for Comcast before the FCC, is Richard Bennett, a "network architect" who sat on the FCC's en banc panel to defend Comcast. His arguments prompted the laughter of Professor David Clark, Dr. David J. Reed, and much of the audience.[73]

C. Non-Discriminatory Options Exist

Tellingly, there are many non-discriminatory options to manage bandwidth. The FCC does not need to endorse *any* of these. We do not even endorse any of them here under *all* conditions, because network providers could use any of these tools, depending on their implementation, in discriminatory ways.[74]

As a threshold matter, it is not our burden or the FCC's burden to determine how Comcast or any network provider manages its congestion. All the FCC needs to do is ensure transparency and clarify (once again) that network providers cannot discriminate against applications. The FCC was clear in its 700 MHz Order that it is not reasonable network management to block an application based on the congestion it causes, and that network providers must use nondiscriminatory means.[75] The FCC does not need to hire engineers to figure out how to do this—no less than it must hire engineers to figure out how certain broadcasters can avoid interfering with other broadcasters.

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[72] Dr. David J. Reed Opening Statement, at 3 (citing Sally Floyd, "Inappropriate TCP Resets Considered Harmful," Internet RFC 3360 (Aug. 2002), <http://www.ietf.org/rfc/rfc3360.txt?number=3360>).

[73] Notably when Bennett accused the Petitioners of not providing information about specific congestion issues on Comcast's network—information Comcast does not share.

[74] For example, with P2P caching, Comcast could only cache its own services or do so preferentially.

[75] Free Press et al. Comments at 23.

We do not always need engineers to identify practices that violate the principles set forth in the Policy Statement. The FCC need merely law down the rule and the industry can respond. There is no lack of creative engineering to handle congestion, as BitTorrent's DNA product demonstrates; that proprietary product of BitTorrent, Inc. makes it impossible for use of its product to be the cause of problematic congestion on a shared network.[76]

Nonetheless, here appear to be some non-discriminatory means to manage bandwidth.

1. The Best Option: Investment in the Network

Upgrades are the best option. Upgrades are the route that nations with competition have seen, that consumers would demand in a competitive market, that most support our global competitiveness, and that most adhere to Section 706 of the 1996 Telecommunications Act, which calls for next-generation, two-way networks for sharing high-quality video, data, and other content.[77] As we discussed above, upgrades are not needless, *should* be consistent and "never-ending," can handle consumer bandwidth demands and are not outrageously expensive.

Network providers can provide their customers with more bandwidth, at a reasonable cost bourn in other nations.[78] The most common method of upgrade for the cable industry is node splitting. Cable modem networks are shared networks, with everyone on the node sharing the same download channel and the same (smaller) upload. Node splitting refers to the practice of adding equipment or software to split in half the number of people sharing a given node. If 500 customers share 50mbps on a node, after a node split two sets of 250 customers would share 50mbps each.

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[76] See http://www.bittorrent.com/dna/technology.html.
[77] Free Press et al. Comments at 19-20.
[78] Jonathan Tombes, "Node Splits: How, When and Whether" *Cable360*, March 1, 2007, Available at http://www.cable360.net/ct/strategy/businesscases/22263.html

The Cable plants could also—and should—allocate more bandwidth to Internet services and away from closed, one-way cable services. The biggest bandwidth hog by far on Comcast's network is Comcast. It allocates hundreds of MHz of spectrum to its channels and video on demand. Comcast sends every channel down the cable pipe meaning many channels that are not being watched are taking up bandwidth; this consists of considerable bandwidth: a GAO report noted, "most people, on average, watch only about 17 networks."[79] At the same time, Comcast allocates no more than two or three channels to broadband, likely because of the fear that with increased broadband capacity, consumers will watch television online not through Comcast's cable offerings. Comcast's senior vice president of new-media development has estimated that "if cable operators converted all of the spectrum in their networks to be a single DOCSIS 3.0 channel-bonded connection, the bandwidth of that link would approach 5 gigabits per second, or twice that of Gigabit Passive Optical Network technology." [80] Instead, Comcast offers hundreds of channels when people could watch the seventeen they enjoy online.

Indeed, we believe cable companies can increase broadband bandwidth *without losing* channels because of the emergence of switched digital video (SDV). With SDV, only channels requested by customers are sent through the last mile. This allows providers to save considerable bandwidth. In 2006, Time Warner Cable CTO Mike LaJoie noted that in their implementation

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[79] Issues Related to Competition and Subscriber Rates in the Cable Television Industry, U.S. General Accounting Office, October 2003, GAO-04-8, p. 37, Available at http://www.gao.gov/new.items/d048.pdf.

[80] Todd Spangler, "DOCSIS Upgrade: Only 'a Couple Billion Dollars': Comcast's Craddock: Technology Much More Economical than Fiber-to-the-Home, Multichannel News, May 9, 2007, http://www.multichannel.com/index.asp?layout=articlePrint&articleID=CA6440866.

the bandwidth savings "exceeded 50 percent."[81] In 2007, Comcast decided on an SDV vendor and enacted test markets.[82]

However, even if cable companies do not adopt SDV, we find it highly unlikely that consumers and our society are better served by cable networks carrying more of the 300th most watched channels on the cable television network—which can be offered online—rather than doubling or tripling the capacity available to broadband networks.

More extensive upgrades include DOCSIS 3.0, which cable providers have been slow to roll out and which promises increased capacity. According to Comcast's senior vice president of new-media development Steve Craddock, upgrading to DOCSIS 3.0 will not be expensive. In 2007, he stated the upgrade "will be far more economical to deploy than building fiber-to-the-home." He joked about the low cost: "Cable can go deploy DOCSIS 3.0 for a couple billion dollars. It's the kind of money we can find in Bill Gates' sofa cushions." It is an incremental upgrade, so does not require the expense of "digging up the streets": "We could blanket the entire U.S. footprint in a matter of years because it's an incremental upgrade."[83] Amortized over several years, the cost of DOCSIS 3.0 does not appear so crushing that a competitive market would not have driven harder the conversion.

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[81] Mike Robuck, "Switch is on for Cox, Time Warner Cable," *Cable360*, April 13, 2006, Available at http://www.cable360.net/ct/news/ctreports/18481.html.

[82] Todd Spangler, "Comcast Picks BigBand as Switched Digital Video Vendor," *Multichannel News*, Oct. 31, 2007, Available at http://www.multichannel.com/article/CA6496096.html; Jeff Baumgartner, "Comcast Reveals SDV Test Beds," *Cable Digital News*, April 26, 2007, Available at http://www.lightreading.com/document.asp?doc_id=122733.

[83] Todd Spangler, "DOCSIS Upgrade: Only 'a Couple Billion Dollars': Comcast's Craddock: Technology Much More Economical than Fiber-to-the-Home, Multichannel News, May 9, 2007, http://www.multichannel.com/index.asp?layout=articlePrint&articleID=CA6440866.

2. Several Existing TCP Options

Comcast suggests that without its active management (read blocking and degrading), congestion would overwhelm the last mile. Dr. David J. Reed's testimony strongly disagrees. Indeed, BitTorrent relies on TCP so it responds to congestion like other traffic and backs off during congestion.

As Dr. Reed notes, the Internet is a set of "Autonomous Systems," or networks not owned by each other. Network providers like Comcast "do *not* create the Internet for their customers, instead they provider *access* to a larger collective system, of which they are a small part."[84]

When an Autonomous System has congestion, several "normal" options are available. Generally, the protocols call for the senders to slow down. According to Dr. Reed, "[f]rom the beginning," the ultimate solution was recognized as getting the senders to "'slow down' their rate of sending and prioritize their traffic if need be." Solving the congestion problem "requires cooperation from the senders." Responsibility for "indicating priority and slowing down traffic" is part of the standard Internet protocols, "particularly TCP." Despite the wrong claims by network providers in this proceeding, "[a]ll file transfers, including BitTorrent, use TCP, so when congestion is detected, the senders slow down;" "TCP responds [to notification of congestion] by rapidly slowing down its transmission."[85]

The specific standards for slowing down traffic include diffserv, RED, and ECN. Diffserv (for Differentiated Service) allows individual "envelopes" to be labeled for their priority. RED (for Random Early Drops) signals congestion to the ends by dropping packets

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[84] Testimony of Dr. David P. Reed, At the FCC En Banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, Second Panel, p. 1.

[85] Id., at 2.

randomly, which does not hurt the transmission because the ends can send the same data, they will just do so more slowly. ECN (for Early Congestion Notification) is the standard way to mark "envelopes" passing through congested areas so the end points can decide to slow traffic. Again, BitTorrent and all file transfers use TCP so these methods are "available for use today for situations such as the congestion alluded to by Comcast in its press materials."[86]

3. P2P Caching

Several companies, including PeerApp and Oversi, provide peer-to-peer caching services. According to these companies, and experts with whom we have spoken in the cable industry, P2P caching helps network providers manage congestion through caching popular files.[87] It can be used in a nondiscriminatory way through an algorithm that only retains the files transferred most often. The technique relieves upload bandwidth use for the network provider while still providing all consumers the services they select and permitting application-providers to provide their services and reach consumers. It provides better service both to consumers who use P2P and to those that do not.

P2P caching alleviates the strain on upload bandwidth because the uploading file is already cached and thereby sidesteps the last mile bottleneck.[88] As Oversi claims, P2P caching "relieves the P2P burden and turns P2P into a huge ISP opportunity."[89] It claims its product can "reduce the ISP Bandwidth requirement by 60-90%," create "large savings in bandwidth costs (especially on international links)," and, unlike Sandvine products, creates "[s]ubstantial

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[86] Id., at 3 n. 4.

[87] White Papers, http://www.peerapp.com/docs/ComparingP2P.pdf; http://www.infinitus.info/sitebuildercontent/sitebuilderfiles/peerapp_wp.pdf

[88] "How P2P Caching Works," http://www.peerapp.com/products-ultraband.aspx

[89] Oversi website, See http://www.oversi.com/solutions/isps.html.

enhancement in end users experiences."[90] PeerApp advertises a similar product, claiming its product eliminates "up to 80% of P2P traffic across ISPs' networks" and to support "all the current major P2P network protocols, including Bittorrent, eDonkey, Gnutella and FastTrack."[91] BitTorrent has put the necessary info in their application in order to allow ISP's to implement this tool.[92]

4. Collaboration

Another method for reducing ISPs' bandwidth costs is for network providers to collaborate with P2P companies. For example, several commenters discussed the P4P initiative,[93] an ongoing strategic collaboration, which is co-chaired by technologists at Pando (a leading P2P company) and Verizon,[94] and includes leading peer-to-peer companies and leading network providers. Through P4P, network providers share information about their network topology and network management practices with P2P companies, who can then better direct P2P traffic in ways that significantly reduce bandwidth. This optimization "not only reduces the volume of data traversing the ISP's infrastructure, it creates a more manageable flow of data."[95] P4P co-chair Laird Popkin noted that those involved "see it as an obvious win-win."[96] P4P may benefit phone companies more than cable companies; phone companies are members while cable

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[90] Oversi, *Id.*

[91] Id.

[92] "CacheLogic, BitTorrent Team," *Light Reading*, August 7, 2006, Available at http://www.lightreading.com/document.asp?doc_id=100699.

[93] AT&T Comments at 17; Verizon at 37; Digital Computing Industry Association Comments.

[94] The "Core Group" includes P2P companies like BitTorrent, Inc., Vuze, Pando, Joost, Limewire, and Grid Networks, and network providers like Verizon, AT&T, and Telefonica Group. "Observers" to the P4P collaboration include CableLabs, Cablevision, Cox Communications, Time Warner Cable, Turner Broadcasting, and even Comcast. See http://www.pandonetworks.com/p4p.

[95] Id.

[96] Michael Calore, "P2P-2-ISP Peace Pipe Could Ease Bandwidth Crunch," *Wired*, August 30, 2007, Available at http://www.wired.com/software/webservices/news/2007/08/p2p?currentPage=all.

companies are mere observers. Nonetheless, P4P is still in the research phase and benefits for cable systems may still be realized.

Comcast and cable companies could attempt their own collaboration with peer-to-peer. Comcast could learn from BitTorrent's engineers, whose BitTorrent DNA technology makes it impossible for BitTorrent, Inc. to be the cause of network congestion. A P2P client can be aware of when network congestion exists and respond accordingly by backing off (not terminating). BitTorrent DNA has congestion control, geographic awareness, and support for local cache discovery.[97] It works at a network level as it does at the computer level. If a P2P user is using BitTorrent while on a game, BitTorrent must slow down to ensure the game experience is uninterrupted. BitTorrent DNA does the same at a network level, such as when a neighbor is using the upload channel to make a VOIP call. Collaboration would better advance consumer welfare than anticompetitive behavior and an arms race.

5. Disclose to Consumers the Network's Bandwidth Limitations (Rather than "Disclosure" of Blocking)

Rather than be caught red-handed by customers, consumer groups and the press[98], network providers should tell their customers they are having congestion problems. They could simply ask their consumers to moderate their usage during certain hours, and provide information on which times and uses should be modified. Internet users often follow norms and could act as good citizens.[99] Similarly, providers could, as proposed by Professor David Clark, allow user selection of priority by the customers themselves. Allowing them to decide when

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[97] See http://www.bittorrent.com/dna/technology.html.

[98] See http://www.dslreports.com/forum/r18323368-Comcast-is-using-Sandvine-to-manage-P2P-Connections; http://www.eff.org/wp/packet-forgery-isps-report-comcast-affair; http://www.sfgate.com/cgi-bin/article.cgi?f=/n/a/2007/10/19/financial/f061526D54.DTL.

[99] Lawrence Lessig, "The New Chicago School," *The Journal of Legal Studies,* Volume XXVII, June 1998.

they wanted to ensure information was getting through as quickly as possible.[100]

Network providers could even provide incentives for consumers to use the bulk of their bandwidth during off-peak hours, just like wireless companies provide free minutes on weekends. Comcast could offer a five or ten dollar rebate for consumers using their bandwidth on weekends, or using little bandwidth.

Alternatively, Comcast could be more honest about the upload speed it advertises in its tiers of service. In light of Comcast's decision not to upgrade their upstream bandwidth, Comcast could be honest about the speed of there uploads. This would provide their customers with a more accurate idea of the speeds they will be receiving.[101] What's more, given the technology they have in place known as "Powerboost," customers using upload bandwidth for short durations would not see a noticeable reduction in service but those utilizing bandwidth for longer periods of time would see their bandwidth drop to level that is acceptable for Comcast's outdated network.[102]

6. Metering/Individual Basis Methods

The long exercised method to dealing with this congestion issues has been to contact customers directly.[103] After the Associated Press revealed the results of their test, Comcast noted, "There are .01 percent that are engaging in what we call 'excessive use.'…We need to manage that, and to the extent we identify this excessive use, we call those customers and offer

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[100] Commentary of Professor David Clark, See Cite at n. 69.

[101] Comments of Jonathan DeBoer, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841050.

[102] "A Powerboost burst will normally last…as long as 5MB of a file upload". See http://www.comcast.com/Customers/FAQ/FaqDetails.ashx?Id=3697.

[103] Chris Oakes, "Napster Not At Home With Cable," *Wired*, April 7, 2000, Available at http://www.wired.com/science/discoveries/news/2000/04/35523.

them additional services like commercial services."[104] This strategy was similarly stated as Comcast's method in 2004.[105] One article claims that "excessive use" is "extremely rare and applicable to less than one-tenth of one percent of our customers."[106] In their recently updated FAQ, Comcast once again stated that "a very small number – well less than 1% - use excessive amounts of bandwidth."[107]

Talking to the .01% highest-bandwidth users and offering them a premium connection sounds far more reasonable than targeting particular applications. Commenters have suggested creative methods of metering.[108]

Of course, metering could be used in ways to target competitors[109] or to raise prices for all consumers.[110] But metering can be a better method than blocking/degrading applications.

In addition, Comcast would have to be more honest with this "choice" than it is now. According to Comcast, "excessive use" is downloading the equivalent of "30,000 songs, 250,000

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[104] Andy Patrizio, "Comcast Suspected of Limiting BitTorrent Use," *InternetNews*, October 19, 2007, Available at http://www.internetnews.com/infra/article.php/3706376.

[105] Ex Parte Filing of Comcast Corporation, In the Matter of Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities, CS Docket 02-52, April 7, 2004, p. 2, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516086991.

[106] See n. 111.

[107] Comcast Comments at Attachment B; Comcast also notes that "a disproportionately large amount of the traffic currently on broadband networks originates from a relatively small number of users" Comcast Comments at 25.

[108] The commenter, Joseph Tucek described this method in a concise manner:

leaky bucket filtering only allows traffic to be sent if a user has sufficient "tokens"; if sufficient tokens are not available, they are queued (to a limit) until enough tokens have accumulated. Tokens are given to a user at a constant rate, and stored in a fixed size bucket. If a user doesn't use their tokens, they overflow the bucket and "fall on the floor". The rate that tokens are added provide a limit to long-term average bandwidth use, while the size of the bucket limits the length of any "burst" traffic.

Comments of Joseph Tucek, WC Docket 07-52, at 4-5, available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841225.

[109] See http://bits.blogs.nytimes.com/2008/01/17/time-warner-download-too-much-and-you-might-pay-30-a-movie/.

[110] See http://www.dslreports.com/shownews/Verizon-Industry-Comment-On-Time-Warner-Cable-Plans-91172.

pictures or 13 million emails in a month"[111] This is a phantom limit that is extremely difficult for customers to identify and even obtain this vague information in the first place.[112] According to Comcast's FAQ, this figure has increased.[113] Comcast discontinues service when this threshold is reached.

Professor David Clark lamented that network providers provide almost no information on how much network maintenance cost. Nonetheless, he asserted the number available on Wikipedia, and that he himself had triangulated and confirmed the number's rough accuracy, a gigabyte of customer usage a month costs 10 cents. He asserts that given this inexpensive cost to the provider, they could easily create usage caps at reasonable prices to consumers.[114]

7. Conclusion

Adhering to the Policy Statement and undertaking reasonable network management is not mutually exclusive. We have identified other legitimate but far from ideal network management practices such as bandwidth caps.[115] Also, some of the tools currently in existence and apparently widely used allow ***providers*** to set the parameters of network management themselves.[116] So while these tools appear to have the capability of adhering to the Policy Statement, they can also enable violations of it, as evidenced by Comcast.

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[111] Michael Mullen, "Comcast Clarifies High Speed Extreme Use Policy," *GameDaily*, Sept. 14, 2007, Available at http://www.gamedaily.com/articles/news/comcast-clarifies-high-speed-extreme-use-policy/18014.

[112] Joseph S. Enoch, "Comcast Cuts Off Heavy Internet Users," *ConsumerAffairs.com*, August 24, 2007, Available at http://consumeraffairs.com/news04/2007/08/comcast_ban.html.

[113] "Sending 20,000 high resolution photos, Sending 40 million e-mails; Downloading 50,000 songs; or Viewing 8,000 movie trailers." Comcast Comments at Attachment B.

[114] Testimony of Professor David Clark at the FCC en banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, Second Panel, Video stream available at http://www.fcc.gov/realaudio/mt022508v.ram.

[115] Consumer and the FCC should be wary of bandwidth caps, these caps apparently exclude MSO's Video on Demand content which are delivered using IP streams. Further, many consumers have little basis for understanding the amount of bandwidth they utilize in a given month.

[116] "traffic shaping equipment could be used to implement "per-user rules" or "per-user traffic limits," like the dynamic quotas endorsed in the Free Press Petition" Verizon Comments at 47; See also the following links discussing the flexibility of the tools: http://www.bivio.net/news_releases/082106-linuxworld-conf.htm;

In making its declaration, the FCC can encourage investment into nondiscriminatory tools. Given the growth in this market, undoubtedly new options will be created for those unwilling to perform the necessary upgrades.[117] Neither the Commission nor the Petitioners need to provide a detailed roadmap for what Comcast or any other Internet Service providers must do to come into compliance with the Policy Statement. But the FCC should be wary of arguments that discrimination is necessary.[118]

III. How Broadband Networks Affect our Global Economic Competitiveness

Comcast's unreasonable and deceptive bandwidth management practices reduce consumer utility, stifle innovation and competition, and represent a long-term threat to America's ability to compete effectively in the global marketplace.

Comcast controls nearly one-quarter of the U.S. residential broadband marketplace[119], a similar share of the multichannel video market[120], and likely controls well over 40 percent of all homes with video-on-demand (VOD) capability.[121] This nationwide VOD marketshare somewhat masks the *local* dominance Comcast has in this emerging service, where in their service territories they have a near monopoly over VOD service.

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http://www.allot.com/index.php?option=com_content&task=view&id=589&Itemid=18; http://www.proceranetworks.com/products/traffic-shaping.html.

[117] See Cite at n. 26.

[118] 47 CFR §15.

[119] Comcast reported 13.2 million residential high-speed Internet customers in their 2007 *Annual Report*; the FCC reported 58.2 million residential broadband lines as of December 31st 2006, equating to a 23 percent share by Comcast; however since the FCC figure included mobile wireless (thus probable duplicate complementary connections), Comcast's effective share is likely higher than 23 percent.

[120] Comcast reported 24.1 million residential video customers in their 2007 *Annual Report;* Nielsen reported 99.3 million cable or other alternative delivery subscribers as of November 2007 ("Nielsen Media Research 2007-2008 Universe Estimates"), equating to a 24 percent market share.

[121] According to Comcast's 2007 *Annual Report*, the company had 15.2 million digital cable customers at the end of 2007. SNL Kagan reported that there were 36.2 million digital cable subscribers in the U.S. as of September 2007. Thus Comcast has an approximate 42 percent share of the digital cable market. In order to provide VOD services, an MVPD customer has to subscribe to the digital service tier (DBS providers do not currently offer VOD services). Thus the share of the digital cable market is a reasonable low-end estimate approximation of the VOD marketshare. It is low-end, because not all digital cable systems offer VOD capability,

Thus, Comcast's dominance of the VOD market gives them an extremely strong ***incentive*** to stifle any VOD competition that might emerge that uses the Internet as a delivery platform. And Comcast's market power in the broadband marketplace – and technical control of the network – provides them the ***ability*** to stifle such competition by disrupting competitive technologies and competitors in their infancy.

The economic consequences of such anti-competitive behavior are quite broad and go far beyond the financial conditions of individual companies like Comcast. From an economic perspective, broadband networks themselves have little value aside from their capital asset worth. Consumers do not value the broadband connection, rather they value what they can ***do*** with that connection. When a consumer decides to purchase a 6Mbps download/768kbps upload connection from Comcast for $42.95 per month instead of buying a 768kbps download/128kbps upload connection from Verizon for $19.95 per month, they place the additional $23 value in the additional *abilities* of that higher bandwidth connection. As applications are developed that utilize the higher bandwidth connections, consumer adoption of these connections increase, and the market expands and matures. In short, *applications drive the growth of broadband deployment and adoption.*

According to the U.S. Census Bureau, as of October 2007 approximately 62 percent of U.S. households used the Internet, with 51 percent of U.S. homes subscribing to broadband Internet access and 11 percent subscribing to dial-up access.[122] While this level of adoption seems impressive, the available data indicates that the growth in consumer adoption of

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but Comcast had as of 2005 (according to the *12th MVPD Report*) deployed VOD capability to 73 percent of homes passed by their cable service.

[122] U.S. Census Bureau, *October 2007 Current Population Survey*, as reported by Commerce Department in *Networked Nation: Broadband in America 2007*, January 2008.

broadband in the U.S. is slowing.[123] By comparison, nearly 90 percent of U.S. homes subscribe to a multichannel video product, most often cable television or digital broadcast satellite (DBS).[124] It is therefore clear that a robust online video application and delivery market is the best hope to get broadband adoption moving towards a higher saturation point. Demographics favor this potential, as younger consumers are far more likely to have watched an online video product.[125] But in order for the full potential of this growth engine to be realized, the broadband connections are going to have to be able to do more than stream low-resolution YouTube videos -- they will need to support the transfer of high-definition video.

There is ample evidence in this proceeding that P2P applications are the best near-term technological answer to the problem of online distribution of high-definition video. The old command-and-control "hub and spoke" content distribution model is highly inefficient and raises artificial barriers to entry in the online video market. The centralized distribution model requires that those who wish to offer a high-definition product to contract with a commercial server provider, and pay extremely expensive bandwidth fees. Consumers who wish to view content under this model must sit and wait while downloads from the central server slowly take place. The *upload capacity* that consumers have purchased from their ISPs lay dormant. Alternatively, under the P2P model distributors can avoid much of the costs associated with server hosting, lowering barriers of entry for content providers. Consumers receive files much faster, as they are distributed in a "mesh" or "packet" fashion -- the more efficient manner that is the essence of the Internet's architecture. P2P distribution makes use of consumer's upload speeds, putting this resource to use, as it was designed and as it is paid for.

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[123] See http://www.leichtmanresearch.com/press/111207release.html.

[124] Nielsen estimates that approximately 100 million U.S. homes have an MVPD product; U.S. Census Bureau estimated that there are approximately 117 million occupied U.S. households.

It is important to remember that the Internet is a two-way communications medium; indeed, this is where its limitless potential lies and is what differentiates it from the traditional "push" media of broadcast, cable and print. Congress rightly recognized this potential when it established the regulatory framework to guide the deployment of broadband technology. Section 706 of the Telecommunications Act of 1996 directs the FCC to "determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion" defining 'advanced telecommunications capability' as "high-speed, switched, broadband telecommunications capability that enables users to *originate* and receive *high-quality* voice, data, graphics, and *video* telecommunications using any technology"[126] [emphasis added].

Thus we see that Comcast's deceptive anticompetitive behavior is a threat to further growth in the U.S. broadband market, a threat to the viability of new and innovative content providers (many of whom have been shut out from access to the traditional media), a threat to America's global competitiveness, and runs completely counter to official communications law and policy.

The U.S. cannot afford to fall further behind other nations in the deployment and utilization of broadband infrastructure. According to the Organization for Economic Cooperation and Development (OECD), as of December 2006 the United States ranks 15th out of the 30-member nations in per capita broadband use, down from 4th place in 2001.[127] In terms of growth in broadband penetration during 2006, the U.S. ranked 20th out of 30 nations.

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[125] See http://www.leichtmanresearch.com/press/021908release.html.

[126] 47 U.S.C. § 157. See § 706(b) of the Telecommunications Act of 1996, 104 P.L. 104; 110 Stat. 56; 1996 Enacted S. 652; February 8, 1996.

[127] Organization for Economic Cooperation and Development (OECD), "OECD Broadband Statistics to December 2006"

The U.S. ranks 21st in another metric: the International Telecommunications Union's (ITU) Digital Opportunity Index. This index measures eleven different variables of technology development, including an important factor not captured in the simple broadband rankings -- the cost of connectivity relative to per capita income. Notably, the US dropped from 8th place in the Digital Opportunity Index in 2000 to 21st place by 2005. We are ranked 36th relative to other nations in the increase in the absolute value of our Digital Opportunity Index score between 2000 and 2005. [128]

International rankings have very practical significance far beyond the mere ordinal rankings. The absolute magnitudes in difference in penetration have real world economic consequences, and every single point of separation matters.

Currently about 50% of U.S. households subscribe to broadband service. If the U.S.'s penetration level were as high as in Denmark or the Netherlands, this would translate into an additional 36 million total subscribers, or approximately 33 million additional residential subscribers. This would put the U.S. *household* penetration level at 67%.

These differences have real world consequences. In 2003 when residential broadband penetration was at 20%, economists estimated the annual consumer surplus from broadband to be about $10 billion per year. At the time, that measure estimated that if broadband penetration were 50% of all U.S. homes, consumers would realize a $38 billion annual surplus; if household broadband penetration were at 95%, the consumer surplus would be $350 billion annually.[129] Because of network effects, ***the benefits of higher broadband penetration accumulate***

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[128] World Information Society Report, August 2006, http://www.itu.int/osg/spu/publications/worldinformationsociety/2006/wisr-web.pdf

[129] Crandall et. al., "The Effect of Ubiquitous Broadband Adoption on Investment, Jobs, and the U.S. Economy," Criterion Economics, L.L.C., September 2003.

exponentially, thus even a minor increase in our international broadband ranking has tremendous positive impact on the American economy.

Though the U.S. position in the international rankings is cause for concern, even more troubling is how we have progressed in recent years relative to other countries. From December 2001 to December 2006 the U.S. penetration in the OECD rankings increased by 15.1 subscribers per 100 inhabitants, below the OECD average of 15.9, and 14th overall in the amount of increase among the 30 nations. The average 5-year growth rate of the countries that outperformed the U.S. since 2001 is 40% higher, and the growth rate of the top performing country, The Netherlands, is over 85% higher than that of the U.S.

From December 2005 to December 2006, the U.S. penetration in the OECD rankings increased by 3.3 subscribers per 100 inhabitants, below the OECD average of 3.4, and 20th overall in the amount of increase among the 30 nations. The average 1-year growth rate of the countries that outperformed the U.S. in the past year is nearly 60% higher, and the growth rate of the top performing country, Denmark, is 114% higher than that of the U.S. Even South Korea, a very early broadband leader that in theory should be closer to market saturation, outperformed the U.S.'s growth over the past year.

The growth trends indicate that the U.S. is likely to continue to fall behind the rest of the world in broadband penetration, which will have lasting and significant effects on the U.S. economy. Comcast's actions threaten to stifle the best hope for a turnaround in the U.S. broadband market -- high-definition online video distribution. If Comcast is allowed to continue its discriminatory practices, the floodgates of innovation will be shut, forever dooming the U.S. to second-class status among the world's economic leaders. High-tech companies will move

their operations overseas, where the infrastructure needed to deploy these "killer applications" is universally deployed.

IV. Opposition Claims Hold No Weight

Beyond the misrepresentations of our petition, Comcast and others have muddied the record with assertions of all sorts. Free Press et al. would like correct many of these to ensure the Commission can make a decision with meaningful and accurate information.

Comcast's actions produce a very perceptible effect. Comcast claims, "there is no perceptible effect that would unduly discourage the use of any application or service."[130] and "In no event is any user prevented from accessing any lawful content."[131] These are bold claims; the public's interest alone in this preceding clearly shows otherwise. We encourage the Commission to look at the comments of a variety of everyday citizens who have commented in this proceeding and across the Internet discussing how Comcast affects their usage of peer-to-peer. The people impacted the most are those that seek to originate content, whether adding new content or encouraging others to explore content they found intriguing. As the tests exhibit in the original petition, one person's upload is another's download.

Comcast is not targeting a small number of users. Comcast continues to cite a "very small number of users" using an "immense amount of bandwidth."[132] This has been their red herring throughout this episode. As mentioned in both our petition and comments, files of all sizes are being blocked indeed the two tests were from files of 500k and 4.24mb.[133] These are smaller than many email attachments that go through unimpeded. The same goes for uploads to

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[130] Comcast Comments at 35.
[131] Id. at 35, 36.
[132] Id.at 14.
[133] Free Press et al. Comments at 10; Declan McCullagh, "Comcast really does block BitTorrent traffic after all," *CNET News,* Oct. 19, 2007, Available at http://www.news.com/8301-13578_3-9800629-38.html.

Comcast's user generated cite Ziddio or files transferred through YouSendIt.[134] This is of particular note given Comcast's claim they are only blocking at times when "absent such management, would degrade the activities of Comcast High-Speed Internet users."[135] Thanks to Comcast's new response to a "very small number of users," all customers in that area seeking to originate content through peer-to-peer are prevented from doing so.

Nothing justifies targeting P2P. Comcast also believes the Petitioners fail "to account for the fact that differential treatment of different things is not discriminatory."[136] The underlying fact is all file transfers use TCP packets and if this logic were accepted, Comcast would be given free reign to treat anything on the Internet differently from anything else. Comcast is stating that BitTorrent is not competing with other online video distributors (including Comcast) or Comcast's traditional cable offerings. We devoted more than 10 pages to this topic in our initial filing.[137] To a consumer seeking to enjoy a program, they are all choices. Similarly, note whom BitTorrent, Vuze and Miro believe their chief competitors are, the cable companies.

Deception is paramount. Comcast also posits that if they were acting in an anticompetitive manner why would they not be blocking VoIP providers competing with their Comcast Digital voice product.[138] Beyond the Commenters describing this type of action occurring, Comcast's attempts to deceive the press and customers, laying plain that they did not want anyone to know they were interfering with customer's connections.[139] Also, consider the comments of Dr. David J. Reed at the FCC En Banc Hearing "I asked Comcast engineers if they

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[134] Free Press et al. Comments at 51; See http://www.yousendit.com/.
[135] Comcast Comments at 37.
[136] Id.
[137] Free Press et al. Comments at 47-59
[138] Comcast Comments at 38
[139] See Appendix 1

could tell me what they were doing…and they told me they were not allowed to tell me."[140] As Associated Press investigative reporter Peter Svennson notes "Comcast users may be the ones noticing it the least."[141] However dropping a VoIP call would be extremely visible to customers even with Comcast staying silent. Not to mention the number of calls it would generate to Comcast tech support.

Reset packets are not used this way in freedom loving countries. Comcast claimed " a "reset" is nothing more than a bit in the TCP packet header that is used to signal that there is an error condition within the network."[142] The FCC hearing was very instructive on this matter. This reset packet use occurs when a problem occurs in the connection between two computers, not when a network provider unilaterally decides there is too much traffic on the network and unilaterally decides there is an "error condition." Comcast notes, "this is the same message that the computer receives when any number of problems occur during a P2P file transfer."[143] The "number of problems" is between the two computers who initiated the connection, not the provider transporting the information. Most illustrative were the comments of Professor David Clark and Dr. David J. Reed at the FCC hearing.[144] A technically minded commenter, Joseph Tucek notes, using these packets also leaves each user believing the other user has lost their

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[140] See Cite at n. 69.

[141] Brook Gladstone, "Please Don't Share," *On The Media*, Oct. 26, 2007, Available at http://www.onthemedia.org/transcripts/2007/10/26/02.

[142] Comcast Comments at 28.

[143] Id.

[144] Professor David Clark: "it is called a reset because it is a way for one end of a TCP connection to say to the other end phffft I am out of here ok and I actually am very uncomfortable with the idea, that the network in the middle is creating a message to you that appears to come from me. I just, I have a lot of trouble with that."

Dr. David J. Reed: "in order to do that they had to generate information that was coming from inside the envelope. Ok, they had to read what was inside that envelope in order to fool me into thinking that it came from my counter party…but they did synthesize something based on data that is not supposed to be used on the Internet…So there is a brightline very clear to me of people who act unilaterally, impulsively and without data." See Cite at n. 69.

Internet connection. However, both sides are actually fully functioning.[145] Furthermore, this is a technique used by the People's Republic of China in their massive filtering effort, as well as malicious hackers.[146]

The reset packets are forged. Similarly, Comcast claimed that the way Free Press et al. (and in turn the two original researchers) described their actions as "forged" and "a telephone operator impersonating the called and calling parties" was "inflammatory hyperbole."[147] We heard the exact same analogy come from a well-respected Internet engineer. Professor David Clark stated, "And it is called a reset because it is a way for one end of a TCP connection to say to the other end phffft I am out of here ok and I actually am very uncomfortable with the idea, that the network in the middle is creating a message to you that appears to come from me."[148]

Comcast's road analogy is inaccurate. Comcast states their behavior is similar to where "a traffic ramp control light regulates the entry of additional vehicles onto a freeway during rush hour."[149] Let us put this analogy in the proper light. This is akin to the owner of the highway deciding to throw all of the Fords off the road. Now let's also imagine that it is Toyota that owns the highway. Toyota argues they have to block Ford because there are just too many Fords and the drivers of Fords are obviously greedy pigs who just can't help themselves from driving too much and clogging up the road. They'd like us to ignore the fact that by throwing all the Fords off the road, the Toyota cars gain a significant competitive advantage for consumer desirability—i.e. they are actually permitted to be on the road, an important luxury in the auto

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[145] Comments of Joseph Tucek, WC Docket 07-52, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841225.

[146] Richard Clayton, Steven J. Murdoch, and Robert N. M. Watson, "Ignoring the Great Firewall of China," University of Cambridge, Available at http://www.cl.cam.ac.uk/~rnc1/ignoring.pdf; "A reset packet is carefully validated by the endpoint because hackers were using them before and they were sort of spraying them around and caused everybody to be disrupted" See Cite at n. 69.

[147] Comcast Comments at 28.

[148] See n. 69.

industry. And they are throwing Ford drivers off no matter whether they are daily commuters, or just someone out for a Sunday cruise after church.

HTTP is the largest source of traffic. Another theme put forth is that Peer-to-Peer traffic makes up the overwhelming majority of ISP bandwidth.[150] While the data for these numbers are difficult to find, as discussed at the FCC Hearing, other data has suggested that with the success of YouTube, HTTP traffic encompasses more of the total Internet traffic than P2P.[151]

V. Deception and Abuse of Power

Throughout this affair, Comcast has conducted itself to the press, the public and the Commission that can be described as nothing else than misplaced arrogance. This was most evident in the deception of the public through the press. One of the main priorities of Comcast's blocking is to ensure its customers are not aware of the activity, believing their Internet connection remains unfettered. Sandvine markets itself as such.[152] What's more, their customer service department was instructed to play coy even when directly confronted by customers about their actions.[153] We have a compiled a timeline in Appendix 1 of Comcast's statement in the second half of 2007, ranging from being flat wrong to at best semantic trickery. Comcast's initial comments further highlight this trait.

- Comcast claims it "openly and readily acknowledged the management of its network" and "strives to be as transparent as possible to its subscribers."[154] As Appendix 1 demonstrates, Comcast has lied throughout this episode.

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[149] Comcast Comments at 29.

[150] AT&T Comments at 14; Verizon Comments at 31.

[151] Ellacoya, "Ellacoya Data Shows Web Traffic Overtakes Peer-to-Peer (P2P) as Largest Percentage of Bandwidth on the Network," June 18, 2007, Available at http://www.ellacoya.com/news/pdf/2007/NXTcommEllacoyaMediaAlert.pdf.

[152] Free Press et al. Petition at 12-13. Given this fact, it is strange that Free Press et al. are chided by Comcast, "they shed no light on Comcast's network management practices," Comcast Comments at 25.

[153] See http://consumerist.com/consumer/leaks/comcasts-we-dont-throttle-bittorrent-internal-talking-points-memo-315791.php.

[154] Comcast Comments at 40-41.

- Comcast claims it's network management decision are based "on what is needed to serve the best interests of *all* Internet users."[155] Comcast appears to be disregarding the 99.99 percent of customers who are using the service as Comcast believes they should and all the Internet users outside Comcast's network who are blocked by Comcast from receiving the content they have requested.
- Comcast further illustrates their stance stating, "network management is best left to the sound, good-faith judgment of the engineers and proprietors."[156] Comcast is stating that between them and the blogosphere[157] this provides an "ample check on the reasonableness of such judgments."[158] Given their extensive deception and their outright stance that what they are doing is within the confines of reasonable network management, Free Press et al. believe they have proved themselves wrong on this point.
- In Comcast's filing and at the recent FCC Hearing the company stated "the AP experiment – and it was an experiment not a test-did not use BitTorrent the way it is designed to be used."[159] That is, the way Comcast thinks their customers should be using this application. Never mind what users and the application developers themselves think. This dangerous line of thinking was roundly refuted by hearing panelists.[160] What's more, all "swarms" start out as one sender to one receiver. If a user creates content and wants to distribute it through BitTorrent. The user needs to get the content to other users before the possibility for a swarm is possible. Comcast notes this by saying "in the case of P2P the downloading computer *may* have hundreds or thousands of other computers to look to for the desired file."[161] This is an important distinction because adding your viewpoint is paramount to democratic discourse and this is the "originate" function so highly emphasized in the section 706 of the 1996 Telecom Act.[162]

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[155] Comcast Comments at 3; See also id. at 4, "the network is managed for the benefit of all customers."

[156] Id. at 5.

[157] Many in this community can be found as members of SavetheInternet.com Coalition, See http://www.savetheinternet.com/=members.

[158] Comcast Comments at 5.

[159] Id. at 32; Commentary of David L. Cohen, At the FCC en banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, First Panel, Video stream available at http://www.fcc.gov/realaudio/mt022508v.ram.

[160] Professor Tim Wu: "Comcast cannot deny, there is a single factor that they cannot deny, which is Associated Press, EFF, who…were users of the Internet, sought to use an application a certain way and were blocked."; Professor Yochai Benkler: "what Mr. Cohen just described is exactly how delay functions as blocking, and that distinction doesn't mean a thing. What he described was that node got a bit that told it you're delayed, go send somewhere else. That somewhere else need not be a Comcast customer. It could be elsewhere. Don't use our network. Don't you, the user who installed bit torrent and set your sharing so that even when you're not downloading you're seeding, which is partly what makes bit torrent so effective, you are not allowed to share your computation resources which you purchased and invested in and paid for monthly to help this overlay network function. Instead, we're going to tell you, we're going to use a protocol that tells you, you're being delayed." Commentary at the FCC en banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, First Panel, Video stream available at http://www.fcc.gov/realaudio/mt022508v.ram.

[161] Comcast Comments at 28. [Emphasis Added]

[162] Free Press et al. Comments at 19-20.

- Testimony of David L. Cohen, 2006[163]: "If Comcast were to try to "deny, delay, or degrade" the Internet experience that our more than nine million cable Internet customers have paid for, how can we possibly expect to keep them as customers…*Any* provider that does not meet the needs of users will suffer from a serious backlash from consumers and policymakers."
- Testimony of David L. Cohen, 2008[164]: "Comcast may on a limited basis temporarily delay certain P2P traffic."

The many statements coming from Comcast throughout this proceeding shed ample light on the Company's frame of thinking. The Commission should take into account this gatekeeper mentality and deception when deciding on the merits of this episode.

VI. The FCC has Abundant Jurisdiction to Punish Comcast and Enjoin Such Practices

Comcast claims that the FCC lacks the jurisdiction to regulate Comcast's offering of Internet access. Comcast argues distinctly that the FCC cannot adopt rules enforcing the Policy Statement's principles and that the FCC cannot enforce the Policy Statement in adjudication without rules. Both arguments are flawed and both conflict with authorities like the Supreme Court.

A. The FCC Has the Authority for Rules or Adjudications or Enforcing Nondiscrimination on Facilities-Based Providers

Comcast advances a flimsy argument that the FCC cannot impose requirements on facilities-based providers of information services. As a result, Comcast asserts its own legal expertise and rejects the assertions of the United States Supreme Court, the FCC, and others.

The FCC has authority under Title I where the Commission has subject matter jurisdiction over the service to be regulated and the assertion of jurisdiction is "reasonably

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[163] Testimony of David L. Cohen, Hearing on "Reconsidering Our Communication Laws: Ensuring Competition and Innovation," U.S. Senate Committee on the Judiciary, June 14, 2006.

[164] Testimony of David L. Cohen, At the FCC en banc Hearing on Broadband Network Management Practices, Cambridge, MA, Feb. 25, 2008, First Panel.

ancillary to the effective performance of [its] various responsibilities."[165] There is no question that the FCC has subject matter jurisdiction over facilities-based providers of information services, as the FCC has jurisdiction as the one agency over "all interstate and foreign communication by wire or radio."[166] Comcast's citations to the contrary are unavailing.[167]

There is also little question that ensuring consumers can access all Internet content, applications, and devices is ancillary to the FCC's statutory responsibilities. The FCC's Policy Statement cites both 47 U.S.C. §230 and section 47 U.S.C. § 706.

In section 230(b) of the Communications Act of 1934, as amended (Communications Act or Act), Congress describes its national Internet policy. Specifically, Congress states that it is the policy of the United States "to preserve the vibrant and competitive free market that presently exists for the Internet" and "to promote the continued development of the Internet." In section 706(a) of the Act, Congress charges the Commission with "encourag[ing] the deployment on a reasonable and timely basis of advanced telecommunications capability" – broadband – "to all Americans."

The FCC has asserted that enforcing the Policy Statement will further the goals of 230(b) and preserve the free market existing "for the Internet." Comcast implies that 230(b) means the FCC cannot regulate a network provider like Comcast because the Internet should be "unfettered by Federal or State regulation." Comcast is not "the Internet." Nowhere in the Communications Act does Congress suggest that Internet access providers *are "*the Internet," and Dr. David J. Reed has stated the obvious: Comcast merely provides access to the Internet, and is not itself the

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[165] Wireline Broadband Order, at 14913-14; US v. Southwest Cable Co., 392 US 157 (1968); US v. Midwest Video Corp., 406 US 469 (1972).

[166] 47 U.S.C. § 151-152.

Internet.[168] In addition, the FCC was instructed to "preserve" the free market that "presently" existed in 1996. In 1996, Internet access providers included only phone companies, who were burdened with detailed common carriage regulation. This regulation, in fact, is largely to thank for the Internet's openness and freedom.[169]

The FCC also rightly asserted that the Policy Statement supported § 706 and the deployment of advanced telecommunications capability. The Commission wrote, in its 2005 Wireline Order, issued with the Policy Statement: "we agree that actively interfering with consumer access to any lawful Internet information, products, or services would be inconsistent with the statutory goals of encouraging broadband deployment and preserving and promoting the open and interconnected nature of the public Internet."[170]

The Commission can also rely on 230(b)(3), which instructs the Commission to "encourage the development of technologies which maximize user control over what information is received by individuals, families, and schools who use the Internet and other interactive computer services."

Agreeing with this analysis is a long list of authorities and industry players.

The Supreme Court has stated that "the Commission remains free to impose special regulatory duties on facilities-based ISPs under its Title I ancillary jurisdiction. In fact, it has

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[167] Comcast's citation to ALA v. FCC, 406 F.3d 689 (D.C. Cir. 2005), is irrelevant, as that case involved consumer electronics equipment use after communication had already been transmitted, so the FCC lacked subject matter jurisdiction.

[168] "Internet Access Providers do not create the Internet for their customers, instead they provide access to a larger collective system, of which they are a small part." Testimony of Dr. David J. Reed, FCC En Banc Hearing, Feb. 25, 2008, Available at http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519843517.

[169] Mark A. Lemley and Lawrence Lessig, "The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era" (April 1, 2000). *Berkeley Program in Law & Economics, Working Paper Series.* Paper 37.

[170] *See* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 F.C.C.R. 14853, 14904 ¶ 96 (2005).

invited comment on whether it can and should do so."[171] The Court even implicitly blessed the FCC's previous actions of imposing obligations on facilities based information-service providers under Title I: in Computer II and Computer III, the "differential treatment of facilities-based carriers was therefore a function not of the definitions of 'enhanced-service' and 'basic service,' [the precursors to the information-telecommunication distinction] but instead of a choice by the Commission to regulate more stringently, in its discretion, certain entities that provided enhanced service."[172] Comcast claims that the Supreme Court's determination is mere "dicta," but the dicta of six Justices in 2003 will likely carry great weight with appellate courts and predict Supreme Court behavior far more than the arguments of several Comcast attorneys.

The White House has also observed that the FCC has jurisdiction: "The Administration supports the broadband policy statement of the Federal Communications Commission (FCC) … [and] the Administration believes the FCC currently has sufficient authority to address potential abuses in the marketplace."[173]

In addition to the Supreme Court and White House, the FCC has repeatedly asserted its jurisdiction, as Comcast concedes. For decades, in the Computer Inquiries, the FCC asserted Title I authority.[174] It was under Title I jurisdiction, in fact, that the Commission required facilities-based common carriers to provide the basic transmission services underlying their enhanced services on a nondiscriminatory basis pursuant to tariffs governed by Title II of the Act.[175] In its Cable Modem Order & NPRM, the FCC invited comment on whether under its Title I jurisdiction it should require cable companies to offer other ISPs access to their facilities

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[171] Brand X, 545 U.S. at 996.
[172] Brand X, 545 U.S. at 996.
[173] See http://www.whitehouse.gov/omb/legislative/sap/109-2/hr5252sap-h.pdf.
[174] *See, e.g.*, Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), 77 F.C.C.2d 384 ¶¶ 32, 174, 181, 224 (1980).

on common-carrier terms.[176] In the Wireline Broadband Order, the FCC asserted, "We recognize that both of the predicates for ancillary jurisdiction are likely satisfied for any consumer protection, network reliability, or national security obligation that we may subsequently decide to impose on wireline broadband Internet access service providers."[177] In the Broadband Industry Practices NOI, the FCC asserted "ample" Title I jurisdiction.[178] In the Policy Statement: "The Commission, however, 'has jurisdiction to impose additional regulatory obligations under its Title I ancillary jurisdiction to regulate interstate and foreign communications.' As a result, the Commission has jurisdiction necessary to ensure that providers of telecommunications for Internet access or Internet Protocol-enabled (IP-enabled) services are operated in a neutral manner."[179]

Other providers have similarly acknowledged the FCC's authority here. At the FCC's En Banc Hearing of Feb. 25, Tom Tauke, of Verizon, conceded that the FCC has jurisdiction to impose fines in an adjudication. AT&T's comments urged the Commission to focus on the specific complaint and called the Policy Statement the proper "road map" to address the complaint, acknowledging the Commission's jurisdiction.[180] Hands Off the Internet, which is funded by phone companies to oppose network neutrality, concedes the Commission has enough jurisdiction for an adjudication.[181]

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[175] Wireline Broadband Order, ¶24.
[176] Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, 17 FCC Rcd. 4798, 4839, ¶ 72 (2002).
[177] Wireline Broadband Order, ¶109
[178] Wireline Broadband NOI, ¶146,
[179] http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf.
[180] AT&T Comments at 3.
[181] Hands Off The Internet Comments at 3-4.

So, according to the Supreme Court, the White House, the FCC, and industry commenters here, the FCC has jurisdiction. Only the company with a pending complaint against it denies this FCC jurisdiction.

B. The FCC Has the Authority to Impose Forfeitures

Comcast tries to argue that the FCC can't impose forfeitures based on violations of the Policy Statement. The FCC provided clear notice to the industry that it planned to make policy through adjudications. Despite Comcast's handwaving about rules and policy statements, it is black letter law that agencies can make policy through adjudication.[182] The Supreme Court has said, as early as 1947, "In performing its important functions in these respects, therefore, an administrative agency must be equipped to act either by general rule or by individual order. To insist upon one form of action to the exclusion of the other is to exalt form over necessity."[183]

The network providers, including Comcast, must have been aware that the Commission could act through adjudication. The Commission often makes policy through adjudication. Indecency is one example. The FCC has statutory authority to curb indecent broadcasts, just as it has the statutory directive to promote broadband deployment, a free market for the Internet, and to maximize user control of Internet information. The FCC issued a policy statement on indecency in 2001, meant to guide the broadcast industry of how it would treat indecency complaints[184]—just as the FCC issued an Internet Policy Statement in 2005. And the FCC can announce even *new policies* in its adjudications, let alone enforce existing policies, so long as the Commission has a reasoned basis. Even though the Second Circuit found a recent adjudication-

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[182] NLRB v. Wyman-Gordon Co., 394 U.S. 759, 765-66 (1969). See generally Charles H. Koch, Jr., Policymaking by the Administrative Judiciary, 56 Ala. L. Rev. 693 (2005); M. Elizabeth Magill, Agency Choice of Policymaking Forum, 71 U. Chi. L. Rev. 1383 (2004).

[183] SEC v. Chenery Corp., 332 U.S. 194, 202 (1947).

[184] *See, e.g.*, Fox TV Stations v. FCC, 489 F.3d 444, 450-51 (2nd Cir. 2007).

based policy change to be arbitrary and capricious, it did not doubt that the Commission had authority to made policy through adjudication.[185]

The Commission stated that the Internet Policy Statement would be incorporated "into its ongoing policymaking activities."[186] In the 2005 Wireline Order issued along with the Policy Statement, the Commission signaled that, at the time, it would address these matters through complaints not rules: "Should we see evidence that providers of telecommunications for Internet access or IP-enabled services *are violating these principles*, we will *not hesitate* to *take action* to address *that conduct*."[187] The Chairman told Congress that: "the Commission remains vigilant and stands ready to step in to protect consumers' access to content on the Internet."[188]

The industry had more than enough notice that the Commission intended to use a case-by-case method to enforce the Policy Statement. We doubt Comcast's counsel and executives would have been blind to what the rest of the industry concedes. Industry participants have signaled their understanding in testimony to Congress. For example, the President of the Electronics Industries Alliance stated, in June 2006:

We believe that the FCC has jurisdiction to vigilantly monitor the broadband Internet access service market and expeditiously review any complaint of any competitive activity.[189]

The wireless industry's president made the same point:

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[185] *Id.* at 456.

[186] Federal Communications Commission, Policy Statement, Aug. 5, 2005, http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf.

[187] *See* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 F.C.C.R. 14853, 14904 ¶ 96 (2005).

[188] Statement of Federal Communications Commission Chairman Kevin J. Martin before the Committee on Commerce, Science & Transportation, Feb 1, 2007, http://commerce.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=1809&Witness_ID=1951.

[189] The Honorable Dave McCurdy, President and Chief Executive Officer Electronics Industries Alliance, Testimony Before the United States Senate Committee on Commerce, Science, and Transportation, Hearing on S.

> The industry agrees with FCC Chairman Martin that the FCC already has the jurisdiction and ability to address any problems in this area and urges you to carefully consider the unintended, negative consequences that could befall the U.S. wireless consumer if anticipatory regulations are enacted.[190]

The US Telecom Association president said the same thing. The industry had no doubt that the FCC was watching the network providers, and had the "capacity" to act:

> And, the FCC has demonstrated both the will and the capacity to safeguard Internet freedom. We are well aware that Congress and the FCC are watching our companies closely.[191]

Comcast admitted as much. David L. Cohen testified in 2006 that: "If Comcast were to try to 'deny, *delay*, or degrade' the Internet experience that our more than nine million cable Internet customers have paid for, how can we possibly expect to keep them as customers…Any provider that does not meet the needs of users will suffer from a serious backlash from consumers *and policymakers*."[192]

There is sufficient notice for Comcast and the rest of the industry to understand that the Commission could and would act on complaints through adjudication to make policy. Under 47 U.S.C. §503, the Commission can therefore impose a forfeiture.

2686, Communications Reform Bill, June 13, 2006, Available at http://commerce.sedocnate.gov/public/_files/McCurdy061306.pdf

[190] Mr. Steve Largent, President and Chief Executive Officer, CTIA - The Wireless Association, Testimony Before the United States Senate Committee on Commerce, Science, and Transportation, Hearing on S. 2686, Communications Reform Bill, May 18, 2006, Available at http://files.ctia.org/pdf/Testimony_Largent_Senate_S2686.pdf.

[191] Walter McCormick, Jr, President & CEO of the United States Telecom Association, Testimony Before the United States Senate Committee on Commerce, Science, and Transportation, Hearing on S. 2686, Communications Reform Bill, June 13, 2006, Available at http://commerce.senate.gov/public/_files/McCormick061306.pdf.

[192] Testimony of David L. Cohen, Hearing on "Reconsidering Our Communication Laws: Ensuring Competition and Innovation," U.S. Senate Committee on the Judiciary, June 14, 2006.

C. The FCC Should Impose Forfeitures

As argued in our Complaint,[193] network providers' potential harm to economic growth, consumer welfare, innovation, and free speech should be deterred. Because it is hard to detect such discrimination—Comcast was discovered after months of denials and its lies demonstrate that it did not expect to get caught—the Commission must impose very heavy penalties. A rational business will discount the penalties by the low likelihood of getting caught, so the FCC must have high enough expected penalties to ensure that network providers do not engage in discrimination and undermine national growth.

The FCC sometimes does not impose forfeitures when "existing precedent" would permit certain actions and the FCC announces new policy in an adjudication. In such cases, a party may not have the "requisite notice to justify a penalty."[194] This case is different. Comcast has more than enough notice that it should not be blocking applications or content. The Policy Statement is well-known and Comcast had engaged in years of lobbying centered on the Policy Statement and fighting the need for network neutrality legislation. Comcast lied about its activity and there is no plausible argument that blocking peer-to-peer connections, or merely "delaying" them, meets the Policy Statement. Clearly, consumers can't run the "applications of their choice" or access the lawful content of their choice when Comcast blocks or "delays" BitTorrent.

Moreover, even if Comcast had a plausible argument that it could not predict the FCC would act against network providers violating the Policy Statement, which it does not, Comcast could no have believed that deceiving consumers, the press, and applications-providers could be legal. Comcast chose a tool meant to be undetected. It lied to the press and its consumers

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[193] Free Press et al. Complaint.
[194] Fox TV Stations v. FCC, 489 F.3d 444, 452 (2nd Cir. 2007).

repeatedly about its actions. It paid seat-warmers to clap at the en banc hearing.[195] The FCC often reserves its most crushing penalties for deceptive marketing, forgery, and lying to the Commission.[196] The Commission generally imposes strict penalties on lying to consumers, such as in slamming and cramming cases.

This case is so egregious, and Comcast's defense so transparently bogus, that Comcast should have been on clear notice that it would have to pay huge forfeitures if it chose to cut corners on bandwidth while torpedoing its competitors and lying to consumers.

In addition, if the FCC continues to make policy on the Policy Statement in a case-by-case way, and plans to enforce disclosure, the FCC must show it is serious about punishing network providers. Otherwise, they will have incentives to experiment with blocking and discrimination, as getting caught is unlikely and will then cost them nothing.

D. The FCC Should Enjoin Practices Like Comcast's

As discussed in our Complaint, the harms to innovation, free speech, and competition are difficult to quantify and enormous, so the FCC must stop Comcast's activity immediately.

VII. Conclusion

Opposing Commenters are wrong that blocking applications conforms to the Policy Statement, is technically required, and that the Commission lacks jurisdiction to protect consumers.

Respectfully Submitted,

Marvin Ammori

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[195] Mark Jewell, "Comcast Accused of Falsely Taking Hearing Seats," Washington Post, Feb. 28, 2008, Available at http://www.washingtonpost.com/wp-dyn/content/article/2008/02/27/AR2008022703394.html.

[196] Amer-I-Net Services Corp., 15 FCC Rcd. 3118, 3123 (2000) ("We further note that, in other cases involving forgeries or deceptive marketing practices since the Amer-I-Net NAL, we have issued NALs with similar and even larger forfeitures than that imposed here.").

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February 28, 2008

Appendix 1

Comcast Timeline

April 8, 2007
Comcast is Reported as a Customer of Sandvine

> Sandvine already counts top U.S. cable provider Comcast Corp. among its customers, Barron's said.[1]

May 12, 2007
Robb Topolski, Former Software Quality Engineer at Intel Corp. Reports Comcast Is Blocking BitTorrent Using Equipment from Sandvine[2]

August 17, 2007
TorrentFreak Reports Wide-scale BitTorrent Blocking by Comcast

> Over the past weeks more and more Comcast users started to notice that their BitTorrent transfers were cut off. Most users report a significant decrease in download speeds, and even worse, they are unable to seed their downloads. A nightmare for people who want to keep up a positive ratio at private trackers and for the speed of BitTorrent transfers in general.[3]

August 20-22, 2007
Comcast Denies Throttling or Blocking BitTorrent, Claims that it Individually Contacts Subscribers That Are Violating Policy

> But when I spoke to Comcast spokesman Charlie Douglas earlier today, he flat-out denied that the company was filtering or "shaping" any traffic on its network. He said the company doesn't actively look at the applications or content that its customers download over the network.[4]
>
> In the rare instances the company has to enforce its policy, Douglas said that Comcast contacts subscribers to work out the issue. But he firmly reiterated that the company doesn't filter or throttle back traffic.[5]

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[1] "Easing Network Debate May Aid Allot/Sandvine Paper," Reuters, April 8, 2007, Available at http://www.reuters.com/article/companyNewsAndPR/idUSN0826692320070408

[2] Robb Topolski, "Comcast is Using Sandvine to Manage P2P Connections," DSLReports.com, May 12, 2007, Available at http://www.dslreports.com/forum/r18323368-Comcast-is-using-Sandvine-to-manage-P2P-Connections

[3] Ernesto, "Comcast Throttles BitTorrent Traffic, Seeding Impossible," TorrentFreak, August 17, 2007, Available at http://torrentfreak.com/comcast-throttles-bittorrent-traffic-seeding-impossible/

[4] Marguerite Reardon, "Comcast Denies Monkeying with BitTorrent Traffic," CNETNews.com News Blog, August 21, 2007, Available at http://www.news.com/8301-10784_3-9763901-7.html

[5] Id.

> Comcast assured us that it was *not* doing what Ernesto claims it's doing. Under its current network policy, according to a company spokesman, the company would never block BitTorrent traffic - or traffic related to any other application.[6]
>
> "Customers who are notified of excessive use typically and repeatedly consume exponentially more bandwidth than an average residential user, which would include, for example, the equivalent of sending 256,000 photos a month, or sending 13 million emails every month (or 18,000 emails every hour, every day, all month)," the company said. "In these rare instances, Comcast's policy is to pro-actively contact the customer via phone to work with them and address the issue or help them select a more appropriate commercial-grade Comcast product."[7]
>
> "We're not blocking access to any application, and we don't throttle any traffic," says Charlie Douglas, a Comcast spokesman.[8] [9] [10]

August 30, 2007
Comcast Reaffirms That It Is Not Blocking Applications.

> Comcast uses the latest technologies to manage our network to provide a fast, reliable broadband experience for all of our customers. We do not block access to any applications, including BitTorrent and do not alter Internet speed. Comcast currently works with a number of industry groups to share knowledge and information that will help us provide the best service, and will continue to do so.[11]

September 13, 2007
Comcast Confirms That It Is Not Blocking, Degrading, Interfering With, or Discriminating Against Particular Protocols or Traffic

> On Wednesday, we spoke with Comcast to try to find out what was going on in this case. Comcast assured us that, while it does do some kinds of network management on its residential network, it isn't deliberately blocking, degrading, interfering with, or discriminating against particular

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[6] Cade Metz, "Comcast Throttles BitTorrent Users," The Register, August 22, 2007, Available at http://www.theregister.co.uk/2007/08/22/comcast_throttles_bittorrent_users/

[7] Ryan Lawler, "Comcast Takes on TorrentFreak," Light Reading, August 21, 2007, Available at http://www.lightreading.com/document.asp?doc_id=132115

[8] Id.

[9] Jonathan Berr, "Comcast vs. BitTorrent?" Philadelphia Inquirer Blog, September 7, 2007, Available at http://blogs.phillynews.com/inquirer/phillyinc/2007/09/comcast_vs_bittorrent_bloggers_1.html

[10] Dan Frommer, "Comcast (CMCSA): We Don't Throttle BitTorrent," Silicon Alley Insider, August 20, 2007, Available at http://www.alleyinsider.com/2007/08/comcast-cmcsa-w.html

[11] Michael Calore, "Comcast Responds: 'We Don't Block BitTorrent,'" Wired Blog Network Compiler, August 30, 2007, Available at http://blog.wired.com/monkeybites/2007/08/comcast-respond.html

protocols or kinds of traffic. (This is consistent with what Comcast told the press in August when these allegations were widely raised.) The company said that it isn't using network management techniques that are designed to disrupt anyone's use of BitTorrent (or any other application).[12]

October 19, 2007
Associated Press Confirms That Comcast Is Blocking BitTorrent; Comcast Denies Any Blocking and Reaffirms Policy of Contacting Individuals

> "Comcast does not block access to any applications, including BitTorrent." – Comcast spokesperson Charlie Douglas[13][14][15][16][17]

> At the Web 2.0 Summit in San Francisco on Friday, Comcast Interactive Media President Amy Banse responded to questions about P2P throttling by pointing to the company's need to "manage" heavy Internet use. "99.9 percent of our customers happily say they use e-mail and are uploading and downloading video and photos every day at speeds they enjoy," she said. "There are .01 percent that are engaging in what we call 'excessive use.' We're talking about things like sending 18,000 e-mails every hour of every month. We need to manage that, and to the extent we identify this excessive use, we call those customers and offer them additional services like commercial services."[18]

October 22, 2007
Comcast Claims It Is Delaying, Not Blocking BitTorrent

> Speaking on background in a phone interview earlier today, a Comcast Internet executive admitted that reality was a little more complex. The company uses data management technologies to conserve bandwidth and allow customers to experience the Internet without delays. As part of that management process, he said, the company occasionally – but not always

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[12] Seth Schoen, "Comcast and BitTorrent," Electronic Frontier Foundation, September 13, 2007, Available at http://www.eff.org/deeplinks/2007/09/comcast-and-bittorrent

[13] Chris Albrecht, "Comcast Does Indeed Block BitTorrent," NewTeeVee, October 19, 2007, Available at http://newteevee.com/2007/10/19/comcast-does-indeed-block-bittorrent/

[14] Jacqui Cheng, "Evidence Mounts that Comcast is Targeting BitTorrent Traffic," Ars Technica, October 19, 2007, Availble at http://arstechnica.com/news.ars/post/20071019-evidence-mounts-that-comcast-is-targeting-bittorrent-traffic.html

[15] Peter Svensson, "Comcast Blocks Some Internet Traffic," Associated Press, October 19, 2007, Available at http://www.msnbc.msn.com/id/21376597/

[16] "Associated Press Confirms That Comcast Blocks Some BitTorrent Traffic; Despite Comcast Denials," TechDirt, October 19, 2007, Available at http://www.techdirt.com/articles/20071019/115242.shtml

[17] "Comcast Caught Throttling BitTorrent Traffic," Electronista, October 19, 2007, Available at http://www.electronista.com/articles/07/10/19/comcast.bittorrent.shaping/

[18] Andy Patrizio, "Comcast Suspected of Limiting BitTorrent Use," InternetNews.com, October 19, 2007, Available at http://www.internetnews.com/infra/article.php/3706376

– delays some peer-to-peer file transfers that eat into Internet speeds for other users on the network.[19]

Comcast denied that it was forging packets. Since P2P traffic uses "disproportionately large amounts of bandwidth," Comcast occasionally delays P2P traffic, including packet uploads, during heavy congestion, according to a spokeswoman. This does not prevent them from reaching their destination, she said.[20]

The company still claims that it is isn't blocking BitTorrent and other P2P traffic, just "delaying it."

Another Comcast executive told the *New York Times* that the company "occasionally" delays P2P traffic, "postponing" it in some cases. His rather clumsy analogy was that of getting a busy signal when making a phone call and eventually getting through after several attempts. "It will get there eventually," is the takeaway message.[21]

Comcast Corp. on Tuesday acknowledged "delaying" some subscriber Internet traffic, but said any roadblocks it puts up are temporary and intended to improve surfing for other users.[22]

November 1, 2007
Comcast Issues Statement to FCC Denying Any Blocking

"Comcast does not, has not, and will not block any Web sites or online applications, including peer-to-peer services, and no one has demonstrated otherwise. We engage in reasonable network management to provide all of our customers with a good Internet experience, and we do so consistently with FCC policy.
As the FCC noted in its policy statement in 2005, all of the principles to encourage broadband deployment and preserve the nature of the Internet are 'subject to reasonable network management.' The Commission clearly

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[19] Brad Stone, "Comcast: We're Delaying, Not Blocking, BitTorrent Traffic," Bits, an NY Times blog, October 22, 2007, Available at http://bits.blogs.nytimes.com/2007/10/22/comcast-were-delaying-not-blocking-bittorrent-traffic/

[20] Chloe Albanesius, "Comcast Admits Delaying, Not Blocking, P2P Traffic," PC Magazine, October 22, 2007, Available at http://www.pcmag.com/article2/0,1759,2204751,00.asp

[21] Eric Bangeman, "Comcast Shooting Itself in the Foot with Traffic Shaping 'Explanations,'" Ars Technica, October 23, 2007, Available at http://arstechnica.com/news.ars/post/20071023-comcast-shooting-itself-in-the-foot-with-traffic-shaping-explanations.html

[22] Peter Svensson, "Comcast Admits Delaying Some Traffic," Associated Press, October 23, 2007, Available at http://www.msnbc.msn.com/id/21444566/

recognized that network management is necessary by ISPs for the good of all customers."[2324]

November 30, 2007
Comcast's Reaffirms Statement to FCC

"Comcast does not, has not, and will not block any Web sites or online applications, including peer-to-peer services, and no one has demonstrated otherwise," spokeswoman Sena Fitzmaurice told CNET News.com. "We engage in reasonable network management to provide all of our customers with a good Internet experience, and we do so consistently with FCC policy."[25]

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[23] Comcast Statement Regarding Petitions Filed With The FCC on Broadband Network Management, PR Newswire, November 1, 2007, Available at http://mobile.prnewstoday.com/release.htm?cat=telecommunications&dat=20071101&rl=NETH15101112007-1

[24] Andy Patrizio, "Comcast Again Denies P2P Throttling," InternetNews.com, Nov. 2, 2007, Available at http://www.internetnews.com/bus-news/article.php/3708751.

[25] Anne Broache, "Net Neutrality May Not Resolve Comcast vs. BitTorrent," CNETNews.com, November 30, 2007, Available at http://www.news.com/Net-neutrality-may-not-resolve-Comcast-vs.-BitTorrent/2100-1028_3-6220802.html