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## Are Zero-Rating Practices in the Public Interest? A Set of Case Studies

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# ARE ZERO-RATING PRACTICES IN THE PUBLIC INTEREST? A SET OF CASE STUDIES

SCOTT JORDAN<sup>1</sup>

## Abstract

Zero-rating and associated throttling practices by broadband Internet access service providers are widely debated. We evaluate three types of such practices. We find that sponsored data programs are likely in the public interest if and only if the price charged is reasonable and not unreasonably discriminatory. In contrast, we find that zero-rating and throttling of video streaming is not in the public interest, because it constitutes application-specific throttling and is not reasonable network management. We also find that free mobile Internet access to specific edge providers is likely not in the public interest, because it likely unreasonably interferes with or disadvantages end-users or edge providers.

## 1. 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 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, para. 151]. 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".

The literature on zero-rating practices mostly consists of arguments for and against such practices, see e.g. [2]-[17]. The academic literature, see e.g. [18]-[28], has yet to provide clear guidance on how such practices should be evaluated.

The goal of this paper is to provide such guidance. We consider three types of zero-rating practices: (1) zero-rating and associated throttling of video streaming, (2) sponsored data programs, and (3) free mobile Internet access to specific edge providers.

In the United States, the *2015 Open Internet Order* established a framework under which the practices of broadband Internet access service providers could be evaluated [1]. The rules places on such practices under the *2015 Open Internet Order* have since been repealed by the *2017 Restoring Internet Freedom Order* [29]. However, the framework established by the *2015 Open Internet Order* remains of interest to guide net neutrality efforts in the United States Congress, at local levels, and in other countries, as well as for academic purposes. In addition, the *2017 Restoring Internet Freedom Order* is being litigated.

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The 2015 *Open Internet Order* included 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. The *Order* did not pass judgement on whether zero-rating practices would violate any its rules, but it did 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” [1, para. 151]. 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 would be addressed on a case-by-case basis under the *Order’s* general conduct and transparency rules.

Applying this framework, for each type of practice, we evaluate four factors: (A) competitive effects of the practice, (B) the effect of the practice on innovation, investment, or broadband deployment, (C) whether the practice is application-agnostic, and (D) how much end users have control over the practice.

Section 2 provides a brief overview of the relevant *Open Internet* rules. In sections 3-5, we evaluate three types of recent zero-rating practices: zero-rating and throttling of video streaming, sponsored data programs, and free mobile Internet access to specific edge providers. 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 AT&T’s and Verizon’s sponsored data programs (called *Sponsored Data* and *FreeBee Data* respectively) are in the public interest, if and only if the price charged is reasonable and not unreasonably discriminatory. We show that these programs are likely to have a significant positive effect on competition among edge providers, if the price charged to the edge provider is similar to the marginal usage-based charge to the consumer. Furthermore, the practices appear to be application-agnostic.

In contrast, we find that T-Mobile’s implementation of zero-rating and throttling of video streaming (called *Binge On*) is not in the public interest. We show how the program implements throttling of video streaming in a manner that neither qualifies as reasonable network management for the purpose of managing congestion nor for the purpose of reducing traffic that is unwanted by end users.

Finally, we find that T-Mobile’s implementation of zero-rating free mobile Internet access to specific edge providers (called *Music Freedom*) is likely not in the public interest. We show how zero-rating of specific music streaming providers distorts competition among music streaming services, but may have positive effects on competition between broadband providers. We also show how the program implements throttling of non-zero rated traffic that exceeds a consumer’s data cap in a manner that does not qualify as reasonable network management, and that the effect of this throttling is likely to dominate any pro-competitive effect of the practice.

## 2. An Overview of the Relevant Open Internet Rules

The *Open Internet Order’s* transparency rule ensured that consumers can make informed choices, and ensured that edge providers have the information necessary to innovate, promotes competition, and supports enforcement [30, para. 53]. 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” [30, para. 54]. The required disclosures included network practices, performance characteristics, and commercial terms. They must be “in plain language accessible to current and prospective end users and edge providers” [1, para. 161] [30, para. 56].

The *Open Internet Order’s* no-throttling rule provided 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”. [1, para. 119]. The rule allows an exception for “reasonable network management”, as discussed below. 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 [1, para. 122].

The *Open Internet Order's* general conduct rule provided 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 (i) 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 (ii) edge providers' ability to make lawful content, applications, services, or devices available to end users" [1, para. 136]. The rule also allows an exception for reasonable network management. The *Order* set out a non-exhaustive list of factors to be used in assessing a network practice under the general conduct rule [1, para. 138-145]. The most pertinent factors for evaluation of zero-rating practices were: application-agnostic; competitive effects; and effects on innovation, investment, or broadband deployment. We analyze these factors below.

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. The *Order* defines a "network management practice" as "a practice that has a primarily technical network management justification, but does not include other business practices" [1, para. 215]. 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." We analyze these factors below.

### 3. Zero-Rating and Throttling of Video Streaming

We first 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*.

#### 3.1. Transparency

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" [31]. 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.

We start with the consumer portion of the transparency rule, which required a broadband provider to disclose accurate information about network practices sufficient for consumers to make informed choices regarding use of their broadband service. With respect to the zero-rating component of *Binge On*, T-Mobile maintains a consumer-focused website describing which plans are eligible [31] and listing the participating edge providers [32]. 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*, application-specific throttling practices are also network practices that must be disclosed under the transparency rule. 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” [1, para. 169] [30, para. 56]. 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 throughput for other customers using data because less network payload is dedicated to video” [33, at “Video Optimization”]. 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”. 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 UDP or encrypted may “require additional collaboration with T-Mobile to enable the video detection” [34]. 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. 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 to the cellular network, deliver[s] a DVD quality (typically 480p or better) video experience ... with minimal buffering while streaming” [33, at “What speeds and performance can T-Mobile-branded Broadband Internet Access Services customers expect? Where are these speeds available?”]. 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 (for example, HD) which is often better suited for larger screen” [35]. While these disclosures are improved from earlier ones that did not disclose the speed to which video is throttled<sup>2</sup>, 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”.

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<sup>2</sup> See e.g. the April 11, 2016 version of T-Mobile Internet Services webpage, archived at <https://web.archive.org/web/20160411014634/http://www.t-mobile.com:80/company/company-info/consumer/internet-services.html>.

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" [33, at "Network Management for Extremely High Data Usage and Tethering"]. 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, which requires a broadband provider to disclose accurate information about network practices sufficient for content and application providers to develop, market, and maintain Internet offerings. In addition to the consumer-facing disclosures, T-Mobile publishes an overview of content provider technical requirements for *Binge On* [34]. 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 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.

### 3.2. Throttling

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 (Transmission Control Protocol), 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 balance supply and demand while accommodating mobility" [1, para. 223]. 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 [1, para. 220]. 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” [31]<sup>3</sup>, 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” [31]. 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.

### 3.3. Zero-rating

*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.<sup>4</sup>

## 4. Sponsored Data Programs

We next 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* and Verizon *FreeBee Data*.

### 4.1. Transparency

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” [36]. 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” [37]. 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.

We start with the consumer portion of the transparency rule. AT&T maintains a consumer-focused website describing which plans are eligible [36]. Verizon does not, but appears to consider any Verizon Wireless customer on a data plan with a data cap eligible [38]. 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.

We turn next to the edge provider portion of the transparency rule. Both AT&T [39] and Verizon advertise these zero-rating programs to edge providers. There are technical requirements that allow the broadband provider to identify zero-rated content, and a brief overview of these requirements are publicly available. Pricing information is not publicly disclosed. Further information about both programs is available to edge providers upon request. It is unclear whether the availability only upon request of pricing and of detailed technical requirements satisfies the transparency rule.

<sup>3</sup> The claim is apparently based on an estimate that unthrottled video streams at up to three times the 1.5 Mbps throttled rate.

<sup>4</sup> 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 [40], at 10. The Bureau did not evaluate the throttling component of T-Mobile Binge On in that policy review.

#### 4.2. Throttling

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

#### 4.3. Zero-rating

We turn next to the general conduct rule. Proponents may claim that sponsored data programs qualify as reasonable network management, and hence fall within the exception to the general conduct rule. The rationale for this claim is that zero-rating practices are a form of second-degree price discrimination that results in increased broadband provider profit, and that 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.

We thus turn to the most pertinent factors for evaluation of zero-rating practices: application-agnostic; competitive effects; and effects on innovation, investment, or broadband deployment. 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 [1, footnote 344]. 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 transport- layer protocol, or that has particular characteristics (e.g., the size, sequencing, and/or timing of packets)." 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).

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 [39]. 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. Competition affects the "'virtuous cycle' in which innovations at the edges of the network enhance consumer demand, leading to expanded investments in broadband infrastructure that, in turn, spark new innovations at the edge" [1, para. 7]. 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.

Sponsored data 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*. 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" [1, para. 80], 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" [1, para. 82]. The question is whether such a practice has pro-competitive or anti-competitive 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.



A sponsored data program may have either pro-competitive or anti-competitive effects. If the payment is reasonable and not unreasonably discriminatory, then the zero-rating practice does not distort competition, and is hence not anti-competitive. 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 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.

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 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" [42]. 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" [42]. If so, then the program's price would not be unreasonable.<sup>5</sup> Similarly, Verizon has stated that it "gives third parties nondiscriminatory access to FreeBee" [43].

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.

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.

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 anti-competitive, 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.

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<sup>5</sup> See, however, [40], 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 [41].

## 5. 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*.

### 5.1. Transparency

T-Mobile tells consumers that they may “stream unlimited music from your favorite services in our network—without getting hit with data charges” [44]. 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 [44], 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” [45]. 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 traffic of customers whose usage – including music zero-rated under *Music Freedom* – exceeds a specified monthly threshold [33, at “Network Management for Extremely High Data Usage and Tethering”]. 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” [45].

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” [44]. 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.

### 5.2. Throttling

There is 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 non-zero-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” [33, at “Choice of High-Speed Data”].

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” [44]. 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 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 the 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.

### 5.3. Zero-rating

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. Sections 201 and 202 of the *Communications Act* prohibit common carriers from using unreasonable or unreasonable 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, *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.

*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 anti-competitive 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 anti-competitive 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 anti-competitive 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.

## 6. Summary

In all cases considered, 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/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 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 anti-competitive 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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