

NET NEUTRALITY: SOMETHING OLD; SOMETHING NEW

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2015 MICH. ST. L. REV. 665

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PROLOGUE

The subtitle of this Article, “Something Old; Something New,” has taken on additional significance since the October 2014 symposium at which it was presented. In the intervening months, the Federal Communications Commission (FCC or Commission) did an abrupt about-face in the direction taken by its Open Internet rules—from a standards-based approach using the Commission’s § 706 authority¹ to a rules-based approach premised on reclassification of Internet Access as a “telecommunications service” subject to its Title II authority.² The editors have graciously allowed those of us writing on net neutrality to substantively update our contributions.³

The original version of this Article, which was based primarily on comments that I submitted to the FCC even earlier, in July 2014, had argued that the standards-based approach proposed in the May 2014 Notice of Proposed Rulemaking (NPRM)⁴ was sound—and indeed, was necessary.⁵ The Commission disagreed. In February 2015, it adopted its new Open Internet rules, adopting the rules-based approach premised on reclassification of “Broadband Internet

1. See Preserving the Open Internet, 25 FCC Rcd. 17,905, ¶ 77, at 17,947 (2010).

2. Protecting and Promoting the Open Internet, 2015 WL 1120110, ¶¶ 47-50, at *13-14 (2015).

3. Indeed, the legal landscape around the Open Internet Order has continued to develop in important ways in the few weeks since this article was last substantively revised. Perhaps most important, in *King v. Burwell*, the Supreme Court once again took a skeptical approach to agency action relating to matters of “deep economic and political significance,” continuing a recent trend central to this Article’s argument. *King v. Burwell*, 135 S. Ct. 2480, 2489 (2015) (citing *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 2427, 2444 (2014)). As developed in this Article, the Court’s 2014 opinion in *Utility Air Regulatory Group* raises serious questions about the Open Internet Order – the recent opinion in *Burwell* amplifies the seriousness of this concern. For further development of this argument, see Brief for International Center for Law & Economics and Administrative Law Scholars et al. as Amici Curiae Supporting Petitioners, *United States Telecom Ass’n v. FCC*, No. 15-1063 (D.D.C. Aug. 6, 2015), available at http://laweconcenter.org/images/articles/icle_oio_amicus_filed.pdf. This brief, filed in support of challengers to the Open Internet Order and of which I was a primary author, builds on the arguments developed at greater length in this article.

4. Protecting and Promoting the Open Internet, 29 FCC Rcd. 5561, ¶¶ 116-41, at 5602-10 (2014).

5. See generally JUSTIN (GUS) HURWITZ, COMMENTS ON PROTECTING AND PROMOTING THE OPEN INTERNET (2014), available at <http://apps.fcc.gov/ecfs/document/view?id=7521706505>.

Access Service” (BIAS) under Title II.⁶ As such, the tone and structure of this Article must change. Following a stage-setting discussion, it now starts with “something new”—key elements of the already pending challenges that the FCC faces as its Order moves through Federal Court.⁷ It then turns back the dial to explain why a standards-based approach is both an appropriate and necessary approach to net neutrality regulation. This structure provides a “one-two” punch, first explaining why the Commission’s current rules are likely to be rejected by the courts, and then explaining why the basic concept of the rules is flawed.

INTRODUCTION

Net neutrality—like this symposium—is about the importance of innovation. Proponents of network neutrality regulation argue that openness and neutrality are principles that have defined the Internet architecture and that have made it a fertile platform for innovation.⁸ Indeed, this is the basic motivation for the FCC Open Internet efforts.⁹

The challenge for the FCC has been finding statutory basis for taking action based on what is a policy goal. The FCC’s statutory mandate is to regulate the various communications industries in the United States—telephone, broadcast radio and television, cable and other multi-channel television, and satellite. The FCC’s statutory mandate is not to promote innovation or to set national innovation policy. It is perhaps unsurprising then that the Commission has struggled to find legal basis for its net neutrality efforts. This has been particularly difficult for the Commission since it has historically disavowed its most direct source of regulatory authority,

6. 2015 WL 1120110, ¶¶ 14-25, at *5-8.

7. At least 10 challenges to the Open Internet Order have been filed in federal circuit courts. All of these challenges have subsequently been consolidated before the D.C. Circuit with oral arguments scheduled for December 4, 2015. *United States Telecom Ass’n v. FCC*, No. 15-1063 (D.D.C. Aug. 6, 2015).

8. *Net Neutrality: What You Need to Know*, SAVE THE INTERNET, <http://www.savetheinternet.com/net-neutrality-what-you-need-know-now> (last visited Aug. 11, 2015).

9. See *Protecting and Promoting the Open Internet*, 29 FCC Rcd. 5561, ¶ 25, at 5570 (2014). “Open Internet” and net neutrality are synonymous and used interchangeably in this Article. Open Internet is the terminology adopted by the FCC to describe network neutrality. *Id.* at 5649 (statement of Mignon L. Clyburn, Comm’r).

Title II of the Communications Act.¹⁰ Title II gives the Commission pervasive authority to regulate “telecommunications services.”¹¹ But the Commission has, until adopting its recent Open Internet Order, classified Internet Access as an “information service”¹²—and information services are regulated under Title I of the Communications Act, which gives the Commission much less regulatory authority.¹³

Short of reclassifying Internet access as a Title II service, over the past many years the Commission has developed an alternative theory of regulation under Title I. Section 706 of the Communications Act required the Commission to ensure the deployment of advanced telecommunications capabilities, which it has determined includes Internet service.¹⁴ The basic regulatory theory of the Commission’s Open Internet rules—which the FCC has used to justify regulation under § 706 and to motivate regulation under Title II—is that net neutrality promotes innovation on the Internet, which in turn may promote new products and services that increase consumer demand for Internet services.¹⁵ In response, Internet Service Providers (ISPs) will expand and upgrade their networks (i.e., deploy advanced telecommunications capabilities) to meet this demand. The FCC refers to this theory in which innovation drives demand drives supply as the “virtuous circle” of innovation.¹⁶

But this virtuous circle can turn both ways: Many innovations may be better enabled—or even require—non-neutrality; and neutrality may foreclose some forms of innovation. Whether neutrality or non-neutrality better promotes innovation is an empirical question. More important, it is a fact-specific question. Some innovation likely benefits more from one than the other, and conversely. Any Open Internet regulation must be careful not to protect only one at the expense of the other.

The basic argument that I present is that the Commission should not adopt comprehensive Open Internet rules but rather

10. Inquiry Concerning High-Speed Access to the Internet over Cable and Other Facilities, 17 FCC Rcd. 4798 (2002); Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs., 545 U.S. 967, 980 (2005); *see infra* Section II.A.

11. *See* 17 FCC Rcd. 4798, ¶ 95, at 4847-48.

12. *Id.* ¶ 38, at 4822.

13. *Id.* ¶ 95, at 4847-48.

14. 47 U.S.C. § 1302(a) (2012).

15. Protecting and Promoting the Open Internet, 29 FCC Rcd. 5561, ¶ 25, at 5570 (2014).

16. *See id.* ¶¶ 26-27, at 5570-71.

should promulgate general guidelines to provide notice to industry participants (be they consumers, last-mile or backbone carriers, or edge providers) about the general classes of conduct of concern to the Commission. Should subsequent conduct raise concerns under these guidelines, the Commission should take strong and swift enforcement action, proceeding on a case-by-case basis under its § 706 authority.

This approach, which is captured in the “commercially reasonable” standard proposed in the Commission’s 2014 NPRM,¹⁷ is grounded in modern principles of administrative law and procedure; is sufficient to protect consumers and police potentially problematic behavior; and is pragmatic both in that it is less likely to result in further years of Open Internet rulemaking efforts (and concomitant uncertainty) than other alternatives being considered by the Commission and in that it is more likely to survive judicial challenge than those alternatives. It allows for the continued development of new pro-consumer businesses and business models on the Internet while allowing the Commission to investigate and take action against conduct that may harm consumers—in this sense it is unlike other alternatives under consideration that could foreclose the development of pro-consumer businesses and business models in the interest of preventing hypothetical (and often nonsensical) consumer harm. This approach maintains flexibility that is essential to avoid manipulation, capture, and arbitrage by firms that would use the Commission’s rules to profit, possibly at the expense of consumers.

This Article proceeds in three parts. Part I provides a general, brief overview of the Commission’s latest iteration of the Open Internet Order. This overview is not meant to be comprehensive—at over 300 pages, excluding Commissioner statements, that is not possible in a short article. Rather, it provides an overview of the general contours and identifies specific issues important to the rest of this Article.

Part II jumps straight to judicial challenges to the Order. Organizationally, this discussion will draw from issues discussed in Part III, and logically follows that discussion. However, given the pendency of judicial challenges to the Order, this discussion demands primary placement. Not all possible challenges are discussed. Rather, the focus is on challenges that are important either for their broader precedential importance or because they directly

17. *Id.* ¶¶ 116-120, at 5602-03.

challenge the premises of the Open Internet order. To wit, this discussion considers arguments that the Commission lacks statutory authority to adopt regulations that broadly affect the Internet (important in the *Chevron* (especially “Step Zero”),¹⁸ *Brown & Williamson*,¹⁹ *City of Arlington*,²⁰ and *Utility Air Regulatory Group*²¹ line of cases); that reclassification requires more substantial fact-finding to overcome the Commission’s prior classification of Internet access as a Title I service (important in the *State Farm*²² and *Fox I*²³ line of cases); and that the Order is arbitrary and capricious because it failed to consider important record evidence suggesting that non-neutrality is not necessarily harmful and can be beneficial. This last point calls into question the FCC’s entire Open Internet endeavor.

Part III turns to the various fields of research relevant to the Open Internet Order to understand whether its motivating concerns actually justify regulatory intervention. The literature in these fields is robust and consistently leads to the same result: Neutrality can, in some cases, be beneficial to consumers, and in other cases, harmful; and conversely, non-neutrality can, in some cases, be harmful to consumers, and in other cases, beneficial.²⁴ In particular, this discussion looks to the literatures on the economics of vertical integration, openness and innovation, and multi-sided markets, as well as the operational characteristics of the Internet (statistical multiplexing and packet switching). And it explains that concern that “paid prioritization” necessarily creates “fast lanes” is technologically wrong and is based on misunderstandings of how the Internet works. Indeed, it is entirely possible that paid prioritization of some traffic can increase performance of other traffic for purely technical reasons. Any rule, therefore, that prophylactically mandates or forecloses the adoption of broad classes of business structures or conduct is, almost by definition, arbitrary, and its adoption capricious. A conclusion follows.

18. *Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837 (1984).

19. *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120 (2000).

20. *City of Arlington, Texas v. FCC*, 133 S. Ct. 1863 (2013).

21. *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 2427 (2014).

22. *Motor Vehicle Mfrs. Ass’n of the U.S., Inc. v. State Farm Mutual Auto. Ins. Co.*, 463 U.S. 29 (1983).

23. *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502 (2009) (*Fox I*).

24. *See infra* Part III.

I. THE OPEN INTERNET ORDER

Before discussing the various judicial, economic, technical, and other challenges facing the Commission's Open Internet Order, the contours of the Order should be put on the table. The discussion below provides a brief history of the order; an overview of the Order's statutory basis; and an overview of the Order's substance. This discussion is limited to the factors necessary for the subsequent discussions.

A. A Brief History of the Order

The Commission's latest Open Internet Order has been more than a decade in the making—and fits into themes the Commission has been dealing with since at least its first *Computer Inquiry*,²⁵ *Carterfone*,²⁶ and *Hush-a-Phone*²⁷ orders. The modern history of the issue started with academic work,²⁸ which gave rise to the Commission's 2005 *Internet Policy Statement*.²⁹ The D.C. Circuit Court of Appeals rejected the Commission's effort to enforce the Internet Policy Statement in the 2010 *Comcast* case on the grounds that the Commission lacked statutory authority to police the Internet.³⁰ This decision resulted from the Commission's prior determinations that Internet Access was an Information Service subject to Title I of the Communications Act, as opposed to a Telecommunications Service subject to Title II;³¹ and that § 706 of

25. Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities (*Computer Inquiry*), 29 F.C.C.2d 162 (1971).

26. Use of the Carterfone Device in Message Toll Telephone Service (*Carterfone*), 13 F.C.C.2d 420 (1968).

27. Hush-A-Phone Corporation and Harry C. Tuttle, Complainants v. American Telephone and Telegraph Company, et al., Defendants (*Hush-a-Phone*), 23 F.C.C. 405 (1957).

28. See, e.g., Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. ON TELECOMM. & HIGH TECH. L. 141 (2003).

29. Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 FCC Rcd. 14986 (2005).

30. *Comcast Corp. v. FCC*, 600 F.3d 642, 661 (D.C. Cir. 2010).

31. *Inquiry Concerning High-Speed Access to the Internet over Cable and Other Facilities*, 17 FCC Rcd. 4798, ¶ 38, at 4822 (2002); see also *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 976, 991-92 (2005).

the Telecommunications Act³² did not grant the Commission affirmative regulatory authority.³³

In response to its loss in *Comcast*, the Commission undertook a rulemaking to both issue binding Open Internet rules—as opposed to a mere policy statement—and also to reevaluate its prior determination that § 706 is not an affirmative grant of regulatory authority applicable to the Internet. This rulemaking culminated in the 2010 Open Internet Order.³⁴ Importantly, this Order was released following the Supreme Court’s holding in *Fox I*, which reaffirmed and clarified that agencies are broadly free to alter their prior statutory interpretations so long as any new interpretation is an otherwise permissible interpretation.³⁵

The 2010 Order was again challenged, this time by Verizon. In January 2014, the D.C. Circuit issued its decision in *Verizon*, again rejecting the bulk of the Order.³⁶ In specific, the D.C. Circuit rejected the Commission’s “No Blocking” and “No Unreasonable Discrimination” rules, holding the Commission and effectively subjected providers of Title I Information Services to common-carriage requirements³⁷—contrary to the Communications Act’s requirement that only providers of Title II Telecommunications Services be treated as common carriers.³⁸ However, the D.C. Circuit expressly upheld the Commission’s re-interpretation of § 706 as conferring affirmative regulatory authority applicable to the Internet.³⁹ And the court drew on another of its recent cases involving the Commission, *Cellco*, in a way that strongly suggested that the Commission’s Order would be upheld were it modified to apply a “commercially reasonable” standard, as opposed to a common carrier-like standard, to the No Blocking and No Unreasonable Discrimination rules.⁴⁰

In the months immediately following the *Verizon* decision, FCC Chairman Tom Wheeler began the process of issuing new Open

32. 47 U.S.C. § 1302(a) (2012).

33. Deployment of Wireline Services Offering Advanced Telecommunications Capability, 13 FCC Rcd. 24,012, ¶ 69, at 24,044-45 (1998).

34. Preserving the Open Internet, 25 FCC Rcd. 17,905 (2010).

35. *Fox I*, 556 U.S. 502, 514-15 (2009).

36. *Verizon v. FCC*, 740 F.3d 623, 655-59 (D.C. Cir. 2014).

37. *Id.* at 655, 658-59 (holding that the 2010 Open Internet Order imposed common-carriage obligations).

38. *Id.* at 650 (“We think it obvious that the Commission would violate the Communications Act were it to regulate broadband providers as common carriers.”).

39. *Id.* at 635 (affirming the Commission’s new reading of § 706).

40. *Id.* at 657 (providing a roadmap).

Internet rules.⁴¹ The initial tack taken was to follow the D.C. Circuit’s roadmap—re-implement the prior rules based on a “commercially reasonable” standard.⁴² In May 2014, the Commission issued an NPRM for proposed rules taking this approach.⁴³ The NPRM requested views on alternate approaches, including brief discussion of reclassifying Internet access from Title I to Title II—though it did not propose rules based upon such approaches.

Over the following nine months, the Commission received approximately four million comments in the rulemaking proceeding; it also held various roundtable-style workshops, and Commission officials conducted a substantial number of *ex parte* meetings with various stakeholders and other interested parties.⁴⁴ While the Commission has yet to release the totality or comprehensive summary of the 4 million comments received, it appears that a majority of them advocated reclassifying Internet access as a Title II service—but a substantial minority advocated that the FCC leave the Internet classified as a less-regulated Title I Information Service. Importantly, the vast majority of comments on both sides were driven by advocacy groups⁴⁵—indeed, there is a strong argument that the vast majority of these comments were advocating positions that could not reasonably be attributed to those submitting them (e.g., few, if any, non-telecom lawyers could be expected to have a sophisticated enough understanding of the relevant law to

41. See, e.g., STATEMENT BY FCC CHAIRMAN TOM WHEELER ON THE FCC’S OPEN INTERNET RULES, FCC (Feb. 19, 2014), *available at* <https://www.fcc.gov/document/statement-fcc-chairman-tom-wheeler-fccs-open-internet-rules>; STATEMENT BY FCC CHAIRMAN TOM WHEELER REGARDING DC CIRCUIT OPINION, FCC (Jan. 14, 2014), *available at* <https://www.fcc.gov/document/chairman-wheeler-statement-court-opinion-open-internet-rules>.

42. See Protecting and Promoting the Open Internet, 29 FCC Rcd. 5561, ¶¶ 116-41, at 5602-10 (2014).

43. *Id.*

44. Protecting and Promoting the Open Internet, 2015 WL 1120110, ¶¶ 47-6, at *3 (2015).

45. Advocacy spending on both sides of the net neutrality debate has been substantial. See, e.g., Josh Peterson & Yaël Ossowski, *Ford Foundation Pours Millions into Net Neutrality to Guarantee Billion-Dollar Investments*, WATCHDOG.ORG (Dec. 15, 2014), <http://watchdog.org/187392/ford-foundation> (“Between 2007-2014, the Ford Foundation dropped \$46 million in support of pro-net neutrality organizations That would put the Ford Foundation’s contribution to the net neutrality lobbying effort not far behind that of all major telecommunications firms combined”); Amy Schatz, *One Million Net Neutrality Comments vs. \$42 Million in ISP Lobbying*, RE/CODE (July 22, 2014, 12:02 PM), <http://recode.net/2014/07/22/one-million-net-neutrality-comments-vs-42-million-in-isp-lobbying>.

meaningfully argue for “Title I” vs. “Title II” classification—yet a substantial portion of comments used such terminology).

Despite strong advocacy efforts by proponents of reclassifying Internet access as a Title II service, as of late fall 2014, it appeared that the Commission was going to hold to the proposal advanced in the NPRM and articulated by the D.C. Circuit—reissuance of the 2010 rules based on a “commercially reasonable” standard. Reports suggest that Chairman Wheeler planned for the Commission to vote on such rules at its December 2014 meeting.⁴⁶

In November 2014, shortly before the cutoff for the Chairman to announce the agenda for the December open Commission meeting, the Commission abruptly changed tack. This immediately followed a high-profile statement by President Obama calling on the Commission to reclassify Internet access as a Title II service.⁴⁷ Chairman Wheeler denies that this change in direction resulted from the President’s statement. Rather, he says that he “became concerned that the relatively untested ‘commercially reasonable’ standard might be subsequently interpreted to mean what was reasonable for the ISP’s commercial arrangements.”⁴⁸ Apparently, he felt that the best solution to this concern was to radically alter the Commission’s approach to the Open Internet Order as opposed to adding one or two sentences clarifying the meaning of the existing text.

Over the following weeks, the Commission staff drafted new rules, substantially rewriting the Order to reclassify Internet access as a Title II Telecommunications Service. The new rules were circulated to the FCC Commissioners in early February and adopted by a 3-2 vote on February 26, 2015.⁴⁹

Since adoption, the rules have been published by the Commission and in the Federal Register—procedural requirements for parties to challenge the rules in court. The rules will go into effect on June 12, 2015, pending a possible stay issued by the

46. Gautham Nagesh & Brody Mullins, *Net Neutrality: How White House Thwarted FCC Chief*, WALL STREET JOURNAL (Feb. 4, 2015, 7:52 PM), <http://www.wsj.com/articles/how-white-house-thwarted-fcc-chief-on-internet-rules-1423097522>.

47. *Id.*

48. Tom Wheeler, Chairman, FCC, Remarks at Silicon Flatirons Center (Feb. 9, 2015).

49. Ruiz & Lohr, *supra* note 47; Press Release, FCC, FCC Adopts Strong Sustainable Rules to Protect the Open Internet (Feb. 26, 2015), *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-332260A1.pdf.

Commission or Federal Court.⁵⁰ As of this writing, eight lawsuits challenging the Order have been filed—six in the D.C. Circuit and one in the Fifth Circuit by parties arguing, for various reasons, that the rules need to be thrown out; one in the Third Circuit arguing that the rules need to be remanded to the Commission because they are too weak to meet the Commission’s statutory obligations.⁵¹

B. The Order’s Statutory Basis

The most controversial aspect of the Commission’s Order is the statutory authority upon which it is based.⁵² As with the 2010 rules, the Commission has continued to rely on § 706 to provide statutory authority for its rules. But it has also reclassified a newly defined class of service—Broadband Internet Access Service (BIAS)—as a Title II Telecommunications Service. The 2015 Open Internet Order relies on both of these statutory bases in parallel, not in the alternative.⁵³

As discussed previously, the Commission’s use of § 706 is premised on its “virtuous cycle” theory.⁵⁴ Section 706 requires that the Commission “shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans.”⁵⁵ The Commission’s basic theory is that its Open

50. As of this writing, one petition for such a stay has been filed. See Kathryn Bachman, *Telecom, Cable Industries File with FCC to Stay Net Neutrality Order*, KATYONTHEHILL (May 1, 2015, 4:00 PM), <http://katyonthehill.com/telecom-industry-files-with-fcc-to-stay-net-neutrality-order>.

51. John Eggerton, *FCC’s Open Internet Order Challenged in 3rd Circuit*, MULTICHANNEL NEWS (Apr. 24, 2015, 6:34 PM), <http://www.multichannel.com/news/technology/fccs-open-internet-order-challenged-3rd-circuit/390081>.

52. The Order also applies its rules to mobile wireless service—the 2010 Order had exempted mobile wireless service from most of its requirements. In the case of mobile, the 2015 Order also uses Title III, which gives the Commission authority to regulate use of spectrum in the public interest, as a statutory basis. Consideration of the Order’s treatment of mobile wireless is beyond the scope of this Article.

53. See Protecting and Promoting the Open Internet, 2015 WL 1120110, ¶ 273, at *76 (2015); see also Wheeler, *supra* note 48 (“My proposal will also use the significant powers in Section 706, not as a substitute but as a second tool. This one-two punch . . . applies Title II, as well as Section 706, to protect broadband Internet access. It is the FCC using all of the tools in its toolbox to protect innovators and consumers.”).

54. See discussion *supra* INTRODUCTION; see also 2015 WL 1120110, ¶ 20, at *7.

55. 47 U.S.C. § 1302(a) (2012); see also § 1302(b) (“If the Commission’s determination [whether advanced telecommunications capability is being deployed

Internet rules will promote the deployment of new edge services (i.e., applications) that, in turn, will drive consumer demand for BIAS, which, in turn, will increase investment by ISPs to meet that consumer demand. This interpretation is *relatively* uncontroversial—it is supportable on current understandings of *Chevron* deference and has been upheld by the D.C. and Tenth Circuits.⁵⁶

More controversial is the Commission's reclassification of BIAS as a Title II service.⁵⁷ The reasons that this is controversial will be considered in detail in Part II—generally, it is because of the breadth of the Commission's authority under Title II and concern over whether it is appropriate for the Commission to apply this broad authority to Internet-related regulations, as a matter of statutory authority, congressional intent, and sound policy—for now our focus is merely to describe what the Commission has done in the Open Internet Order.

The first main reason that reclassification is controversial is because Title II gives the Commission broad and nearly pervasive authority to regulate telecommunications carriers. For instance, § 215 of the Communication Act requires that the Commission

examine into transactions entered into by any common carrier which relate to the furnishing of equipment, supplies, research, services, finances, credit, or personnel to such carrier and/or which may affect the changes made or to be made and/or the services rendered or to be rendered by such carrier, in wire or radio communication subject to this chapter, and shall report to the Congress whether any such transactions have affected or are likely to affect adversely the ability of the carrier to render adequate service to the public, or may result in any undue or unreasonable increase in charges or in the maintenance of undue or unreasonable charges for such service; and in order to fully examine into such transactions the Commission shall have access to and the right of inspection and examination of all accounts, records, and memoranda including all documents, papers, and correspondence now or hereafter existing, of persons furnishing such equipment, supplies, research, services, finances, credit, or personnel.⁵⁸

Title II comprises over fifty such sections. Some address very narrow concerns—albeit by giving the Commission broad authority. Section

to all Americans in a reasonable and timely fashion] is negative, it shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.”).

56. *Verizon v. FCC*, 740 F.3d 623, 641 (D.C. Cir. 2014); *In re FCC 11–161*, 753 F.3d 1015, 1042 (10th Cir. 2014).

57. 2015 WL 1120110, ¶ 306, at *85.

58. 47 U.S.C. § 215(a).

222, for instance, gives the Commission authority to regulate privacy-related aspects of Title II services.⁵⁹ Other provisions are very broad. Section 201, for instance, empowers the Commission generally to ensure that “[a]ll charges, practices, classifications, and regulations for and in connection with such communication service, shall be just and reasonable.”⁶⁰

Reclassification empowers the Commission to use the full extent of this very broad authority. Curiously, it should be noted, it is not clear whether this authority supports all of its substantive rules. In particular, § 202 prohibits only “*unjust or unreasonable* discrimination.”⁶¹ Yet the new rules include absolute bars on throttling and so-called paid prioritization, both of which are forms of discrimination—such an absolute bar may be in conflict with the “unjust or unreasonable” limitation on this authority.⁶²

Importantly, the Commission is not required to apply all of the provisions of Title II. To the contrary, § 10 of the Telecommunications Act *requires* the Commission to forbear from provisions that are no longer necessary due, generally, to changes in the market.⁶³ In the Open Internet Order, the Commission forbore from thirty sections of Title II. This is, itself, controversial because arguments have been made for and against forbearance of nearly every provision in Title II. Moreover, there is reasonable concern that the “core” provisions of Title II—primarily §§ 201 and 202, from which the Commission did not forbear—effectively give the Commission pervasive authority over ISPs’ business practices.

The other main reason that reclassification is controversial is that the Commission has consistently argued that Internet access is *not* subject to Title II regulation. This has been the consistent position of the Commission for as long as it has been a question. It has been the position of the Commission under both Democratic and

59. *Id.* § 222. Following reclassification, the scope of this authority over various aspects of the Internet ecosystem is uncertain. The Commission held a workshop on April 28, 2015, to consider these issues. *See Public Workshop on Broadband Consumer Privacy*, FCC (Apr. 28, 2015), <https://www.fcc.gov/events/web-and-cgb-public-workshop-broadband-consumer-privacy>.

60. 47 U.S.C. § 201.

61. *Id.* § 202(a) (emphasis added).

62. Indeed, Chairman Wheeler testified before Congress that “there is nothing in Title II that prohibits paid prioritization”—though he has since walked back that statement. *Oversight of the Federal Communications Commission Before the Subcomm. on Commc’ns & Tech. of the H. Comm. on Energy & Commerce*, 133th Cong. (statement of Tom Wheeler, Chairman, FCC).

63. 47 U.S.C. § 160.

Republican leadership. It is a position that has been accepted by Congress and is the position enshrined in the text of the Telecommunications Act.⁶⁴ And it is a position that the Commission brought to and successfully defended before the Supreme Court.⁶⁵ It is unsurprising that so complete a change in policy is controversial—and, as discussed in Part II, it raises important and difficult legal questions.

C. What Does the Open Internet Order Do?

A detailed discussion of the substance of the Order is well beyond the scope of this Article. It can, however, be described at a high level.

The core provisions of the Order comprise four rules. The first three are specific: No Blocking, No Throttling, and No Paid Prioritization.⁶⁶ These rules generally prevent ISPs from blocking access to lawful Internet content, slowing down users' access to specific Internet content or “favoring” certain content (e.g., by providing enhanced access to ISP-preferred content as compared to other content) in exchange for payments or other consideration from that content's owners. The fourth rule prohibits “[u]nreasonable [i]nterference or [u]nreasonable [d]isadvantage [s]tandard for Internet [c]onduct.”⁶⁷ The Order also includes enhanced transparency rules, requiring ISPs to disclose various information about their services and policies.⁶⁸

The Order identifies and carves out a number of practices from the scope of these rules, reserving treatment of those practices to future determination by the Commission. These practices include interconnection,⁶⁹ “zero-rating” and sponsored-data plans,⁷⁰ specialized services (also known as “non-BIAS data services”),⁷¹ and content delivery networks (CDNs).⁷² It also establishes an ombudsperson to facilitate consumer complaints and enforcement

64. *Id.* § 230.

65. *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 973 (2005).

66. *Protecting and Promoting the Open Internet*, 2015 WL 1120110, ¶¶ 14-19, at *76 (2015).

67. *Id.* ¶¶ 133-35, at *36-37.

68. *Id.* ¶¶ 23-24, at *7.

69. *Id.* ¶¶ 28-31, at *8-9.

70. *Id.* ¶¶ 151-53, at *42.

71. *Id.* ¶¶ 207-13, at *60-61.

72. *Id.* ¶¶ 190, 340, at *54, 96.

action against ISPs;⁷³ and establishes a procedure for firms wanting to offer services that may violate the rules to seek advisory opinions or waivers.⁷⁴

II. THE CHALLENGES TO THE ORDER

The 2015 Order is the Commission’s third bite at the net neutrality apple—both its initial effort with the 2005 *Internet Policy Statement* and its 2010 Open Internet Order were rejected by the courts.⁷⁵ And, despite not going into effect until June 12, 2015, eight lawsuits challenging the Order have already been filed as of May 1, 2015. These challenges come as no surprise—throughout the drafting process it was clear that the Order would be challenged, especially if the Commission reclassified Internet access as a Title II service. Indeed, Commissioner Ajit Pai, one of the two dissenting commissioners, filed a sixty-three page dissenting statement with the Order, outlining many arguments against it.⁷⁶

This Part discusses a number of the challenges being raised against the Order.⁷⁷ It focuses on two general classes of arguments: those based in issues broader than the Order itself, and those that cut to the substantive heart of net neutrality regulation. In specific, it considers arguments that the FCC lacks statutory authority to regulate Internet access, that the Commission’s prior classification of

73. *Id.* ¶¶ 254-56, at *71.

74. *Id.* ¶¶ 229-39, at *66-68. Waiver is available on a case-by-case basis for any Commission rules—the Open Internet rules are not treated differently and afford no additional availability of waivers. *See id.* ¶ 130, at *36. The Commission, however, adopts a more restrictive waiver rule to govern paid prioritization and notes that it “anticipate[s] granting such relief only in exceptional cases.” *Id.* ¶¶ 130, 132, at *36.

75. *Comcast Corp. v. FCC*, 600 F.3d 642, 661 (D.C. Cir. 2010) (rejecting the 2005 *Internet Policy Statement*); *Verizon v. FCC*, 740 F.3d 623, 655-59 (D.C. Cir. 2014) (rejecting the 2010 Open Internet Order).

76. Protecting and Promoting the Open Internet, 2015 WL 1120110, at *212-66 (dissenting statement of Comm’r Ajit Pai).

77. Other challenges to the Order include: insufficiency of the notice provided by the May 2014 NPRM, and, in particular, that the final rule was not a “logical outgrowth” of the rules anticipated by the notice; First and Fifth Amendment challenges to the Order (either of which would be an incredibly important holding, clarifying longstanding areas of debate within the telecom industry, and more generally; but neither of which is likely to be addressed by the courts, per the canon of constitutional avoidance); regulation of mobile wireless under a common carrier standard, contrary to 47 USC § 332(c); and impropriety of the Commission’s new interpretation of the definition of the “Public Switched Network” to include the Internet.

Internet access as a Title I service imposes heightened requirements on reclassification,⁷⁸ and that the Order is arbitrary and capricious for having failed to address contrary material submitted in the record.⁷⁹ Any of these challenges could lead to the reversal of the Order. Importantly, the first two could establish precedent with general impact on all administrative agencies; the third could undermine future efforts by the FCC to establish strong prophylactic rules (e.g., barring paid prioritization absolutely as opposed to evaluating paid prioritization arrangements under a case-by-case “commercially reasonable” standard).

A. The Commission Lacks Authority to Regulate “The Most Powerful Network Ever”

The most important challenge to the Commission’s Order is to its basic authority to regulate Internet Access. This challenge is important in part because it goes to the limits of the Commission’s regulatory authority. But the challenge stems from broader issues in American administrative law and could therefore have implications far beyond the Commission and its Open Internet order. Since its seminal decision in *Chevron*, the Supreme Court has struggled to define the outer boundaries of agencies’ regulatory authority. Under *Chevron*, agencies receive broad deference in interpreting their statutes.⁸⁰ But that deference is not unlimited, and, from time to time, the Commission has excoriated agencies for acting outside the scope of their regulatory authority. For instance, in *Brown and Williamson*, the Court rejected the FDA’s efforts to regulate cigarettes as a drug delivery system, saying that it “Congress could not have intended to delegate a decision of such economic and political significance to an agency in so cryptic a fashion.”⁸¹ This concern was echoed in the

78. Discussion of these first two challenges draws substantially from Justin (Gus) Hurwitz, *Regulating the Most Powerful Network Ever*, 10 PERSP. FROM FSF SCHOLARS, Feb. 19, 2015, available at http://www.freestatefoundation.org/images/Regulating_the_Most_Powerful_Network_Ever_021815.pdf.

79. Discussion of this third challenge draws in part from Gus Hurwitz, *Chairman Wheeler and the Terrible, Horrible, No Good, Very Bad Open Internet Order*, TECHPOLICYDAILY.COM (Mar. 17, 2016, 6:00 AM), <http://www.techpolicydaily.com/communications/terrible-horrible-no-good-open-internet-order>.

80. *Chevron U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 862 (1984).

81. *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 160 (2000); see also *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 2427, 2444 (2014)

more recent *Utility Air Regulatory Group (UARG)*, in which the Court rejected the EPA's efforts to regulate greenhouse gasses when doing so required the EPA to effectively rewrite ("tailor") its statutory authority in order to implement its authority in a reasonable manner.⁸² But these cases have been the exception to the general trend of *Chevron* deference, which has been to extend deference broadly and to rely on the political process—not the courts—to check any regulatory abuses. This is perhaps best seen in the recent *City of Arlington* case, in which the Court extended *Chevron* deference to the FCC in determining the jurisdictional boundaries laid out in its statute—arguably giving the Commission authority to define the boundaries of its own authority.⁸³ Should challenges to the Commission's Order ultimately make it to the Supreme Court, as many suggest is possible, this will likely be a central question considered by the Justices.

We can frame this question as whether the Commission has authority to regulate Internet access under Title II.⁸⁴ Proponents of the Chairman's proposal take for granted that such classification is appropriate.⁸⁵ It is useful to spend a moment considering why this

("[The Court] expect[s] Congress to speak clearly if it wishes to assign to an agency decisions of vast 'economic and political significance.'").

82. *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 2427, 2446 (2014) ("[T]he need to rewrite clear provisions of the statute should have alerted EPA that it had taken a wrong interpretive turn."); *id.* at 2446 ("The power of executing the laws . . . does not include a power to revise clear statutory terms that turn out not to work in practice.").

83. *City of Arlington v. FCC*, 133 S. Ct. 1863, 1874-75 (2013). While *City of Arlington* is generally framed as asking whether *Chevron* deference extends to jurisdictional ambiguity, Justice Scalia's opinion upholding deference for the Commission quite convincingly explains that the line between "jurisdictional" and "substantive" statutory language is itself ambiguous, such that *Chevron* should not—indeed cannot—apply differently for the two types of question. *Id.* at 1868-70.

84. This could be approached either as a *Chevron* "Step Zero" or "Step Two" question. Under a "Step Zero" analysis, the question would be whether Congress intended to delegate to the FCC authority to regulate "the most powerful network ever," see Hurwitz, *Regulating the Most Powerful Network Ever*, *supra* note 78, at 4; under a "Step Two" analysis, the question would be whether a construction of the Communications Act giving the Commission such broad authority is permissible reading the statute as a whole.

85. *Communicators with Gigi Sohn* (C-SPAN television broadcast Feb. 6, 2015), available at <http://www.c-span.org/video/?324180-1/communicators-gigi-sohn>; Amir Nasr, *FCC Will Head to Court to Defend Net Neutrality...Again*, MORNING CONSULT (Aug. 13, 2015), <http://morningconsult.com/2015/08/fcc-will-head-to-court-to-defend-net-neutrality-again/> (quoting Marvin Ammori as saying "It will be super easy to defend in court," Marvin Ammori, a leading advocate for network neutrality and affiliate scholar at Stanford Law School's Center for Internet

confidence is misplaced. Their view stems largely from the apparent support that all nine Justices expressed for Title II classification in *Brand X*.⁸⁶ There are three basic reasons why *Brand X* does not establish that the Commission has authority to regulate Internet access. First, whether it is appropriate to classify broadband Internet access as a telecommunications service was not a question at issue in *Brand X*, such that the Court did not inquire deeply into, let alone decide, the matter.⁸⁷ Second, to the extent the Justices were cognizant of the issue, their focus was on specific sections of Title II—those relating to the unbundling of and access to unbundled network elements—which is a substantially narrower question than whether Internet access is appropriately the subject of Title II at all.⁸⁸ While logically no part of Title II can apply if Title II cannot apply at all, the Justices' consideration of the former in *Brand X* was premised on undeveloped and unchallenged assumptions about the latter. And third, even if these issues had been squarely before the Court, the Internet today—both in terms of the technology and its importance as a social, economic, and political platform—is different today than it was a decade ago. This changed factual setting could easily change the outcome of the Court's analysis.

Chevron's basic inquiry is into congressional intent: Did Congress intend for the Commission to exert the authority that it is claiming? Statutory ambiguity, such as exists in the Communications Act's definitions, is an important condition for an agency to claim deference—lacking such ambiguity, the intent of Congress is generally clear, and “that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.”⁸⁹ But ambiguity is only the start of the matter—ambiguous terms alone do not render congressional intent unclear; nor does it give the agency *carte blanche* in resolving the ambiguity. As explained by the Court in *UARG*:

[R]easonable statutory interpretation must account for both “the specific context in which . . . language is used” and “the broader context of the statute as a whole.” A statutory “provision that may seem ambiguous in

and Society, said in an interview. “They just need to clarify why they changed their mind, they don’t even need to explain if one is better than the other.””).

86. Nat’l Cable & Telecomms. Ass’n v. *Brand X* Internet Servs., 545 U.S. 967, 973, 1005 (2005).

87. See generally *id.*

88. *Id.* at 988.

89. *Chevron U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 842-43 (1984).

isolation is often clarified by the remainder of the statutory scheme . . . because only one of the permissible meanings produces a substantive effect that is compatible with the rest of the law.” Thus, an agency interpretation that is “inconsisten[t] with the design and structure of the statute as a whole” does not merit deference.⁹⁰

UARG frames the basic challenge to classification of broadband Internet access services as telecommunications services. The Chairman’s plan involves not just classifying these services under Title II, but “moderniz[ing] Title II, tailoring it for the 21st century,”⁹¹ by “taking the legal construct that once was used for phone companies and paring it back to modernize it.”⁹² In effect, the Chairman means to create a new legal regime for the regulation of broadband Internet access. Indeed, it almost necessarily *must* create a new legal regime because, as described in a moment, applying some portions of Title II does not make sense in the context of the modern Internet. The Court is likely to view efforts to rewrite the statute in this way with substantial skepticism because the need to “modernize” the statute suggests that the Chairman’s proposal is incompatible with the congressionally designed statutory structure.

In *UARG*, the EPA’s decision to regulate greenhouse emissions for motor vehicles triggered statutory permitting requirements for stationary sources of greenhouse gasses as well. The statute requires permitting of any stationary source emitting more than 250 (or in some cases 100) tons of air pollutants per year.⁹³ Classifying greenhouse gasses as air pollutants substantially increases the number of stationary sources subject to this permitting requirement—a burden that neither the EPA nor those subject to its regulations could reasonably be expected to meet. In order to avoid this absurd result, the EPA adopted a “tailoring” rule, under which it would only enforce the permitting requirement for stationary sources emitting 100,000 tons of greenhouse gasses per year.⁹⁴

90. *Util. Air Regulatory Grp. v. EPA (UARG)*, 134 S. Ct. 2427, 2442 (2014) (internal citations omitted).

91. Tom Wheeler, *FCC Chairman Tom Wheeler: This is How We Will Ensure Net Neutrality*, WIRED (Feb. 4, 2015, 11:00 AM), <http://www.wired.com/2015/02/fcc-chairman-wheeler-net-neutrality/>.

92. *FCC Proposes Treating All Internet Traffic Equally*, PBS NewsHour (PBS television broadcast Feb. 4, 2015, 6:35 PM), available at <http://www.pbs.org/newshour/bb/fcc-proposes-treating-all-internet-traffic-equally>.

93. 42 U.S.C. § 7602(j) (1977).

94. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514 (June 3, 2010).

The Court found fault with, and rejected, this approach on several grounds. First, as explained by Justice Scalia, entirely separate from the need to “tailor” the statute, the fact that the EPA’s adopted approach “would place plainly excessive demands on limited governmental resources is alone a good reason for rejecting it.”⁹⁵ We do not expect that Congress intended to place implausible burdens on an agency (or, for that matter, those it regulates), especially if alternative readings of the statute are possible. Second, the Court finds that the “EPA’s interpretation is also unreasonable because it would bring about an enormous and transformative expansion in EPA’s regulatory authority without clear congressional authorization.”⁹⁶ Both of these concerns reflect the basic premise that the Court “expect[s] Congress to speak clearly if it wishes to assign to an agency decisions of vast ‘economic and political significance.’”⁹⁷

There is no question that applying the full force of Title II—a statute designed to regulate an industry that effectively consisted of a single firm—to an industry that today comprises literally thousands of firms⁹⁸ would impose excessive burdens on the FCC, state regulators, and the industry. Title II, for instance, *requires* the Commission to examine every detail of a telecommunications carrier’s business, including all transactions that relate to “the furnishing of equipment, supplies, research, services, finances, credit, or personnel.”⁹⁹ Title II gives the Commission authority over, and requires in the first instance that it exercise authority over, every aspect of a regulated carrier’s business.¹⁰⁰ This may have made sense in the era of a telephone monopoly, especially one using relatively simple technology deployed in a static manner to provide a small number of services to homogeneous customers. It makes absolutely no sense in the context of today’s market—a market in which

95. *UARG*, 134 S. Ct. at 2444.

96. *Id.*

97. *Id.*

98. For instance, WISPA (which opposes Chairman Wheeler’s plan) has nearly 800 Wireless ISP members, *Principal Members*, WISPA, <http://www.wispa.org/Directories/Member-Directory> (last visited Aug. 11, 2015); the American Cable Association (which also opposes Chairman Wheeler’s plan) represents over 800 small and medium cable-based ISPs, *About Us: ACA Overview*, AMERICAN CABLE ASSOCIATION, http://www.americancable.org/about_us/aca_overview_0 (last visited Aug. 11, 2015); and there are at least another 700 LECs offering broadband Internet access.

99. 47 U.S.C. § 215(a) (1934).

100. *Id.*

thousands of firms offer service using myriad technologies via networks that are effectively rebuilt every eighteen to twenty-four months to support a vast array of consumer uses under many different business models. The burden of applying Title II would clearly be excessive and would clearly amount to an “enormous and transformative expansion” of the Commission’s authority.¹⁰¹

That the Chairman’s proposal would be an “enormous and transformative expansion” in the Commission’s authority can be seen in other ways as well.¹⁰² Despite his strenuous efforts to maintain the contrary, the Chairman is proposing to regulate what he has called on several recent occasions “the most powerful network in the history of mankind.”¹⁰³ The first sentence of the 2015 Order similarly asserts that “[t]he open Internet drives the American economy and serves, every day, as a critical tool for America’s citizens to conduct commerce, communicate, educate, entertain, and engage in the world around them”;¹⁰⁴ and the 2014 NPRM similarly begins with, “The Internet is America’s most important platform for economic growth, innovation, competition, [and] free expression [I]t has been, and remains to date, the preeminent 21st century engine for innovation and the economic and social benefits that follow.”¹⁰⁵ The telephone network, which Title II was designed to regulate, is an important social and economic tool—but it would be a far stretch indeed to call it “the most important network in the history of mankind” or to call it “America’s most important platform for economic growth, innovation, competition, [and] free expression.” The Communications Act authorized the Commission to regulate the former, not the latter.

The proposal is also contrary to the regulatory structure and approach that Congress has laid out for the Internet. While the Communications Act, as amended by the 1996 Telecom Act, is almost silent with respect to the Internet, it is not entirely silent.¹⁰⁶ Section 230 asserts very plainly that “[i]t is the policy of the United States . . . to preserve the vibrant and competitive free market that

101. See *UARG*, 134 S. Ct. at 2444.

102. See *id.*

103. See Hurwitz, *Regulating the Most Powerful Network Ever*, *supra* note 78, at 1.

104. Protecting and Promoting the Open Internet, 2015 WL 1120110, ¶ 1, at *2 (2015).

105. Protecting and Promoting the Open Internet, 29 FCC Rcd. 5561, ¶ 1 (2014).

106. See 47 U.S.C. § 230 (1996).

presently exists for the Internet and other interactive computer services, *unfettered by Federal or State regulation.*”¹⁰⁷ This is in line with the overall structure and purpose of the Telecom Act, which was enacted “to promote competition and *reduce* regulation.”¹⁰⁸ The FCC’s approach to the Internet has followed this deregulatory path—and over the past twenty years Congress has not seen a need to change either the statute or the Commission’s path. Indeed, one of the most important things that Congress has done legislatively with respect to the Internet is to consistently prohibit federal or state taxation of Internet access. Yet the Chairman has expressly acknowledged that his proposal would permit collection of Universal Service fees on broadband Internet access.¹⁰⁹ While the mechanism is different from taxation, the effect is the same—an incremental increase in costs imposed by the state—and that effect is contrary to nearly two decades of clear congressional policy.

This brings us to the EPA’s “tailoring rule” and its relation to the Commission’s forbearance authority. In *UARG*, the Court found that the EPA’s efforts to avoid the excessive burdens resulting from its statutory construction by “tailoring” the permitting requirements were problematic for two reasons.¹¹⁰ First, the tailoring effort was itself problematic; and second, the need to tailor the rules demonstrated that its interpretation was contrary to the statutory scheme designed by Congress.¹¹¹ In discussing these concerns, the Court explained:

An agency has no power to “tailor” legislation to bureaucratic policy goals by rewriting unambiguous statutory terms. . . . Were we to recognize the authority claimed by EPA in the Tailoring Rule, we would deal a severe blow to the Constitution’s separation of powers. . . . The power of executing the laws necessarily includes both authority and responsibility to resolve some questions left open by Congress that arise during the law’s administration. But it does not include a power to revise clear statutory terms that turn out not to work in practice. . . .

107. *Id.* § 230(b)(2) (emphasis added).

108. Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (codified as amended at 47 U.S.C. § 151) (emphasis added).

109. See FCC, THE OPEN INTERNET ORDER: PRESERVING AND PROTECTING THE INTERNET FOR ALL AMERICANS (Mar. 12, 2015), *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-332486A1.pdf (“With respect to Universal Service, the Order . . . allows a current, separate proceeding on how to reform universal service contributions to proceed.”).

110. *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 2427, 2444-45 (2014).

111. *Id.*

We reaffirm the core administrative-law principle that an agency may not rewrite clear statutory terms to suit its own sense of how the statute should operate. . . . Instead, the need to rewrite clear provisions of the statute should have alerted EPA that it had taken a wrong interpretive turn. . . . Because the Tailoring Rule cannot save EPA's interpretation of the triggers, that interpretation was impermissible under *Chevron*.¹¹²

The Chairman's proposed "modernization" of Title II is clearly an effort to "revise clear statutory terms that turn out not to work in practice" and to "rewrite clear statutory terms to suit its own sense of how the statute should operate." This suggests that the Commission has "taken a wrong interpretive turn" and that its "interpretation [is] impermissible under *Chevron*."

The obvious response to these concerns is that, unlike the EPA, the Communications Act gives the FCC express power to forbear from enforcing unnecessary provisions of the Act (including portions of Title II).¹¹³ As such, the Commission is congressionally authorized to forbear from applying those portions of Title II that would cause the statute "not to work out in practice."¹¹⁴ The Chairman's proposed approach would therefore be in line with congressional design, Congress having expressly granted forbearance authority. This is a legitimate and important difference between the EPA's and FCC's tailoring efforts. But the Commission's forbearance authority is not unlimited, and reliance on forbearance to save the proposed rules is arguably subject to the same infirmities as the EPA's approach.

There are at least two reasons why forbearance does not save the FCC's tailoring approach. First, and simplest, it is likely the case that forbearance is not permanent—should the Commission find at a later date that the conditions giving rise to forbearance have changed (including simply that it is, in the (current or future) Commission's view, in the public interest to discontinue its forbearance), any provision of Title II could come back into force. Thus, the argument that forbearance pares back the most onerous provisions of Title II, thereby easing concerns about the burdens Title II regulation imposes and the expansion in scope of the FCC's power, is illusory. These problems are only avoided by the grace of the Commission's own beneficence. Forbearance, in other words, is no cure to the previous concerns expressed by the Court in *UARG*—concerns that Justice Scalia explained provided sufficient basis on their own (i.e.,

112. *Id.* at 2445-46.

113. 47 U.S.C. § 160(a) (1996).

114. *Id.*

independent of the EPA's tailoring efforts) to reject the EPA's rules.¹¹⁵

Second, and more nuanced: The FCC's forbearance power is limited, such that forbearance can only be granted under certain circumstances. This means that forbearance may not be sufficient to address concerns of excessive burden and statutory structure. Section 10 requires that the Commission forbear from enforcing provisions of the Communications Act subject to three conjunctive conditions: Enforcement is not necessary to ensure just and reasonable prices and practices, enforcement is not necessary for the protection of consumers, and forbearing from enforcement is in the public interest.¹¹⁶ None of these factors considers whether forbearance is necessary to make the Commission's preferred construction of the statute work in practice, and the fact that forbearance may be necessary in order to make the statute work is not on its own sufficient to trigger forbearance. As a result, it is entirely possible that the Commission's classification of broadband Internet access under Title II could yield burdensome, or otherwise problematic, results sufficient to render the classification impermissible.

The Order's "modernization" of Title II is therefore based on authority just as weak as that upon which the EPA based its "tailoring rule." The FCC does have authority to forbear from enforcing portions of the Communications Act—and the EPA, like every agency, has some discretion to determine how it exercises its authority. But the FCC's power is not discretionary: Section 10 is written in the imperative requiring that "the Commission shall forbear" if certain conditions are met.¹¹⁷ The statutory design, therefore, serves to *constrain* the Commission's discretion over what provisions of the Communications Act it enforces.¹¹⁸ It is not a mechanism to allow the Commission to "rewrite clear statutory terms to suit its own sense of how the statute should operate."¹¹⁹ It allows the Commission to trim the fat of the statute, not to excise tumors threatening to consume it. As such, like any other agency, the FCC cannot "adopt . . . unreasonable interpretations of statutory

115. *UARG*, 134 S. Ct. at 2445-46.

116. *See* 47 U.S.C. § 160(a). The statement of the first requirement is a paraphrase.

117. *Id.*

118. *See generally id.*

119. *UARG*, 134 S. Ct. at 2446 ("We reaffirm the core administrative-law principle that an agency may not rewrite clear statutory terms to suit its own sense of how the statute should operate.").

provisions and then edit other statutory provisions to mitigate the unreasonableness.”¹²⁰

The Order’s approach is made even more egregious because it is not compelled. In *Verizon*, the D.C. Circuit made clear—at a time prior to the Court’s decision in *UARG*—that § 706 presented a reasonable means to the Chairman’s desired ends.¹²¹ Had the Chairman opted to follow the path set forth by the D.C. Circuit, we would not find ourselves in the present situation, and the Commission would be on much firmer legal grounds. Rather, the Commission has elected to pursue the more aggressive path. The dangers of this discretionary path are substantial. As explained in the EPA context, “Since, as we hold above, the statute does not compel EPA’s interpretation, it would be patently unreasonable—not to say outrageous—for EPA to insist on seizing expansive power that it admits the statute is not designed to grant.”¹²² The Chairman’s chosen path is similarly unreasonable—and equally outrageous.

This is particularly the case given how little sense the Chairman’s explanation for his sudden embrace of Title II makes. He has explained that at some point (roughly contemporaneous with the President urging him to take a Title II-based approach), he “became concerned that the relatively untested [§ 706-based] ‘commercially reasonable’ standard might be subsequently interpreted to mean what was reasonable for the ISP’s commercial arrangements.”¹²³ In his words, that “was a possibility that was unacceptable,” and this led him to embrace Title II.¹²⁴ This explanation, however, simply makes no sense. First, the D.C. Circuit had made clear that § 706, at least in its view, provides the Commission with the necessary authority.¹²⁵ And second, the concern that the “commercially reasonable” standard proposed in the May NPRM would be interpreted to protecting ISP’s commercial interests could be trivially addressed with a single sentence, along the lines of “Determinations of ‘commercial reasonableness’ shall give substantial weight to the effects of those agreements upon consumers, and no agreement shall be deemed commercially reasonable that is not also substantially in the consumer interest.”

120. *Id.*

121. *Verizon v. FCC*, 740 F.3d 623, 635 (D.C. Cir. 2014).

122. *UARG*, 134 S. Ct. at 2446.

123. Wheeler, *supra* note 48.

124. *Id.*

125. *Verizon v. FCC*, 740 F.3d 623, 635 (D.C. Cir. 2014).

B. The Problematics of Changing Classifications

The next challenge to consider is whether the FCC, having previously classified Internet access as a Title I “information service,” can now reclassify it as a Title II “telecommunications service.” This challenge turns on questions raised by—and so far unanswered—the Supreme Court’s holding in *Fox I*. In that opinion, the Court held that agencies are broadly free to change their prior interpretations of a statute and that the fact of a prior interpretation does not create any heightened burden upon the agency in adopting a changed interpretation.¹²⁶ But the Court also indicated that this permissive approach to changed interpretations may not hold where the factual setting has significantly changed or where serious reliance interests are at stake.¹²⁷ The challenge to the Order would give the courts opportunity to consider what these limitations mean.

Proponents of the Order have expressed confidence that the courts will uphold the Commission’s reclassification. They first point to *Brand X*, in which all nine justices appeared amenable to classifying Internet access as a Title II telecommunication service.¹²⁸ As explained above, this reliance on *Brand X* is misplaced.¹²⁹ And they also point to the first part of the *Fox I* holding in which the Court held that an agency’s prior construction of its statute generally does not create obstacles to a changed construction of that statute so long the changed construction is otherwise permissible.¹³⁰

This is not an unreasonable understanding of the law—but it is also not complete, and the outcome is not as certain as its proponents suggest. While agencies’ discretion to change between otherwise-permissible constructions of the law is broad, it is not unbounded. As explained in *Fox I*, for instance, reliance interests may create a heightened bar to a changed interpretation.¹³¹ The meaning of this limitation has not been developed by the courts, but there is a sound argument that an industry that has invested hundreds of billions of

126. *Fox I*, 556 U.S. 502, 514-15 (2009).

127. *Id.*

128. Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs., 545 U.S. 967, 973, 1005 (2005).

129. See *supra* note 85 and accompanying text.

130. See, e.g., Protecting and Promoting the Open Internet, 2015 WL 1120110, ¶¶ 357-60, at *101-02 (2015).

131. *Fox I*, 556 U.S. 502, 515 (2009) (stating the agency may need to “provide a more detailed justification than what would suffice for a new policy created on a blank slate . . . when its prior policy has engendered serious reliance interests that must be taken into account”).

dollars in private capital based on the prior classification has an established reliance interest.¹³²

Fox I also explains that an agency changing its evaluation of facts may justify greater scrutiny of the new policy.¹³³ In the case of reclassification, the Commission will need to explain why its prior determination regarding incorporation of features such as Domain Name System (DNS) service does not preclude classification as a telecommunications service. This may be difficult given that ISPs today have become far *more* involved in managing the traffic flowing to and from users' computers—including, for instance, filtering harmful traffic, making real-time capacity and load-balancing decisions, and offering service-specific content delivery and interconnection services. Managing consumer-focused Internet access services is far more involved today than it was even a few years ago. Importantly, any effort to partition such management functions from the Order, for instance by treating them as reasonable network management practices, creates an exception with the potential to swallow the Order—while some consumers may want largely unmanaged Internet access, it is likely that most consumers do not care whether their service is managed and that a large portion of consumer demand would be better served by substantially managed Internet access. As a result of these (overwhelmingly pro-consumer) services, users have less ability to control what information is sent from or received by points of their specification—the basic requirement for a service to be a “telecommunications service.”

The Commission will also have to address the criticism that its existing policy has been overwhelmingly successful, and the changed

132. See HAL SINGER, THREE WAYS THE FCC'S OPEN INTERNET ORDER WILL HARM INNOVATION (May 2015) (noting \$76 billion of capex in 2014 alone, in the context of discussing the adverse effects of Title II classification on investment), available at http://www.progressivepolicy.org/wp-content/uploads/2015/05/2015-05-Singer_Three-Ways-the-FCCs-Open-Internet-Order-Will-Harm-Innovation.pdf. This concern could also be analyzed from a due process or regulatory takings perspective, as the Order, by encumbering the use of the networks built with these investments, substantially devalues them.

133. *Fox I*, 556 U.S. at 515 (the agency may need to “provide a more detailed justification than what would suffice for a new policy created on a blank slate . . . when, for example, its new policy rests upon factual findings that contradict those which underlay its prior policy. . . . In such cases it is not that further justification is demanded by the mere fact of policy change; but that a reasoned explanation is needed for disregarding facts and circumstances that underlay or were engendered by the prior policy.”).

policy is not in response to any manifest harms. The Internet economy has thrived under the Title I model, especially in the United States. Indeed, it is well documented that investment in the United States has substantially outpaced that in Europe and the rest of the world.¹³⁴ Had there been examples of clear problems under the Commission's Title I approach to the Internet, it would be much easier to meet *Fox I's* requirement to justify its changed assessment of the facts—instead, given the overwhelming success of its prior approach, the Commission is likely to face at least some resistance in these efforts.

Finally, the fact that the Order *reclassifies* Internet access implicates a nexus of First Amendment, Due Process, Takings, and related concerns. Thorough consideration of these issues is beyond the scope of this Article—indeed, it is unlikely that these issues will be addressed by the courts because there are narrower grounds available upon which the Order should be rejected. Nonetheless, these are important issues that should be raised on appeal and which ultimately cut to the quick of the Commission's regulatory efforts. Reclassification of broadband Internet access from a largely unregulated Title I to a pervasively regulated Title II service can be seen as substantially burdening previously unburdened speech, as devaluing privately owned network infrastructure, or both. These raise clear, but complicated, First and Fifth Amendment issues. Reclassification also raises a perplexing question about the nature of common carrier services: Why is a common carrier a common carrier? Is it because of the nature of the service it offers and consumer demand for that service, or is it a consequence of legal definition? Traditional common carriers generally offer services that only make sense to be offered on a common-carriage basis, both as a function of consumer demand and supply-side economics. For instance, there would be little demand, or business justification, for a train service that only traverses *some* stations—once you've laid the

134. See Christopher S. Yoo, *Modularity Theory and Internet Policy* 33 (May 1, 2013) (unpublished manuscript), available at http://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1467&context=faculty_scholarship; RICHARD BENNETT, AM. ENTERPRISE INST., *G7 BROADBAND DYNAMICS: HOW POLICY AFFECTS BROADBAND QUALITY IN POWERHOUSE NATIONS*, (2014), available at <http://www.aei.org/wp-content/uploads/2014/11/G7-Broadband-Dynamics-Final.pdf>; Roslyn Layton & Michael Horney, *Innovation, Investment, and Competition in Broadband and the Impact on America's Digital Economy* (Mercatus Center, Working Paper No. 14-22, Aug. 2014), available at <http://mercatus.org/sites/default/files/Layton-Competitionin-Broadband.pdf>.

tracks, you can't not follow them. Similarly, there would be little demand for a postal service that only delivered to a range of addresses curated by the postal carrier—once you have built your distribution network, it is easier to serve all addresses in it than only some, for both consumers and carriers. On the other hand, there likely is consumer demand for internet services that only access a curated portion of the Internet—most consumers access only a very small portion of online content, many would like to be shielded from potentially harmful content, and it is in many ways easier to manage a network that carries only a deterministic set of content than one that must carry whatever content may be directed at it (by either its users or other, potentially harmful, agents). This raises the curious question: Could Internet service providers offer a curated Internet service that only allows users access to a finite range of content? And, if so, would that service be subject to the Open Internet Order? The answer to the first question seems likely yes—and the answer to the former seems no.¹³⁵

None of these arguments is dispositive—and, importantly, the contours of the relevant legal standards have not been meaningfully developed through litigation. While it is not unreasonable to think that the Court would ultimately uphold the Commission's changed classification of broadband Internet access from an "information service" to a "telecommunications service," it also is not as foregone a conclusion as proponents of the Open Internet Order assert.

135. See Open Internet Order, 15 FCC Rcd. 24, ¶ 25, at 9-10 (2015). Recall that the definition of Broadband Internet Access Service given in the Order is "[a] mass-market retail service by wire or radio that provides the capability to transmit data to and receive data from *all or substantially all Internet endpoints*, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up Internet access service." *Id.* (emphasis added). If the offered service only allows access to a small subset of Internet endpoints, it falls out of this definition. *Id.* The Commission may argue that the second sentence of its definition, stating that "This term also encompasses any service that the Commission finds to be providing a functional equivalent of the service described in the previous sentence, or that is used to evade the protections set forth in this Part," would capture such a curated service. *Id.* But such an argument seems unlikely to prevail if there is consumer demand for such a curated offering. And it assumes the answer to the question presented above: What makes a common carrier a common carrier? The Commission's argument would only succeed if common carrier status is a mere legal category that can be arbitrarily defined by regulatory actors—an argument to which the courts would likely be hostile.

C. The Order is Arbitrary and Capricious for Failure to Consider Relevant Factors

The final challenge considered here is that the Open Internet Order is arbitrary and capricious—in specific for failing to consider or respond to adverse evidence in the record and for basing its determinations on conclusory analysis. Unlike the prior two challenges, which go to issues that are broader than the Order (and are therefore likely to draw the attention of the Supreme Court), this challenge goes to the underlying logic of the Order itself. Should the Order be rejected by the courts as arbitrary and capricious, it may be for reasons that the Commission is ultimately unable to remedy—namely, that the overwhelming weight of the relevant literature does not support the Commission’s approach.

The key precedent comes from the Supreme Court’s holding in *State Farm*:

Normally, an agency rule would be arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.¹³⁶

The second and third of these factors are most relevant here: The Commission needs to have considered all important issues and to have responded adequately to significant comments introduced into the record.¹³⁷ The D.C. Circuit—in which the initial appeal of the Order is likely to be heard—has a particularly high standard for agency consideration of record evidence. It has regularly rejected FCC orders on the grounds that they offer only conclusory analysis.¹³⁸

136. *Motor Vehicle Mfrs. Ass’n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

137. On agencies’ obligation to respond to significant comments—those which, if correct, would lead the agency to a different outcome—see Jonathan Weinberg, *The Right to be Taken Seriously*, 67 U. MIAMI L. REV. 149, 157 (2012) (“Indeed, the D.C. Circuit urged, without an obligation that the agency respond to significant comments, the opportunity to comment would be ‘meaningless.’ The courts have repeatedly reaffirmed this obligation.”).

138. *See, e.g., AT&T Wireless Servs., Inc. v. F.C.C.*, 270 F.3d 959, 968 (D.C. Cir. 2001) (“Conclusory explanations for matters involving a central factual dispute where there is considerable evidence in conflict do not suffice to meet the deferential standards of our review. . . . Because there is too much evidence in the record suggesting a contrary conclusion, however, the court is unable to discern why

The Order is, as a whole, poorly written. The prose is choppy and editing abrupt. It is clearly the product of hands working independently, with varying levels of expertise. Perhaps most important, however, the Order's use of comments from the record is haphazard at best. While there were clearly a number of comments that defined the Commission's discussion—for instance, those submitted by parties close to the Chairman's office, such as Mozilla and Free Press—by and large it feels as though comments were found using computerized searches. Where the Commission needed support of its assertions, in other words, it searched the database of comments and included excerpts from those which supported its conclusions—and perhaps made a passing attempt at responding to those raising concerns.

Of course, one can only speculate as to whether these criticisms reflect the actual process used by the Commission. The concerns they present, however, can be seen by looking at just a few paragraphs of the Order—specifically, the analysis supporting the Commission's ban on paid prioritization.¹³⁹ Concern about paid prioritization—and rhetoric about degradation, “fast lanes,” and “slow lanes”—was perhaps the driving concern leading up to the Commission's May 2014 NPRM. It is therefore reasonable to expect that the Commission would have treated this discussion with some care—it should be at least as well presented as any other portion of the order.

The key text of the Order's discussion of paid prioritization is in paragraph 126, which explains that “[t]he paid prioritization ban we adopt today is based on the record that has developed in this proceeding.”¹⁴⁰ This discussion makes reference to concerns that allowing paid prioritization “will result in the bifurcating of the

the Commission [reached the conclusion that it did]. Accordingly, we [remand the case to the Commission for further explanation.]”); *Am. Radio Relay League, Inc. v. F.C.C.*, 524 F.3d 227, 241 (D.C. Cir. 2008) (“But that aside, the Commission offered no reasoned explanation for its dismissal of empirical data that was submitted at its invitation. . . . Given the acknowledged critical nature [of this data], so conclusory a statement cannot substitute for a reasoned explanation, for it provides neither assurance that the Commission considered the relevant factors nor a discernable path to which the court may defer.”). See also *AT&T Corp. v. FCC*, 236 F.3d 729, 737 (D.C. Cir. 2001); *U.S. Telecomm. Ass'n v. FCC*, 227 F.3d 450, 461 (D.C. Cir. 2000).

139. See 15 FCC Rcd. 24, ¶ 126, at 53-55. As discussed below, I submitted extensive comments on this subject—which are presented in part in the next Part of this article.

140. *Id.*

Internet into a ‘fast’ lane . . . and a ‘slow’ lane,” and that paid prioritization could hamper entry, deter innovation, harm competition and consumers, and give rise to a litany of other problems. The Order cites two examples from the comments (both expressing concerns about how prioritization could affect development of high-bandwidth applications and content like video). And the commission asserts that its “conclusion is supported by a well-established body of economic literature.”

The Commission’s reasoning does not stand up to even cursory scrutiny. To support the assertion that paid prioritization could cause a bifurcation of the Internet into “fast” and “slow” lanes, and in particular that this could lead to “degraded performance” for non-prioritized traffic, the Commission points to comments from Mozilla (arguing that prioritization is “zero sum”),¹⁴¹ and to comments from Sandvine,¹⁴² which the Commission mischaracterizes as asserting that giving one application a greater share of that bandwidth reduces the bandwidth available for other applications.¹⁴³ In fact, the Order cites to Mozilla’s comments twice for the same proposition.¹⁴⁴

Let’s start with the mischaracterization of the Sandvine comments. Sandvine’s discussion of paid prioritization starts by noting that “the FCC has put tremendous focus on Pay for Priority. We’re not quite sure why.”¹⁴⁵ Sandvine goes on to explain why the Commission should not be worried about paid prioritization, arguing that the bifurcation argument—the one that that the Commission cites to support banning paid prioritization—is likely “technically unsound.”¹⁴⁶ The Commission has taken the Sandvine comments out of context and misrepresented them as supporting its preferred policy conclusions. What is even worse, Sandvine’s actual argument that concerns about paid prioritization are technically and economically unsound directly contradicts the Commission’s bifurcation concern. How does the Commission resolve this contradiction? It doesn’t. The citation supporting the Commission’s “bifurcation” concern only

141. CHRIS RILEY & ALEX FOWLER, COMMENTS OF MOZILLA 20 (2014), available at <https://blog.mozilla.org/netpolicy/files/2014/07/Mozilla-NN-Comments-July-2014.pdf>.

142. SANDVINE, COMMENTS OF SANDVINE INCORPORATED 8 (2014), available at <http://apps.fcc.gov/ecfs/document/view?id=7521381623>.

143. 15 FCC Rcd. 24, 54 n.287.

144. CHRIS RILEY & ALEX FOWLER, REPLY COMMENTS OF MOZILLA (2014), available at <https://blog.mozilla.org/netpolicy/files/2014/09/Mozilla-NN-Reply-Comments-Sept-2014.pdf>.

145. SANDVINE, *supra* note 142.

146. *Id.* at 9.

includes supporting comments—it simply ignores the concerns commenters like Sandvine have raised.

And, lest there is any doubt as to Sandvine’s preferred policy outcome, it starts its comments by explaining that it “has seen firsthand how innovative service plans have increased adoption of the Internet around the world, enhanced competition, and given consumers more (and more affordable) choice.”¹⁴⁷ And it spends the rest of its comments arguing that the Commission should protect innovative business models and billing arrangements—contrary to the Commission’s decision to ban or subject such arrangements to Commission scrutiny.¹⁴⁸ It is perverse, at best, for the Commission to use Sandvine’s comments to make a point with which Sandvine disagrees in support of a policy that Sandvine was arguing against.

The Commission does cite both an *ex parte* notice that I submitted and comments from ADTRAN as offering a contrary view. But it does nothing to consider, let alone rebut, these arguments beyond acknowledging them. Indeed, in another set of comments—which the Commission does not cite¹⁴⁹—I explain in great detail why it is wrong to say that prioritization is “zero sum.” Contrast this with the Mozilla comments, which provide only a brief discussion that does little more than assert the zero-sum theory as true, without reference to any of the extensive literature in the field.

Beyond making no serious attempt at making its own arguments or analyzing the sentences it cherry-picks from comments, the Commission also ignores the existing body of actual research directly relevant to paid prioritization. Asserting that its “conclusion is supported by a well-established body of economic literature,” the Order cites a total of six academic articles: four articles on price discrimination from the 1980s and two “more recent” articles (both are from 2000, one was never published), all of which are almost entirely irrelevant to the discussion of paid prioritization.¹⁵⁰ Meanwhile, the Commission makes no mention of the significant body of research conducted over the past decade on the precise question of paid prioritization—even though substantial portions of this literature were discussed in the record.¹⁵¹ To summarize this literature—which is discussed in more detail below—the consistent

147. *Id.* at 2.

148. *Id.* at 2-3.

149. *See infra* Part III.

150. 15 FCC Rcd. 24, 55 n.296.

151. Indeed, I introduced much of this information into the record and mentioned it to Commission officials at various public and private meetings.

conclusion of this literature, almost to the paper, is that paid prioritization can be beneficial to consumers and to competition. It can also be harmful to both. It is difficult, if not impossible, to tell *ex ante* whether any specific form of paid prioritization will have beneficial, harmful, or indeterminate effects. It is a violation of the most basic principles that govern agency decision-making that the Commission simply chose to ignore the past decade of research on the very topic it was considering. But this is exactly what the Commission did.

III. THE REALITY OF OPEN INTERNET REGULATION

The discussion above indicates that there are various fields of research relevant to the Open Internet Order. The literature in these fields is robust and consistently leads to the same result: Neutrality can, in some cases, be beneficial to consumers, and in other cases, harmful; and conversely, non-neutrality can, in some cases, be harmful to consumers, and in other cases, beneficial. This Part looks to the literatures on the economics of vertical integration, openness and innovation, and multi-sided markets, as well as the operational characteristics of the Internet (statistical multiplexing and packet switching). And it explains that concern that “paid prioritization” necessarily creates “fast lanes” is technologically wrong and is based on misunderstandings of how the Internet works. Indeed, it is entirely possible that paid prioritization of some traffic can increase performance of other traffic, for purely technical reasons. Any rule, therefore, that prophylactically mandates or forecloses the adoption of broad classes of business structures or conduct is, almost by definition, arbitrary, and its adoption capricious.

A. The Reality of “Openness” and Innovation

A basic assumption of the Open Internet Order is that it is possible to craft pro-consumer Open Internet rules. While there may be some business practices and other forms of conduct that are sufficiently harmful (or beneficial) to consumers to merit *ex ante* treatment—such as conduct that would be clearly problematic under the antitrust laws—the effects on the wider range of practices or conduct subject to the Order is generally ambiguous. As such, it was ill-advised for the Commission to adopt strong rules—as discussed above, this almost necessarily renders the Order arbitrary and capricious. Rather, where the Commission feels that the potential for

harmful practices or conduct is great, it should provide guidance as to the standards by which it will assess whether specific instances are, in fact, harmful. Such guidance is likely a necessary requirement to satisfy constitutional due process and fair notice requirements, particularly where the Commission may want to seek fines or damages against a firm.

Three types of organizational structures demonstrate this ambiguity: “open” innovation platforms, vertical integration, and multi-sided markets.

Net neutrality advocates, the strongest supporters of Open Internet regulation, often assert that the Internet has thrived because it is “open.”¹⁵² Indeed, this idea is captured by (or perhaps has captured) the Commission’s own caption for both this and the previous Open Internet docket.¹⁵³ The reality, however, is that “openness” is neither necessary nor sufficient for the sort of growth that the Internet has seen and fostered—indeed, it can limit such growth. Moreover, the Internet never has been open in the way that advocates suggest.

1. *The Internet as an “Open” Platform*

On the first point, literature and experience amply demonstrate that “open” platforms, or general-purpose technologies generally, *can* promote growth and increase social welfare, but they also demonstrate that open platforms *can* also limit growth and decrease

152. See Marvin Ammori, *We’re About to Lose Net Neutrality—and the Internet as We Know It*, WIRED (Nov. 4, 2013, 9:30 AM), <http://www.wired.com/2013/11/so-the-internets-about-to-lose-its-net-neutrality/> (calling net neutrality the Internet’s “foundational principle”); SAVE THE INTERNET, <http://www.savetheinternet.com/sti-home> (last visited Aug. 11, 2015) (“Net Neutrality has made the Internet an unrivaled space for free speech, civic participation, innovation and opportunity.”); BARBARA VAN SCHEWICK, *INTERNET ARCHITECTURE AND INNOVATION 1-2* (2010). *But see* Gus Hurwitz, *An Unfounded Principle: Ammori’s Non-Neutral Network History*, TECHPOLICYDAILY.COM (Nov. 13, 2013, 6:00 AM), <http://www.techpolicydaily.com/internet/unfounded-principle-ammoris-non-neutral-network-history/>.

153. See Open Internet Order, Para 1; Protecting and Promoting the Open Internet, 29 FCC Rcd. at 5563 (“[I]nnovation and the economic and social benefits [of the Internet] . . . flow, in large part, from the open, end-to-end architecture of the Internet”). See generally Preserving the Open Internet Broadband Industry Practices, 25 FCC Rcd. 17,905 (2010), available at https://apps.fcc.gov/edocs_public/attachmatch/FCC-10-201A1.pdf.

social welfare compared to “closed” alternatives.¹⁵⁴ There are several reasons for this. Developing open systems can impose costs on initial developers, both in their development of the system and their education of third parties in how to interface with it. It can ossify a system, as subsequent changes will have negative spillovers for third parties. It can fragment a system, if subsequent changes are made by the initial developer or subsequent developers choose to fork a project. It can impose technical costs, as an open system may need to be “more robustly” (e.g., inefficiently) engineered in order to support open interfaces. In particular, to be truly “open,” a system may need to make internal variables and functions available externally (to those outside the system), even where they are best kept internal to the system¹⁵⁵—this can lead to substantively inefficient system design or inefficient use of development resources. An example of this can be seen in the architectural differences between the Internet Protocol stack, which is a four-layer model, and the Open Systems Interconnections (OSI) reference model, which is a seven-layer model.¹⁵⁶ The OSI model is unquestionably more “open” in that it allows a larger number of interface pairings and the export of a greater number of internal variables and functions to facilitate those pairings; the OSI model, however, is rarely used, largely because it is grossly over-engineered.¹⁵⁷ A protocol designed on the OSI model would cost more to develop, be harder to maintain, and have worse technical performance than one designed on a more streamlined (and less “open”) model.¹⁵⁸

154. Timothy F. Bresnahan & M. Trajtenberg, *General Purpose Technologies “Engines of Growth?”*, 65 J. ECONOMETRICS 83, 94-96 (1995); see also Christopher S. Yoo, *Modularity Theory and Internet Policy* 33 (May 1, 2013) (unpublished manuscript), available at http://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1467&context=faculty_scholarship (discussing the same).

155. See Yoo, *supra* note 154, at 22-24 (discussing interdependency and information hiding between modules).

156. See generally Andrew L. Russell, *OSI: The Internet That Wasn't*, IEEE SPECTRUM (July 30, 2013), <http://spectrum.ieee.org/computing/networks/osi-the-internet-that-wasnt> (discussing the relationship between the OSI and Internet model). The two models' layer approaches represent somewhat different purposes but are broadly comparable. See *id.*

157. See *id.* (“On one side you have something that’s free, available, you just have to load it. And on the other side, you have something which is much more architected, much more complete, much more elaborate, but it is expensive.” (quoting Interview with Marc Levilion, Eng’r, IBM Fr. (2012))).

158. As a simple, but important, example: The most computationally time-consuming process performed in the Transmission Control Protocol/Internet Protocol (TCP/IP) stack is the passing of the payload (the actual data being sent

Beyond the academic literature, much of which is grounded on theory or models, the relative merits of open versus closed systems has been vividly played out in practice. The classic fights here have played out between, e.g., IBM (a closed system model) and IBM-compatible PCs (open systems); between Apple (a notoriously closed system) and other OS models (e.g., Linux, an open system; and Microsoft, an intermediary model); between application vendors (e.g., traditional closed-source models and the open-source development model); and between different mobile platforms (e.g., between Apple's closed iOS and Google's partially-open Android platform).¹⁵⁹ The results of these fights are generally well known and demonstrate the indeterminacy of the value of "openness." Apple is the clearest example demonstrating the success of closed models.¹⁶⁰ The Apache web server is a leading example of the value of openness.¹⁶¹ Google's Android is an enlightening example. Google

between endpoints) between layers. In a truly "open" stack, TCP/IP, being a four-layer stack, requires data to be copied three times across the memory bus; for large packets, this can dramatically increase latency. An OSI model, being a seven-layer stack, would require twice as many copies. The seminal article on this issue is David D. Clark et al., *An Analysis of TCP Processing Overhead*, IEEE COMM. MAG., May 2002, at 94, available at <http://groups.csail.mit.edu/ana/Publications/PubPDFs/An%20Analysis%20of%20TCP%20Processing%20Overhead.pdf> ("What we showed was that the code necessary to implement TCP was not the major limitation to overall performance. In fact, . . . the throughput is close to being limited by the memory bandwidth of the system."). An integrated, "closed," stack, on the other hand, can perform this same function with a single copy operation. Many high-performance IP stacks do precisely this, often integrating the IP or even Transmission Control Protocol (TCP) processing functions with the network interface ("offloading" the IP or TCP processing). See generally, e.g., PAVAN BALAJI, HEMAL V. SHAH & D.K. PANDA, SOCKETS VS RDMA INTERFACE OVER 10-GIGABIT NETWORKS: AN IN-DEPTH ANALYSIS OF THE MEMORY TRAFFIC BOTTLENECK (2004), available at <http://www.mcs.anl.gov/~balaji/pubs/2004/rait/rait04.10gige.pdf> (discussing several of these approaches). Importantly, this involves a form of deep-packet inspection, where the middle layers of the IP stack need to both look down the stack into a packet's headers and up the stack into system state information in order to directly place a packet's payload directly into application memory in its initial copy operation.

159. See generally JONATHAN L. ZITTRAIN, *THE FUTURE OF THE INTERNET—AND HOW TO STOP IT* (2008).

160. See Yoo, *supra* note 154, at 55-57.

161. For important recent work on this topic, see Shane Greenstein & Frank Nagle, *Digital Dark Matter and the Economic Contribution of Apache* (Nat'l Bureau of Econ. Research, Working Paper No. 19507, 2013), available at <http://www.nber.org/papers/w19507> ("We argue that these findings point to a large potential undercounting of the rate or return from IT spillovers from the invention of

develops the core OS on an open source basis but retains closer control over the core suite of applications that run on the platform.¹⁶² One should also consider Wikipedia and its struggles to maintain its quality as an open platform over time.¹⁶³

The conclusion to draw from this discussion is that, while open platforms can generate consumer benefits, there is no *ex ante* reason to believe that a particular platform will do so merely because it is open. To the contrary, closed platforms can prove more valuable than open ones.

The second point to make about the “preservation” of the open Internet is that the Internet simply is not, and never has been, an open platform in the sense that net neutrality advocates take it to be.¹⁶⁴ The TCP/IP stack incorporates many design decisions and compromises that were made that either expressly or incidentally improve or degrade the performance of different types of applications or different users based upon how they connect to the network.¹⁶⁵ Moreover, many of these decisions were made based upon the characteristics of then-available computer hardware—they would likely have been made differently and have had different consequences given today’s technology and uses of the network.

This fundamental point has been made clearly and strongly by several research scientists that were intimately involved with the development of the Internet. This is best seen with David Clark. Quoting from a 2009 Communications Daily interview with Clark, Hazlett and Wright recount Clark’s description of the early Internet:

“‘The network is not neutral and never has been,’ Clark said, dismissing as ‘happy little bunny rabbit dreams’ the assumptions of net neutrality

the Internet, and to a large potential undercounting of ‘digital dark matter’ in general.”).

162. See Rolf Winkler, *Android’s ‘Open’ System Has Limits*, WALL STREET JOURNAL (Feb. 12, 2014, 8:06 PM), <http://www.wsj.com/articles/SB10001424052702304888404579378850231234912>.

163. For discussion of the open platforms’ questionable reliance on ongoing input and support from third parties, see Jonathan M Smith et al., *Experiences Enhancing Open Source Security in the POSSE Project*, in FREE/OPEN SOURCE SOFTWARE DEVELOPMENT 242, 244-45 (Stefan Koch ed., 2005).

164. Jon Crowcroft, *Net Neutrality: The Technical Side of the Debate—a White Paper*, 1 INT’L J. COMM. 567, 579 (2007).

165. This can also be seen again in the comparative history of the OSI and TCP/IP protocol stacks. See Russell, *supra* note 156 (discussing that TCP/IP prevailed over the OSI model as “growing numbers began using TCP/IP to meet the practical near-term pressures” and noting that “‘openness’ is full of contradictions. OSI brought to light the deep incompatibility between idealistic visions of openness and the political and economic realities”).

supporters that there was once a ‘Garden of Eden’ for the Internet. NSFnet, an early part of the Internet backbone, gave priority to interactive traffic, he said: ‘You’ve got to discriminate between good blocking and bad blocking.’”¹⁶⁶

Similarly, Jon Crowcroft explains “the basic realities of the net, which has never been a level playing field for many accidental and some deliberate reasons,” concluding that “[w]e never had network neutrality in the past, and I do not believe we should engineer for it in the future either.”¹⁶⁷ Others have made this same point from the early years of the FCC’s involvement in net neutrality.¹⁶⁸

Much of the discussion about the open Internet—including the proposed rules—focus on openness qua neutral treatment of users, applications, and data by the network.¹⁶⁹ As this is a more constrained understanding of openness than much of the innovation literature cited above, it is useful to note—as Clark, Crowcroft, and others also do—that discrimination in the handling of packets has long been discussed as desirable or necessary in development of the technical standards under which the Internet operates.¹⁷⁰ Similarly,

166. Thomas W. Hazlett & Joshua D. Wright, *The Law and Economics of Network Neutrality*, 45 *IND. L. REV.* 767, 785 (2012) (quoting Greg Piper, *Internet Architect Suggests “Futures Market” to Avoid Policy Disputes*, *COMM. DAILY*, Feb. 5, 2009, at 1 (quoting David Clark)).

167. Crowcroft, *supra* note 164, at 567, 579.

168. Douglas A. Hass, Note, *The Never-Was-Neutral Net and Why Informed End Users Can End the Net Neutrality Debates*, 22 *BERKELEY TECH. L.J.* 1565, 1566-67, 1575-86 (2007).

169. *See id.* at 1570-75.

170. *See, e.g.*, Memorandum from S. Blake et al. to Network Working Grp. 3 (Dec. 1998), *available at* <https://www.ietf.org/rfc/rfc2475.txt> (“Service differentiation is desired to accommodate heterogeneous application requirements and user expectations, and to permit differentiated pricing of Internet service.”); Memorandum from K. Nichols, V. Jacobson & L. Zhang to Network Working Grp. 4 (July 1999), *available at* <https://tools.ietf.org/html/rfc2638> (discussing paid prioritization, saying, “[i]t is expected that Premium traffic would be allocated a small percentage of the total network capacity, but that it would be priced much higher”); Memorandum from R. Braden, D. Clark & S. Shenker to Network Working Grp. 2, 4, 5 (June 1994), *available at* <https://tools.ietf.org/html/rfc1633> (“[R]eal-time applications often do not work well across the Internet because of variable queuing delays and congestion losses. The Internet, as originally conceived, offers only a very simple quality of service (QoS), point-to-point best-effort data delivery. Before real-time applications such as remote video, multimedia conferencing, visualization, and virtual reality can be broadly used, the Internet infrastructure must be modified to support real-time QoS, which provides some control over end-to-end packet delays. . . . The first assumption is that resources (e.g., bandwidth) must be explicitly managed in order to meet application requirements. . . . An alternative approach, which we reject, is to attempt to support

research demonstrates that so-called “non-neutral” treatment can be affirmatively desirable.¹⁷¹

2. Vertical Integration

The literature on vertical integration is related to the literature on innovation and openness—and many of the concerns raised by the Order can be expressed in terms of vertical integration. For instance, much of the Order is concerned with how a vertically integrated content and distribution firm treats its own traffic compared to that of its competitors.¹⁷² These are unquestionably valid concerns—indeed, the widest range of potentially problematic conduct is already proscribed by antitrust law,¹⁷³ such that further regulation by the

real-time traffic without any explicit changes to the Internet service model. The essence of real-time service is the requirement for some service guarantees, and we argue that guarantees cannot be achieved without reservations. . . . We conclude that there is an inescapable requirement for routers to be able to reserve resources, in order to provide special QoS for specific user packet streams, or ‘flows.’”).

171. See, e.g., RICHARD T.B. MA ET AL., ON COOPERATIVE SETTLEMENT BETWEEN CONTENT, TRANSIT AND EYEBALL INTERNET SERVICE PROVIDERS (2008), available at <http://dna-pubs.cs.columbia.edu/citation/paperfile/172/CoNEXT08.pdf> (“[W]e find the justification of the existence of paid-peering between transit ISPs. . . . Our previous work . . . showed that . . . selfish ISPs have incentives to perform globally optimal routing and interconnecting decisions to reach an equilibrium that maximizes both individual profit and global social welfare. . . . In this paper we extend our model. . . . Our result [finds instances where paid-peering can benefit welfare.]”); David D. Clark, *Network Neutrality: Words of Power and 800-Pound Gorillas*, 1 INT’L J. COMM. 701, 705-06 (2007) (“As a technical mechanism, QoS seems to be beneficial. It directly addresses the real performance requirements of different sorts of Internet traffic. . . . This reality begs the question of whether we can find a set of rules that might distinguish between ‘good’ or ‘acceptable’ forms of discrimination, and ‘bad’ discrimination. Unless we can find a bright line, using regulation of discrimination to define acceptable behavior may cause more trouble than it cures.”).

172. See Protecting and Promoting the Open Internet, 29 FCC Rcd. 5561, 5606, 5609-10 (2014).

173. See, e.g., Hazlett & Wright, *supra* note 166, at 7-8 (“At its heart, the Net Neutrality Order seeks to prohibit broadband providers from entering into vertical contractual relationships out of fear that they have an incentive to disadvantage rivals and ultimately harm competition. . . . Students of antitrust will recognize that these economic concerns are identical to those animating antitrust rules governing vertical relationships.”); JOSHUA D. WRIGHT, NET NEUTRALITY: IS ANTITRUST LAW MORE EFFECTIVE THAN REGULATION IN PROTECTING CONSUMERS AND INNOVATION? 2, 4-5 (2014), available at http://www.ftc.gov/system/files/documents/public_statements/409571/140620antitrusttestimony.pdf (prepared statement of Joshua Wright, Comm’r, Federal Trade Commission) (“At its heart, the net neutrality debate concerns the competitive effects of vertical contractual

Commission would largely be duplicative and generally unwarranted.

Nonetheless, the economic literature of vertical integration provides useful guidance for the Commission to consider. As with the literature on open platforms and innovation, the conclusions relating to vertical integration are consistently ambiguous.¹⁷⁴ Most vertical integration *can* harm consumers, but most vertical integration also *can* benefit consumers. Importantly, in practice, firms generally vertically integrate to capture efficiencies, and in so doing, such integration ultimately benefits consumers.¹⁷⁵ As explained by Federal Trade Commission Commissioner and Professor of Law and Economics Josh Wright, “[o]ver a century of antitrust jurisprudence, economic study, and enforcement agency practice have produced a well-understood economic analysis of the competitive effects of a vertically integrated firm’s ‘discrimination’ in favor of its own products or services, including widespread recognition that such arrangements generally produce significant benefits for consumers.”¹⁷⁶

One of the most illustrative examples of misplaced concerns about vertical integration leading to harmful regulatory intervention is the Supreme Court’s 1948 *Paramount* case in which the Court broke up the vertically integrated movie production and distribution industry.¹⁷⁷ Subsequent decades of analysis have not been kind to this action, finding that the vertical disintegration led to, *inter alia*, higher ticket prices for consumers, reduced variety and quality of films being produced, substantial loss of jobs within the movie industry, and, generally, the end of the golden age of Hollywood and the

arrangements between broadband providers and content providers. . . . This type of competitive concern is grounded in antitrust economics. . . . In light of the economic evidence, in my view, antitrust offers a superior analytical framework . . . to address potential anticompetitive conduct in the broadband sector.”)

174. James C. Cooper et al., *Vertical Antitrust Policy as a Problem of Inference*, 23 INT’L J. INDUS. ORG. 639, 643 (2005).

175. *See, e.g., id.* at 658 (surveying the literature and finding the vast majority of studies find vertical integration to have procompetitive effects).

176. Joshua D. Wright, *Defining and Measuring Search Bias: Some Preliminary Evidence 5* (George Mason Univ. Law & Econ. Research Paper Series, Working Paper No. 12-14, 2011).

177. *United States v. Paramount Pictures, Inc.*, 334 U.S. 131, 140-41 (1948). *See also* Ricard Gil, *Does Vertical Integration Decrease Prices? Evidence from the Paramount Antitrust Case of 1948*, 7 AM. ECON. J: ECON. POL. 162 (2015), <https://www.aeaweb.org/articles.php?doi=10.1257/pol.20120245>.

beginning of a multi-decade dark age.¹⁷⁸ One of the central reasons for this is that vertical integration allowed firms to better absorb risk and to better capture the returns on risky investment; conversely, the vertically disintegrated firms faced greater exposure to risk and less ability to capture the rewards of risky investment. The result was a substantial reduction in innovation in the industry: Vertical integration can be a key ingredient for basic research, development, and innovation.

3. Multi-Sided Markets

A final area of literature relates to multi-sided markets: markets in which two or more groups of users interact with one another by means of some platform.¹⁷⁹ The Internet is a prototypical example of a multi-sided market, with ISPs and backbone providers acting as platforms that facilitate the interaction between end users and edge providers. To not needlessly belabor the point, as with the prior examples, the relevant literature yields consistently inconsistent results. In multi-sided markets, prohibiting platforms from engaging in discriminatory pricing can yield either consumer benefits or harm.¹⁸⁰

178. See F. Andrew Hanssen, *Vertical Integration During the Hollywood Studio Era*, 53 J.L. & ECON. 519, 520 (2010).

179. See generally Jean-Charles Rochet & Jean Tirole, *Two-Sided Markets: A Progress Report*, 37 RAND J. ECON. 645 (2006); see also *supra* note 158 (collecting a sample of literature applying multi-sided market analysis to network neutrality).

180. The literature here is voluminous, often demonstrates benefits from non-neutrality, and consistently notes ambiguous results. For some examples (most of which cite to the broader literature), see Nicholas Economides & Joacim Tåg, *Network Neutrality on the Internet: A Two-Sided Market Analysis*, 24 INFO. ECON. & POL'Y 91, 100 (2012) (“We have showed that one can find such parameter ranges both in the monopoly model and in the duopoly model suggesting that network neutrality regulation could be warranted even when some competition is present in the platform market. *However, the overall effect of implementing network neutrality regulations can still be both positive and negative depending on parameter values.*” (emphasis added)); Paul Njoroge et al., *Investment in Two-Sided Markets and the Net Neutrality Debate*, 12 REV. NETWORK ECON. 355, 356, 398 (2013) (“This paper adds to the growing body of formal economic analysis that will help inform policy makers on the net neutrality debate and sheds light on the validity, or lack thereof, of the arguments proposed by the different advocacy groups involved. In particular, this article develops a game theoretic model based on a two-sided market framework . . . to investigate the effects of a net neutrality mandate on investment incentives of ISPs, and its concomitant effects on social welfare, consumer and CP surplus, and CP market participation. . . . Regarding social welfare, the main conclusion drawn

The examples discussed above make abundantly clear the indeterminacy inherent in any Open Internet rules. It is difficult, if not impossible, to know *ex ante* whether any given business model or type of conduct by online intermediaries will be beneficial or harmful to consumers. Any rules that mandate or foreclose certain practices or conduct on an *ex ante* basis would therefore be, of necessity, arbitrary or capricious. The converse, however, is also true: It is possible that certain practices or conduct can harm consumers, such that the Commission must develop an approach to the regulation of the Internet that allows it to take action where action is, in fact, necessary.

This suggests that the Commission should prefer to adopt general standards over clear rules. The legal basis for such an approach is discussed in the next Subsection.

Before turning to that discussion, it is useful to urge here that, should the Commission adopt clear rules, it must affirmatively embrace and discuss the relevant economic literature to explain why a rule of general applicability is in the public interest. Given the uncertain consumer-welfare effects that run throughout the relevant literature, the Commission must affirmatively address these concerns in order to avoid judicial challenge for any rules that it adopts. Indeed, such challenge will likely be warranted, given the arbitrariness such rules would demonstrate. More problematic, such a legal challenge would almost certainly result in further years of consumer doubt and uncertainty relating to net neutrality, which would cause concomitant consumer harm.

from the theoretical model is that it is larger under the non-neutral regime. The numerical experiments across the different models in general add support to this finding. As discussed earlier, this fact is driven by the higher investments in the non-neutral regime, which increase the gross value gained by both CPs and consumers.” (footnote omitted)); Jay Pil Choi & Byung-Cheol Kim, *Net Neutrality and Investment Incentives*, 41 RAND J. ECON. 446, 448, 457, 466 (2010) (“Considering all three channels through which net neutrality can have an influence upon short-run total welfare, we can conclude that *static* welfare implications of net neutrality regulations depend on the tradeoff between transportation cost saving and inefficient production. If the margin difference is significantly large relative to the degree of product differentiation, the discriminatory network would be preferred from the viewpoint of social welfare.” “We thus find that the relationship between net neutrality regulation and investment incentives for network operators and application/content providers is subtle. . . . Even though we cannot draw general unambiguous conclusions, we identified key effects that are expected to play important roles in the assessment of net neutrality regulations.”).

B. The Reality of the Technology: Statistical Multiplexing and Discrimination

The next subject to consider is the technological reality of net neutrality—and, in particular, of prioritization and paid-prioritization. These issues are addressed from a technical perspective, focusing on statistical multiplexing—the basic means by which multiple users and applications are able to share Internet facilities. Importantly, many advocates for strong Open Internet rules assert that prioritization necessarily means a reduction in capacity available for non-prioritized services¹⁸¹—and this is a view that the FCC, erroneously, embraced in the Open Internet Order.¹⁸² From a technical perspective, this understanding is simply not correct. This Section explains why and offers other policy implications derived from the technical mechanisms controlling how data is sent over the Internet.

1. *A Brief Primer: Statistical Multiplexing, Congestion, and Queue Management*¹⁸³

The Internet is a shared facility. The basic mechanism by which the Internet works is that human-understandable information that is to be communicated between endpoints is digitized and broken into small packets. These packets are sent over a shared

181. See, e.g., PAID PRIORITIZATION: THE ANTITHESIS OF OPENNESS ON THE INTERNET (n.d.), available at http://www.freepress.net/sites/default/files/fp-legacy/Paid_Prioritization.pdf (“[T]he routing of IP data is a zero-sum game. If a router speeds up one set of bits, by definition, all other bits are slowed down.”); S. Derek Turner, *Beware of the Straw Man*, SAVE THE INTERNET, <http://www.savetheinternet.com/blog/2014/05/13/beware-straw-man> (last visited Aug. 11, 2015) (“[T]he routing of IP data is a zero-sum game.”); CHRIS RILEY & ALEX FOWLER, COMMENTS OF MOZILLA 20 (2014), available at <https://blog.mozilla.org/netpolicy/files/2014/07/Mozilla-NN-Comments-July-2014.pdf> (“[P]aid prioritization is inherently different from paid interconnection or peering practices and from content delivery networks, because it is zero-sum. . . . Prioritization is inherently a zero-sum practice, and inherently creates fast and slow lanes . . .”).

182. Protecting and Promoting the Open Internet, 2015 WL 1120110, ¶ 126, at *37 (2015).

183. The discussion that follows is meant to give a general sense of complicated technical concepts in order to demonstrate their importance to the Open Internet discussion. Some liberties have been taken as to precise technical descriptions in order to make the discussion reasonably accessible to a generalist audience.

communications infrastructure that routes them from a sender to a receiver; the receiver reassembles the packets and converts them back into human-understandable form. This is generally called a “packet switching” network, referring to the use of packetized data to communicate between endpoints.¹⁸⁴

But the packetization of data isn’t the only basic feature of the Internet. Once data is packetized, it needs to be communicated across the network. This is done by a process known as statistical multiplexing.¹⁸⁵ The basic idea behind statistical multiplexing is that a significant portion of any communications channel goes unused by any given application. For instance, a typical voice conversation consists of more silence (gaps between sounds made by the speakers) than speech. Other applications can make opportunistic use of that capacity without adversely affecting the initial application. Statistical multiplexing is the mechanism by which unused capacity by one communications channel is shared by other communications channels.¹⁸⁶ This has two general benefits. First, without statistical multiplexing, five “conversations” would require five communications channels; with statistical multiplexing, those five conversations can be accommodated by two, or perhaps three, communications channels. This reduces the cost and complexity of a communications network. And second, this allows individual “conversations” access to much greater capacity during periods of relative quiet on the network.

Packetization and statistical multiplexing are closely related: Packet switching is the mechanism that makes statistical multiplexing possible on the Internet. Prior to the advent of packet switching, telecommunications services used either circuit-switched or dedicated lines. Under this model, lines were allocated to specific users for specific periods of time. As a result, they could not be shared between other simultaneous users. Packet switching changed

184. For a general history of packet switching and its relationship to the Internet, see Barry M. Leiner et al., *Brief History of the Internet*, INTERNET SOC’Y, <http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet> (last visited Aug. 11, 2015).

185. Damon Wischik, Mark Handley & Marcelo Bagnulo Braun, *The Resource Pooling Principle*, COMPUTER COMM. REV., Oct. 2008, at 47, 48 (“Statistical multiplexing through packet switching is the most fundamental concept in the Internet architecture.”).

186. One of the seminal articles in the field is Paul T. Brady, *A Statistical Analysis of On-Off Patterns in 16 Conversations*, 47 BELL SYS. TECH. J. 73 (1968) (finding that more than 60% of speaking time in telephone conversations is silence, suggesting that 60% of a channel’s capacity could be used for other purposes).

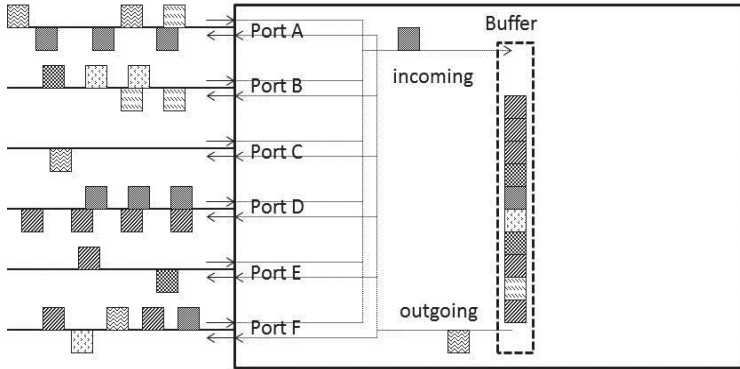
this, allowing for a much finer-grained level of sharing on a purely statistical basis.

The benefits of statistical multiplexing are immense. Because most communication is “bursty,” few applications need the full capacity of a dedicated communications channel. Statistical multiplexing therefore allows substantially more aggregate capacity to be offered to a group of users than would otherwise be possible if each user was allocated a dedicated communications channel. Conversely, any additional capacity added to a network to benefit one or a small group of users also creates additional capacity for all other users. Thus, because statistical multiplexing allows users to opportunistically use other users’ unused capacity, incremental capacity benefits all users.

Statistical multiplexing is implemented primarily by two mechanisms: the algorithms that individual computers use to determine the rate at which they inject packets into the network (“congestion avoidance” algorithms), and the algorithms that routers use to sort and prioritize packets (“queu[ing] disciplines”).¹⁸⁷ Queuing disciplines are particularly important. As routers receive packets from multiple sources, they store those packets in temporary buffers before processing them to be sent to their destination. Early routers would process packets in the order that they arrived (i.e., on a first-in-first-out (FIFO) basis) (Figure 1); if buffers were full, the router would drop any incoming packets (i.e., on a “tail-drop” basis).¹⁸⁸ On naïve inspection, this appears to be a fair (even “neutral”!) approach to handling traffic. In practice, however, FIFO and drop-tail algorithms can result in some streams getting a disproportionate share of available capacity, other streams being locked out of getting any capacity at all, and overall inefficient levels of network utilization.

187. See generally Memorandum from B. Braden et al. to Network Working Grp. (Apr. 1998), available at <http://www.ietf.org/rfc/rfc2309.txt>. The term “queuing discipline” used here encompasses both queue management and scheduling algorithms.

188. See *id.* at 3-4.



A basic router. As packets arrive they are added to a buffer for processing. The router processes packets one at a time, sending them to a destination port, in the order in which they arrived.

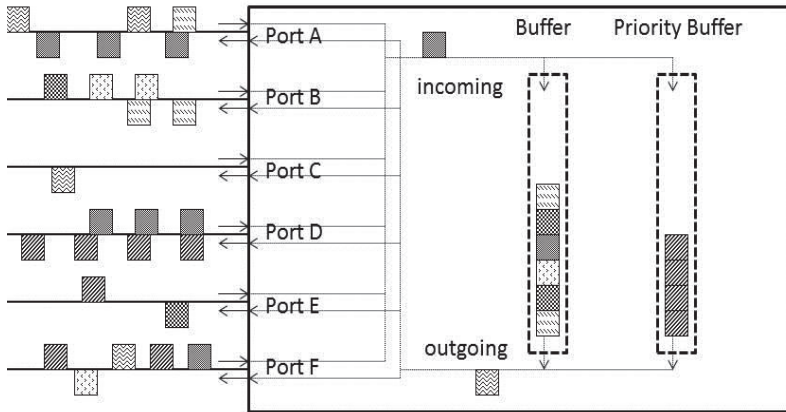
Figure 1

Given these concerns, engineers have been developing various active-queuing disciplines—generally referred to as Active Queue Management (AQM)—for decades.¹⁸⁹ AQM algorithms allow routers to adopt different approaches to managing queues and dropping packets as buffers reach capacity in order to ensure “fair”¹⁹⁰ and efficient network operation. This is the mechanism by which “paid prioritization” is most likely to be implemented: ISPs can configure their routers to handle prioritized data specially. For instance, prioritized traffic can be moved to the head of the queue. Or, more often, prioritized traffic will be placed in a separate queue, from which packets will be processed more often than from other queues (Figure 2).¹⁹¹

189. See, e.g., Sally Floyd & Van Jacobson, *Random Early Detection Gateways for Congestion Avoidance*, 1 IEEE/ACM TRANSACTIONS ON NETWORKING 397, 397 (1993).

190. “Fair” is a term of art, referring to how congestion-control algorithms and router-queuing disciplines interact to apportion bandwidth on a shared resource. There are multiple definitions and no consensus definition. Generally, “fairness” means that, on a connection shared by N connections, no connection will prevent any other connection from being able to use at least $1/N$ of the overall capacity.

191. Importantly, queuing disciplines alone cannot efficiently guarantee an equal allocation of bandwidth among streams. Bandwidth allocation is governed by many factors, including congestion on other parts of the network, latency and packet-round-trip time, and congestion algorithm. Certain queuing disciplines attempt to ensure equal bandwidth between streams; while such disciplines can increase the share of bandwidth allocated to lower-speed streams (e.g., those that take longer to reach a steady-state packet rate due to relatively higher round-trip



One model of a router with prioritization. As packets arrive, most go into one buffer, while “priority” packets go into their own buffer. The router can process packets from the two buffers in many ways, for instance by alternating between the buffers. This reduces the time that prioritized packets spend “waiting.”

Figure 2

Under any queuing discipline, congestion occurs in one of two ways: Packets are either dropped, or they are delayed. Drops occur either when a router’s buffer space is full or when the network connection between devices is at capacity (e.g., trying to transmit data at a rate of 15 mbps for a sustained period over a connection only capable of transmitting 10 mbps).¹⁹²

times), they often accomplish this at the cost of disproportionately slowing other streams. See, e.g., Memorandum from J. Babiarz, K. Chan & F. Baker to Network Working Grp. 6 (Aug. 2006), available at <https://tools.ietf.org/html/rfc4594> (explaining that, under the DiffServ prioritization model, “[a] priority queuing system is a combination of a set of queues and a scheduler that empties them in priority sequence”).

192. In practice, these cases are generally equivalent today. This is because most devices are on one of two types of connection. Either they are on switched ports, meaning that there is only a single sender/receiver pair on each connection, or they are on an asymmetric shared connection with a single gateway (e.g., the CMTS). In that case, devices on the shared connection may interfere with one another, resulting in loss of packets sent to the gateway. However, the bulk of data is typically being sent in the other direction, from the gateway to devices on the shared connection (e.g., from edge providers, through the CMTS, to end-users). Where this is the case, the gateway is the only transmitter, so drops are likely to result as data from edge providers arrives at a rate exceeding the capacity of the shared

Delays occur when packets arrive at a router faster than the router can send them to their destination. Where this happens, the router buffers packets until it can process them. Such delays most often occur because Internet traffic is “bursty,” meaning that packets from a given sender tend to arrive at a router in groups—not because the destination network has insufficient capacity to handle the data to be sent over it. As an example, if we assume a router with ten 100 mbps ports (and symmetric traffic patterns across all ports), with average utilization of 40 mbps per port, it is likely that the rate of incoming traffic to each port will regularly exceed several hundred mbps for very short periods of time. Without buffering, this would result in substantial packet loss (i.e., dropped packets); with buffering, the router can queue several hundred or thousand packets (or more) received over, e.g., milliseconds to tens of milliseconds and send them back out over a period of, e.g., tens of milliseconds to hundreds of milliseconds. Most applications are not particularly sensitive to delays—and even those that are can generally tolerate the moderate variances that are typically seen on actual networks—so it is often preferable to address congestion with buffering instead of by dropping packets.¹⁹³

Another example is particularly illustrative, as it demonstrates a common instance where buffers may be overrun, resulting in packet loss. The MPEG-DASH protocol, which is used by services like Netflix to stream video with adaptive bitrates, sends video in chunks (commonly in units of ten seconds of video each).¹⁹⁴ This

connection; in which case, the gateway will buffer packets until its buffers are exhausted, at which point it will begin dropping packets.

193. But note, this is not always the case—proper tuning of buffer sizes is a difficult and technical topic. See, e.g., Jim Gettys & Kathleen Nichols, *Bufferbloat: Dark Buffers in the Internet*, ACM QUEUE, Nov. 2011, at 57. Additionally, while it may be preferable to address ongoing congestion by buffering instead of dropping packets, congestion *avoidance* is often best implemented by responding to delay. There is longstanding research and debate within the technical community over congestion-control algorithms that rely on packet loss (e.g., TCP Reno) vs. packet delay (TCP Vegas). See, e.g., Lukasz Budzisz et al., *On the Fair Coexistence of Loss- and Delay-Based TCP*, 19 IEEE/ACM TRANSACTIONS ON NETWORKING 1811, 1811 (2011).

194. For discussions of MPEG-DASH relevant to this and the next paragraph, see Ahmed Mansy, Bill Ver Steeg & Mostafa Ammar, *SABRE: A Client Based Technique for Mitigating the Buffer Bloat Effect of Adaptive Video Flows*, 2013 PROCS. 4TH ACM MULTIMEDIA SYS. CONF. 214, 215 (“[W]e show . . . that a single DASH stream can cause significant delays to other ongoing applications sharing the home network in a typical residential setting.”); Jim Martin et al., *Characterizing Netflix Bandwidth Consumption*, 2013 CONSUMER COMM. &

typically results in an ON/OFF transmit pattern, where video is sent from the server to the client for about ten seconds, and then sends nothing for about ten seconds. Researchers are only just starting to understand how this protocol, which transmits for relatively large bursts, interacts with router buffering and TCP's congestion-control algorithm. While on average data is being sent to a steady number of clients at a constant data rate, statistically there will be periods where either far more or far fewer than the average number of segments are being simultaneously sent. When more than the average number of segments are simultaneously sent, given the size of each segment, there is a potential to saturate router buffers and cause packet-loss congestion. Such congestion may give the appearance that the network is under-provisioned by the network operator when in fact it

NETWORKING CONF. 230, 230, 235 (“Ongoing academic research is providing foundations for understanding how DASH applications behave and how they might be improved. . . . [W]e seek to understand the impact of adaptive applications on congestion and bandwidth control mechanisms throughout the Internet or within a broadband access network. The work presented in this paper provides foundations for achieving this goal.” “[Academic research on DASH is just emerging]. The dynamics and implications of multiple levels of end-to-end congestion control are not well understood.”); Saamer Akhshabi, Ali C. Begen & Constantine Dovrolis, *An Experimental Evaluation of Rate-Adaptation Algorithms in Adaptive Streaming over HTTP*, 2011 PROCS. 2D ACM MULTIMEDIA SYS. CONF. 157, 158 (“Adaptive streaming over HTTP is a new technology. It is not yet clear whether the existing commercial players perform well, especially under dynamic network conditions. Further, the complex interactions between TCP’s congestion control and the application’s rate-adaptation mechanisms create a ‘nested double feedback loop’ - the dynamics of such interacting control systems can be notoriously complex and hard to predict.”); Te-Yuan Huang et al., *Confused, Timid, and Unstable: Picking a Video Streaming Rate Is Hard*, 2012 PROCS. 2012 ACM CONF. ON INTERNET MEASUREMENT 225, 237 (“[A]ll three [MPEG-DASH] services we study display degraded performance in the presence of competing traffic, well below the video quality possible if the client used its fair share of bandwidth.”); Te-Yuan Huang, *A Buffer-Based Approach to Video Rate Adaptation 23* (June 2014) (unpublished Ph.D. dissertation, Stanford University) [hereinafter Huang, *A Buffer-Based Approach*], available at <http://yuba.stanford.edu/~nickm/papers/ty-thesis.pdf> (“In the worst case, the feedback loop creates a ‘death spiral’ and brings the playback rate all the way down to its lowest value.”); Junchen Jiang, Vyas Sekar & Hui Zhang, *Improving Fairness, Efficiency, and Stability in HTTP-Based Adaptive Video Streaming with FESTIVE*, 2012 PROCS. 8TH INT’L CONF. ON EMERGING NETWORKING EXPERIMENTS & TECHS. 97, 97 (“Many commercial video players rely on bitrate adaptation logic to adapt the bitrate in response to changing network conditions. Past measurement studies have identified issues with today’s commercial players with respect to three key metrics—efficiency, fairness, and stability—when multiple bitrate-adaptive players share a bottleneck link. Unfortunately, our current understanding of why these effects occur and how they can be mitigated is quite limited.”).

is largely the result of application-level attempts at congestion control; additionally, while it will adversely affect all traffic being sent over the shared link, it is likely to affect some traffic more adversely than other traffic, potentially giving the appearance of discriminatory treatment.¹⁹⁵

Critically, from the perspective of the Commission's Open Internet efforts, this demonstrates the limits of our understanding of the basic technologies that the FCC is attempting to regulate. It is difficult to imagine that the Commission can implement an *ex ante* regulatory regime that yields an efficient allocation of these resources given the current state of knowledge about how these resources work. The interaction between MPEG-DASH, router queuing, and congestion control is a current area of cutting-edge research. Current research suggests that traditional best-effort non-prioritized routing may yield substantially inefficient use of the network resource. It may well turn out to be the case that efficient routing of data like streaming video requires router-based prioritization. It may even turn out that efficient routing of streaming video data is necessarily harmful to other data—it may not be possible to implement a single network architecture that efficiently handles data with differentiated characteristics. If this is the case, then it may certainly be “commercially reasonable” that streaming-video providers pay a premium for the efficient handling of their data in order to compensate for the negative externalities that those uses impose upon other users and uses.

2. *Prioritization, Congestion, and (Not So) Slow Lanes*

To date, no firm is known to have offered a paid-prioritization service of the sort contemplated by the Order.¹⁹⁶ It is, therefore, not entirely clear what such a service would look like or how it would be implemented. While necessarily speculative—again demonstrating the danger of adopting strong *ex ante* rules—in all likelihood a paid-prioritization model would be implemented through priority buffering as described above: A firm would pay to have its packets handled on a priority basis by another firm's routers.

195. See, e.g., Huang, A Buffer-Based Approach, *supra* note 194, at 23 (describing the performance “death spiral” that services using MPEG-DASH (such as Netflix) can experience under congestion circumstances).

196. ADTRAN, REPLY COMMENTS OF ADTRAN, INC. (2014), available at <http://apps.fcc.gov/ecfs/comment/view?id=6019125300>.

Prioritization can affect connections in one of two ways: by increasing or decreasing that connection's bandwidth, and by increasing or decreasing its delay. The primary effect of prioritization is to decrease a prioritized connection's delay; this follows from the basic prioritization mechanism of handling incoming packets via a priority queue. Unsurprisingly, this can increase the delay to which non-prioritized packets are subjected. This increased delay¹⁹⁷ is unlikely to meaningfully affect most applications. While some applications are particularly sensitive to delay, delay is a persistent technical reality. All applications are subject to delay, and most are not sensitive to it; all delay-sensitive applications are designed to accept and mitigate delay as best they can. Any increase in delay caused by prioritization is likely to be marginal and fall within the accepted margins of typical delay-sensitive applications. Moreover, because delay is a persistent technical problem that is only exacerbated, not created, by prioritization, a better approach to delay mitigation is the wide-scale implementation of application-controlled or automated-prioritization (e.g., Quality of Service (QoS)) mechanisms by routers. These mechanisms—many of which already exist but are infrequently implemented—allow routers to prioritize delay-sensitive traffic. Wide-scale implementation of these mechanisms would broadly address any concerns raised by the adverse effects of paid-prioritization on delay-sensitive applications.

Prioritization would also affect how much bandwidth competing streams are able to use. Assuming the network is uncongested—as recent research makes clear is the case on most consumer-Internet backbones¹⁹⁸—prioritization would allow a prioritized connection to consume more bandwidth. But, counterintuitively and contrary to the understanding of many net

197. This discussion does not differentiate between “delay” and “changes in delay” (technically known as jitter). For some applications, especially streaming media, jitter is more problematic than delay. Prioritization would likely yield similar effects for both delay and jitter, though the precise effects are ambiguous.

198. See David Clark et al., *Measurement and Analysis of Internet Interconnection and Congestion 11* (Sept. 9, 2014) (unpublished manuscript), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2417573 (finding no widespread or persistent congestion on backbone interconnection points; rather, observed congestion resulted from changing business arrangements); MEASUREMENT LAB CONSORTIUM, *ISP INTERCONNECTION AND ITS IMPACT ON CONSUMER INTERNET PERFORMANCE 4* (2014), available at http://www.measurementlab.net/static/observatory/M-Lab_Interconnection_Study_US.pdf (finding that congestion incidents are related to business relationships, not technological capacity).

neutrality advocates, prioritization would not appreciably affect the bandwidth available to other connections.

This follows from the interaction of queuing disciplines and congestion avoidance in statistically multiplexed systems. Almost every implementation of TCP in use today uses packet loss, not delay, to control its data rate.¹⁹⁹ End hosts on the Internet do not know how much bandwidth is available to them, so they have no way of knowing at any given time what speed they should send data at.²⁰⁰ What they do instead is start sending data at a slow speed and incrementally increase that speed until congestion occurs (e.g., packets are dropped). At that point, they know they have exceeded available capacity, so they slow down (usually by reducing transmit rate by half); they then resume incrementally increasing their speed. This process, known as “congestion avoidance,” repeats indefinitely.²⁰¹

Because congestion-avoidance algorithms primarily rely on packet loss to signal congestion, so long as a network is not experiencing packet loss, prioritization will not substantially affect the rate at which end hosts send packets.²⁰² Thus, and directly

199. Standard implementations of TCP used by all major operating systems rely on the packet-loss mechanism. Delay-oriented congestion-control algorithms also exist but are less frequently used—largely because they are systematically unable to make as efficient use of the network resource in a system shared with packet-loss-oriented TCPs. *See, e.g.,* Budzisz et al., *supra* note 193, at 1811. The great exception to this is recent versions of Windows, which uses a hybrid loss and delay-based algorithm (Compound TCP). Even under congestion, however, Compound TCP is bounded on the low end by the performance of the standard Reno loss-based algorithm.

200. This is a fundamental constraint of the Internet. Since no one can know, *ex ante*, how many users will be sharing a connection at a given time, one can never know how much bandwidth is available to a given user at a given time—even if all of the technical characteristics of the network are known (which they are not). For instance, if three users share a 100 mbps connection but only two are active at a given time, a “fair” TCP will let each of them use 50 mbps. If the third user then starts using the connection, only 33 mbps will be allocated to each. There is no way to know whether or when other users will be making use of the shared resource.

201. This process, known as “additive increase / multiplicative decrease” (AIMD), was first described in Van Jacobson, *Congestion Avoidance and Control*, *COMPUTER COMM. REV.*, Aug. 1988, at 314, 321.

202. The rate at which TCPs increase the rate at which they send data is affected by delay, so there is some marginal effect on speed that results from prioritization. This is, however, a second-order effect, so it is bounded by a relatively small margin, even in the case of a linear increment. Modern TCPs increasingly use non-linear recovery mechanisms (e.g., CUBIC, New Reno, Compound TCP), for which a marginal increase in delay is unlikely to substantially affect average transmission rates. For a comparison of several of these algorithms,

contrary to the claims of many advocates, prioritization of some connections does not reduce the capacity available to other connections. Or, if we use the rhetoric of the debate, on connections without substantial packet loss, the hypothetical addition of “fast lanes” (prioritized connections) does not relegate other connections to a “slow lane.”

This discussion suggests several conclusions relating to the Order’s concerns about prioritization.

First and foremost, the effects of prioritization should be measured primarily in terms of on-net packet loss, and, in particular, the relative levels of packet loss between prioritized and non-prioritized traffic. If these rates are similar (including the case where they are at or near zero), this strongly suggests that any prioritization is commercially reasonable. Indeed, it strongly suggests that prioritization is not affecting non-prioritized traffic at all. In cases where there is substantial packet loss but the rates are comparable between prioritized and non-prioritized traffic, this suggests the relevant network is under-provisioned—but it does not suggest concerns relating to prioritization or Open Internet principles generally.

The only situation where prioritization on uncongested networks may reasonably be seen as adversely affecting non-prioritized connections is where those connections are substantially delay-sensitive. In such cases, network providers implementing paid prioritization should take steps to ensure such applications are not unduly affected. Such steps could take many forms: from user-selectable prioritization, to automated (e.g., Deep Packet Inspection (DPI)-based) prioritization of delay-sensitive traffic, to other router-based QoS mechanisms (e.g., tuning the rate at which prioritized buffers are serviced relative to non-prioritized buffers). These and similar ideas have long been discussed within the technical community as important to efficient network use,²⁰³ paid prioritization may reasonably increase the urgency of their

see generally Habibullah Jamal & Kiran Sultan, *Performance Analysis of TCP Congestion Control Algorithms*, 2 INT’L J. COMPUTERS & COMM. 30 (2008).

203. One need only look at the specification for the TCP protocol as developed in the late 1970s to see this. The specification expressly includes a “Type of Service” field to all packets to be given “precedence, delay, throughput, and reliability” treatment by routers. See INFO. SCIS. INST., RFC 791, INTERNET PROTOCOL: DARPA INTERNET PROGRAM PROTOCOL SPECIFICATION 28 (1981), available at <https://www.ietf.org/rfc/rfc791.txt>. As noted in RFC 791, the predecessor to the Internet, ARPANET, offered similar functionality.

deployment. Given the (small, but hard to define) range of possible applications that could be adversely affected by prioritization, the uncertain ways and extent to which they may actually be affected in any particular case, and the myriad approaches to mitigating such effects, the Commission should address any concerns arising from prioritization on a case-by-case basis.

In all other cases, the fact that a network is uncongested strongly suggests both that any prioritization is commercially reasonable and that such prioritization is not adversely affecting other connections.

Because a great portion of a given connection's performance is determined by circumstances outside the control of a given network operator (i.e., by off-net factors), competitive benchmarking of services' on-net performance is an important tool in understanding how, or whether, any on-net prioritization is affecting a given service's performance. For instance, as discussed above, the performance characteristics of MPEG-DASH, the protocol currently used by firms like Netflix to deliver streaming video, are not yet well understood. Initial research suggests that MPEG-DASH in particular has poor performance characteristics that are attributable to its design and interaction with TCP's congestion-control mechanisms—and that are outside of the control of a given network operator.²⁰⁴

Operationalizing this factor, in evaluating whether prioritization unreasonably affects a given service, the Commission should look to the performance of other similar services. If other similar services are able to operate well on a given network, this strongly suggests that any performance issues are related to off-net factors. Even in the absence of such positive comparisons, the Commission should be careful to look at the underlying technical mechanisms and state of relevant research in attributing any performance difficulties to on-net versus off-net factors.

Related to this point, the earlier discussion of statistical multiplexing leads to a final observation: Services that consume a statistically disproportionate amount of the shared network resource (e.g., available capacity) impose a negative externality upon all other users and uses of that resource. Independent from any fees for prioritization, such users should reasonably be expected to pay a premium for their disproportionate use of the resource. A basic premise of the Internet is that aggregation of underutilized resources creates a more efficient aggregate resource. This aggregation is

204. See Mansy, Ver Steeg & Ammar, *supra* note 194, at 214-15.

accomplished by statistical multiplexing. But when a single service uses a disproportionate share of the network resource, the opportunistic sharing enabled by statistical multiplexing (i.e., allowing one service to use another service's excess capacity) becomes free-riding instead. Such conduct is more harmful to the Internet's future as an innovative platform than prioritization or other concerns raised in the NPRM; to whatever extent the Commission takes action to police conduct such as prioritization, similar attention should be paid to services that make uncompensated disproportionate use of the network resource.

CONCLUSION

The normative justification for net neutrality is that it promotes innovation. And, to the extent it relies on the "virtuous circle" theory to justify its regulatory intervention, the FCC premises its Open Internet rules on the belief that such innovation will ultimately drive investment in the deployment of new advanced telecommunications services. While both of these beliefs are likely true in many cases, they are also likely not true in others. The relationship between net neutrality and innovation is more complicated than this simple story—the story guiding the FCC's approach to broadband regulation—of innovation tells.

This Article has done two things beyond providing a general overview of the Commission's regulatory efforts in this area. First, it has discussed three of the judicial challenges that the Commission's Open Internet order is likely to face. There are many other challenges that are being raised against the Order, but the three discussed here either present issues of broader impact than just the Order, so are likely to attract the eventual attention of the Supreme Court, or potentially undermine the Commission's basic theory of Open Internet regulation. The first of these challenges is that the Commission doesn't have statutory authority to adopt what FCC Chairman Wheeler has repeatedly called "the most important network ever"—or, to frame it in terms of broader interest, that the courts expect Congress to speak clearly in assigning an agency such broad authority. The second challenge is that reclassification of Internet access from a Title I to a Title II service raises heightened procedural requirements under *Fox I* due to changed factual settings or reliance interest engendered by the prior classification. This concern also raises—and this Article briefly discusses—a nexus of potential First and Fifth Amendment concerns as well as questions

about the definition of common carriers. And the third challenge is that the Order is arbitrary and capricious in its use of and failure to address comments introduced into the record. This discussion is particularly important because, as addressed in the final Part of the paper, there is substantial literature that urges strongly against the sort of rules the Commission adopted in the Open Internet Order.

The second thing that this Article did was discuss that extensive literature. Any action undertaken by the Commission must be based, first and foremost, on a sound understanding of the underlying technology, lest the Commission risk both acting in contravention of its legal mandate and significantly undermining the efficient operation of the Internet. Unfortunately, the Open Internet Order fails this test. The relationship between “openness” as in input, on the one hand, and various outputs such as innovation, competition, and consumer welfare, on the other, has been extensively studied in various literatures. This work consistently concludes that there is no one-size-fits-all way to promote innovation. “Openness” may be positively, negatively, or uncorrelated with these outcomes. This suggests that any effort to implement strict, *ex ante* “openness” requirements on the Internet is—almost by definition—arbitrary and capricious.

