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EVALUATING ZERO-RATING AND ASSOCIATED THROTTLING PRACTICES UNDER THE OPEN INTERNET ORDER

Scott Jordan

ABSTRACT

Zero-rating practices and associated throttling practices have been an issue of intense public policy debate. This article evaluates such practices under the Open Internet Order's transparency, no-throttling, and general conduct rules. The evaluation separately considers application-agnostic zero-rating, class-based zero-rating, edge provider-based zero-rating, and affiliated zero-rating. The article evaluates sponsored data programs (AT&T Sponsored Data, Verizon FreeBee Data), zero-rating and throttling of video streaming (T-Mobile Binge On), free mobile Internet access to specific edge providers (T-Mobile Music Freedom), and zero-rated or unlimited access to affiliated content (AT&T Data Free TV, Verizon go90, Comcast XFINITY Stream TV).

Keywords: broadband service; zero-rating; usage-based pricing; open Internet.

Introduction

Several broadband Internet access service providers in the United States have introduced programs under which specific network traffic is excluded from end users' data caps or otherwise treated differently from other traffic under a usage-based pricing policy. Such practices are often referred to as "zero-rating." Such practices are sometimes accompanied by network practices that throttle, or exempt from throttling, the zero-rated network traffic.

Zero-rating practices and associated throttling practices have been an issue of intense public policy debate. Proponents of zero-rating practices argue that zero-rating practices "may in some instances provide benefits to consumers," that they "increase choice and lower costs for consumers," that zero-rating practices "support continued investment in broadband

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infrastructure and promote the virtuous cycle," that zero-rating practices "benefit edge providers by helping them distinguish themselves in the marketplace and tailor their services to consumer demands," and that "there exist spillover benefits [. . .] that should be considered."[1] In contrast, opponents of zero-rating practices argue that "the power to exempt selective services from data caps seriously distorts competition, favors companies with the deepest pockets, and prevents consumers from exercising control over what they are able to access on the Internet," that zero-rating practices "are a harmful form of discrimination," and that zero-rating practices "may hamper innovation and monetize artificial scarcity."

In the United States, the practices of broadband Internet access service providers are regulated under the 2015 Open Internet Order. The order includes transparency requirements, a rule against certain types of throttling, and a general conduct rule under which network practices may be evaluated on a case-by-case basis.[2] The order does not pass judgement on whether zero-rating practices would violate any of its rules, but it does discuss how they would be judged. The order states that the Federal Communication Commission (FCC) is "mindful of the concerns raised in the record that [zero-rating practices] have the potential to distort competition by allowing [broadband] service providers to pick and choose among content and application providers to feature on different service plans."[3] The order also states that "[a]t the same time, new service offerings, depending on how they are structured, could benefit consumers and competition." It then declares that FCC concerns about zero-rating practices will be addressed on a case-by-case basis under the order's general conduct and transparency rules.

The literature on zero-rating practices mostly consists of arguments for and against such practices. The academic literature (summarized below) does not yet provide much guidance as to whether zero-rating and associated throttling practices would be allowed or prohibited under

1. Federal Communications Commission, "Protecting and Promoting the Open Internet," paragraph 151.

2. The FCC is currently considering changes to the 2015 Open Internet Order's rules. See Federal Communications Commission, "Restoring Internet Freedom." The NPRM proposes to eliminate the general conduct rule, seeks comment on whether to modify the no-throttling rule, and seeks comment on whether to keep, modify, or eliminate the transparency rule. Nevertheless, we believe the analysis in this paper is of both academic and policy interest. If the FCC issues an order, it is likely to be litigated. In addition, the US Congress may attempt to write open Internet rules.

3. Ibid., paragraph 151.

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the Open Internet Order. The goal of this article is to provide such guidance.

The next section provides a brief overview of the academic literature and the arguments for and against zero-rating practices. The arguments are broken out by the category of the claim, in order to later evaluate the arguments under the Open Internet Order's stated factors for evaluating network practices. The categories considered include discrimination, end-user control, and broadband provider competition; edge provider competition; congestion, network capacity, and broadband provider investment; edge provider innovation; and consumer surplus.

Since many zero-rating practices are applied to specific network traffic, the following section gives an overview of the applicability of the Open Internet Order's rules to application-specific practices. We then examine the effect of the order's transparency rule on zero-rating practices and discuss the potential challenges of requirements to publicly disclose accurate information about traffic that is zero-rated and/or throttled and the likely effects of any throttling practice. We then examine the effect of the order's no-throttling rule on network practices associated with zero-rating programs, and we find that an associated throttling practice may be prohibited under the rule unless it qualifies as reasonable network management. That leads us to next examine the definition and tests for a network practice to qualify as reasonable network management. We find that zero-rating practices themselves do not qualify, but that associated throttling practices might qualify depending on whether they have a primarily technical network management justification, whether application-specific throttling is technically justified and sufficiently tailored, and the amount of control an end user may exercise over the practice.

We then examine the application of the order's general conduct rule to various types of zero-rating practices and associated throttling practices. We conclude that the no-throttling rule would be determinative for throttling practices, and thus that throttling practices likely need not be separately evaluated under the general conduct rule. For zero-rating practices, we examine the principal factors to be used in evaluation: application-agnostic, end-user control; competitive effects; and effects on innovation, investment, or broadband deployment. For each factor, we consider the relevant arguments for and against zero-rating practices. We find that application-agnostic zero-rating practices are likely allowed under the general conduct rule if and only if they are reasonable and not unreasonably discriminatory; that class-based zero-rating practices will be evaluated by comparing the

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harm of application-specificity to competitive harms and benefits; that edge provider-based zero-rating would likely be prohibited due to the amount of application-specificity and anticompetitive effects; and that affiliated zero-rating is likely allowed if and only if there is a reasonable and not unreasonably discriminatory underlying zero-rating practice.

In the concluding section, we evaluate four types of recent zero-rating practices: sponsored data programs (including AT&T Sponsored Data and Verizon FreeBee Data), zero-rating and throttling of video streaming (including T-Mobile Binge On), free mobile Internet access to specific edge providers (including T-Mobile Music Freedom), and zero-rated or unlimited access to affiliated content (including AT&T Data Free TV, Verizon go90, and Comcast XFINITY Stream TV). For each type, we evaluate the zero-rating practice and any associated throttling practice under the order's transparency rule, no-throttling rule, and general conduct rule. We find that sponsored data programs are likely allowed if the price charged is reasonable and not unreasonably discriminatory, and that zero-rating of affiliated content is likely allowed if there is an underlying such sponsored data program and if the price charged to edge providers does not unreasonably exceed the economic net cost to the broadband provider. In contrast, we find that zero-rating and throttling of video streaming is likely prohibited under the no-throttling rule, and that free mobile Internet access to specific edge providers is likely prohibited under the general conduct rule.

Academic Literature and Arguments for and Against Zero-Rating Practices

Discrimination, End-User Control, and Broadband Provider Competition

Many opponents view many types of zero-rating practices as a form of harmful discrimination that substitutes the broadband provider's judgement for the consumer's judgement, and that is thus contrary to the principles of an open Internet.[4] Van Schewick states that "[n]etwork neutrality rules aim to prevent network providers from distorting the playing field among applications or classes of applications, and from interfering

4. Consumer Federation of America, 39; Consumers Union, "Reply Comments in the Matter of Protecting," 5; Electronic Frontier Foundation, 25.

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with users' choices regarding the use of the network."[5] Consumers Union claims that "the power to exempt selective services from data caps [. . .] prevents consumers from exercising control over what they are able to access over the Internet."[6] Goodman suggests that the degree of user participation should be a significant factor in judging zero-rating practices.[7] Curwin believes that even class-of-application based zero-rating practices (such as those that zero-rate selected music streaming apps) distort competition, because they discriminate among different classes of applications.[8] Center for Democracy and Technology (CDT) similarly believes that "limitations as to certain types or sources of content undermine net neutrality's application and content agnosticism, and pose risks of market distortion similar to the risks posed by exclusive or sponsored zero-rating arrangements," but they also see class-of-application based zero-rating practices as less concerning than exclusive arrangements, explaining that "[w]hen a zero-rating arrangement exempts from metered pricing all edge providers within a particular class of applications, the potential harms of zero rating are reduced but not altogether eliminated."[9]

Proponents typically respond that discriminatory practices are not necessarily harmful, and should be judged by whether they harm consumers or competition.[10] Proponents argue that zero-rating practices and application-specific practices allow broadband providers to differentiate themselves, and that the resulting price discrimination will benefit consumers. Verizon states that "such arrangements can allow broadband providers [. . .] to distinguish themselves [. . .], and can benefit consumers by giving them additional choices,"[11] and Eisenach claims that such practices "are an instrument by which mobile wireless firms can differentiate themselves from competitors by offering access to customized content with their mobile wireless services."[12] Some proponents also claim that bundling of broadband Internet access service with content results in second degree price discrimination that benefits consumers.[13]

5. van Schewick, "Network Neutrality and Zero-rating," 1–3, 5–6.
6. Consumers Union, "Reply Comments in the Matter of Protecting," 5.
7. Goodman, 89–91.
8. Curwin, 225–28.
9. Stallman and Adams, 14–15.
10. See e.g., Brake, 10.
11. Verizon, "Reply Comments," 9–10, 27–28.
12. Eisenach, 7. See also International Center for Law and Economics and TechFreedom, 21–22.
13. Ibid., 6.

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CDT argues that the potential benefits to broadband competition may depend on the size and number of competitors, explaining that "[i]n markets where new competitors struggle to establish themselves, zero rating may give consumers more competitive choices among carriers."[14]

A few academic papers use empirical approaches to estimate the impact of zero-rating on broadband subscription.[15] However, this literature is not yet rich enough to draw definitive conclusions.

Edge Provider Competition

Opponents argue that zero-rating practices often distort competition between edge providers. Public Knowledge claims that only edge providers zero-rated by the largest broadband providers will be "the ones that thrive and reach consumers, putting carriers in a distinct position to pick winners and losers."[16] CDT expresses particular concern over exclusive zero-rating practices, because they "create[] a distorted playing field that forecloses competition from existing edge providers and new entrants."[17] CDT also expresses some concern over zero-rating practices in which the broadband provider charges edge providers, because "[e]dge providers with greater bargaining strength will be more likely to receive favorable terms than their competitors and even when sponsored zero-rating arrangements are offered to all edge providers on equal terms, they will tend to favor those edge providers with greater resources."[18]

Opponents argue that zero-rating of traffic affiliated with a broadband provider is particularly onerous since it also distorts competition between broadband providers and edge providers. Public Knowledge explains that broadband providers "may gain greater benefits by extracting edge provider profit margins through implementation of a vertical price squeeze, 'charging a significantly higher price to the opponent for the use of the monopolized link than it 'charges' itself.'"[19]

14. Stallman and Adams, 21.

15. See e.g., Saenz de Miera Berglind; Frieden; Layton and Elaluf-Calderwood; Galpaya.

16. Consumers Union, "Comments in the Matter of Protecting," 12–13. Also see Curwin, 233–34.

17. Stallman and Adams, 12–13.

18. Ibid., 13–14.

19. Public Knowledge et al., 20–21 (with internal quote taken from Economides). See also Public Knowledge et al., "Comments," 52–53; van Schewick 2/19/15 Ex Parte, 5–6.

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Proponents respond that there is no distortion of competition if the zero-rating practice is nonexclusive. Eisenach argues that "[w]ithout exclusivity—the inclusion of some participants and the exclusion of others—there is no foreclosure, and hence no anticompetitive concern."[20] Some proponents go even further, arguing that even exclusive arrangements enhance efficiency. For instance, Eisenach claims that "[e]xclusivity raises competition concerns [. . .] only [when it is] sufficiently widespread so as to foreclose entry (and expansion) by an otherwise equally efficient competitor [. . .]."[21] Howell and Layton make a similar argument, furthermore explaining that there is no foreclosure and no negative impact upon either edge providers or consumers unless the zero-rated content is a close substitute to nonzero-rated content.[22]

Congestion, Network Capacity, and Broadband Provider Investment

Proponents argue that zero-rating and application-specific practices will increase network investment. They first claim that such practices will result in pricing that more accurately reflects the cost of the network capacity required and will result in more economically efficient allocation of network resources. Howell and Layton explain that "it is necessary for the price signals associated with lower costs to be sent to consumers so that efficiency-raising changes in purchasing behaviours can take place" and that "[c]oncealing information about cost differences (e.g., by averaging the prices for two or more applications) prevents consumers making efficiency-raising choices."[23] International Center for Law and Economics (ICLE) and TechFreedom claim that application-specific practices "direct data consumption to its highest-valued use."[24]

Proponents then claim this increase in economic efficiency results in increased capacity and reduced congestion. ICLE and TechFreedom state that application-specific practices "limit data usage and relieve congestion" and that they allow broadband providers to "reduce the risk from infrastructure investment," thereby creating "an enormous impetus for

20. Eisenach, 8.
21. Ibid., 8.
22. Howell and Layton, 22–24.
23. Ibid., 24–25.
24. International Center for Law and Economics and TechFreedom, "Comments," 17–19.

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broadband investment."[25] Verizon claims that "[s]uch arrangements thus help offset the substantial costs of infrastructure deployment and upgrades faced by broadband providers without increasing costs to consumers."[26]

Such claims, however, are often premised on such practices allowing consumers to "pick and choose which types of data or even content providers are most important to them."[27] Opponents often claim that zero-rating and application-specific practices impede such user choice.

Edge Provider Innovation

Proponents argue that zero-rating practices can allow small edge providers to reach new consumers.[28] AT&T claims that their Sponsored Data zero-rating program "offers upstart providers a scalable and flexible tool that they can use to drive interest and engagement with their content,"[29] and the Free State Foundation explains that "the putative new entrant might well be looking to negotiate some arrangement with a [broadband] service provider that will give it a fighting chance of competing with the entrenched giants by differentiating itself."[30]

In contrast, opponents believe that zero-rating practices and associated throttling practices impose a burden on edge providers that stifles innovation, due to the requirement of new individualized arrangements and due to technical requirements and errors in classification of applications in application-specific practices.[31] CDT believes that the burdens of individualized arrangements can be lessened through transparency, stating that "[w]hen there are specifications or limitations placed on the content or applications that are eligible for zero rating or a zero-rated platform, it is essential that the carrier or platform provider make those technical specifications clear and, ideally, assist the edge provider in meeting them."[32]

25. Ibid.

26. Verizon, "Reply Comments," 9–10.

27. International Center for Law and Economics and TechFreedom, "Comments," 17–19.

28. Alcatel-Lucent, 23–24; CTIA—The Wireless Association, 34; Layton, 4; United States Telecom Association, 46–47.

29. AT&T, "Reply Comments," 77–79.

30. The Free State Foundation, 15.

31. Public Knowledge et al., "Comments," 54–55; van Schewick 2/19/15 Ex Parte, 3, 6; van Schewick, 1/29/16 Ex Parte, 18–26.

32. Stallman and Adams, 15–16.

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Consumer Surplus

Proponents argue that zero-rating practices increase consumer surplus, or at least social welfare. Some claim that consumer surplus increases because such plans decrease the price paid by consumers. Information Technology and Innovation Foundation (ITIF) claims that zero-rating practices "are likely welfare-enhancing, offering a service that meets consumer demand at a lower price point,"[33] and AT&T claims that their Sponsored Data zero-rating program benefits "consumers, in the same way that toll-free calling and free shipping do."[34] Others claim that consumer surplus increases because zero-rating plans increase consumer choice. Cellular Telecommunications Industry Association (CTIA) claims that "[t]he hallmark of [zero-rating practices] is that they expand consumer welfare, offering consumers new options and more value."[35] Others claim that zero-rating practices increase broadband use, which in turn increases the utility of current users due to the network effect.[36]

In contrast, opponents argue that zero-rating plans often decrease consumer surplus. Some claim that consumer surplus decreases because, in the absence of robust broadband competition, there will be little pass-through of broadband provider revenue from zero-rating plans to lower broadband prices, and that increased edge provider costs will be passed onto consumers.[37] Some claim that consumer surplus also decreases because zero-rating practices may increase the ability of a broadband provider to charge monopoly rent. Van Schewick claims that broadband providers that charge edge providers for zero-rating "would have an incentive to lower monthly bandwidth caps or increase the per-byte price for unrestricted Internet use in order to make it more attractive for [edge] providers to pay for zero-rating."[38]

A few academic papers use models to determine when a broadband provider may implement a zero-rating practice and how much it may charge.[39] However, this literature is not yet rich enough to paint a complete picture about the effect of zero-rating on competition or on consumer surplus.

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33. The Information Technology and Innovation Foundation, 15–16.

34. AT&T, "Reply Comments," 77.

35. CTIA—The Wireless Association, 36. See also Alcatel-Lucent, 23–24; The Free State Foundation, 15.

36. Eisenach, 5.

37. van Schewick 2/19/15 Ex Parte, 3; Kimball, 45.

38. van Schewick 2/19/15 Ex Parte, 3–4. See also Public Knowledge et al., "Comments," 53–54.

39. See e.g., Andrews et al.; Cho et al.; Song and Wang; Zhang et al.

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Application-Specific Network Practices

The central goal of both the 2010 and 2015 Open Internet Orders is to ensure that "consumers can make their own choices about what applications and services to use."[40] The rules attain this goal through prohibitions of unreasonably discriminatory practices without user consent. This section gives an overview of the applicability of the order's rules to application-specific network practices. The following sections examine each rule's application to such practices.

In the 2015 Open Internet Order, the FCC classified broadband Internet access service as a telecommunications service. Prohibitions of unreasonable discrimination are central in the regulation of telecommunications services. The idea is embedded in the statutory definition of telecommunications, which is the "transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received."[41] Open Internet concerns may thus arise whenever a broadband provider uses network practices that change the form or content of the information sent without user consent.

Section 201 of the Communications Act prohibits common carriers from using unjust or unreasonable practices. Section 202 of the Communications Act prohibits common carriers from using unreasonably discriminatory practices, and from giving any unreasonable preference to any particular person of class of persons. The 2015 Open Internet Order implements these statutory requirements in its no-blocking, no-throttling, no paid prioritization, and general conduct rules.

The order defines a network practice as application agnostic "if it does not differentiate in treatment of traffic, or if it differentiates in treatment of traffic without reference to the content, application, or device" and defines a practice as application specific if it is not application agnostic.[42] The order explains that "[a]pplication-specific network practices include, for example, those applied to traffic that has a particular source or destination, that is generated by a particular application or by an application that belongs to a particular class of applications, that uses a particular application- or

40. Federal Communications Commission, "Preserving the Open Internet," paragraph 3.
41. 47 U.S.C. 153, section 3(44).
42. Federal Communications Commission, "Protecting and Promoting," footnote 344.

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transport-layer protocol, or that has particular characteristics (e.g., the size, sequencing, and/or timing of packets)."[43]

Application-specific practices may be based on the class of application, content, or device (class based), based on the specific application or edge provider (edge provider based); or only available to the broadband provider (affiliated).

The no-blocking rule "prohibits network practices that block a specific application or service, or any particular class of applications or services, unless it is found to be reasonable network management."[44] Similarly, the no-throttling rule prohibits any network practice "that impairs, degrades, slows down, or renders effectively unusable particular content, services, applications, or devices, that is not reasonable network management."[45] Network practices that discriminate on the basis of the application or class of application may thus violate the no-blocking and/or no-throttling rules, unless they qualify as reasonable network management.

The no paid prioritization rule also focuses on discrimination on the basis of application or class of application. In the order, "prioritization" is defined as "the management of a broadband provider's network to directly or indirectly favor some traffic over other traffic, including through use of techniques such as traffic shaping, prioritization, resource reservation, or other forms of preferential traffic management."[46] Network practices that affect the transmission of traffic for a particular application or class of application in exchange for payment by an edge provider may thus violate the no paid prioritization rule. However, zero-rating practices do not by themselves affect the transmission of traffic, and thus are not examined under this rule.

The general conduct rule is more general and broader than the no-blocking, no-throttling, and no paid prioritization rules. The rule is concerned with forms of discrimination that may not be prohibited by the other rules, but may nevertheless cause harm to the open Internet. It sets forth a rule by which the FCC may prohibit, on a case-by-case basis, "practices that unreasonably interfere with or unreasonably disadvantage the ability of consumers to reach the Internet content, services, and applications of their choosing or of edge providers to access consumers using the Internet."[47] A network practice that discriminates on the basis of the

43. Ibid., footnote 344.
44. Ibid., paragraph 113.
45. Ibid., paragraph 120.
46. Ibid., paragraph 125.
47. Ibid., paragraph 135.

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application or class of application may thus violate the general conduct rule if the discrimination results in unreasonable interference or unreasonable disadvantage, unless it qualifies as reasonable network management.

The Transparency Rule

The transparency rule ensures that consumers can make informed choices, ensures that edge providers have the information necessary to innovate, promotes competition, and supports enforcement.[48] Specifically, the rule states that broadband Internet access service providers shall "publicly disclose accurate information regarding the network management practices, performance, and commercial terms of its broadband Internet access services sufficient for consumers to make informed choices regarding use of such services and for content, application, service, and device providers to develop, market, and maintain Internet offerings."[49] The required disclosures include network practices, performance characteristics, and commercial terms. They must be "in plain language accessible to current and prospective end users and edge providers."[50]

Zero-rating practices are commercial terms that must be disclosed. Specifically, the order states that required disclosures include "any data caps or allowances that are a part of the plan the consumer is purchasing, as well as the consequences of exceeding the cap or allowance."[51] If a data cap is not applied to all of a customer's traffic, for example, because of a zero-rating practice, the disclosure must thus provide accurate information about which traffic counts toward a data cap, and the information must be sufficient for consumers to make informed choices regarding use of the broadband Internet access service.

For instance, consider a zero-rating practice that exempts from data caps or usage-based charges certain traffic from chosen edge providers (e.g., Amazon Prime music or YouTube video streaming). Commonly, only certain traffic (e.g., only traffic identified as music or videos) from the chosen edge providers is zero-rated. The broadband provider must provide accurate information about the traffic that is zero-rated. The challenge here

48. Federal Communications Commission, "Preserving the Open Internet," paragraph 53.
49. Ibid., paragraph 54.
50. Ibid., paragraph 56 and "Protecting and Promoting," paragraph 161.
51. Federal Communications Commission, "Protecting and Promoting," paragraph 164.

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is that identification by a broadband provider of a class of applications, for example, music or video, is often imperfect. Applications within a class of applications use a variety of formats, and hence a broadband provider often cannot accurately identify all traffic within a class of applications, even that from a single edge provider. In particular, content is often encrypted in a manner that frustrates a broadband provider's attempt at classification. If a broadband provider cannot accurately identify encrypted content, and thus does not zero-rate it, it might disclose this limitation. However, given that most consumers do not understand which content is encrypted, would such a disclosure meet the transparency rule's requirement that disclosures be in plain language and sufficient for consumers to make informed choices? Alternatively, a broadband provider may work individually with each zero-rated edge provider to accurately identify all traffic intended to be zero-rated. However, such customization places additional burdens on edge providers, which are discussed in the following. Furthermore, the Internet's fundamental architecture does not expect telecommunications providers—who are paid to transmit information of the user's choosing without change in the form or content of the information—to examine the content transmitted and to take any action based on that content. Such uses of deep packet inspection are widely controversial.

Zero-rating practices are sometimes combined with throttling practices, for example, by only zero-rating network traffic that is subject to throttling. Application-specific throttling practices are also network practices that must be disclosed. Specifically, the order states that disclosures of such practices must include "the purpose of the practice, which users or data plans may be affected, the triggers that activate the use of the practice, the types of traffic that are subject to the practice, and the practice's likely effects on end users' experiences."[52] Disclosures about the types of traffic that are subject to the practice are similarly challenging, since the algorithms for identifying traffic are imperfect and difficult to accurately explain in plain language.

Even application-agnostic throttling is often not sufficiently disclosed. Currently, many mobile broadband providers in the United States offer plans which they describe as providing "unlimited" data. However, such plans often throttle traffic to and from consumers whose usage has surpassed

52. Federal Communications Commission, "Preserving the Open Internet," paragraph 56 (discussing application-specific behavior that inhibits or favors certain applications or classes of applications) and 2015 Open Internet Order, paragraph 169.

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a specified monthly usage. The problem here is often disclosure of such practices "likely effect on end users' experiences." Many such disclosures state only that throttling of heavy users may result in decreased performance such as reduced speeds and increased latency, but do not disclose anything about the frequency or severity of such decreased performance.[53] It is unlikely that such limited disclosures could be reasonably construed as providing information sufficient for consumers to make informed choices regarding use of mobile broadband Internet access service.

The No-Throttling Rule

The no-throttling rule provides protection against broadband provider practices that inhibit the delivery of particular content, applications, or services. Specifically, the rule states that broadband Internet access service providers shall not "impair or degrade lawful Internet traffic on the basis of Internet content, application, or service, or use of a non-harmful device."[54] The rule allows an exception for "reasonable network management," as discussed in the following section. The no-throttling rule does not prohibit congestion management. First, congestion management that is deemed reasonable network management is not prohibited. Second, network practices that do not discriminate on the basis of content, application, or service are not prohibited by this rule, regardless of whether they qualify as reasonable network management. For instance, a broadband provider may allocate available capacity to competing users based on usage, including throttling users' traffic when they exceed their data cap.[55]

53. See e.g., AT&T disclosures about "AT&T Unlimited Data Plans" at https://www.att.com/gen/public-affairs?pid=20879 (". . . may experience reduced data speeds and increased latency during periods of congestion as compared to other customers using the same cell site . . . [which] may cause web sites to load more slowly or affect the performance of data-heavy activities such as video streaming or interactive gaming."); Sprint disclosures about Quality of Service of "unlimited" data plans at https://www.sprint.com/legal/open_internet_information.html ("may experience reduced throughput and increased latency . . . [and] may also notice temporary changes in the performance of data intensive applications such as streaming video or online gaming . . ."); T-Mobile disclosures about "unlimited" plans at https://www.t-mobile.com/company/company-info/consumer/internet-services.html (". . . which may result in slower data speeds"); and Verizon disclosures about congestion management on "Verizon Plan Unlimited" at https://www.verizonwireless.com/support/broadband-services/ (which includes no description of the impact).

54. Federal Communications Commission, "Protecting and Promoting," paragraph 119.

55. Ibid., paragraph 122.

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Many zero-rating practices are combined with throttling practices. For example, T-Mobile's Binge-On mobile broadband plan zero-rates video from a specified list of edge providers only if that video is throttled to a specified rate. Such practices can thus be evaluated under the no-blocking and no-throttling rules.

Broadband plans that throttle certain applications, classes of applications, devices, or classes of devices (e.g., that throttle video) degrade Internet traffic on the basis of content, application, service, or device. Thus, such plans violate the no-throttling rule unless (1) the traffic is unlawful, (2) the device is harmful, or (3) the throttling practice qualifies as reasonable network management. Putting a disclosure of the throttling practice in the broadband plan's terms of service does not make the associated traffic unlawful, nor does it make the device harmful. The no-throttling rule prohibits broadband providers from imposing a fee on edge providers to avoid having the edge providers' content, service, or application throttled.[56] Thus, a broadband provider cannot circumvent the rule by offering an alternative plan that does not throttle. The claims of reasonable network management are discussed below.

In addition, many so-called "unlimited" data plans throttle certain classes of applications (e.g., video) or traffic to/from certain devices (e.g., tethered devices) to specified rates, or block such traffic entirely (e.g., to/from tethered devices). Such practices can thus be evaluated under the no-blocking and no-throttling rules.

Reasonable Network Management

Network practices that qualify as reasonable network management do not violate the no-throttling rule or the general conduct rule, regardless of the other factors for evaluation. Proponents of zero-rating practices often claim that such practices result in capacity augmentation, which reduces congestion. Proponents of application-specific throttling practices often claim that such practices reduce congestion. Thus, broadband providers are likely to claim that both zero-rating practices and associated throttling practices are reasonable network management.

The order first defines what constitutes a "network management practice" and then states when a network management practice is reasonable. These two steps are discussed in the following sections.

56. Ibid., paragraph 120.

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Network Management Practice

The order defines the "network management practice" as "a practice that has a primarily technical network management justification, but does not include other business practices."[57] The first question is thus whether a zero-rating practice or an application-specific blocking or throttling practice has a primarily technical network management justification. It is critical here to distinguish between a zero-rating practice itself, the data cap that may underlie a zero-rating practice, and any associated throttling practice.

First, consider whether a zero-rating practice is a network management practice. A zero-rating practice determines if, when, and how a consumer's network traffic results in a usage-based charge. Zero-rating practices do not affect themselves the transmission of traffic through the broadband provider's network. Proponents argue zero-rating practices are a form of second-degree price discrimination that results in increased broadband provider profit, and a portion of this increased profit may be reinvested in incremental network capacity, which reduces congestion. However, any such reinvestment is indirect, and the primary purpose of the zero-rating practice itself has a primarily business justification. Thus, zero-rating practices are not *network management practices* and do not qualify for consideration as reasonable network management.

Second, consider whether a data cap underlying a zero-rating practice is a network management practice. Concerns about data caps will themselves be addressed on a case-by-case basis under the order's general conduct and transparency rules. For that reason, there may be a separate evaluation of whether a data cap qualifies as reasonable network management. Data caps that are intended to recover the cost associated with heavy users might qualify as reasonable network management if they are sufficiently tailored to achieving a reduction in congestion.[58] In contrast, data caps that are intended to maximize broadband provider profit or to protect incumbent services are unlikely to qualify as reasonable network management.[59] Evaluation of data caps under the 2015 Open Internet Order is outside the scope of this article.

Finally, consider whether a throttling practice associated with a zero-rating practice is a network management practice. Broadband providers are likely to claim that the primary purpose of their throttling practices

57. Ibid., paragraph 215.
58. Jordan.
59. Ibid.

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is congestion management. Opponents are likely to claim that the primary purpose of such a throttling practice is a business practice, namely to differentiate their service offerings. The 2010 Open Internet Order explicitly states that alleviating congestion is a technical network management justification.[60] The 2015 Open Internet Order explicitly states that "[i]f a practice is primarily motivated by such an other justification, such as a practice that permits different levels of network access for similarly situated users based solely on the particular plan to which the user has subscribed, then that practice will not be considered under this exception."[61] Thus, if the primary purpose is to manage congestion, the throttling practice has a primarily technical network management justification and may be considered as a network management practice. In contrast, if the primary purpose is to differentiate service offerings, the throttling practice does not have a primarily technical network management justification and may not be considered as a network management practice. We analyze these arguments later in case studies.

Alternatively, a broadband provider may claim that the primary purpose of a throttling practice is to address traffic that is unwanted by end users. For example, broadband providers who throttle video traffic often claim that the throttling does not reduce the quality of the video when watched on devices without high resolution screens. The order specifically states that "addressing traffic that is unwanted by end users" is a technical network management justification.[62] Thus, if a broadband provider can establish that a throttling practice achieves a reduction in traffic that is unwanted by end users, the practice may be considered as a network management practice.

Tailored Practices

If a network practice constitutes a *network management practice*, then that practice can be examined to determine whether it qualifies as reasonable network management. The order states that "[a] network management practice is reasonable if it is primarily used for and tailored to achieving a legitimate network management purpose, taking into account the particular network architecture and technology of the broadband Internet access service."

60. Federal Communications Commission, "Preserving the Open Internet," paragraph 82.
61. Federal Communications Commission, "Protecting and Promoting," paragraph 216.
62. Ibid., paragraph 220.

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If the primary purpose of a throttling practice is to manage congestion, then it is likely that it is "primarily used for" congestion management. Hence, the next question would be whether the throttling practice is "tailored to achieving" a reduction in congestion. Proponents are likely to claim that throttling practices are tailored to achieving a reduction in congestion because they are appropriately targeted at high volume network traffic, for example, video. Opponents are likely to respond that congestion management can be better accomplished through application-agnostic practices, and broadband providers should not single out a single class of applications; however high a percentage of overall traffic it constitutes.

Throttling practices may be application agnostic; application specific based on the class of application, content, or device (class based); or application specific based on the specific application or edge provider (edge provider based). We consider these three types of practices in turn.

An application-agnostic throttling practice does not violate the no-throttling rule, since it is not based on "content, application, or service, or use of a non-harmful device," and thus, there is no need under the no-throttling rule to determine whether it qualifies as reasonable network management.

A class-based throttling practice may violate the no-throttling rule, and thus, there is a need to determine whether it qualifies as reasonable network management. A broadband provider need not show that a class-based throttling practice is the *most tailored* method for alleviating congestion.[63] However, since class-based discrimination violates a central open Internet goal (i.e., consumers can make their own choices about what applications and services to use), there is a high bar to establish that a class-based throttling practice is a sufficiently tailored congestion management practice. The order states that "[a] network management practice is more likely to be found reasonable if it is transparent, and either allows the end user to control it or is application-agnostic."[64] Most Internet applications utilize an application-agnostic congestion management technique called the Transmission Control Protocol (TCP), and hence a broadband provider must show that class-based throttling is sufficiently tailored to achieving a

63. The FCC rejected a proposal that "network management techniques . . . would only be reasonable if they were used temporarily, for exceptional circumstances, and have a proportionate impact to solve a targeted problem." See Ibid., paragraph 222.

64. Ibid., paragraph 221.

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legitimate congestion management purpose that is not already achieved by TCP. In general, this would be a difficult showing.

However, the case-by-case evaluation of whether a class-based throttling practice is tailored to achieving congestion management will also take into account the particular network architecture and technology of the broadband service, namely "the differences across broadband access platforms of any kind, including cable, fiber, DSL, satellite, unlicensed Wi-Fi, fixed wireless, and mobile wireless."[65] Thus, a key question is whether there are particular challenges posed by certain network architectures (e.g., those used by mobile broadband) that may merit class-based throttling.

The question of whether a throttling practice is "tailored to" alleviating congestion focuses on whether it is a reasonable method for doing so. Proponents are likely to argue that throttling is an efficient and effective means for alleviating congestion, particularly if the throttled class is of high volume. However, congestion usually occurs on a short time scale, often seconds or less. Opponents are likely to argue application-specific throttling is a blunt instrument, and hence an ineffective means for alleviating congestion, because it often throttles at times and places in which congestion is not present.

The determination of reasonableness is likely to center on the technical benefit—congestion management—versus the amount of tailoring. In particular, the order states that "[i]n evaluating congestion management practices, a subset of network management practices, we will also consider whether the practice is triggered only during times of congestion and whether it is based on a user's demand during the period of congestion."[66] A class-based throttling practice that is triggered only during times of congestion, and based on a user's demand during those times, is more likely to be determined to be sufficiently tailored than one that is not. An edge provider-based throttling practice may also violate the no-throttling rule, and thus, there is a similar need to determine whether it qualifies as reasonable network management. As with class-based throttling practices, a broadband provider need not show that an edge provider-based throttling practice is the *most tailored* method for alleviating congestion. However, it is highly unlikely that a broadband provider could show that edge provider-based throttling is sufficiently tailored to achieve a technical management purpose, given the focus on a particular application or edge provider.

65. Ibid., paragraph 216.
66. Ibid., paragraph 220.

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If the primary purpose of a throttling practice is to address traffic unwanted by end users, then it is likely that it is "primarily used for" a legitimate network management purpose. Hence, the next question would be whether the throttling practice is "tailored to achieving" a reduction in unwanted traffic. A primary challenge to such an assertion is that the edge provider has a superior ability to intelligently and effectively reduce unwanted traffic than does a broadband provider. The edge provider has better information about the transmitted content, and thus may make better decisions about how to reduce unwanted content. However, since the broadband provider need not establish that throttling is the *most tailored* method, it is sufficient for a broadband provider to show that an end user desires to have the broadband provider implement such throttling. We consider this in the following subsection.

End-User Control

User choice is a central goal of the order. Indeed, the overarching goal of the Open Internet Orders can be seen as preferring end-user control over broadband provider control when the latter would result in action as a gatekeeper.[67] End-user control and transparency are central to determinations of reasonableness.[68] Under the 2010 Open Internet Order, end-user control was a key factor (along with transparency, application-agnostic, and standardization) in determining whether a network practice unreasonably discriminated. Specifically, the 2010 Order determined that network practices that offer end-user control in the ability to "select quality-of-service enhancements on their own connections for traffic of their choosing" would be unlikely to violate the 2010 Order's no unreasonable discrimination rule.

The existence or absence of user choice in the exercise of a network practice can determine whether the practice qualifies as reasonable network management. A user may have control over if and when a network practice is applied. Since the order states that "[a] network management practice is more likely to be found reasonable if it is transparent, and either allows the end user to control it or is application-agnostic,"[69] determinants

67. See e.g., Federal Communications Commission, "Preserving the Open Internet," paragraph 24 and "Protecting and Promoting," paragraph 80 (discussing a broadband provider's ability to act as a gatekeeper).

68. See e.g., Federal Communications Commission, "Preserving the Open Internet," paragraph 6.

69. Federal Communications Commission, "Protecting and Promoting," paragraph 221.

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of end-user control will be considered in case-by-case evaluation. In particular, common determinants may include (1) whether the practice is opt-in or opt-out, (2) the ease or difficulty in turning the practice on or off, and (3) the time delay between an end user indicating a choice and that choice being effected. Network practices that are not active unless and until a user opts-in to that practice are almost certain to qualify as reasonable network management if they have a legitimate network management purpose and are transparent. If a class-based throttling practice is active by default but allows a user to opt-out, both the method for opting-out and the time until this choice becomes effective are likely to be considered. The amount and ease of such end-user control is likely to be weighed against the amount of tailoring of a class-based throttling practice. The examples of such tradeoffs are discussed in the case studies.

A second type of choice pertains to consumer choice among broadband plans. Plans that include application-specific throttling practices may sometimes be offered alongside plans that do not include such practices. When this occurs, broadband providers often argue that the offering of plans that implement throttling alongside plans that do not increases consumer choice. While this may be true, the order explicitly states that broadband providers are prohibited from charging edge providers a fee to avoid having the edge provider's content, service or application blocked or throttled. It is highly unlikely that consumer choice over throttling that is exercised only at the time of the selection of a broadband plan (and likely for a fee) would be considered to be a sufficient expression of end-user control to qualify the throttling practice as reasonable network management.

The General Conduct Rule

The general conduct rule provides protection against broadband provider practices that harm Internet openness. Specifically, the rule states that broadband Internet access service providers shall not "unreasonably interfere with or unreasonably disadvantage (1) end users' ability to select, access, and use broadband Internet access service or the lawful Internet content, applications, services, or devices of their choice, or (2) edge providers' ability to make lawful content, applications, services, or devices available to end users."[70] The rule allows an exception for reasonable network management.

70. Ibid., paragraph 136.

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Application-specific throttling practices can be evaluated as reasonable network management and can be evaluated under the no-throttling and general conduct rules. It is worth considering the logical intersection between these various evaluations.

First, consider an application-specific throttling practice that qualifies as reasonable network management. In this case, the practice does not violate either the no-throttling or general conduct rules, and need not be evaluated under them.

Second, consider an application-specific throttling practice that does not qualify as reasonable network management. In this case, the practice would first be evaluated under the no-throttling rule. Recall from the discussion above that an application-specific throttling practice violates the no-throttling rule unless (1) the traffic is unlawful, (2) the device is harmful, or (3) the practice qualifies as reasonable network management. Thus, any such practice that does not qualify as reasonable network management and that throttles lawful traffic and/or nonharmful devices is prohibited under the no-throttling rule. Consequently, there is no need to evaluate such a practice under the general conduct rule.

In contrast, recall from our discussion above that zero-rating practices are not *network management practices*, and thus do not qualify for consideration as reasonable network management. In addition, zero-rating practices do not by themselves affect the transmission of traffic through the broadband provider's network, and thus cannot violate the no-throttling rule. Thus, any complaint about a zero-rating practice would be considered solely under the general conduct rule.

The order sets out a nonexhaustive list of factors to be used in assessing a network practice under the general conduct rule.[71] The most pertinent factors for evaluation of zero-rating practices are application agnostic, end-user control, competitive effects, and effects on innovation, investment, or broadband deployment.

Application Agnostic

Whether a network practice is application agnostic is a key factor in evaluation of the practice under the general conduct rule. The order finds that application-agnostic network practices "do not interfere with end users' choices about which content, applications, services, or devices to use,

71. Ibid., paragraphs 138–145.

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nor do they distort competition and unreasonably disadvantage certain edge providers," and that thus such practices would likely not violate the general conduct rule. Conversely, application-specific network practices are likely to interfere with end users' choices (absent user consent), and may thus cause an unreasonable interference or an unreasonable disadvantage to end users' or edge providers' ability to use broadband Internet access service.

While other factors may come into play in evaluation of a zero-rating practice under the general conduct rule, no other factor merits as strong a positive statement as does the application-agnostic factor. Due to the heavy emphasis in the order on consumer choice over what applications and services to use, it is worthwhile to consider the amount of application-specificity in various types of zero-rating practices.

Application-agnostic zero-rating practices do not differentiate on the basis of the content, application, or device. A zero-rating practice could be application agnostic if it exempts traffic from data caps based on payment by third parties.[72] Application agnostic zero-rating practices do not unreasonably interfere with or unreasonably disadvantage *end users' ability* to select, access, and use broadband Internet access service or the lawful Internet content, applications, services, or devices of their choice, since such practices do not distinguish among content, applications, services, or devices. Whether an application-agnostic zero-rating practice unreasonably interferes with or unreasonably disadvantages *edge providers' ability* to make lawful content, application, services, or devices available to end users turns on whether any payment for zero-rating results in unreasonable disadvantage. If the payment is reasonable and not unreasonably discriminatory, then the zero-rating practice does not distort competition. (We discuss this further below when examining the competition factor.) Thus, such practices would likely not violate the general conduct rule.

Class-based zero-rating practices include or exempt traffic from data caps or usage-based charges based on the class of content (e.g., music), class of application (e.g., video streaming), or class of devices (e.g., tethered devices). Class-based zero-rating practices do not *interfere with an end user's ability* to select, access, and use broadband Internet access service or the lawful Internet content, applications, services, or devices of their

72. A data cap is application agnostic if it is applied to all traffic, or if traffic is zero-rated without differentiation on the basis of content, application, or device.

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choice, since (absent an associated throttling practice) the zero-rating practice does not by itself affect the transmission of user traffic. However, class-based zero-rating practices may *disadvantage an end user's ability* to select, access, and use broadband Internet access service or the lawful Internet content, applications, services, or devices of their choice, since zero-rated content, applications, services, or devices are advantaged compared to other content, applications, services, and devices. Similarly, class-based zero-rating practices may *disadvantage edge providers' ability* to make lawful content, application, services, or devices available to end users.

However, class-based practices do not violate the general conduct rule unless they result in *unreasonable disadvantage*. The issue with class-based practices is that the broadband provider is charging based on the class of traffic rather than on the common carrier service provided (i.e., transmission of information of the user's choosing). Such class-based discrimination violates a central open Internet goal—that consumers can make their own choices about what applications and services to use. An alternative approach would be to let the consumer determine the zero-rated class, for example, a consumer may zero-rate up to a specific amount of traffic of his or her choice. A zero-rating practice in which the consumer determines the classes would be application agnostic, since it is the consumer—not the broadband provider—that classifies traffic. Furthermore, this likely converts the zero-rating practice into a modified data cap. The determination of whether the disadvantage is unreasonable likely turns on the magnitude of the disadvantage compared to benefits considered in other factors under the general conduct rule. The magnitude of the disadvantage depends on the volume of the zero-rated class. If the volume is low (e.g., music on fixed broadband Internet access service), then the disadvantage is correspondingly low. However, if the volume is high (e.g., video on mobile broadband Internet access service), then the disadvantage is correspondingly high. In addition, the magnitude of the disadvantage may depend on the accuracy of classification, since the disadvantage to edge providers' ability to make content, applications, services, or devices available to end users depends on whether they are included in the defined class. Below, we discuss the potential benefits considered in other factors under the general conduct rule.

Edge provider-based zero-rating practices include or exempt traffic from data caps or usage-based charges based on the edge provider and the application (e.g., Amazon Prime music or YouTube video streaming). Sections 201 and 202 of the Communications Act prohibit common carriers from

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using unreasonable or unreasonably discriminatory practices, and from giving any unreasonable preference to any particular person or class of persons. Edge provider-based zero-rating practices distort competition, and violate sections 201 and/or 202. Edge provider-based zero-rating practices unreasonably disadvantage *end user's ability* to select, access, and use broadband Internet access service or the lawful Internet content, applications, services, or devices of their choice. Similarly, edge provider-based zero-rating practices unreasonably disadvantage *edge providers' ability* to make lawful content, application, services, or devices available to end users. Thus, edge provider-based zero-rating practices violate the general conduct rule.

Affiliated zero-rating practices exempt Internet traffic affiliated with a broadband provider's information service from data caps or usage-based charges. Such information services may include, for example, a broadband provider's video streaming service. If there is an underlying zero-rating practice open to all edge providers on reasonable and not unreasonably discriminatory terms, then the underlying zero-rating practice is application agnostic. If so, then the affiliated zero-rating practice may itself not be unreasonable or unreasonably discriminatory. If, however, there is no such underlying zero-rating practice open to all edge providers on reasonable and not unreasonably discriminatory terms, then the affiliated zero-rating practice may be viewed as an extreme case of an edge provider based zero-rating practice, in which exemptions are available on preferential terms to the broadband provider itself. Such affiliated zero-rating practices violate sections 201 and 202, distort competition, and violate the general conduct rule.

There is also an interesting situation in which a broadband provider exempts video streaming traffic affiliated with its own cable service, but claims that traffic is not carried over its broadband Internet access service. The 2015 Open Internet Order classifies broadband Internet access service as a telecommunications service, and thus subject to Title II of the Communications Act.[73] Broadband Internet access service is defined as "[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."[74] Broadband providers may offer other services, called

73. Ibid., section IV.

74. Ibid., paragraph 187.

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"non-BIAS data services," which share network capacity with broadband Internet access service. Below, we consider a case study in which Comcast claims that its Stream TV product is a non-BIAS data service, and is thus not subject to the general conduct rule.

End-User Control

The order states that "[a] practice that allows end-user control and is consistent with promoting consumer choice is less likely to unreasonably interfere with or cause an unreasonable disadvantage affecting the end user's ability to use the Internet as he or she sees fit."[75] There are two elements to user choice pertinent to zero-rating practices: choice between service plans and choice in how to use a service plan.

Broadband plans that include zero-rating practices may sometimes be offered alongside plans that do not include such practices. In such cases, it may be argued that the zero-rating practice increases consumer choice. However, because the offering of a plan with a zero-rating practice has the potential to distort competition by allowing broadband service providers to pick and choose among content and application providers, such a form of user choice is more appropriately evaluated under the "competitive effects" factor than under the "end-user control" factor, and we do so below.

The remaining form of user choice is the user control over how to use a service plan. Indeed, end-user control was discussed above as a substantial factor in evaluation of an application-specific blocking or application-specific throttling practice as reasonable network management. Although a zero-rating practice could in theory offer consumers the ability to determine if and when the zero-rating practice is actively used, we are not aware of any current zero-rating plans that do. In addition, even if there was such end-user control over a zero-rating practice, it may still pose competitive concerns.

Competitive Effects

The effect of a zero-rating practice on competition is a principal factor in determining whether the practice is prohibited under the general conduct rule. Competition affects the "'virtuous cycle' in which innovations at the

75. Ibid., paragraph 139.

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edges of the network enhance consumer demand, leading to expanded investments in broadband infrastructure that, in turn, spark new innovations at the edge."[76] Practices that enhance competition (and hence enhance the virtuous cycle) will be viewed favorably under this factor, and practices that reduce competition (and hence reduce the virtuous cycle) will be viewed unfavorably. A zero-rating practice may affect three types competition: (1) between a broadband provider and edge providers, (2) among edge providers, and/or (3) among broadband providers. We consider these three types of competition separately.

We first consider competition *between a broadband provider and edge providers*, which is explicitly discussed in the order under the competitive effects factor. The order starts by expressing concern over broadband provider incentives, stating that "broadband providers have incentives to interfere with and disadvantage the operation of third-party Internet-based services that compete with the providers' own services."[77] For instance, a broadband provider that offers an information service "may seek to gain economic advantages by favoring their own or affiliated content over other third-party sources."[78] The order then concludes that practices that "have anti-competitive effects in the market for applications, services, content, or devices would likely unreasonably interfere with or unreasonably disadvantage edge providers' ability to reach consumers,"[79] and thus would likely be prohibited under the general conduct rule.

The focus here is thus on a broadband provider that offers an information service and that implements an affiliated zero-rating practice. The question is whether such a practice has anticompetitive effects in the market for applications, services, content, or devices. The answer is likely to turn on whether there is an underlying zero-rating practice, and on how "open" that underlying zero-rating practice is. Indeed, the order particularly calls out "the extent of an entity's vertical integration as well as its relationships with affiliated entities."[80] If an underlying zero-rating practice is available without charge to all edge providers competing with the broadband provider's information service, then the affiliated zero-rating practice is unlikely to be anticompetitive. (Note, however, that the affiliated practice must still be evaluated under other factors.) If the underlying zero-rating practice is

76. Ibid., paragraph 7.
77. Ibid., paragraph 140.
78. Ibid., paragraph 82.
79. Ibid., paragraph 140.
80. Ibid., paragraph 140.

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available on reasonable and not unreasonably discriminatory terms to all edge providers competing with the broadband provider's information service, then the determination of whether the affiliated zero-rating practice is anticompetitive likely turns on whether the broadband provider is really paying the same price as competitors or whether this payment to itself is an inconsequential internal transfer payment. In contrast, a zero-rating practice that is exclusive to the broadband provider, or not available on reasonable and not unreasonably discriminatory terms to all edge providers, is almost certainly anticompetitive. Although some proponents argue that an exclusive vertical arrangement may enhance economic efficiency, this argument is contrary to the virtuous cycle, which is based on the observation that openness maximizes consumer surplus when there are high fixed costs such as those in broadband Internet access service.

We next consider competition *among edge providers*, which also affects the virtuous cycle, and hence should also be considered under the competitive effects factor. The order explains that broadband providers can exploit their gatekeeper role "by acting in ways that may harm the open Internet, such as [. . .] demanding fees from edge providers,"[81] and that "[s]uch practices could result in so-called 'tolls' for edge providers seeking to reach a broadband provider's subscribers, leading to reduced innovation at the edge, as well as increased rates for end users, reducing consumer demand, and further disrupting the virtuous cycle."[82] The question is whether such a practice has pro-competitive or anticompetitive effects in the market for applications, services, content, or devices. The answer is likely to turn on both the price charged (if any) and the amount of application-specificity. We consider application-agnostic, class-based, and edge provider-based zero-rating practices in turn.

An *application-agnostic* zero-rating practice (e.g., one that exempts traffic from data caps based on payment by third parties) may have either pro-competitive or anticompetitive effects. If the payment is reasonable and not unreasonably discriminatory, then the zero-rating practice does not distort competition, and is hence not anticompetitive. While zero-rating practices available on such terms may indeed be taken up more often by edge providers with greater resources, we disagree with some opponents to such zero-rating practices that this results in unreasonable disadvantage. Indeed, as proponents argue, edge providers may have a

81. Ibid., paragraph 80.
82. Ibid., paragraph 82.

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higher willingness-to-pay than consumers, and faced with a similar price per unit data may purchase a greater volume. Although some of this cost will be passed onto consumers, not all need be, and thus it is possible that an application-agnostic zero-rating practice that is reasonable and not unreasonably discriminatory may *enhance* competition among edge providers. The determination of whether a payment is reasonable can likely be made by comparing the price charged to the edge provider to the marginal usage-based charge to the consumer (e.g., the incremental price per unit volume for upgrading to the next higher data cap). The determination of whether a payment is unreasonably discriminatory is common in regulation of telecommunication services. Volume discounts are typically considered to be reasonable discrimination, but individually negotiated prices are typically considered to be unreasonable discrimination.

In contrast, a *class based* zero-rating practice (one that includes or exempts traffic from data caps or usage-based charges based on the class of content, class of application, or class of device) is likely to distort the market for edge provider services. As opponents of such practices contend, the decision by the broadband provider of the class to zero-rate by itself distorts competition between various classes of applications. We thus disagree with proponents of such practices who contend that there is no distortion of competition if the zero-rating practice is non-exclusive. A practice may be anticompetitive without resorting to exclusion. We also disagree with proponents of such practices who content that there is no distortion of competition unless the zero-rated content is a close substitute to nonzero-rated content. Indeed, the history of innovation in Internet applications is replete with examples of classes of applications that were not initially thought to be substitutes to other classes, but nevertheless were eventually recognized to be substitutes.

Similarly, an *edge provider-based* zero-rating practice (one that includes or exempts traffic from data caps or usage-based charges based on the edge provider) is very likely to distort the market for edge provider services unless it is open to all edge providers on reasonable and not unreasonably discriminatory terms.

We finally consider competition *among broadband providers*, which also affects the virtuous cycle, and hence should also be considered under the competitive effects factor. The order explains that "practices that would enhance competition would weigh in favor of promoting consumers' and edge providers' ability to use broadband Internet access service to reach

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one another."[83] When discussing zero-rating practices, the order specifically states that "new service offerings, depending on how they are structured, could benefit consumers and competition."[84] However, the order also explains that "regardless of the competition in the local market for broadband Internet access, once a consumer chooses a broadband provider, that provider has a monopoly on access to the subscriber,"[85] and thus "even if the mobile market were sufficiently competitive, competition alone is not sufficient to deter mobile providers from taking actions that would limit Internet openness."[86] As discussed above, proponents argue that zero-rating practices and application-specific practices allow broadband providers to differentiate themselves, and that the resulting price discrimination will benefit consumers. Proponents usually focus on three types of differentiation.

First, they claim that a broadband provider may use a zero-rating practice to offer plans differentiated from those offered by other broadband providers. If zero-rating practices are used in this manner, then there is likely a pro-competitive effect in the market for broadband Internet access service. However, they may also be an anticompetitive effect between a broadband provider and edge providers and/or among edge providers, and if so these competitive effects must be weighed against each other.

Second, proponents of class-based zero-rating practices often claim that such practices may increase consumer surplus when compared to plans that do not differentiate between classes of traffic. Such claims are spurious, since they do not compare apples to apples. The correct comparison is between zero-rating practices in which *the broadband provider* determines the classes and zero-rating practices in which *the consumer* determines the classes. Since consumers have more information about their own utility than do broadband providers, placing the control in the hands of consumers inevitably results in higher consumer surplus. Zero-rating practices in which the consumer determines the classes would be application-agnostic, since it is the consumer—not the broadband provider—that classifies traffic.

Third, some proponents claim that a broadband provider may use a zero-rating practice to bundle broadband Internet access service with

83. Ibid., paragraph 140.
84. Ibid., paragraph 152.
85. Ibid., paragraph 80.
86. Ibid., paragraph 148.

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content, and that this bundling may be pro-competitive. However, as discussed above, any such bundling is very likely to distort the market for edge provider services unless it is open to all edge providers on reasonable and not unreasonably discriminatory terms, and we doubt that any pro-competitive effect in the market for broadband Internet access service would outweigh the anticompetitive effect in the market for information services.

Effects on Innovation, Investment, or Broadband Deployment

The effects of a zero-rating practice on innovation, investment, and/or broadband deployment is also a principal factor in determining whether the practice is prohibited under the general conduct rule. These effects are central to the "virtuous cycle." Thus, enhancements to innovation, investment, or broadband deployment would be considered a positive factor in evaluating a zero-rating practice under the general conduct rule, and impediments to innovation, investment, or broadband deployment would be considered a negative factor. These effects are discussed separately.

A zero-rating practice may affect broadband provider innovation and/or edge provider innovation. Economic forms of innovation, for example, innovation in broadband plans and innovation in methods for edge providers to reach potential customers, were already considered in the competitive effects factor, and thus need not be considered again here. It remains to evaluate technical forms of innovation, for example, technical innovation in network management practices and technical innovation in edge provider services.

Broadband providers may argue that associated throttling practices (e.g., methods to reduce the volume of video traffic) are technical innovations in network management practices. However, any such network practice would be first evaluated under the reasonable network management exception, since the practice is for the purposes of management of the broadband Internet access service. As we discussed above in the section on reasonable network management, the determination of whether such a practice is reasonable network management may turn on whether the practice is opt-in or opt-out and the ease or difficulty in turning the practice on or off. If a practice is reasonable network management, there is no further need to evaluate it under the general conduct rule, and conversely if it is not reasonable network management it is unlikely that the innovation is a positive factor under the general conduct rule.

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We turn next to innovation in edge provider services. Opponents argue that zero-rating practices and associated throttling practices impose a burden on edge providers that stifles innovation. There are several potential burdens that should be examined on a case-by-case basis, and the magnitude of any burden is likely to turn on the amount of application-specificity and the implementation of the practice. Application-agnostic zero-rating practices that charge reasonable prices to edge providers do not impose any burden on edge provider innovation. Edge provider-based network practices are fairly simple to implement and are also unlikely to impede technical innovation. It remains to consider class-based network practices. We commented above that class based practices may result in an unreasonable disadvantage to edge providers if the volume of the zero-rated class is high and/or the classification of traffic is inaccurate. These same factors affect edge provider innovation. Class-based practices require a method for the broadband provider to identify the traffic that falls within the class. Traditional Internet architecture does not call on the broadband provider to classify traffic. One method a broadband provider may use to classify traffic is to utilize deep packet inspection to examine application-specific fields within traffic. However, there will always be estimation errors in using this method, as the broadband provider does not have enough information about each application to obtain perfect accuracy. Alternatively, a broadband provider may work with each edge provider to improve the accuracy. In either case, this may impose a constraint on innovation in edge provider services, since accuracy may come at the cost of technical innovation in the design of such services.

We turn next to edge provider investment and broadband provider investment. Increases or reductions in edge provider investment are reflective of changes in edge provider competition, and thus were already considered above in the competitive effects factor. Proponents argue that zero-rating practices will increase network investment. This argument relies on the claim that such practices result in pricing that more accurately reflects the cost of the network capacity required, and thereby result in more economically efficient allocation of network resources. We consider this claim separately for application-agnostic practices and application-specific practices. If a zero-rating practice is *application agnostic*, and if the broadband provider charges *reasonable* prices, then incremental revenue from edge providers can be expected to fuel increased network investment, as the incremental revenue is related

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to the cost of providing the corresponding network capacity. However, if the prices are *not reasonable*, then incremental revenue will correlate more strongly with edge provider willingness-to-pay than with the cost of network capacity, and there will be little incentive to reinvest such revenue into network capacity.

In contrast, the argument that *application-specific practices* will result in pricing that more accurately reflects the cost of network capacity is simply false. Price signals can be easily sent to consumers without application-specific practices. Bandwidth tiers signal to consumers the cost of the network capacity required to accommodate the subscribed download and upload speeds. Data caps signal to consumers the marginal cost of monthly usage, which is somewhat correlated with the cost of network capacity. Consumers, in turn, decide upon the usage of various classes of applications based on the utility generated and on the cost of usage. Both bandwidth tiers and data caps are application agnostic, and they do not require any application-specific network practice to be implemented by the broadband provider. Arguments that broadband providers can improve on price signals using application-specific practices are fallacious.

Finally, we turn to broadband deployment. Proponents often argue that zero-rating practices lower the cost to users and thereby increase broadband subscription. They envision two manners in which costs are lowered: direct reductions due to zero-rating, and indirect reductions through innovation in broadband service plans and innovation in network management. Proponents and opponents disagree about whether direct reductions in cost due to zero-rating will be offset through increases in the cost of zero-rated content and/or through increases in the cost for the transmission of the nonzero-rated content. However, they agree that if there is a net reduction in cost, then it occurs because of increased competition, which we already considered in the competitive effects factor. Similarly, any indirect reductions through innovation were also considered in the competitive effects factor.

Case Studies

In this section, we present case studies of four types of zero-practices, some of which have associated throttling practices. In each case study, we evaluate the practices based on the analysis above.

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Sponsored Data Programs

We first consider zero-rating practices in which a broadband Internet access service provider offers zero-rating for a fee to edge providers. Two prominent examples are AT&T Sponsored Data[87] and Verizon FreeBee Data.[88]

AT&T describes Sponsored Data as a program "that enables companies to sponsor the data usage for specific content on behalf of eligible AT&T wireless customers [. . .] without impacting [the customer's] monthly data plan allowance." Similarly, Verizon describes FreeBee Data as a program that "enables businesses to acquire, engage, and retain customers by providing their content free of data charges." In both programs, an edge provider may choose which of its content to zero-rate. If an AT&T or Verizon mobile broadband customer on a qualifying data plan retrieves the content while on the broadband provider's cellular network, the volume of the content is not counted toward the customer's monthly data allowance.

The transparency rule requires a broadband provider to disclose accurate information about sponsored data plans sufficient for consumers to make informed choices regarding use of their broadband service. AT&T maintains a consumer-focused website describing which plans are eligible.[89] Verizon does not, but appears to consider eligible any Verizon Wireless customer on a data plan with a data cap.[90] Zero-rated content is tagged with an icon placed next to the content to identify it as zero-rated. These disclosures are likely to satisfy the consumer portion of the transparency rule.

The transparency rule also requires a broadband provider to publicly disclose accurate information regarding the commercial terms of sponsored data plans sufficient for content and application providers to develop, market, and maintain Internet offerings. Both AT&T and Verizon advertise these zero-rating programs to edge providers.[91] There are technical requirements that allow the broadband provider to identify zero-rated content, and a brief overview of these requirements is publicly available. Pricing information is not publicly disclosed. Further information about both programs is available to edge providers upon request. It is unclear whether

87. AT&T, "Sponsored Data."
88. Verizon, "FreeBee Data."
89. AT&T, "Sponsored Data API."
90. Verizon, "FreeBee Data FAQs"; Are all subscribers eligible for FreeBee Data?
91. AT&T, "Sponsored Data"; Verizon, "FreeBee Data."

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the availability only upon request of pricing and of detailed technical requirements satisfies the transparency rule.

The no-throttling rule does not apply because zero-rated and nonzero-rated content are treated identically in the transmission of the content through the broadband provider's networks.

We turn next to the general conduct rule. Sponsored data programs do not qualify as reasonable network management, since above we concluded that zero-rating programs (absent associated network practices that affect the transmission of traffic) are not network management practices.

Sponsored data programs would appear to be application-agnostic. Both programs have technical requirements for content to be zero-rated, principally that zero-rated content be available over http and that it be identified by specific URLs.[92] However, these technical limitations are unlikely to be construed as differentiating on the basis of content, application, or device. Application agnostic is a positive factor under the general conduct rule.

Next consider the competitive effects of sponsored data programs. Such zero-rating programs are unlikely to have significant effects on the competition *between a broadband provider and edge providers*, since application-agnostic zero-rating programs are open to much more content than those in the classes of traffic offered under a broadband provider's own information services. Sponsored data programs are also unlikely to have significant effects on the competition *among broadband providers*, as they are unlikely to significantly affect consumer's subscription choices, unless they grow to encompass a substantial proportion of user traffic.

However, sponsored data programs may have a significant effect on competition *among edge providers*. As discussed above, an application-agnostic zero-rating practice may have either pro-competitive or anticompetitive effects based on the price charged. If the price is reasonable and not unreasonably discriminatory, then the zero-rating practice may enhance competition among edge providers, but if the price is unreasonable or unreasonably discriminatory, then the program distorts competition and is anticompetitive. The lack of transparency of both AT&T's and Verizon's pricing terms makes evaluation difficult. Regarding *discrimination*, AT&T has stated that it "makes its sponsored data program available to all content

92. AT&T, "Sponsored Data API" at "Are there any technical limitations on the type of content that can be delivered via Sponsored Data?"; Verizon, "FreeBee Data FAQs" at "What are the technical limitations of the FreeBee Data service?"

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providers on the same terms and conditions" and that it "charg[es] them the same low per gigabyte rate regardless whether they are big or small or how much data they purchase."[93] If so, then the program's price would not be unreasonably discriminatory. The determination of whether a payment is *reasonable* can likely be made by comparing the price charged to the edge provider with the marginal usage-based charge to the consumer (e.g., the incremental price per unit volume for upgrading to a higher data cap). We do not have information on the price charged to edge providers. However, AT&T has stated that the price charged is "as low as the market-based rates AT&T Mobility offers to major wireless resellers who commit to significant purchase volumes" and "generally well below the effective rates that retail customers pay per unit of actual consumption."[94] If so, then the program's price would not be unreasonable.[95] Similarly, Verizon has stated that it "gives third parties nondiscriminatory access to FreeBee."[96]

Sponsored data programs may have either a positive or negative effect on *edge provider economic innovation*, but these effects are directly related the ability of edge providers to reach potential customers, which were already considered in the competitive effects factor. Since sponsored data programs do not affect network management, there is no effect on *technical innovation*. Similarly, increases or reductions in *edge provider investment* are reflective of changes in edge provider competition. Sponsored data programs are also unlikely to have significant effects on *broadband deployment*, unless they grow to encompass a substantial proportion of user traffic. However, sponsored data programs may have an effect on *network capacity*. If the broadband provider charges reasonable prices, as both AT&T and Verizon claim, then incremental revenue can be expected to fuel increased network investment. However, if the prices are not reasonable, then incremental revenue will correlate more strongly with edge provider willingness-to-pay than with the cost of network capacity, and there will be little incentive to reinvest such revenue into network capacity.

93. AT&T, "Letter and Legal Analysis from Robert W. Quinn," 2–3.

94. AT&T 11/21/16 letter, attached White Paper, 3.

95. See, however, Federal Communications Commission Wireless Telecommunications Bureau, "Policy Review of Mobile Broadband," 12–16, which contends that "[a]ll indications are that AT&T's charges far exceed the costs AT&T incurs in providing the sponsored data service." The policy review was later retracted without analysis or explanation; see Federal Communications Commission Wireless Telecommunications Bureau, "Order in the Matter."

96. Verizon, Letter from Kathleen Grillo, 2–3.

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In summary, sponsored data programs will be judged under the general conduct rule. Their application-agnostic nature is a positive factor. Given that, competitive effects are likely to dominate the evaluation. Programs that charge a reasonable and not unreasonably discriminatory price to edge providers are pro-competitive, and will be not be prohibited. Programs that charge an unreasonable or unreasonably discriminatory price are anticompetitive, and this factor will likely outweigh the benefit of being application-agnostic, and thus such programs will likely be prohibited under the general conduct rule.

Zero-Rating and Throttling of Video Streaming

We next consider zero-rating practices in which a broadband Internet access service provider offers zero-rating for free to edge providers, and implements an associated network practice that throttles video. A prominent example is T-Mobile Binge On.[97]

There are two components to Binge On: zero-rating and throttling. First, T-Mobile tells consumers that they may "[s]tream as much video as you want from your favorite providers without using a drop of your high-speed data." Second, T-Mobile tells consumers that "[d]etectable video typically streams at DVD quality (480p+) with Binge On unless video provider opts-out."

Consumers may choose whether to participate in Binge On, and edge providers may choose whether to participate in the zero-rating and/or throttling components. If neither a T-Mobile consumer nor an edge provider acts, then when the customer streams video while on the T-Mobile network, traffic that T-Mobile identifies as video is throttled to a maximum of 1.5 Mbps but not zero-rated. If a T-Mobile customer does not act, but an edge provider opts-in to Binge On zero-rating, video from that edge provider to the customer is throttled (as before) but the volume of the video is not counted towards the customer's monthly data allowance. Finally, if either a T-Mobile customer opts-out of Binge On, or an edge provider opts-out of Binge On throttling, such video is neither throttled nor zero-rated. An edge provider is not allowed to opt-in to zero-rating and opt-out of throttling. An edge provider's options, if a customer has not opted-out of Binge On, are summarized in Table 1.

97. T-Mobile, "Binge On."

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TABLE 1 An edge provider's options when a customer has not opted-out of Binge On

	Edge provider does not opt-in to Binge On zero-rating	**Edge provider opts-in to Binge On zero-rating**
Edge provider does not opt-out of throttling	Throttled but not zero-rated	Throttled and zero-rated
Edge provider opts-out of throttling	Neither throttled nor zero-rated	Not allowed

We start with the consumer portion of the transparency rule. With respect to the zero-rating component of Binge On, T-Mobile maintains a consumer-focused website describing which plans are eligible,[98] and listing the participating edge providers.[99] Customers may thus easily identify whether they may use Binge On and for which edge providers. Although T-Mobile may not in general accurately identify all traffic flows that contain video, it is likely that edge providers who opt-in to Binge On zero-rating are sufficiently motivated to work with T-Mobile to improve the accuracy. T-Mobile also discloses that "[s]ome content, e.g. ads, may be excluded" from zero-rating. T-Mobile prominently states that consumers may opt-out of Binge On, and gives instructions for opting out, which can be done through the T-Mobile website, a T-Mobile app, or through a text message. These disclosures are likely to satisfy the consumer portion of the transparency rule *for the zero-rating component* of the practice.

With respect to *the throttling component* of Binge On, the Order states that disclosures of such practices must include "the purpose of the practice, which users or data plans may be affected, the triggers that activate the use of the practice, the types of traffic that are subject to the practice, and the practice's likely effects on end users' experiences."[100] T-Mobile gives two *purposes* for the throttling component. First, T-Mobile tells consumers that "[a]ll detectable video streaming is optimized for your mobile device so you can watch up to 3 times more video using the same amount of high-speed data." Second, T-Mobile explains on its Internet Services webpage that "[s]treaming video optimization improves overall data usage management of the network, resulting in greater network speeds and

98. Ibid.

99. T-Mobile, "T-Mobile Binge On Streaming Video List."

100. Federal Communications Commission, "Preserving the Open Internet," paragraph 56 (discussing application-specific behavior that inhibits or favors certain applications or classes of applications) and "Protecting and Promoting," paragraph 169.

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throughput for other customers using data because less network payload is dedicated to video."[101] Since T-Mobile allows users to opt-out of both Binge On zero-rating and throttling (but not to opt-out of throttling but not zero-rating), T-Mobile explains which users or data plans may be affected by Binge On throttling in the same manner that it explains which users or data plans may be affected by Binge On zero-rating.

With respect to the *trigger* that activates throttling and *which types of traffic* are throttled, T-Mobile explains on its Internet Services webpage that "[v]ideo optimization occurs only to data streams that are identified by our packet-core network as video," that "[s]ome videos, like those consumed via VPN, may not be optimized," and that "[s]ome video consumed while tethering may be difficult to identify as video and therefore cannot be optimized." As discussed above, the challenge here is that identification by a broadband provider of video is often imperfect. Video streaming applications use a variety of formats and protocols to encode and transmit video, and T-Mobile will not throttle traffic flows that it does not recognize as video, even if not transmitted via VPN or to a tethered device. In particular, T-Mobile discloses to edge providers that video streams transmitted over the user datagram protocol (UDP) or encrypted may "require additional collaboration with T-Mobile to enable the video detection."[102] Since an edge provider's video traffic is subject to Binge On throttling *even if* the edge provider has not opted into Binge On zero-rating, it is likely that some video streaming is not identified as such by T-Mobile and thus not throttled.[103] In addition, T-Mobile discloses that Binge On not only affects video streaming, it "may also affect the speed of video downloads." The question is whether T-Mobile discloses accurate information about which types of traffic are throttled sufficient for consumers to make informed choices regarding use of their broadband service. If classification of traffic as video is relatively accurate, then these disclosures are likely to satisfy the transparency rule *for the trigger of the throttling component* of the practice.

With respect to the practice's *likely effects on end users' experiences*, in addition to disclosing that "[d]etectable video typically streams at DVD quality (480p+)," T-Mobile explains on its Internet Services webpage that Binge On "adjust[s] the delivery rate for streaming video to up to 1.5Mbps" and that the result of such throttling is that Binge On "when connected

101. T-Mobile, "Internet Services" at "Video Optimization."
102. T-Mobile, "Content Provider."
103. Kakhki, et al.

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to the cellular network, deliver[s] a DVD quality (typically 480p or better) video experience [. . .] with minimal buffering while streaming."[104] T-Mobile further explains that "[w]hile many changes to streaming video files are likely to be indiscernible, the optimization process may impact the appearance of the streaming video as displayed on a user's device." On a separate support website, T-Mobile explains that under Binge On "many video services will deliver videos that will look good on a mobile device (at DVD-quality, typically 480p or better), rather than a higher resolution version (e.g., HD) which is often better suited for larger screen."[105] While these disclosures are improved from earlier ones that did not disclose the speed to which video is throttled,[106] they remain not sufficiently accurate. While T-Mobile describes Binge On throttling as utilizing "streaming video optimization technology," T-Mobile is not itself optimizing video. Instead, T-Mobile is assuming the edge provider will detect that its video stream has been throttled to 1.5 Mbps and will adapt the video resolution and frame rate accordingly. Thus, T-Mobile cannot guarantee that the resulting video will be "DVD quality," nor that it will be delivered "with minimal buffering."

There is another aspect of T-Mobile's disclosures to consumers about Binge On that deserves attention. T-Mobile deprioritizes the traffic of customers who have exceeded a specified monthly usage. T-Mobile discloses that data that is zero-rated under Binge On "still counts towards all customers' usage for this calculation."[107] It is debatable whether this disclosure on the Internet Services webpage is sufficient to moderate the advertisement on its Binge On webpage that a consumer may "[s]tream as much video as you want from your favorite providers without using a drop of your high-speed data."

We turn next to the edge provider portion of the transparency rule. In addition to the consumer-facing disclosures, T-Mobile publishes an overview of content provider technical requirements for Binge On.[108] This document explains to edge providers how to opt-in to Binge On zero-rating, and how to opt-out of Binge On throttling. However, T-Mobile explains that both opting-in to zero-rating and opting-out of throttling may require

104. T-Mobile, "Internet Services" at "What speeds and performance can T-Mobile-branded Broadband Internet Access Services customers expect? Where are these speeds available?"

105. T-Mobile, "Binge On Support."

106. See e.g., the April 11, 2016, version of T-Mobile, "Internet Services."

107. Ibid. at "Network Management for Extremely High Data Usage and Tethering."

108. T-Mobile, "Binge On Requirements."

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working with T-Mobile to ensure that video is properly identified, and that this may require technical modifications to the edge provider's service. These disclosures likely satisfy the edge provider portion of the transparency rule.

We now turn from the transparency rule to the no-throttling rule, under which Binge On's throttling practice would be evaluated. Because Binge On throttles a certain class of applications (video), it degrades Internet traffic on the basis of application, and thus is prohibited under the no-throttling rule unless the throttling practice qualifies as reasonable network management. T-Mobile cannot circumvent the rule by offering an alternative plan that does not throttle. In evaluating whether the practice is reasonable network management, the first question is whether it has a primarily technical network management justification. As mentioned above, T-Mobile gives two justifications—allowing subscribers to watch more video using the same data allowance, and improving overall data usage management of the network. The FCC would have to judge which of the two justifications is primary. Given that T-Mobile uses the same throttling practice not only for Binge On but also for some other plans (e.g., one of their "unlimited" plans), it is reasonable to conclude that network management is the primary purpose.

The next question is whether the throttling practice is "tailored to achieving" a reduction in congestion. T-Mobile argues that reducing the capacity used by video results in greater throughput for other traffic flows, and T-Mobile is likely to argue that throttling video to 1.5 Mbps is a tailored method. However, Binge On primarily throttles video flows that use TCP, and TCP itself implements application-agnostic congestion control. Thus, T-Mobile would have to justify that its throttling of video is tailored to achieving congestion management that is not already achieved by TCP. As T-Mobile explains, throttling a video stream that uses TCP to 1.5 Mbps may reduce the capacity used by video. However, reducing the usage of a class of applications is not in general a legitimate network management purpose, nevertheless a tailored practice. Thus, T-Mobile would have to justify how throttling video is tailored to achieving a legitimate network management purpose *given the particular network architecture and technology* of the broadband service, namely mobile broadband. Indeed, the order recognized that "the additional challenges involved in mobile broadband network management mean that mobile broadband providers may have a greater need to apply network management practices, including mobile-specific network management practices, and to do so more often to

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balance supply and demand while accommodating mobility."[109] However, balancing supply and demand can be accomplished using application-agnostic network practices such as TCP and data caps. It does not require application-based practices such as Binge On throttling. Furthermore, the determination of reasonableness considers whether the practice is triggered only during times of congestion and is based on a user's demand during those times. Binge On throttling does neither. Thus, Binge On would not qualify as reasonable network management *for the purpose of managing congestion*.

Although T-Mobile has not made the argument, it could alternatively argue that the purpose of Binge On throttling is to reduce traffic *that is unwanted by end users*. The Order specifically states that "addressing traffic that is unwanted by end users" is a technical network management justification.[110] T-Mobile could build on its advertisement that Binge On allows a consumer to "watch up to 3X more video—stretching your high-speed data farther,"[111] and could claim that consumers who have not opted out of Binge On want their video compressed to 1.5 Mbps, and thus do not want video traffic that exceeds 1.5 Mbps. However, T-Mobile would face two obstacles to such an argument. First, by combining Binge On zero-rating with Binge On throttling, T-Mobile has made it difficult to effectively argue that users who do not opt-out wish to stretch their high-speed data allowance by further compressing video. Indeed, the primary pitch that T-Mobile makes is that "you can stream all you want for FREE without using your data."[112] If video is zero-rated, then compressing it does not further stretch one's high-speed data allowance. Second, both end-user control and application-agnostic are factors in evaluating reasonable network management. If Binge On was an *opt-in* practice for end users, the positive factor of end-user control would likely outweigh the negative factor of an application-specific practice. However, since Binge On is an *opt-out* practice for end users, end-user control is weaker and is unlikely to outweigh the negative factor of an application-specific practice. Thus, Binge On is unlikely to qualify as reasonable network management, for the purpose of reducing traffic that is unwanted by end users, unless it is changed to an opt-in practice.

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109. Federal Communications Commission. "Protecting and Promoting," paragraph 223.

110. Ibid., paragraph 220.

111. T-Mobile, "Binge On webpage." The claim is apparently based on an estimate that unthrottled video streams at up to three times the 1.5 Mbps throttled rate.

112. Ibid.

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Binge On zero-rating could be evaluated under the general conduct rule. However, although Binge On zero-rating could in theory be separated from Binge On throttling, it is doubtful that T-Mobile would agree to zero-rate video without throttling it. Thus, evaluation of the zero-rating component separate from the throttling component seems premature at this time.[113]

Free Mobile Internet Access to Specific Edge Providers

We next consider zero-rating practices in which a broadband Internet access service provider zero-rates specific edge providers of the broadband provider's choice. A prominent example is T-Mobile Music Freedom.[114]

T-Mobile tells consumers that they may "stream unlimited music from your favorite services in our network—without getting hit with data charges." If a T-Mobile mobile broadband customer on a qualifying data plan streams music while on the T-Mobile network from an edge provider that T-Mobile has chosen to be included in the program, then the volume of the music is not counted toward the customer's monthly data allowance.

We start with the consumer portion of the transparency rule. T-Mobile maintains a consumer-focused website describing which plans are eligible,[115] and listing the edge providers included in the program. Customers may thus easily identify which edge providers are zero-rated. T-Mobile warns consumers that "[m]ost music streaming includes small amounts of non-music streaming data, such as album art and pic advertisements [,. . . that . . .] does count against your high-speed data bucket."[116] Customers on eligible plans are automatically enrolled in Music Freedom, and there is no opt-out. These disclosures are likely to satisfy the consumer portion of the transparency rule.

There another aspect of T-Mobile's disclosures to consumers about Music Freedom that deserves attention. T-Mobile de-prioritizes the

113. We do note, however, that the FCC's Wireless Telecommunications Bureau, in a policy review of mobile broadband operators' zero-rating practices, found that the zero-rating component of T-Mobile Binge On is unlikely to violate the general conduct rule. See Federal Communications Commission Wireless Telecommunications Bureau, "Policy Review of Mobile Broadband," 10. The Bureau did not evaluate the throttling component of T-Mobile Binge On in that policy review.

114. T-Mobile, "Music Freedom."

115. Ibid.

116. T-Mobile, "Music Freedom Support."

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traffic of customers whose usage—including music zero-rated under Music Freedom—exceeds a specified monthly threshold.[117] Similar to the concern about Binge On, it is debatable whether this disclosure on the Internet Services webpage is sufficient to moderate the top-line advertisement on its Music Freedom webpage that Music Freedom "lets you stream all the music you want from participating streaming services with your mobile device without using data."[118]

We turn next to the edge provider portion of the transparency rule. T-Mobile states that only "commercial music streaming services [that] provide licensed content from various sources" are eligible, that "[a]ny lawful and licensed streaming music service can work with us for inclusion in this offer," and that edge providers interested in being included in the program should send T-Mobile email to "begin the process."[119] T-Mobile does not publicly disclose its selection process, including any technical requirements. The transparency rule likely requires more than this. In particular, T-Mobile should publicly disclose the requirements for inclusion.

There is also an associated throttling practice that should be examined under the no-throttling rule. Plans that qualify for Music Freedom are those that have a monthly data cap. If a customer on a T-Mobile plan with a data cap has nonzero-rated usage that exceeds the data cap, then T-Mobile "may reduce [the customer's] data speed to 2G speeds for the remainder of that billing cycle."[120] If all traffic to and from such a user is throttled, then the throttling practice is application-agnostic, and thus it does not violate the no-throttling rule since it does not impair or degrade lawful Internet traffic on the basis of Internet content, application, or service, or use of a non-harmful device. However, T-Mobile states that "[i]f you reach your 4G LTE data limit through other means your on-network data will be slowed to 2G speeds but music streaming through included services will not be slowed down."[121] The zero-rating practice is thus associated with an exemption to the throttling practice that T-Mobile applies to usage above a data cap. This exemption makes the throttling of usage above a data cap an application-specific practice. Therefore, the throttling practice should now be examined under

117. T-Mobile, "Internet Services" at "Network Management for Extremely High Data Usage and Tethering."

118. T-Mobile, "Music Freedom Support."

119. T-Mobile, "Music Freedom."

120. T-Mobile, "Internet Services" at "Choice of High-Speed Data."

121. T-Mobile, "Music Freedom."

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the no-throttling rule. Because the throttling practice degrades Internet traffic on the basis of application (i.e., everything except qualifying music streaming), it is prohibited under the no-throttling rule unless it qualifies as reasonable network management. In evaluating whether the practice is reasonable network management, the first question is whether has a primarily technical network management justification. However, the exemption of selected music from throttling is clearly a business choice, not technical network management. Thus, it does not qualify as reasonable network management, and the associated throttling practice is prohibited under the no-throttling rule.

If T-Mobile were to remove this exemption to its throttling practice, then it would be worthwhile to examine Music Freedom under the general conduct rule. Music Freedom does not qualify as reasonable network management, as it does not affect the transmission of traffic (other than through the exemption to throttling).

Music Freedom is clearly not application-agnostic. Its treatment under the application-agnostic factor of the general conduct rule turns on whether it is a class based practice or an edge provider based practice. If the program is open to all music streaming services that satisfy certain technical requirements, then it is a class based practice. In that case, the evaluation would be similar to that discussed above for Binge On zero-rating. However, T-Mobile does not state that all edge providers satisfying certain requirements will be included upon request, and thus it is likely that T-Mobile exercises its own discretion about which music streaming services to include. If true, the program is not open to all music streaming services that satisfy certain technical requirements, and thus it is an edge provider based practice. In that case, as discussed above in the section on the application-agnostic factor, Music Freedom unreasonably disadvantages edge providers' ability to make lawful content, application, services, or devices available to end users. Thus, Music Freedom violates the general conduct rule.

Although such edge provider based practices violate the general conduct rule purely on the basis of the degree of application-specificity, some will argue that other factors under the general conduct rule should be considered. We thus turn now to the competitive effects factor. T-Mobile does not compete with music streaming services, and thus competition *between a broadband provider and edge providers* is not relevant to Music Freedom. However, both competition *among edge providers* and competition *among broadband providers* are relevant.

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Music Freedom may affect the competition *among music streaming services*. The practice is very likely to distort the market for music streaming services, and thus have an anticompetitive effect, unless Music Freedom is open to all music streaming service on not unreasonably discriminatory terms. However, the terms for inclusion in the program are not publicly disclosed by T-Mobile, and thus it is not possible here to determine whether the terms are unreasonably discriminatory.

Music Freedom may also affect competition *among broadband providers*. T-Mobile clearly uses Music Freedom to differentiate its mobile broadband plans from those offered by other broadband providers. Such differentiation is likely to have a pro-competitive effect in the market for mobile broadband Internet access service.

Competitive effects will thus be a positive factor for Music Freedom if the pro-competitive benefit of differentiation in mobile broadband plans outweighs any anticompetitive harm in the market for music streaming services. Conversely, competitive effects will be a negative factor otherwise.

Finally, we turn to effects on innovation, investment, or broadband deployment. Music Freedom does not include any innovation in network management practices, as it is not network management. It is possible that Music Freedom might reduce technical innovation in music streaming services through technical requirements for inclusion; however, it is more likely that classification is based on the application and edge provider than on deep packet inspection, and thus there is likely little effect on technical innovation. Finally, since there is no exchange of payment, we consider it unlikely that there will be a significant effect on broadband deployment.

In summary, the lack of application-agnosticism is a strongly negative factor under the general conduct rule, and competitive effects is a positive factor only if the pro-competitive benefit of differentiation in mobile broadband plans outweighs any anticompetitive harm in the market for music streaming services. It is unlikely that any positive competitive effects factor outweighs the negative application-agnostic factor, and thus it is likely that Music Freedom violates the general conduct rule.

Zero-Rated or Unlimited Access to Affiliated Content

As a last case study, we consider practices in which a broadband Internet access service provider offers zero-rated or unlimited access to

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affiliated content. Three prominent examples are AT&T Data Free TV,[122] Verizon go90,[123] and Comcast XFINITY Stream TV.[124]

AT&T Data Free TV is a program available to customers who have subscribed to both a qualified AT&T mobile broadband plan and either DIRECTV or U-Verse TV. AT&T advertises that when such customers use the DIRECTV or U-Verse TV app on a mobile device on the AT&T mobile network, "[i]n-App streaming does not count against your data allotments."[125] Verizon go90 is an app that offers free "live sports, original series and your favorite shows."[126] Verizon advertises that "Verizon Wireless customers can stream go90 content with the FreeBee Data 360 service without using data."[127] Comcast XFINITY Stream TV is a service available to subscribers of Comcast's fixed broadband Internet access service in certain states.[128] Comcast advertises that it is a "streaming video cable service that brings live TV, HBO, hit movies and more to your computer, tablet or smartphone" and that "as part of your XFINITY Stream package cable subscription, you can also watch TV Everywhere programming [. . .] over any Internet or mobile connection using the XFINITY Stream app or portal, or popular program apps like HBO Go."[129] Comcast states that "XFINITY Stream package data usage will not be counted towards your XFINITY Internet monthly data usage."[130]

We start with the consumer portion of the transparency rule. AT&T, Verizon, and Comcast all maintain consumer-focused websites describing which plans are eligible and which content does not count toward the data cap.[131] These disclosures are likely to satisfy the consumer portion of the transparency rule.

The no-throttling rule does not apply because zero-rated and nonzero-rated content are treated identically in the transmission of the content through the broadband provider's networks.

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122. AT&T, "Watch DIRECTV App."

123. Verizon, "go90 FAQs."

124. Comcast, "Stream TV."

125. AT&T, "Watch DIRECTV App" at "DATA FREE TV."

126. Verizon, "go90 FAQs" at "What is go90?"

127. Ibid., at "How much does go90 cost?"

128. A subset of the content, not including live TV and certain On Demand content, is also available to customers of other broadband Internet access services. See Comcast, "XFINITY Stream Portal."

129. Comcast, "XFINITY Stream Package."

130. Comcast, "Stream TV" at "Will XFINITY Stream package use data from my XFINITY Internet monthly data usage allowance?"

131. AT&T, "About Data Free TV"; Verizon, "go90 FAQs"; Comcast, "Stream TV."

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We turn next to the general conduct rule. These programs do not qualify as reasonable network management, since above we concluded that zero-rating programs (absent associated network practices that affect the transmission of traffic) are not network management practices.

We first consider the application-agnostic factor. If there is *an underlying zero-rating practice* open to all edge providers on reasonable and not unreasonably discriminatory terms, then the underlying zero-rating practice is application-agnostic. AT&T claims that Data Free TV is an AT&T program that zero-rates content using the AT&T Sponsored Data program, and that "[a]ny unaffiliated content provider can participate in AT&T's Sponsored Data program on the same terms and at the same rate as DIRECTV."[132] Similarly, Verizon claims that go90 is an Verizon program that zero-rates content using the Verizon FreeBee Data program, and that "[t]he same commercial terms apply both to Verizon's affiliates, like go90, and to third parties seeking to sign up for FreeBee."[133] Above, we concluded that both AT&T Sponsored Data and Verizon FreeBee Data would appear to be application-agnostic. However, AT&T Data Free TV and Verizon go90 are not themselves application-agnostic, as they can only be used for affiliated content.

In contrast, there is no doubt that unaffiliated edge providers cannot obtain the same exemption to Comcast's fixed broadband data caps as does Comcast Stream TV. However, Comcast claims that "Stream TV is a Title VI cable service delivered over a private, managed closed transmission path to customers' homes, not over the Internet."[134] The FCC would first evaluate this claim. The FCC would examine whether the cable service traffic uses "some form of network management to isolate the capacity used by [the cable service] from that used by broadband Internet access services."[135] Comcast states that it "provisions a separate 'service flow' to deliver Stream TV service to the home of each Stream TV customer," and that this separate service flow uses dedicated bandwidth. The FCC should examine the disclosures of the expected and actual network performance of the broadband Internet access service required under the Order's transparency rule.[136] For instance, the FCC should ask whether use of the cable service results in any degradation in the performance of the broadband Internet access service.

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132. AT&T 11/21/16 letter, 4.
133. Verizon 12/15/16 letter, 2–3.
134. Comcast, "Opposition of Comcast Corporation," 6–7.
135. Federal Communications Commission. "Protecting and Promoting," paragraph 209.
136. Ibid., paragraphs 165–166.

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If Comcast Stream TV were deemed *not* to be a Title VI cable service, then it is an affiliated zero-rating practice available exclusively to Comcast, and it thereby violates the general conduct rule. If, however, Stream TV is a cable service under Title VI of the Communications Act, then it would likely be evaluated as a non-BIAS data service. The FCC expressed in the Order that it is "especially concerned that over-the-top services offered over the Internet are not impeded in their ability to compete with [non-BIAS] data services."[137] Evaluation of non-BIAS data services is outside the scope of this article.

We turn next to the competitive effects factor. For both AT&T Data Free TV and Verizon go90, the effect of zero-rating upon competition *between the broadband provider and edge providers* must be considered. Both programs compete with edge providers who offer over-the-top video streaming services. As discussed above, if there is an underlying zero-rating practice available to edge providers on reasonable and not unreasonably discriminatory terms, then the determination of whether the affiliated zero-rating practice is anticompetitive likely turns on whether the broadband provider is really paying the same price as competitors or whether this payment to itself is an inconsequential internal transfer payment. Indeed, this was the focus of the FCC's Wireless Telecommunications Bureau in its policy review of both programs. AT&T states that "the sponsored data rate is as low as the market based rates AT&T currently offers even to wireless resellers who commit to significant purchase volumes"[138] and that it is "generally well below the effective rates that retail customers pay per unit of actual consumption."[139] However, while AT&T states that it incurs a marginal cost for carrying the zero-rated traffic, neither the price charged to resellers nor the marginal price charged to customers is necessarily equal to the economic net cost to AT&T. Indeed, research has shown that the marginal price associated with data caps is usually substantially above the marginal cost associated with network capacity.[140] The FCC's Wireless Telecommunications Bureau estimated that if the Sponsored Data price is similar to the discounted wholesale rates paid by major wireless resellers, then "an unaffiliated mobile video service provider would have to pay AT&T $16 a month to offer zero-rated service to a customer who uses just 10 minutes of LTE video per day, increasing to $47 for a customer

137. Ibid., paragraph 210.
138. AT&T 11/21/16 letter, 4.
139. AT&T 11/21/16 letter, attached White Paper, 3.
140. Jordan.

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using 30 minutes per day" and that "[t]hese costs alone would represent 46 percent to 134 percent of DIRECTV Now's $35 retail price."[141] The Bureau concluded that "[t]he limited information we have obtained to date [. . .] tends to support a conclusion opposite from AT&T's contentions–namely, that AT&T offers Sponsored Data to third party content providers at terms and conditions that are effectively less favorable than those it offers to its affiliate, DIRECTV."[142] Similarly, the Bureau concluded that "we have no data to confirm Verizon's unsupported assertion [. . .] that the FreeBee Data 360 sponsored data program offers third parties prices and terms equivalent to the economic net cost by Verizon to zero-rate its affiliated go90 video service."[143]

There is insufficient public information to determine whether AT&T and Verizon are incurring the same economic net cost as the price charged to unaffiliated edge providers. If they are, then the practice would not impede competition between the broadband provider and edge providers. If, however, the price is higher than the economic net cost, the Bureau concluded that AT&T Data Free TV "likely obstruct[s] competition for video programming services delivered over mobile Internet platforms and harm[s] consumers by inhibiting unaffiliated edge providers' ability to provide such service to AT&T's wireless subscribers."[144] Similarly, the Bureau concluded that if the price charged to edge providers under Verizon's FreeBee program is higher than the economic net cost to Verizon, then the Bureau would have similar concerns, albeit with a lower magnitude of anti-competitive effect due to the "less developed segment of the marketplace"[145] in which go90 competes.

The effect of these programs on competition *among mobile broadband providers* should also be considered under the competitive effects factor. AT&T claims that Data Free TV intensifies wireless competition.[146] Data Free TV is used by AT&T to differentiate its plans to compete with other mobile broadband providers, and this differentiation has a pro-competitive effect in the market for mobile broadband Internet access service.

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141. Federal Communications Commission Wireless Telecommunications Bureau, "Letter from Jon Wilkins," 2.

142. Federal Communications Commission Wireless Telecommunications Bureau, "Policy Review of Mobile Broadband," 13.

143. Ibid., 16.

144. Ibid., 13.

145. Ibid., 17.

146. AT&T 12/15/16 letter, 6.

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Finally, we could consider the effects of these practices on innovation, investment, and/or broadband deployment. However, economic forms of innovation were already considered in the competitive effects factor, and these practices do not include any technical forms of innovation.

In summary, the evaluation of both AT&T Data Free TV and Verizon go90 under the general conduct rule is likely to hinge on whether the prices charged to edge providers are reasonable and not unreasonably discriminatory. If the economic net cost to the broadband provider is the same as the price charged to edge providers, then the programs have no anticompetitive effect on edge providers, and have a pro-competitive effect on competition among mobile broadband providers. Thus, they would not violate the general conduct rule. If, however, the price charged to edge providers unreasonably exceeds the economic net cost to the broadband provider, then there are substantial anticompetitive effects between the broadband provider and edge providers. Furthermore, the anticompetitive effects between the broadband provider and edge providers outweighs the pro-competitive effects among mobile broadband providers, and the Bureau concluded that in this case the practice violates the general conduct rule.[147]

Summary of Case Studies Evaluated under the 2015 Open Internet Order

Table 2 summarizes our evaluation of the case studies.

In all cases, there are significant requirements of disclosures to consumers regarding accurate and sufficient information about zero-rated content and the effect of throttling (if any). There may also be significant requirements of disclosures to edge providers regarding availability of zero-rating for their content, price (if any), and the types of traffic throttled (if any).

The no-throttling rule only applies if there is an associated network practice that affects the transmission of traffic. The rule may prohibit application-specific throttling, such as that in T-Mobile Binge On, absent evidence that such practices are reasonable network management. The rules may also prohibit application-specific exemptions to throttling practices that would otherwise be application-agnostic, such as that the exemption in T-Mobile Music Freedom to heavy-user throttling.

The application of the general conduct rule to these cases is dominated by the application-agnostic, competitive effects, and innovation/investment/

147. Federal Communications Commission Wireless Telecommunications Bureau, "Policy Review of Mobile Broadband," 16.

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TABLE 2 Summary of the case studies

	Sponsored Data Programs	Zero-Rating and Throttling of Video Streaming	Free Mobile Internet Access to Specific Edge Providers	Unlimited Access to Affiliated Content
Transparency Rule	Requires that sponsored content be identified to consumers. May require that pricing to edge providers be publicly disclosed.	Requires that zero-rated providers and content be accurately disclosed to consumers. Requires that the types of traffic that are throttled, and the likely effect on users' experiences, be accurately disclosed to consumers.	Requires that zero-rated providers and content be accurately disclosed to consumers. May require that requirements for edge provider inclusion be publicly disclosed.	Requires that zero-rated content be accurately disclosed to consumers.
No-blocking and No-Throttling Rules	Do not apply.	Throttling practice prohibited unless reasonable network management.	Exemption to throttling of usage above data cap prohibited.	Do not apply.
Reasonable Network Management	Does not apply.	Throttling practice likely does not qualify unless the practice is opt-in.	Exemption to throttling does not qualify.	Does not apply.
Application-agnostic	Positive factor, since application-agnostic.	Not evaluated outside of reasonable network management.	Negative factor, since edge provider based.	Negative factor if there is not an underlying application-agnostic zero-rating practice.

(*Continues*)

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TABLE 2 Summary of the case studies (*Continued*)

	Sponsored Data Programs	Zero-Rating and Throttling of Video Streaming	Free Mobile Internet Access to Specific Edge Providers	Unlimited Access to Affiliated Content
Competitive Effects	Positive factor if the price is reasonable and not unreasonably discriminatory. Negative factor if the price is unreasonable or unreasonably discriminatory.	Not evaluated.	Positive factor if and only if the benefit of mobile broadband plan differentiation outweighs the anti-competitive harm in the relevant edge provider services market.	Positive factor if the economic net cost to the broadband provider is the same as the price charged to edge providers. Negative factor if the price charged to edge providers unreasonably exceeds the economic net cost to the broadband provider.
Innovation, Investment, and Broadband Deployment	Positive factor if the price is reasonable.	Not evaluated.	No significant effect.	No significant effect.
Summary	Likely prohibited under the general conduct rule if and only if the price is unreasonable or unreasonably discriminatory.	Likely prohibited under the no-throttling rule unless consumer opt-in.	Exemption from throttling prohibited under the no-throttling rule. Zero-rating likely prohibited under the general conduct rule.	Likely prohibited under the general conduct rule if and only if there is not an underlying application-agnostic zero-rating practice or if the price charged to edge providers unreasonably exceeds the economic net cost to the broadband provider.

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deployment factors. For sponsored data programs, application-agnosticism is a positive factor, and competitive effects and broadband deployment are positive factors if and only if the broadband provider charges reasonable and not unreasonably discriminatory prices for zero-rating (and are negative factors otherwise). Thus, we conclude that sponsored data programs such as AT&T Sponsored Data and Verizon FreeBee Data are likely allowed under the general conduct rule if and only if the price charged is reasonable and not unreasonably discriminatory.

For practices that provide unlimited access to affiliated content, we separately consider practices that are based on an underlying sponsored data program (e.g., AT&T Data Free TV and Verizon go90) and practices that are not (e.g., Comcast XFINITY Stream TV). For practices that are based on a sponsored data program that is allowed under the general conduct rule, only the competitive effects factor is significant. Furthermore, zero-rating of affiliated content is pro-competitive if the economic net cost to the broadband provider is the same as the price charged to edge providers. In this situation, we conclude that such affiliated zero-rating programs are likely allowed under the general conduct rule. In contrast, a practice that is not based on an underlying sponsored data program violates the general conduct rule, unless it not applied to broadband Internet access service (e.g., it applies only to a Title VI cable service), in which case it is evaluated instead as a non-BIAS data service.

For practices that provide free mobile Internet access to specific edge providers, such as T-Mobile Music Freedom, application-specificity is a negative factor, and competitive effects are a positive factor if and only if the benefit of broadband plan differentiation outweighs anticompetitive harm in the relevant edge provider services market (e.g., music streaming services) and are a negative factor otherwise. We find it unlikely that any positive competitive effects factor outweighs the negative application-agnostic factor, and thus it is likely that such programs violate the general conduct rule.

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