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Comments on BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, BoR (16) 94¹

I welcome the opportunity to comment on the BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules. I submit these comments as a professor of law and, by courtesy, electrical engineering at Stanford University whose research focuses on Internet architecture, innovation and regulation. My book “Internet Architecture and Innovation,” which was published by MIT Press in 2010, is considered the seminal work on the science, economics and politics of network neutrality. My papers on network neutrality have influenced discussions on network neutrality all over the world.² I have testified on matters of Internet architecture, innovation and regulation before the US Federal Communications Commission.³ The FCC’s 2010 and 2014 Open Internet Orders relied heavily on my work. I have not been retained or paid by anybody to participate in this proceeding.

My comment is based on and draws heavily on my existing writings on net neutrality. The papers most relevant to this consultation are attached to this submission. The following text summarizes the key ideas and points to the parts of the papers that contain the relevant, more detailed analysis. I would welcome the opportunity to discuss these important issues further.

I. Sub-Internet Offers and 3rd Category of Access Service

Internet offers which only provide access to a limited set of content and applications (“sub-internet offers”), while preventing users from accessing anything else, are not in line with the regulation.

Such services could not qualify as lawful internet access services under Art. 2(2): The restrictions would violate the no-blocking provisions of Art. 3(1) and Art. 3(3), and would undermine end users’ rights according to Art. 3(1), which in turn would violate Art. 3(2).

Sub-internet offers could not qualify as lawful “services other than internet access services” (specialised services) under Art. 3(5), either: They would violate Art. 3(5), subparagraph 2,

¹ This document is an updated version of the comments that were submitted to BEREC on July 18, 2016.

² See, e.g., van Schewick (2007); Frischmann & van Schewick (2007); van Schewick (2015e).

³ See, e.g., van Schewick (2008); van Schewick (2010c); van Schewick (2010b); Federal Communications Commission (2014).

which specifies that “*Such services shall not be usable or offered as a replacement for internet access services, [...]*”. As this provision was part of the legislation throughout all draft stages, the intention of the legislator to ban sub-internet offers is very clear.

Therefore, paragraph 17 of the draft guidelines is correct in prohibiting sub-internet offers.

The legislation leaves no room for a third category of “electronic communications services” (ECS). First, the legislation does not mention such a third category of access service. BEREC would be overstepping its mandate according to Article 5(3), if the guidelines included an access service the legislator did not intend. Second, Article 3(5) uses the phrase “services other than internet access service,” which has to be read as a catch-all provision that covers all other types of ECS.

To reflect this, paragraph 18 should be amended by deleting the words “the nature of” to clarify that any restriction to an internet access service has to be done on the terminal equipment. The mention of “e-book readers” in the same paragraph has to be deleted, because these devices often come with web browser functionality and are therefore capable of connectivity to virtually all end-points in the internet.

II. Specialized Services

A. Problem Analysis

1. The specialized services exception could be used to circumvent the Regulation’s ban on fast lanes for normal Internet applications, content, and services.

The regulation bans ISPs from offering technical preferential treatment (so-called “fast lanes”) to providers of normal Internet applications, content, and services in exchange for a fee (Art. 3(3), subparagraph 2). I am concerned that ISPs could use the regulation’s legitimate exception for specialized services to circumvent that ban. This is not a hypothetical threat. ISPs like Deutsche Telekom have made clear that they want to use the specialized service exception to offer preferential treatment to everyday Internet application like online gaming, online telephony, video conferencing, or online video for a fee.⁴ The guidelines must prevent that.

The law’s ban on fast lanes on the regular Internet is a central component of the law’s net neutrality regime that is necessary to allow start-up innovation to flourish. Allowing ISPs to sidestep this ban would be a fundamental departure from the way the Internet has operated for the past decades. It would increase the costs of developing new applications, content, and services in Europe, fundamentally change the environment for innovation and free speech on the Internet in Europe, and harm all sectors of the European economy.

Thus, defining the boundary between the ban on fast lanes as the general rule and the exception for specialized services in a way that allows legitimate specialized services to emerge while

⁴ Deutsche Telekom (2015).

preventing a circumvention of the rule is of critical importance if the regulation is to realize its stated goal of protecting end users and the continued functioning of the internet innovation ecosystem.

2. Fast lanes would fundamentally change the environment for innovation, competition and free speech on the Internet and would harm all sectors of the economy.

Permitting ISPs to sell fast lanes will harm online innovation in Europe in particular, the European economy in general, and freedom of expression and information.

First, fast lanes would crush start-up innovation in Europe. The Internet provides a prosperous environment for startups because the costs of innovation are incredibly low. If ISPs could start charging fees for access to fast lanes, this would drastically alter the calculus for emerging European startups, making their enterprises more capital intensive and risky. As I explain in the attached paper “The Case for Meaningful Net Neutrality Rules,” this, in turn, would fundamentally change the environment for investment as well.⁵ Many start-ups would not be able to pay the fee and would have to give up on innovating altogether. Far greater investments would be needed to challenge dominant companies. All of this would directly threaten ‘the continued functioning of the Internet ecosystem as an engine for innovation’ (Recital 1)

Second, while ‘fast lanes’ are particularly harmful for the innovative startup ecosystem, they affect almost every part of the economy. Today, most companies rely on the Internet to reach their customers. Large corporations that pay to be in the fast lane will have higher costs, so that we the customers will be forced to pay higher prices for their products and services. Small businesses that are unable to pay will be shut out of the market. Many small businesses in Europe are just starting to take advantages of the opportunities that the Internet has to offer. They should have the same opportunity to benefit from an open Internet as their counterparts in the United States.

Third, fast lanes also impact the freedom of expression and information, by restricting media pluralism. The Internet has become the central platform in European society to seek, receive and impart information. However, fast lanes marginalize those actors who cannot afford privileged treatment, disproportionately affecting not only start-ups and small businesses but also non-profits, educators, artists, musicians, writers, activists, faith groups, and NGOs who play a crucial role in our public discourse. Thus, fast lanes harm the diversity of Internet media to the detriment of the freedom of information and expression, and ultimately the functioning of our democracy.

The impact of so-called fast lanes on start-up innovation, competition, all sectors of the economy, and free speech is described in detail in my attached paper “The Case for Meaningful Net Neutrality Rules”.⁶ I originally submitted it to the Federal Communications Commission during its recent Open Internet Proceeding, but the recommendations and arguments apply

⁵ van Schewick (2015b), Section on “Access fees”.

⁶ van Schewick (2015b), Section on “Access fees”.

equally in Europe. As the paper explains, the proposal was strongly supported by the record in the Open Internet Proceeding. The paper has five appendices that collect relevant excerpts from submissions by a diverse group of stakeholders. The appendices are available from the author on request or can be found online at the following link:

<https://www.fcc.gov/ecfs/filing/60001018648>.

3. Ensuring that regular Internet Access is “good enough” does not solve the problem.

Art. 3(5), subparagraph 2 requires regulators to ensure that specialized services must not reduce the quality of regular Internet access. Some people think that this provision will protect start-ups and others who cannot pay to be in the fast lane, because they can still get to customers at a decent quality by using the normal Internet access service.

This argument rests on a fundamental misunderstanding about the nature of competition on the Internet. Research shows that increasing load times by as little as 100 milliseconds reduces the amount of time people spend on a site, how much they buy, and whether they come back.⁷ Thus, if the guidelines allow ISPs to offer fast lanes to regular Internet applications for a fee as a specialized service, those who can't pay to be in the faster lane provided by the specialized service will have fewer users or readers, fewer sales, and less advertising revenue. This problem affects every application, website and service, not just delay-sensitive applications like online video. Improving the quality of the slower lane – the normal internet access – does not remove that problem. Users and applications are still stuck with the quality differential between paying and nonpaying applications.

Thus, if we want to preserve European innovation and free speech online, we have to make sure that the specialized service exception cannot be used to circumvent the regulation's ban on fast lanes for normal Internet applications.

B. Proposed Solution

1. The draft guidelines must unambiguously prohibit ISPs from circumventing the law's ban on fast lanes by offering fast lanes to regular Internet applications under the guise of specialized services.

The exception in Article 3(5) was written to allow for legitimate emerging services “other” than IAS that will not be able to function on the public open Internet because of new “key features” that require “optimization” that is “objectively necessary” under subparagraph 1 of Article 3(5). People, companies and other entities would buy these services separately, in addition to their regular Internet access.

In interpreting this legitimate exception, the guidelines must ensure that ISPs cannot circumvent the law's ban on fast lanes for normal Internet applications by calling them a specialized service.

The draft guidelines seem to recognize the problem,⁸ but they don't solve it completely.

⁷ See, e.g., <https://www.pearanalytics.com/blog/2009/how-webpage-load-time-related-to-visitor-loss/>.

⁸ See BEREC draft guidelines, paras 101, 104, 106, and 107.

2. The guidelines need to define explicitly how to distinguish a legitimate specialized service from a circumvention of the law’s ban on fast lanes.

To prevent any game-playing by ISPs, the guidelines must state clearly how regulators will distinguish legitimate specialized services from attempts to circumvent the ban. To reach this goal, the guidelines should clarify that an optimization is not “*necessary* in order to meet the requirements of an application ... for a specific level of quality” if that application can function on a well-provisioned Internet access service. By contrast, the fact that an optimization improves the performance of an application compared to that application’s performance on a normal internet access service does not make the optimization “*necessary.*” Finally, if the application cannot function on the normal Internet, then it is a legitimate specialized service that can take advantage of the specialized services exception.

This interpretation flows from the wording of the provision, the overall goals of the regulation, and the overall structure of Art. 3(5).

According to Art. 3(5), ISPs "shall be free to offer

- services other than internet access services which are optimised for specific content, applications or services, or a combination thereof,
- where the optimisation is necessary in order to meet requirements of the content, applications or services for a specific level of quality."

The second part of this phrase is key for distinguishing between (a) a specialized service that circumvents the net neutrality rules and (b) a legitimate specialized service.

Different content, applications, and services have different requirements for specific levels of quality. For example, online telephony functions particularly well if one-way delay is less than 150 ms, and becomes effectively unusable if delay is larger than 400ms. One-way jitter should be below 30 ms. The amount of packet loss that an online telephony application can tolerate depends on the specific coding and loss-concealment techniques used and can reach from 1% to 20%. Streaming video applications that stream stored video can usually tolerate delays of several seconds. They don’t have specific jitter requirements, but packet loss should not exceed 5 %.

In spite of having requirements for specific levels of quality, these applications generally function well on today’s Internet access services. Thus, even though these applications have requirements for a specific level of quality, these requirements are being met by normal Internet access services. In these cases, an optimization is not “*necessary* to meet the requirements of the content, applications, or services for a specific level of quality,” and these applications do not meet the regulation’s requirements for specialized services.

By contrast, if an application has requirements for a specific level of quality that cannot be met by normal Internet access services, making it impossible for the application to function on those services, then an optimization is “*necessary* to meet the requirements of the content, applications, or services for a specific level of quality.”

This interpretation gives us exactly the results we need. If an application can function on the normal Internet, then allowing it to buy an optimisation as a specialized service would basically result in paying for a fast lane. But if the specialized service cannot function on the open Internet and meets the definition of optimization as necessary, this is precisely the kind of service for which the exemption was made. Specialized services allow those kinds of applications to emerge that could not exist otherwise.

This interpretation best realizes the goals of the regulation. Interpreted this way, the specialized services exception enables innovation in applications, content, and services that could not exist in the absence of specialized services.

At the same time, this interpretation makes it impossible to use specialized services to circumvent the regulation's ban on selling preferential treatment to CAPs for a fee, which is critical to realizing the explicit goals of the regulation to "protect end-users" and "guarantee the continued functioning of the internet ecosystem as an engine of innovation." (Recital 1)

Finally, this interpretation flows from the structure of Art. 3(5). First, as a general rule, exceptions (here: the specialized services exception) should be interpreted narrowly in order not to swallow the rule (here: the regulation's ban on fast lanes). Second, the last sentence of recital 16 explicitly requires NRAs to verify that the specialized service is not used to "simply grant general priority over comparable content, applications, or services available via the Internet access service and thereby circumvent the provisions regarding traffic management measures applicable to the internet access services." Third, the text of the law provides no indication that the legislator wanted to allow specialized services to be a vehicle for offering better service to normal Internet applications for a fee. The examples provided in recital 16 ("services responding to a public interest or some new machine-to-machine communications services") suggest that specialized services are meant for new services with special needs, not for regular Internet applications. Finally, Art. 3(5), subparagraph 2 explicitly states that specialized services "shall not be usable or offered as a replacement for internet access services." As Art. 3(5), subparagraph 2 and recital 17 make clear, specialized services need to be offered on capacity that is in addition to and separate from the capacity used for internet access. Thus, from the perspective of both the end user and the application provider, a specialized service offering higher quality transmission to a normal Internet application "replaces" the transmission service provided by regular internet access and is therefore "usable" and "offered as a replacement for internet access services" with respect to this application, violating Art. 3(5), subparagraph 2.

3. The guidelines should make an exception from this definition for certain services offered by ISPs based on reliance interests.

In general, the interpretation proposed above gives us the right results. There is only one exception: Internet telephony services and linear IP TV services offered by ISPs need to be grandfathered in. This includes VoLTE offered by mobile carriers or the digital voice services offered by cable providers. As the existence of numerous online telephony and online video services show, these applications could function on the normal Internet, and so they would fail

the test. However, banning these services now would frustrate legitimate reliance interests. Carriers have been allowed to offer these services in the past and have made investments (such as acquiring spectrum) with the expectation that they would be able to offer both mobile voice and Internet services over that connection, and the regulation should honor those expectations.

Creating an explicit, limited carve-out for these services is preferable over weakening the definition of “necessary” so that it would capture those services. In principle, these services are no different from other services that can function on the normal internet, so there are no other criteria that could be used to meaningfully distinguish them from specialized services that circumvent that ban. Thus, any definition of the word “necessary” that would allow these services to be offered as a specialized service would allow all Internet applications to do the same, opening a gigantic loophole that makes the regulation’s ban on fast lanes meaningless. The only reason to treat them differently is the reliance interest, so listing them explicitly as an exception is the best way to solve that problem.

4. The guidelines need to explicitly foreclose two avenues for circumventing the ban that have been floated by ISPs and equipment vendors.

The draft guidelines could be read to be open to two specific ways of circumventing the ban on fast lanes that ISPs and equipment makers have floated.

First, some ISPs and equipment makers suggest that an app can get a “specialized services” designation just because the contract with the end user assures a certain quality of service (QoS) not available on the open Internet.⁹ This interpretation not only creates bizarre results by giving ISPs the power to single-handedly create the requirements that allow them to circumvent the regulation’s ban on fast lanes, but also is not compatible with the text of the regulation.

Under this interpretation, ISPs and CAPs could simply agree to such QoS language for their mutual benefit without any proof or even evidence that such QoS is objectively necessary for delivery of the service. This would make it possible to offer fast lanes to any Internet applications, content, and services if an ISP so desires, which would completely abolish the regulation’s ban on doing so.

This interpretation is impossible to square with the text of the regulation. Art. 3(5), subparagraph 1 explicitly requires that the “optimization is *necessary to meet the requirements of [an application]* ... for a specific level of quality.” This suggests necessity flows from an inherent need of the application and cannot be met by simple assertion. Similarly, the words “objectively necessary” in Recital 16 imply that necessity is different from subjective preferences as expressed in a contract. Finally, while Recital 16 mentions contractual assurance as one of the factors that regulators need to verify, this is only the second of two conditions necessary to trigger the SpS exception, not an alternative one. Rules of legal interpretation usually suggest

⁹ See, e.g., Cisco Systems, Ericsson & Nokia , p. 3 (“Necessity should be measured against the demands of the end-user purchasing the service and the ensuing need of the provider of the service to ensure delivery to the specified and contractually agreed level of quality.”)

that if a legislator includes two different requirements linked by “and”, these requirements should be interpreted in a way that gives each of them independent meaning. By contrast, if contractual assurance of a specific level of quality already makes the optimization necessary, both requirements become one. Thus, contractual assurance alone cannot make an optimization necessary.

Second, ISPs have suggested that they should be allowed to offer specialized services to online video providers that make it possible to stream video at a higher resolution than currently common in Germany (e.g., 4K), even though online video can function effectively on the normal internet access service. Paragraph 102 of the draft guidelines could be read to support that interpretation, when it says: “For example, a video application could use standard definition with a low bitrate or ultra-high definition with high bitrate, which will obviously have different QoS requirements.” This could be read to imply that the guidelines would treat standard definition video and high-definition video as two different applications when analyzing whether the optimization is “necessary” to meet the application’s requirements.

Such an interpretation is not consistent with text of the regulation. First, it is not consistent with the normal use of the word “application.” Increasing the resolution of a video or the quality of an application does not create a new application. It’s the same application at different quality levels. This is supported by the fact that many of today’s applications (e.g., online video or online telephony) dynamically adjust the resolution or bandwidth-intensity of the application based on the current conditions in the network. YouTube allows users to watch video at different resolutions, but it is still one application.

Treating different quality levels of the same application as one application instead of several is also required by the goals of the regulation. Offering a higher quality to an application that can function on the normal Internet is exactly the kind of fast lane that the regulation was meant to prevent. Legally, providing the same kind of service at a higher quality is not a new application, nor cannot it be a new “key feature” for which optimization is necessary. Otherwise, the ban on fast lanes would be meaningless.

Treating different quality levels as different applications would also stop the virtuous cycle between improvements in applications and improvements in the network that has driven both innovation and investment in applications and in the network. The fact that an application has difficulties functioning at the current level of quality available on the Internet often motivates application designers to improve the application’s technology so that it can work at the available level of quality. At the same time, innovations in Internet applications and services might create a need for additional network capacity. For example, the advent of online video applications increased customer demand for higher capacity Internet connections in the US, prompting US ISPs to invest in deploying additional network capacity in the last mile. Once that capacity was available, it not only benefitted online video applications, but opened up opportunities for other new uses of the Internet that might need that capacity.

If standard definition video does not qualify for a specialized service, but 4K video does because of its higher requirements, this creates an incentive for ISPs not to invest in additional capacity and instead channel 4K video services into specialized services, which allow the ISP to charge the content provider for the special treatment. This harms those video providers that would like to offer their video in 4K, but cannot pay extra fees for a specialized service (e.g., start-ups, small businesses, educational institutions, activists, or independent artists) and their viewers. It also harms the providers of other Internet applications, content, and services which would have been able to take advantage of the additional capacity had the ISP allocated it to normal Internet access instead of allocating it to specialized services. Basically, the interpretation implied in the draft guidelines would freeze in place the open Internet of today; everything that needs more would have to do it as a specialized service.

In sum, when evaluating whether the application can function on the normal Internet, regulators should focus on the kind of application, not on the specific quality level at which it is offered, and the draft guidelines should state that explicitly. Thus, offering online video at a higher definition or online telephony at a lower delay than currently supported in the normal Internet does not meet the requirements for a specialized service because online video and online telephony can function on the normal Internet.

5. Specialized services bought by a user must not be allowed to take away bandwidth from that user's Internet access.

Paragraph 118 allows specialized services bought by a user to take away bandwidth from that users' regular Internet connection. This interpretation harms Internet users and the providers of Internet applications, content, and services and contradicts the text of the regulation as well as the legislative history.

This interpretation harms users and providers of applications, content, and services. In essence, paragraph 118 allows telecom companies to take bandwidth that a customer bought to connect to the Internet and use it for a specialized service that the same person (and, potentially, the providers of these services) is paying for separately. That means people signing up for a specialized service would pay twice for the same bandwidth, and would have less bandwidth available for the websites and Internet apps of their choice. This harms people signing up for a specialized service, and makes it harder for Internet applications, content, and services to reach consumers.

Paragraph 118 directly contradicts the regulation, which requires that specialized services be offered "in addition to" access to the Internet [Art 3(5) second subparagraph], and must not reduce the quality of normal Internet access.

Finally, paragraph 118 runs counter to the legislative history of Article 3(5). Art. 3(5) originally read "and shall not be to the detriment of the availability or general quality of internet access services for other end-users." In the final trilogue negotiations, negotiators decided to delete the

word “other” from the provision, indicating a clear intention to extend the protection of this provision to end users actually taking the particular specialized service and their own Internet access service.

European consumers should not have to figure out whether their ISP is diverting some of their Internet connection, and how much of it, to other uses, and specialized services shouldn’t be permitted to push aside services traveling over the public Internet.

BEREC needs to correct the guidelines to clarify that specialized services can only be offered on bandwidth that is separate from and in addition to, and does not take away bandwidth used for regular Internet access, even if the reduction in bandwidth only affects the users’ own Internet connection.

III. Zero-rating and other forms of differential pricing

A. The draft guidelines unnecessarily limit regulators’ ability to enforce Art. 3(2).

The draft guidelines are based on a misunderstanding of the relationship between Art. 3(2) and Recital 7. As a result, they unnecessarily limit regulators’ ability to monitor and enforce Art. 3(2) of the regulation with respect to commercial practices. This will not only affect regulators’ ability to react to zero-rating plans, but also to other agreements and commercial practices such as other forms of differential pricing or interconnection practices.

Zero-rating is a commercial practice under Art. 3(2) of the regulation. That Article says that commercial practices should not limit the right of end users under Art. 3(1).

Paragraph 42 of the guidelines clarifies that “not every factor that affects end users’ choices should be considered to limit the exercise of the rights of end users’ rights under Art. 3(1).” Instead, “such restrictions would need to result in choice being materially reduced for this to qualify as a limitation of the exercise of the end users’ rights.”

The term “materially reduced in practice” stems from Recital 7, which states that regulators “should be empowered to intervene against agreements or commercial practices which, by reason of their scale, lead to situations where end-users’ choice is materially reduced in practice.” Regulators “should be required ... to intervene when agreements or commercial practices would result in the undermining of the essence of the end-users’ rights.”

By equating the term “limit” in Art. 3(2) with “material reduction of end users’ choice,” paragraph 42 signals that the draft guidelines view Recital 7 as establishing a ceiling for regulatory intervention. If a commercial practice reduces the rights of end users without “materially reducing users’ choice in practice,” the draft guidelines do not provide a possibility for regulatory intervention.

I suspect this interpretation is based on a misunderstanding of the structure of Art. 3(2). In fact, regulators' ability to enforce Art. 3(2) is much broader.

First, Art. 3(2) allows regulators to intervene if a commercial practice limits the rights of end users under Art. 3(1).

Second, Art. 5(1) gives regulators the power to enforce Articles 3 and 4. That means regulators can intervene based on this Article when zero-rating or another agreement or commercial practice limits the exercise of these rights.

Third, Recital 7 establishes some minimal requirements for when regulators should act. Regulators can always act to enforce the rules under Art. 5(1), but at a minimum, they should be empowered to intervene if there is a material reduction in users' rights. And they are *required* to intervene when zero-rating undermines the essence of these rights. Thus, Recital 7 provides a floor, not a ceiling for what NRAs can do with respect to zero-rating or other commercial practices. It does not limit NRAs' ability to enforce the rules to cases where there is a material reduction or the zero-rating undermines the essence of this right. The current interpretation in the draft guidelines does not adequately reflect the role of recitals in EU law. Recitals can clarify or help interpret an article in a regulation, but they cannot independently create or remove obligations. Thus, Recital 7 cannot take away the power to enforce Art. 3(2) that another article of the regulation (Art. 5(1)) confers on regulators.

Paragraph 42 of the guidelines should be corrected to reflect this.

Fourth, like all ISP practices, zero-rating has to comply with the rules regarding traffic management under Art. 3(3). Thus, as the guidelines recognize correctly in paragraph 38, zero-rating offers that block or slow down only applications that are not zero-rated when a user hits her monthly cap, while not applying the same measures to zero-rated application would violate Art. 3(3).

In sum, Art. 3(2) and Recital 7 create the following framework for regulatory intervention:

- if a commercial practice reduces the rights of end users without “materially reduc[ing] end-users’ choice in practice,” regulators can intervene based on Art. 3(2) and Art. 5(1);
- if a commercial practice “lead[s] to situations where end-users’ choice is materially reduced in practice,” regulators should be required to intervene; and
- if a commercial practice “undermin[es] the essence of the right” in Art. 3(1), regulators are required to intervene;
- if a commercial practice includes technical measures, these measures are evaluated separately under Art. 3(3).

B. The draft guidelines should ban harmful forms of zero-rating outright.

The draft guidelines acknowledge that zero-rating can be harmful, but they leave it to national regulators to evaluate specific zero-rating plans on a case-by-case basis. That is not enough: To avoid the considerable social costs associated with evaluating behavior case-by-case, zero-rating practices that are clearly harmful should be explicitly banned by bright-line rules.¹⁰

Bright-line rules provide certainty to the market, keep the costs of regulation low and make it feasible for users, start-ups and non-profits to bring complaints. By removing the regulator’s discretion in specific cases, they also limit opportunities for regulatory overreach.¹¹

By contrast, leaving the evaluation of specific practices to case-by-case adjudications creates considerable uncertainty, increases the costs of regulation and puts the burden on the public to bring complaints.¹² *First*, standards that are evaluated case-by-case make it difficult to determine how they would apply to specific practices. The resulting lack of certainty harms ISPs, entrepreneurs and investors alike, which, in turn, would reduce innovation and investment.¹³ *Second*, case-by-case standards tilt the playing field in favor of large, established players that can afford long, costly proceedings at the regulatory agency and make it difficult for actors with few resources and little experience navigating the regulatory processes – users, start-ups, or non-profits – to bring successful complaints.¹⁴ During the FCC’s Open Internet proceeding, start-ups uniformly explained that such a standard would make it all but impossible for them to bring complaints.¹⁵ *Third*, applying such a standard creates high costs of regulation.¹⁶ *Fourth*, vague case-by-case standards give the regulatory agency ample discretion to decide specific cases and so interfere with competitive markets for websites and services, providing opportunities for regulatory overreach.¹⁷ *Finally*, this approach risks creating a patchwork of 28 different

¹⁰ This paragraph is adopted from van Schewick (2015a), pp. 5, 16-17.

¹¹ van Schewick (2014d).

¹² See generally van Schewick (2015e), pp. 69-83; van Schewick (2014d).

¹³ See generally van Schewick (2015e), pp. 70-73.

¹⁴ See generally van Schewick (2015e), pp. 74.

¹⁵ See, e.g., Comments of Y Combinator, GN Docket No. 14-28, July 14, 2014, at 3, *available at* <http://apps.fcc.gov/ecfs/document/view?id=7521383177> (“No startup has the funds and lawyers and economists to take on billion-dollar ISPs in an FCC action based on the vague legal standards in the proposal. Indeed, the startup ecosystem needs a bright-line, per se rule against discrimination.”); Comments of Tumblr, GN Docket No. 14-28, Sept.9, at 10, *available at* <http://apps.fcc.gov/ecfs/comment/view?id=6018347452>, (“Notably, Tumblr has only two lawyers, and no telecommunications lawyers or lobbyists on staff. Tumblr cannot afford to engage in what would likely be multi-year challenges against the biggest broadband providers, with large legal teams experienced in telecommunications law, simply to secure access for its users equal to that of its current, and future, competitors with deeper resources.”); Reddit at 8, <http://apps.fcc.gov/ecfs/document/view?id=7521679127>, (“We have no lawyers on staff, and we devote our resources solely to meeting the needs of our 100 million visitors. We do not have the resources to engage ISPs in a legal fight, with only a vague standard as our weapon, without any firm ground on which to stand. We need clear, bright-line rules.”). Comments of Meetup, GN Docket No. 14-28, July 14, 2014, at 8, *available at* <http://apps.fcc.gov/ecfs/document/view?id=7521382127> (“It is simply unrealistic to think that a resource-constrained company such as Meetup would be able to avail itself of a vague and amorphous ‘commercial reasonableness’ standard that requires extensive and expensive adversarial proceedings.”). For additional quotes, see Ammori (2014), footnote 1.

¹⁶ See generally van Schewick (2015e), p. 73.

¹⁷ van Schewick (2014c).

regulatory zero-rating regimes. This market fragmentation is the opposite of the digital single market, that the regulation and the guidelines were meant to build towards.

If a practice is yet unknown or cannot be evaluated without considering the specific facts of the case, the practice cannot be evaluated in advance, so these costs are unavoidable. *But if a practice is already known to be harmful*, it should be prohibited by bright-line rules in order to avoid the considerable social costs associated with case-by-case evaluations.

Thus, the guidelines need a comprehensive, Europe-wide ban on harmful forms of zero-rating.

C. BEREC has the power to ban certain harmful forms of zero-rating in the guidelines.

The framework described above gives BEREC the power to enact bright-line rules banning certain harmful forms of zero-rating outright. To do so, it needs to specify in the guidelines that the practice in question “undermines the essence of the right” in Art. 3(1). Because of Recital 7, regulators are then required to intervene and enforce the regulation.

In evaluating zero-rating under Art. 3(2), regulators can consider the following aspects:

According to Art. 3(1), commercial practices should not limit the right of end users under Art. 3(1) to access the applications, content, and services of their choice, and to distribute and provide the applications, content, and services of their choice. Thus, the regulation protects the rights of end users as *consumers* and *producers*. That means that regulators can consider the impact of zero-rating on both consumers and application and content providers.

Moreover, Art. 3(2) must be interpreted in light of the goals of the regulation to protect the rights of end users and ensure the continued functioning of the Internet ecosystem as an engine of innovation.

Finally, according to Recital 33, “[t]he Regulation respects the fundamental rights and observes the principles recognised in particular by the Charter [of Fundamental Rights of the European Union], notably the protection of personal data, the freedom of expression and information, the freedom to conduct a business, non-discrimination and consumer protection.” The Charter of Fundamental Rights of the European Union binds European institutions and national authorities when they implement and apply European Union law, including when they are applying a regulation.¹⁸ As a result, regulators need to interpret the provisions of the regulation and the corresponding recitals in a way that respects these fundamental freedoms. Thus, the impact of ISP practices on freedom of expression and information, which includes the freedom not just to receive, but also to seek and impart information, and on media pluralism, are highly relevant to regulators’ analysis.¹⁹

¹⁸ See Art. 51(1) of the Charter. See also http://ec.europa.eu/justice/fundamental-rights/charter/index_en.htm.

¹⁹ See Art. 11(2) “Freedom of Expression and Information” of the Charter, which states: “The freedom and pluralism of the media shall be respected.”

Thus, the regulation protects end users not only in their roles as consumers and producers in the economy, but also as speakers and listeners in our democracy.

D. The draft guidelines should ban the following three harmful forms of zero-rating: Zero-rating for a fee, and zero-rating of some apps in a class or of whole classes of applications, even if there is no fee.

As the following analysis shows, these forms of zero-rating are so harmful that they undermine the essence of end users' rights under Art. 3(2).²⁰ They violate basic principles that were central for the Internet's ability to foster innovation and free speech, and violate user choice, competition, innovation, and free speech, although in different ways.

1. Zero-rating has a strong discriminatory effect.

Network neutrality rules aim to prevent network providers from distorting the playing field among applications or classes of applications, and from interfering with users' choices regarding the use of the network.²¹ Some commenters assume that zero-rating is less harmful than technical forms of discrimination (such as slowing down or speeding up certain applications), because applications that are zero-rated continue to receive the same technical treatment as applications subject to the cap. However, while zero-rating operates slightly differently, the discriminatory effect is the same: Zero-rated applications are more attractive to users than applications that are not.

Evidence suggests that zero-rating has a powerful effect on people's behavior.

Zero-rated content is more attractive to consumers than content that counts against their cap.

First, research shows that people strongly prefer zero-rated content over content that counts against their cap. For example, in a study commissioned by CTIA, "[n]early three-quarters of respondents (74%) report that they would be more likely to watch videos offered by a new provider if the content did not count against their monthly limit."²² When Slate experimented with zero-rating and "told some would-be listeners that the podcast wouldn't count against the data plans on their smartphones [...] users were 61% more likely to press play."²³

This is not surprising. Consider an Internet service provider that zero-rates its own streaming video application, while the traffic of all other applications is counted towards subscribers' bandwidth cap, a common practice around the world.²⁴ For users who have not exhausted their monthly bandwidth allowance, watching a video that produces 2 gigabytes (GB) of traffic via an unaffiliated application brings those users 2 GB closer to exhausting their bandwidth cap. By contrast, watching the same video via the Internet service provider's application does not reduce the amount of bandwidth available to users before they reach the

²⁰ The following analysis is adopted from van Schewick (2016a).

²¹ The following section is based on van Schewick (2015f), pp. 1-3; van Schewick (2016b), pp. 10-13.

²² CTIA - The Wireless Association (2014).

²³ Knutson (2014).

²⁴ Digital Fuel Monitor (2014a).

bandwidth cap. Users who have exhausted the monthly bandwidth allowance and watch the video using the unaffiliated application will have to bear the consequences of using another 2 GB (e.g., paying overage charges, having their traffic throttled, or being cut off from Internet access), while users watching the video via the affiliated application will not face any consequences. Thus, even if the data packets associated with different streaming video applications receive the same technical treatment in the network, the practice of counting only some streaming video applications towards the monthly bandwidth cap makes those applications relatively more attractive. The lower users' monthly caps, the stronger the pull.

This differential treatment of applications directly translates into a change in behavior. Many consumers are wary of going over their cap. Most consumers don't know how much data specific applications use, and how much monthly data they have left.²⁵ So the safer approach for customers is to use applications that do not count against their cap.²⁶ As a result, consumers will prefer zero-rated content over content that eats up their data – a preference based on a provider's inclusion in a zero-rating program, not on the merits of the provider.

This effect can already be observed with respect to Music Freedom, T-Mobile's zero-rating program for music in the US. On Twitter, Reddit, and Medium, T-Mobile customers have reported that Music Freedom affects which music streaming provider they use when streaming music over their mobile 4G LTE Internet connection. When customers find that their preferred provider is not included in the program, they instead use a different streaming provider that is part of Music Freedom – only because it will not count against their monthly cap.²⁷

Many zero-rated plans directly limit user choice among competing applications.

Second, many zero-rated plans directly limit the ability of customers to make meaningful choices among competing applications. For example, T-Mobile's Binge On program in the US allows customers to stream "unlimited" video from select video providers included in the program. Customers on the lowest qualifying plan with a 3G cap can watch as much as video as they want from Netflix and other providers in the program. But they can only watch 4 ½ hours per month, or 9 minutes per day, from providers that are not in the program – and that's only if they only

²⁵ Various studies have documented that customers have trouble understanding how much bandwidth specific applications use and how much data they have already used. See, e.g., Chetty, et al. (2012), pp. 3025 (study of South African households); Chetty, et al. (2015), p. 6 (study of US, South African, and Indian households); Union des Consommateurs (2013), pp. 29-30 (survey of Canadian Internet users); United States Government Accountability Office (2014), pp. 13, 16-17 (US focus groups).

²⁶ Studies show that Internet customers adjust their online behavior in order to avoid going over the cap, e.g., by reducing their use of the Internet service when they get closer to the cap (Nevo, Turner & Williams (2015), p. 8 (empirical study based on data set of Internet usage data of 55,000 users from an ISP)), by avoiding the use of applications known to be bandwidth-intensive (e.g., streaming video applications) on mobile Internet plans subject to caps (Chetty, et al. (2012), pp. 3025-3026; Horrigan (2014), p. 5 (survey of online Americans); United States Government Accountability Office (2014), pp. 17-18 (US focus groups)) or by waiting to engage in such activities on mobile devices until the device is connected to the Internet via WiFi (Horrigan (2014), p. 5 (survey of online Americans); United States Government Accountability Office (2014), pp. 16-17 (US focus groups)). A recent survey of online Americans found that "[o]ut of 55% of smartphone users with a data cap, more than half – 52% - have altered their online behavior because of the cap – either by not doing some online activities out of concern for hitting the limit or by waiting until they were within Wi-Fi range." (Horrigan (2014), p. 5).

²⁷ Triniton (2015); Triniton (2015); Triniton (2015); cocobandicoot (2015); travysh (2015); Sam (@Sammy1AM) (2015); Mad Hatman (@madhatman) (2015); Yiakoumis (2015).

watch video and don't do anything else online.²⁸ Unlimited video versus 9 minutes per day is not a meaningful choice. As a result, these video providers not included in Binge On simply cannot compete with companies included in Binge On, no matter how good their offerings.

This is not an isolated example. In the European Union, many ISPs zero-rate their own video applications. Customers on these plans can watch unlimited zero-rated videos, but their bandwidth caps prevent them from watching more than 2–5 hours of video content unaffiliated with the ISPs.²⁹ Similarly, many ISPs in Europe zero-rate their own cloud-storage applications. Their users can upload 10 gigabytes of traffic to the ISP's cloud storage for free. But it costs between \$50 and \$70 to upload the same amount of data to other cloud storage sites like Dropbox or Google Drive.³⁰ These plans make it effectively impossible for unaffiliated providers to compete with the ISP's zero-rated application.

Zero-rating may affect the attractiveness of an application to third parties.

Finally, zero-rating may affect an application's attractiveness to end users more indirectly by making the zero-rated application more attractive to third parties that are interested in reaching the application's end users.³¹ For example, just as consumers are more likely to watch zero-rated videos than videos that count against their monthly caps, video content creators are likely to prefer distribution platforms that are zero-rated over platforms that are not. That means video creators might choose a zero-rated video platform, not for its merits but simply because their videos will be more attractive to viewers if they don't use up viewers' data plans. But if zero-rated applications video platforms attract more video creators than other streaming services, this makes those platforms even more attractive to end users and would further disadvantage video streaming services that are not part of zero-rating programs.

²⁸ For a more detailed analysis, see van Schewick (2016b), pp. 11-12.

²⁹ Drossos (2015) (providing data for online video applications).

³⁰ Digital Fuel Monitor (2014b) (documenting the effect for cloud storage applications).

³¹ For a more detailed analysis, see van Schewick (2016b), pp. 12-13.

In sum, zero-rating is a powerful tool to favor some applications over others and causes the same problems as technical forms of differential treatment. Like technical forms of discrimination, zero-rating may be used in one of three ways:

- An ISP can offer applications providers to pay for zero-rating.
- An ISP can zero-rate selected applications in a class of similar applications without charging the providers of the zero-rated applications.
- An ISP can zero-rate all applications in a class without charging the providers of the zero-rated applications.

Like the different kinds of technical discrimination, these different kinds of zero-rating pose different problems, and should be evaluated separately.

2. Zero-rating in exchange for edge-provider payment

ISPs have expressed their interest in offering application providers the opportunity pay to have traffic affiliated with their application exempted from the cap.³² In the US, AT&T offers a program called “sponsored data,” that allows any interested provider to pay to have its content zero-rated.³³ Earlier this year, Verizon announced a similar program.³⁴ These plans create the same problems as allowing application providers to pay for fast lanes or other technical forms of preferential treatment – a practice banned by the FCC’s Open Internet rules and by the EU’s net neutrality regulation.

Zero-rating against a fee harms the start-up innovation ecosystem and free speech

Fees in exchange for zero-rating pose the same threat to innovation and free speech as fees in exchange for technical forms of preferential treatment.³⁵ As the record in the FCC’s Open Internet proceeding shows, start-ups, small businesses and low-cost speakers will often be unable to pay to be in the fast lane; they won’t be able to pay for zero-rating, either. But if some companies can pay so that their content loads faster or does not count against users’ bandwidth cap, then those who can’t pay won’t have a chance to compete and be heard.

The impact of such fees on innovation, small businesses, and free speech is analyzed in detail in my attached report “The Case for Meaningful Network Neutrality.”³⁶

For this reason, many commenters in the FCC’s Open Internet proceeding asked the FCC to ban this type of zero-rating.³⁷

³² The following section is based on van Schewick (2015f), pp. 3-5.

³³ AT&T (2016).

³⁴ Verizon (2016).

³⁵ van Schewick (2014b); van Schewick & Weiland (2015), p. 87.

³⁶ van Schewick (2015b), pp. 11-17.

³⁷ See, e.g., See, for example, 18MillionRising.org, et al. (2015), incl. fn. 1; Common Cause (2015); Future of Music Coalition (2015), pp. 1-2; van Schewick (2015f), pp. 3-8; Vimeo, et al. (2015), p. 2; Union Square Ventures (2015) (all supporting a ban on zero-rating select applications in a class of similar applications and on zero-rating against a fee); van Schewick (2015g), pp. 6-10 (collecting submissions supporting banning zero-rating of select applications in a group of similar applications), 18-20 (collecting submissions supporting banning zero-rating against a fee); Ananny, et al. (2015) (supporting ban on zero-rating against a fee).

Zero-rating against a fee harms users

Proponents of zero-rating argue that allowing application providers to pay for zero-rating will benefit consumers by allowing ISPs to lower prices for mobile Internet services.³⁸ Like arguments that allowing ISPs to be in the fast lane will result in profits that ISPs will use to lower the price of Internet access or deploy more and better broadband networks, this argument is highly questionable. There is no guarantee that ISPs will use the additional profits to lower the price of mobile Internet service. Economic theory suggests that ISPs' incentive to pass through any profits to users depends on the strength of competition in the market for Internet services. Thus, any benefit in the forms of lower prices is highly speculative. In addition, application providers don't exist in a vacuum. Application providers that pay to be zero-rated will have to recoup the costs of zero-rating somehow – e.g., through higher prices or more advertising on the site. Thus, consumers will ultimately pay the price.

At the same time, there are strong indications that allowing ISPs to charge application providers for zero-rating will harm consumers. If ISPs can charge application providers to be zero-rated, they 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 application providers to pay for zero-rating. The resulting reduction in bandwidth caps harms users and providers of applications that do not pay for exclusion from the cap.³⁹ This effect can already be observed in Europe.⁴⁰ As Digital Fuel Monitor has documented, ISPs that zero-rated their own applications have either restricted the amount of bandwidth that users can pay to low bandwidth caps of 5-10GB, not allowing users to buy more, or increased the per-bandwidth price of unrestricted Internet access so that it becomes more difficult to buy additional bandwidth that can be used without restrictions.⁴¹ According to a recent study by Digital Fuel Monitor, mobile carriers in Europe that zero-rate select online video services offer half as much data volume for the same price as carriers that do not.⁴²

By contrast, shortly after the Dutch regulator prohibited ISPs from zero-rating their own applications, KPN doubled its monthly bandwidth cap for mobile Internet access from 5 to 10 GB at no additional cost. It was about to introduce its own mobile TV application, and had planned to zero-rate it. But with zero-rating off the table, KPN faced a choice of offering an application that users can't use (because the bandwidth caps were too low), or increase the bandwidth cap so that users can actually use KPN's application - but in a way that allows users to choose freely among competing applications.⁴³ Thus, banning zero-rating ultimately benefits all users (even those that aren't interested in using the zero-rated application) and all applications, by making more unrestricted bandwidth available.

³⁸ Knutson (2014).

³⁹ See, e.g., Ananny, et al. (2015), p. 3.

⁴⁰ Rewheel (2014a); Rewheel (2014b); Digital Fuel Monitor (2015).

⁴¹ Drossos (2015) (summarizing the findings); Rewheel (2014a) (summarizing the findings); Rewheel (2014b) (documenting the price increase).

⁴² Digital Fuel Monitor (2016), p. 4.

⁴³ Digital Fuel Monitor (2015).

Ultimately, regulators face a trade-off: Allowing zero-rating against a fee harms start-up innovation and small businesses. It fundamentally changes the environment for free expression online. It creates an incentive to lower bandwidth caps, which harms users and anybody who can't pay for zero-rating. It might, in rare cases, lower the price for mobile Internet access, but users will ultimately pay the price through different channels.

In the context of the debate over edge provider payments for priority or other forms of technical treatment, the regulators' answer has been clear: We are not willing to allow practices that are bound to harm users, innovation and free speech in the hope that this might potentially lead to lower prices or more deployment. The same arguments are directly applicable here.

The solution: ban zero-rating in exchange for edge-provider payment

Thus, the draft guidelines should explicitly prohibit ISPs from charging application providers for zero-rating.

The problems that drive a ban on zero-rating in exchange for edge-provider payment exist regardless of whether an ISP offers the opportunity to pay for zero-rating to all applications (as in AT&T's sponsored data offering), to all applications in a class of similar applications (i.e. to all music streaming applications) or exclusively to some, but not all applications within a class of similar applications (i.e. only to YouTube, but not to Netflix). Thus, the rules should categorically ban all forms of zero-rating for a fee, regardless of how they are being offered.

3. Zero-rating of selected applications within a class of similar applications without charging edge providers

In a second type of zero-rating ISPs zero-rate selected applications within a class of similar applications without charging the providers of the zero-rated application.

This practice appears in two variants:

First, ISPs might zero-rate their own applications, while counting all other applications against the cap. In the US, Comcast's zero-rating of its StreamTV online video application is an example of this approach. StreamTV is zero-rated, while other online streaming applications like HBO Go, Netflix or Hulu count towards the cap. According to research by Digital Fuel Monitor, 36 ISPs in the OECD and in Europe zero-rate their own online video applications. Ten ISPs zero-rate their own cloud storage applications, while uploads to competing applications like DropBox or Google Drive count towards the cap.⁴⁴

Second, ISPs might zero-rate one or more unaffiliated applications without charging the providers of the zero-rated application for the benefit. This practice is very common in Latin America, where ISPs often zero-rate the top three social messaging applications or the top three social networks, while continuing to count all other similar applications towards the cap.⁴⁵

⁴⁴ Digital Fuel Monitor (2014a); Digital Fuel Monitor (2014c); Digital Fuel Monitor (2014b); Drossos (2015) (summarizing the findings).

⁴⁵ See Ex parte letter by Ademir Pereira, GN Docket No. 14-28, filed February 19, 2015.

In the US, T-Mobile offers subscribers to its voice only data plans the ability to use unlimited Facebook for free. Thus, users can use as much Facebook as they want, but they can't access anything else on the Internet.

This kind of zero-rating creates the same problems as ISPs slowing down or speeding up some apps but not others. Zero-rating only some applications in a class directly distorts competition among apps in that class. This form of zero-rating is a textbook example of an ISP using its position as a gatekeeper to pick winners and losers online.

Zero-rating selected applications within a class of similar applications without charging edge providers distorts competition and user choice and harms start-up innovation, small businesses and free speech online

The competitive effect of this practice is significant:

When European ISPs zero-rate their own, bandwidth-intensive applications, they set the bandwidth caps so low that use of the competing applications becomes effectively impossible. Thus, users have a choice: They can use an unlimited amount of the zero-rated application, while use of competing applications would exhaust their cap in a few hours.⁴⁶ In these cases, the anticompetitive effect is obvious.

If ISPs zero-rate social networking or social messaging applications, these types of applications generally don't use a lot of bandwidth, so users can still use competing applications even though if the cap is low. But because the draw of zero-rating is at last in part a psychological one (users hate to worry about hitting their caps, even if the caps are large enough) the zero-rating exerts a powerful draw in favor of the zero-rated applications, reinforcing their already dominant market position. Beyond the obvious competitive distortion in individual cases, allowing ISPs to zero-rate selected applications is going to systematically hurt start-ups and small businesses, and will marginalize speakers with less popular views. When they don't zero-rate their own applications (which serves a different purpose), ISPs will choose applications for zero-rating that they think will most appeal to their customers. Like the Latin American ISPs, they will zero-rate the top applications in a class. These applications effectively pay with their own brand and get their already dominant position reinforced in return. New applications that are yet unknown won't have the option. In markets that are subject to economies of scale or network effects, unseating the incumbent is difficult enough. Being up against a zero-rated incumbent will make it even harder for start-ups to succeed.

If a network provider singles out one or more specific applications within a group of like applications (or one or more of several like groups of applications) for differential treatment, the harm to the values that network neutrality rules are designed to protect is obvious.⁴⁷ In this case, the differential treatment directly makes some applications in the class more attractive to users than others. Compared with an application-agnostic network, where users choose among applications without interference from network providers, this distorts users' choices among

⁴⁶ Digital Fuel Monitor (2014b) (documenting the effect for cloud storage applications); Drossos (2015) (providing data for online video applications).

⁴⁷ This paragraph is adapted from van Schewick (2015e), p. 107.

applications and, as a result, tilts the playing field in favor of some applications in the group. The differential treatment distorts competition among the applications in the group and reduces the value of the network for users by manipulating them to use applications that they would not necessarily have chosen otherwise. It also affects application innovation in various ways. In particular, the threat of discrimination reduces application developers' incentives to innovate and their ability to get funding.⁴⁸ Moreover, letting users, not network providers, pick winners and losers on the Internet is an important part of the mechanism that produces innovation under uncertainty.⁴⁹

Zero-rating selected applications does not address the needs of underserved communities

Some commenters argue that at least one type of zero-rating in this class – giving users access to Facebook even if they haven't bought a mobile Internet plan – is beneficial for underserved communities. Having “free” access to Facebook, they argue, is better than not having no access to the Internet at all.

This argument does not apply to the zero-rating of ISPs own applications, so it shouldn't prevent regulators' from adopting a ban on these practices. But even for plans that give users “free” access to Facebook, the argument that these plans benefit minorities is wrong for two reasons:

First, users of these plans don't get Facebook for free. The price of the bandwidth is rolled into their voice subscription.

And second, the argument suggests a false choice. The choice is not between granting low-income communities free access to Facebook or no Internet access at all. Instead of allowing free access to Facebook, ISPs could offer low-cost, limited options that give users free, but limited access to the entire Internet.

Zero-rating Facebook doesn't meet the needs of underserved communities. Now more than ever, Internet access is necessary to secure full participation in American economy and democracy. However, access to Facebook is not the same as access to the Internet. Low-income families need access to the Internet to do homework, communicate with teachers, search for jobs, sign up for health insurance, and register to vote. Minority communities, who have historically been left out of broader social and political discourse, need the Internet to organize, create, educate and innovate online. Facebook alone does not allow them to do this.

If ISPs want to help underserved communities, there are better options that are entirely compatible with meaningful network neutrality rules. Plans that offer “free,” unlimited use of Facebook or similar applications are based on calculations about the average amount of data users use for this application. Rather than giving away bandwidth that can only be used for Facebook, wireless providers could give away a comparable amount of bandwidth that can be

⁴⁸ For a more detailed explanation, see van Schewick (2015e), pp. 71-72.

⁴⁹ For a more detailed explanation, see van Schewick (2015e), pp. 21, 23-24 (Box 4: The Importance of User Choice); see also van Schewick (2015d), pp. 307-309.

used to access the full Internet. These minimal plans would cost the providers the same as zero-rating.

Alternatively, providers could offer subsidized plans that are only available to low-income customers. For example, most German providers offer mobile data plans for students that include more monthly data than regular plans at lower costs. These alternatives would come at no extra cost to providers, but they would provide enormous benefit to low-income communities.

Ultimately, allowing ISPs to zero-rate certain applications as a tool to help spread the digital divide sets a dangerous precedent. Carriers like AT&T, T-Mobile, and GoSmart are currently marketing their zero-rated plans heavily to minority communities who rely on cell phones as their primary way of accessing the Internet. African-Americans and Hispanics are significantly more likely to rely on their phone for Internet connection than non-Hispanic whites, according to a 2013 Pew Research poll. These customers welcome free access to Facebook. What they're not told is that providers could give them free (albeit limited) access to the full Internet – at the same cost as their current, zero-rated plans. As zero-rating becomes more popular, it will spread to wired broadband services in homes that don't have any access at all. This is only the illusion of progress. Low-income families, both on their computers and on their phones, will be restricted to sites that providers choose for them. It will shuttle already marginalized communities into “walled gardens” – cutting them off from free information and full participation. Regulators should not allow this, especially when providers could provide full access at no additional cost.

In sum, like technical discrimination that singles out specific applications for special treatment, zero-rating certain applications artificially makes these applications more attractive than others.⁵⁰ And just like technical discrimination, zero-rating selected applications, but not other, competing applications allows ISPs to tilt the market in favor of specific applications and to “pick winners and losers” on the Internet. This is exactly the kind of harm that network neutrality rules are designed to prevent.

These plans aren't beneficial for underserved communities, either. Plans that offer consumers the ability to use Facebook for “free” aren't free. They don't meet the needs of minorities or other underserved communities who need access to the full Internet. If ISPs really want to help these communities, they have alternatives that are equally cost-effective, but that do not similarly restrict users to a walled garden, distorting competition and user choice in the process.

The solution: Ban zero-rating of selected applications within a class of similar applications without charging edge providers.

For these reasons, the rules should explicitly prohibit ISPs from zero-rating selected applications within a class of similar applications without charging the providers of the zero-rated application. This ban should apply regardless of whether the zero-rated applications are affiliated with the

⁵⁰ van Schewick (2015e), pp. 30-33; van Schewick & Weiland (2015), pp. 89-90.

ISP or not. In the US, many commenters in the Open Internet proceeding asked the FCC to ban this practice.⁵¹

Some participants in the debate have proposed prohibiting ISPs from zero-rating affiliated applications, but would have allowed the zero-rating of unaffiliated applications in the absence of an edge-provider fee.⁵² However, the harm from the practice is the same, regardless of whether an ISP is affiliated with the application or not.

4. Zero-rating of all applications in a class without charging edge providers

In a third kind of zero-rating, an ISP offers a zero-rating program that is open to all applications in a class and allows application providers to join without paying a fee. For example, T-Mobile’s Binge On program in the US is generally open to all video providers that meet T-Mobile’s technical requirements for the program, and video providers don’t have to pay to join the program. T-Mobile USA offers a similar program for music streaming. In Canada, Videotron’s zero-rating program for music seems to belong to this category. Because these programs are open to all apps in a class and providers don’t have to pay to join, they seem less harmful than other forms of zero-rating.

My attached report “T-Mobile’s Binge On Violates Key Net Neutrality Principles” analyses the net neutrality implications of these types of programs in detail. While the report focuses on T-Mobile’s Binge On and Music Freedom programs, the underlying insights are general and not restricted to details of T-Mobile’s specific plans.

As the report shows, these kinds of zero-rating still limit user choice, harms innovation, distorts competition, and stifles free speech online. The following section briefly summarizes the main results of that report.⁵³

These programs still distort competition among applications in a class.

At first sight, these programs seem less problematic for competition because they are open to all applications in a class. As a result, they seem to maintain a level playing field for competition among applications in that class.

In reality, each of the existing zero-rating programs in this category only includes a small subset of the applications in the zero-rated class. In January 2016, T-Mobile’s Music Freedom included 40 music streaming providers – only a small fraction of the more than 2,000 licensed

⁵¹ See, for example, 18MillionRising.org, et al. (2015), incl. fn. 1; Common Cause (2015); Future of Music Coalition (2015), pp. 1-2; van Schewick (2015f), pp. 3-8; Vimeo, et al. (2015), p. 2; Union Square Ventures (2015) (all supporting a ban on zero-rating select applications in a class of similar applications and on zero-rating against a fee); van Schewick (2015g), pp. 6-10 (collecting submissions supporting banning zero-rating of select applications in a group of similar applications).

⁵² See, e.g., the proposal by Henry Waxman, the Chair of the House Energy and Commerce Committee at the time. Zero-rating in exchange for a fee would have been prohibited by his proposed ban on paid prioritization. Waxman (2014), p. 11 (“Arrangements between a broadband provider and an affiliate that give the affiliated entity prioritization should also be considered a violation of this ban [on paid prioritization].” The footnote following this sentence clarified that “[a]ffiliates of broadband providers already have a monetary relationship with the provider and thus [are] subject to the ban on paid prioritization.” Ibid., footnote 34).

⁵³ The section draws heavily on van Schewick (2016b) and van Schewick (2016c).

online radio services in the US. T-Mobile’s Binge On program now includes more than 60 video streaming services⁵⁴ – a small fraction of the hundreds of thousands, if not millions, of websites with video in the world. At the time of this writing, Videotron’s unlimited music program includes 13 music streaming providers.⁵⁵ As a result, they have the same effect on competition, innovation and user choice as zero-rating plans that, by design, only zero-rate selected applications in a class of similar applications.⁵⁶

This is not an accident. Some programs are open in name only, but the ISP does not seem to make an effort to actually add additional applications.⁵⁷ But even ISPs that actively try to add more applications, will always only be able to include a subset of the applications in the zero-rated category. That’s because allowing ISPs to identify applications so that they can be zero-rated is often technically difficult, requires ISPs and application providers to work together, and requires application providers to make changes to their program.

T-Mobile’s Binge On illustrates this problem.⁵⁸ T-Mobile says that it does not intend to become a gatekeeper on the Internet: It says Binge On is open to all legal video streaming providers at no cost, as long as they can meet some “simple technical requirements.” The idea is that any discriminatory effects of Binge On disappear as more providers join the program. However, the technical requirements published on T-Mobile’s website are substantial. They discriminate against providers that use the User Datagram Protocol (UDP), making it harder for innovative providers such as YouTube to join. They discriminate against providers that use encryption, a practice that is becoming the industry standard. While some providers can join easily, a significant number will need to work with T-Mobile to determine whether their service can be part of Binge On. Many will have to invest time and resources to adapt their service to T-Mobile’s systems. The smaller the provider, the longer it will likely take for T-Mobile to get to it.

The result: Binge On allows some providers to join easily and creates lasting barriers for others, especially small players, non-commercial providers, and start-ups.

Notwithstanding its good intentions, T-Mobile is acting as a gatekeeper that picks winners and losers online. Its guidelines define who can and cannot be part of the program. These guidelines directly discriminate among streaming providers, translating providers’ technical design decisions into competitive advantages and disadvantages. And by deciding which Binge On applicants to work with and in which order, T-Mobile determines how quickly providers will be able to compete and whether they will be able to compete at all.

These concerns are not hypothetical. Music Freedom, T-Mobile’s zero-rating program for music streaming, has created similar harms that continue today. T-Mobile has said that Music

⁵⁴ T-Mobile USA (2016), accessed June 28, 2016.

⁵⁵ Videotron (2016), accessed June 28, 2016.

⁵⁶ See the discussion in the last section.

⁵⁷ See, e.g., the zero-rated programs for music offered by Virgin Mobile and Boost Mobile in the US. See van Schewick (2016b), p. 29, fn. 89.

⁵⁸ For a detailed analysis, see van Schewick (2016b), Section IV. While T-Mobile has made changes to the technical requirements since the report was published, the underlying technical problems that create the need for collaboration still exist. Thus, the report’s analysis is still relevant.

Freedom is open to all music streaming services since it launched the program in 2014. Although the program has grown from 7 to 40 providers, it still includes only a fraction of the more than 2,000 licensed online radio streaming services in the US. Some smaller services had to wait 1½ years to be included; some never heard back from T-Mobile at all. In the past three months alone, Twitter users have asked T-Mobile to add at least 109 music streaming providers that are not yet part of the program. Regardless of T-Mobile’s intentions, it is not feasible for the ISP to immediately add every music provider that wants to join. So far, T-Mobile has at least in part focused on adding larger, more popular services first. While that is a rational business strategy, it distorts competition in a way that puts small players at a competitive disadvantage. Moreover, the program is limited to commercial providers as a matter of policy. As a result, Music Freedom has created lasting barriers for small players, non-commercial providers, and start-ups.⁵⁹

These programs distort competition among classes of applications.

Even if an ISP offering this kind of zero-rating program could somehow add every provider in the class to the program, the program would still violate net neutrality. Zero-rating plans that are open only to a specific class of applications (e.g., Binge On is only open to video streaming) favors that class over all other Internet uses, even those that use the same amount of bandwidth or less. As the report shows, this limits user choice and distorts competition among classes of applications.⁶⁰ As long as a zero-rating plan gives special treatment to one class of applications, it undermines the vision of an open Internet where all applications have an equal chance of reaching audiences, and people, not ISPs, choose how to use the bandwidth available to them.

Net neutrality rules generally prohibit ISPs from technically discriminating between individual applications *and* between classes of applications.⁶¹ That means ISPs cannot discriminate between apps in a class of similar apps, e.g. by slowing down only some streaming video applications, but not others. Nor can they discriminate between different classes of apps, e.g., by slowing down or speeding up all streaming video applications, but not online telephony applications.

Just like technical discrimination, zero-rating one class of applications but not others distorts competition among classes of applications and limits user choice. The same considerations that motivate the ban on technical discrimination among classes of applications apply equally here.⁶²

The solution: Ban zero-rating of all applications in a class without charging edge providers

For these reasons, the rules should explicitly prohibit ISPs from zero-rating all applications in a class of similar applications without charging the providers of the zero-rated application.

⁵⁹ For a detailed discussion, see van Schewick (2016b), pp. 26-28.

⁶⁰ For a detailed discussion, see van Schewick (2016b), pp. 28-29.

⁶¹ See, e.g., Federal Communications Commission (2015), p. 49, para 113, p. 51, para 120. When evaluating ISP practices under the general conduct rule, the FCC will consider whether the behavior is application-agnostic (i.e. does not discriminate among applications, content, and services, or among classes of applications, content, and services). Federal Communications Commission (2015), pp. 63-64, para 144 and fn. 344. On the rationale for a non-discrimination rule banning discrimination among applications and classes of applications (even if the classes of applications are not alike), see van Schewick (2015e), pp. 102-152; van Schewick (2015h), Section “Problem #3.”

⁶² van Schewick & Weiland (2015), pp. 88-90.

The proliferation of zero-rating plans changes the Internet as we know it.

If left unchecked, zero-rating plans lead us down a slippery slope. As other ISPs offer similar programs, the cumulative harms will change the Internet as we know it. More and more ISPs will become gatekeepers that pick winners and losers online, distorting competition for an increasing number of Internet users.

Zero-rating ends the era of innovation without permission.

Until now, innovators could reach people all over the world at low costs. All they had to do was develop an application and put it online. But these zero-rating programs require innovators to negotiate with ISPs around the globe and potentially, make changes to their application -- all for an equal chance to compete. For example, T-Mobile's Binge On requires video providers to contact T-Mobile, meet T-Mobile's technical requirements, receive T-Mobile's approval, and if not, change its system to win T-Mobile green light – all for the chance to compete with other video providers.

In a world with many programs like these, entrepreneurs will be required to contact carriers around the world and create different versions of their applications for different carriers. Small players without the required resources, including start-ups and non-commercial speakers, may not be able to compete at all. The result: these zero-rating plans end the era where entrepreneurs are free to “innovate without permission” – a core net neutrality principle that has fostered innovation up until now.

Zero-rating puts carriers in control of our Internet experience.

In today's Internet, we – the people who use the Internet – are in control of our Internet experience. Our ISP sells us bandwidth, but how we use that bandwidth is up to us. In that way, the Internet is like electricity. Electricity companies are not supposed to tell people how to use their electricity or make some uses more attractive than others. They cannot offer unlimited electricity to power particular products, such as Apple iHomes or even all stereos, while charging for electricity to power light bulbs. Similarly, the ISPs that connect us to the Internet are not supposed to control or interfere with what we do online. That's a key net neutrality principle.

In a world with zero-rating, we lose some of that ability to choose. We still get a certain amount of unrestricted data that we can use however we want. But now, carriers are reserving bandwidth for a specific use – the zero-rated sites of the carrier's choice. For example, Comcast has made additional bandwidth available but customers can only use it to watch Comcast's Stream TV. Similarly, T-Mobile's Binge On offers customers “unlimited” bandwidth but only to watch select video providers through Binge On. We don't *have* to use the zero-rated sites. But if we don't use them, we can't use the bandwidth for other uses. That's incredibly limiting. Apparently, the ISPs offering these plans believe their network can tolerate the additional traffic created by the zero-rated applications. But customers can use this additional data only for the zero-rated apps, not for other kinds of applications, even if the applications have exactly the same or even a smaller impact on the network. In the meantime, more vital Internet use, such as doing homework or applying for jobs, continue to count against data caps. Net neutrality is

meant to ensure that people choose how to use their bandwidth, not their ISPs. But these zero-rating plans violate that protection.

Zero-rating creates an incentive for carriers to keep data caps low.

Finally, zero-rating creates an incentive for ISPs to keep data caps low. The lower the bandwidth caps, the more attractive zero-rated apps become. Thus, ISPs have an incentive to keep bandwidth caps low in order to motivate providers to pay to join their zero-rating programs or to make the zero-rated applications more attractive. ISPs also have an incentive to increase the price of unrestricted bandwidth for the same reasons.

This effect can already be seen in Europe. As Digital Fuel Monitor has shown, ISPs that zero-rate their own apps have either reduced data caps or increased the price of unrestricted bandwidth for their customers. This creates a problem for both consumers and application providers. Consumers have less bandwidth for applications that are not zero-rated. And application providers that are not zero-rated have a lasting competitive disadvantage.

By contrast, when a Dutch regulator banned zero-rating, the provider KPN doubled its monthly bandwidth cap for mobile Internet access from 5 to 10 GB at no additional cost.

In sum, European regulators have the legal authority and policy imperative to ban these three forms of zero-rating in order to protect the future of competition, innovation, consumer choice, and free speech in the EU.

E. There are some net neutrality-friendly forms of zero-rating.

The interpretation of Art. 3(2) advanced above would still allow ISPs to offer certain forms of zero-rating. Carriers can offer alternative net neutrality-friendly plans that allow customers to access zero-rated content but without the host of harms.⁶³ Carriers could make certain bandwidth available without limiting how it can be used. This includes, for example, zero-rating offers that zero-rate all applications used during a specific time period, or that offer a zero-rated low-bandwidth mode that the user can use as desired, *as long as they do not involve any fees to participating ISPs*. For example, T-Mobile could offer customers a zero-rated low-bandwidth mode at the same speed as Binge On. Use of that mode would not count against the cap, but customers would be able to use this mode however way they choose: They could watch video *or* do anything else online. Alternatively, carriers could offer customers an option to access zero-rated content in times of low traffic, say 11pm to 6am. Such alternatives show that carriers can offer innovative and competitive plans to attract customers without endangering net neutrality principles.

⁶³ For a longer discussion, see van Schewick (2016b), pp. 31-34.

D. BEREC needs to tweak the criteria which it intends to use to evaluate commercial practices case-by-case.

The list of criteria provided in the Guidelines to evaluate commercial practices is incomplete. It currently does not include a criterion that indicates that practices are more likely to limit the rights of end users under Art. 3(1) if they require the providers of application, content, or services to pay a fee than if they do not involve an edge provider payment. The harmful effects of allowing ISPs to charge application providers for preferential treatment for end users, competition, innovation, all sectors of the economy, and free speech, were discussed in the specialized services section above and apply equally here.

Finally, phrases like “whether there is an effect” or “whether something is reduced in practice” could be read to imply that they require the NRA to evaluate whether the practice has an actual, observable effect on the factor under consideration. Such an interpretation would not do enough to realize the goals of the regulation to protect end users in their various roles as consumers, producers, speakers, and listeners. Also, the impact of a practice is often invisible: For example, let’s assume investors see that ISPs favor some applications over others by zero-rating them and, as a result, decide not to invest in start-ups in the affected class of application because they can no longer rely on a level playing field. It will be hard to show the loss, since applications that otherwise would have been funded never materialize. In addition, a standard that requires a detailed showing of how exactly a specific practice affects application innovation, competition, or free speech, would likely require expert witnesses from a variety of disciplines. Under such a regime, only large corporations would be able to successfully bring complaints.

Thus, BEREC should clarify the criteria regarding the impact on innovation, competition, free speech, content diversity, stressing that the analysis should focus on the foreseeable effect of the practice. To determine whether a practice is likely to reduce innovation and free speech, BEREC should adopt an administrable rule that provides greater certainty to all market participants.⁶⁴ To do so, it should evaluate the practice based on whether it preserves the following four factors:

1. User choice;
2. Application-agnosticism;
3. Low costs of application innovation and free speech;
4. Innovation without permission.

Practices that deviate from at least one of these factors are likely to reduce competition, application innovation and free speech.

This approach would allow complainants to show that a practice is likely to reduce application innovation and free speech and should therefore be prohibited by demonstrating that it violates at least one of these four factors, without requiring them to engage in a detailed analysis of the impact of the practice on these factors.⁶⁵

⁶⁴ The following text is adopted from van Schewick (2015a), pp. 10-19.

⁶⁵ Each of these factors separately affects the Internet’s ability to serve as a platform for innovation and free expression. As a result, practices that deviate from one of the factors will affect innovation and free speech. For

This approach would allow BEREC to rely on general insights drawn from an established body of research that identifies the factors and mechanisms that promote innovation, competition, and free speech online. By allowing complainants to show that a practice will foreseeably reduce application innovation and free speech by demonstrating that it violates at least one of these four factors, the case-by-case analysis would be significantly more administrable. Evaluating behavior based on these factors removes the need to engage in detailed investigations of the impact of the behavior on application innovation and free speech. At the same time, it is straightforward to determine whether a practice interferes with these factors. Thus, such an approach would increase certainty, reduce the costs of regulation, and make it more feasible for users, start-ups and non-profits to bring successful complaints.

The justification for this framework and a more complete explanation of how it would operate is described in more detail in the attached paper “Analysis of Proposed Network Neutrality Rules.”⁶⁶

IV. Traffic Management

The regulation establishes a hierarchy of traffic management measures:

- As a general rule, traffic management has to be as application-agnostic as possible. This rule applies both to traffic management under Art. 3(3), subparagraph 2 and subparagraph 3. As I explain in the attached papers “The Case for Meaningful Network Neutrality Rules” and “Network Neutrality and Quality of Service: What a Non-Discrimination Rule Should Look Like” requiring network management to be as application-agnostic as possible is good policy and necessary to preserve the ability of the Internet to serve as a level playing field as much as possible, while still giving ISPs the tools they need to manage their networks.⁶⁷
- Under certain, limited conditions, Art. 3(3), subparagraph 2 allows ISPs to use traffic management measures that distinguish among classes of traffic based on objective technical requirements.
- If the conditions of Art. 3(3), subparagraph 3, Exception c, apply, ISPs are further allowed to make distinctions among classes of services provided equivalent classes of traffic are treated equally.

example, the regulation’s ban on fast lanes does not distinguish between application-specific and application-agnostic fees for preferential treatment. That’s because one of the main concerns with allowing ISPs to charge edge providers for preferential treatment stems from the resulting increase in the costs of application innovation and speech, and this concern exists regardless of whether the ISP offers the ability to pay for preferential treatment to all interested applications (application-agnostic), to all interested applications in a class or only to a subset of applications in a class. See, e.g., van Schewick (2014b); van Schewick (2014a).

⁶⁶ van Schewick (2015a), pp. 10-19.

⁶⁷ van Schewick (2015b), pp. 7-11 (discussing reasonable network management), 17-23 (discussing user-controlled Quality of Service and discrimination among classes of applications); van Schewick (2015e), pp. 137-140 (discussing reasonable network management), 124-133 (discussing application-agnostic discrimination), 133-137 (discussing user-controlled Quality of Service).

- If the conditions of Art. 3(3), subparagraph 3, Exception b, apply, ISPs are further allowed to make distinctions among individual applications.

While the current version of the draft guidelines recognizes and implements this hierarchy for traffic management under Art. 3(3), Subparagraph 3, it does not state this as clearly for reasonable traffic management under Art. 3(3), Subparagraph 2.⁶⁸

That is a problem.

Class-based network management has the potential to create enormous social costs, even if it is based on the traffic's objective different technical requirements. Such traffic management practices still allow ISPs to distort competition, stifles innovation, harms users, and hurts providers who encrypt traffic by putting all encrypted traffic in the slow lane.

The following excerpt from one of my recent articles explains why.⁶⁹

“The proposal allows ISPs to engage in class-based discrimination.

The proposal allows class-based discrimination: ISPs can make distinctions between different kinds of traffic and treat them differently to optimize overall transmission quality at any time, not just during times of congestion. The discrimination must be based on the technical requirements of the applications in question. Thus, ISPs could treat different kinds of applications differently if they have different technical requirements. For example, Internet telephony is sensitive to delay, but e-mail is not, so an ISP could give low delay to Internet telephony, but not to e-mail.

Whenever an ISP has the power to speed up certain applications or slow down others, it might use this power to give certain applications an advantage over others. The proposal tries to mitigate this danger by forcing ISPs to consider an application's technical requirements when making distinctions among traffic.

However, this kind of class-based discriminatory network management still allows ISPs to give some applications an advantage over others, whether intentionally or inadvertently. It distorts competition, slows all encrypted traffic, harms individual users, stifles innovation, and creates high costs of regulation.

Allowing ISPs to treat classes differently gives them power to deliberately distort competition.

When ISPs are free to define classes, they have a lot of discretion to discriminate against certain applications. ISPs could use this power to deliberately distort competition. For example, an ISP could offer low delay to online gaming to make it more attractive, but it could decide not to offer low delay to online telephony because that would allow Internet telephony to better compete

⁶⁸ The current version of the draft guidelines could be interpreted to implicitly support this hierarchy. However, given the importance of clarity and certainty for industry participants, such a preference should be established as clearly as possible.

⁶⁹ van Schewick (2015c), section “Problem 3”.

with the ISP's own telephony offerings. Although both services are sensitive to delay, ISPs could argue that there are other, technical differences that justify distinguishing between them.

Class-based traffic management can inadvertently harm applications.

Traffic management that distinguishes among different kinds of applications often results in inadvertent discrimination that hurts users, distorts competition, and makes it harder for providers of affected applications to innovate. Traffic management technologies that distinguish among classes of applications often end up harming certain applications, even if that effect is not intended, because the ISPs or their technology misclassify certain applications.

For example, many ISPs in the UK limit the bandwidth available to peer-to-peer file sharing applications during times of congestion, arguing that these applications are not sensitive to delay. This creates huge problems for online gaming. ISPs use deep packet inspection technology to identify these applications, but the technology doesn't work very well: it has a hard time distinguishing between online gaming and peer-to-peer file sharing, so online games stop working or don't work as well as they could. In the end, UK ISPs and gaming providers established standing committees where ISPs, technology vendors, and gaming providers worked together to make sure the games would work on ISPs' networks in spite of the discriminatory network management.

In the UK, this class-based traffic management not only creates problems for online gamers and gaming providers, whose applications perform worse than other kinds of applications, but it also creates problems for innovation. If an online gaming provider wants to introduce a new feature for its game in the UK, it needs to work with the ISPs and their technology vendors to make sure that the feature won't be caught up in the traffic management measures directed at peer-to-peer file sharing. This is the opposite of innovation without permission.

Similarly, until 2010, many ISPs in Canada used deep packet inspection technology to single out all peer-to-peer file sharing applications and limit the amount of bandwidth available to them from 5pm to midnight. Again, ISPs assumed that it was alright to target peer-to-peer file sharing, because it's not sensitive to delay. But this assumption turned out to be wrong: there was an application called Vuze that used peer-to-peer file sharing protocols to stream video in real time. Real-time video is highly sensitive to delay, so the performance of Vuze suffered in the evening, when everybody wants to use the Internet.

Thus, the class-based traffic management might result in harmful discrimination by even the best-intentioned ISPs.

Class-based traffic management discriminates against encrypted traffic.

If traffic is encrypted, then the ISP cannot identify what kind of application—e-mail, telephony, web browsing—that a user is using, so it doesn't know what kind of treatment it needs. In the past, ISPs have addressed the problem by simply putting all encrypted traffic in the slow lane. That means that any time someone sends encrypted data, it will take longer to transmit. People encrypt their data for a variety of valid reasons, for example, to protect privacy, secure sensitive

financial transactions, protect trade secrets, and guard against surveillance. If all encrypted data is automatically slowed down, it would discourage people from using encryption at all.

Class-based traffic management harms individual users.

Class-based traffic management takes the power to choose the right kind of service out of the hands of users and puts it into the hands of ISPs. However, people have different needs for speed on the Internet, and the same person has different needs at different times. As a result, a user's needs may differ from an application's technical requirements, so ISPs don't necessarily know what kind of service a user needs. For example, Internet telephony applications like Skype benefit from low delay, so ISPs may opt to give them low-delay service. That's great if you are doing a job interview, where you want the best quality possible. But if you are talking with a friend, you don't need crystal clear quality over Skype, so low-delay service might not be necessary. File uploads are generally considered not to be sensitive to delay. If you are uploading your hard disk to the cloud to do a backup, you will not mind that ISPs give file uploads lower priority. But if you are a student uploading homework right before it's due, or a lawyer filing a brief before the deadline, or an architect submitting a bid, then the speed of this upload is your highest priority. As long as ISPs, and not users, have the power to decide which classes of application get what kinds of service, users will never get exactly what they need. That's why class-based discrimination often harms users.

Class-based traffic management stifles innovation.

Imagine you develop a new application that would benefit from a specific kind of service. Entrepreneurs and start-ups typically do not have the resources or capacity to reach out to ISPs around the European Union to alert them that their particular application needs a certain kind of service. Even if a start-up manages to contact ISPs, they may not be interested in changing their systems for particular applications, which is a lot of work, especially when new apps don't have any users yet. Entrepreneurs should be able to get the kind of Internet service their application needs without having to seek ISPs' permission.

Class-based traffic management leads to high costs of regulation.

If ISPs get to define classes of applications, the only way to challenge these definitions is to complain to regulatory agencies. The agency would need to determine whether kinds of traffic are similar enough to be treated in the same way, a messy and costly process that would involve lots of lawyers and expert witnesses. This not only creates high costs of regulation, but also tilts the playing field against anybody—users, start-ups, small businesses, low-cost speakers—who doesn't have the money to engage in long and costly proceedings before a regulator.” (End of Excerpt)

The social costs of discrimination among classes of applications are discussed in more detail in the attached paper “Network Neutrality and Quality of Service: What a Non-Discrimination Rule Should Look Like.”⁷⁰

⁷⁰ van Schewick (2015e), pp. 105-124.

The attached article by Cooper and Brown provides vivid examples of how class-based traffic management in the UK harmed applications.⁷¹

The attached paper by Yiakoumis, Yiannis, Sachin Katti & Nick McKeown. 2016, describes the problems with DPI and the high transaction costs imposed by these services (pp. 3-4) and provides concrete evidence that user preferences are indeed heterogeneous (p.3).

The current version of the draft guidelines does not adequately recognize the costs of class-based network management. However, given that the regulation needs to be interpreted in light of the goals of the regulation, these costs are highly relevant when deciding whether these traffic management measures meet the requirements imposed by Art. 3(3) of the regulation.

To recap, Art. 3(3), subparagraphs 1-3 establish a four-fold hierarchy for traffic management measures:

1. ISPs are always allowed to engage in *application-agnostic traffic management* (Art. 3(3), subparagraph 1 and Art. 3(3), subparagraph 3).
2. If application-agnostic traffic management measures cannot adequately address the problem and the conditions in Art. 3(3), subparagraph 2 are met, ISPs are allowed to engage in *traffic management measures that differentiate among classes of traffic based on objective technical requirements*.
3. If neither application-agnostic traffic management measures nor measures differentiating among classes of traffic based on objective technical requirements are capable of solving the traffic management problem and the conditions in Art. 3(3), subparagraph 3, letter (c) are met, ISPs are allowed to *differentiate among classes of traffic as long as equivalent classes of traffic are treated equally*.
4. If none of the measures described in 1-3 above are capable of solving the problem and the conditions in Art. 3(3), subparagraph 3, letter (b) are met, ISPs are allowed to single out specific applications.

Art. 3(3), subparagraph 2 and 3 both require traffic management measures to always be necessary, proportionate and transparent, and to not be based on commercial considerations. As a result, the inherent dangers of class-based traffic management outlined above have to be taken into account when assessing the proportionality of *all* types of traffic management. In light of these harms, class-based traffic management measures are neither necessary nor proportionate if the problem can be solved in an application-agnostic way.

In the draft guidelines, BEREC seems to have applied a higher standard for proportionality regarding the more exceptional traffic management measures under Article 3(3) subparagraph 3 than it has applied to the more conventional, ‘reasonable’ measures under Article 3(3) subparagraph 2. This contradicts the regulation.

⁷¹ Cooper & Brown (2015), pp. 2:9-2:17.

Whether it is based on Art. 3(3), subparagraph 2 or on subparagraph 3, class-based traffic management constitutes an exception from the general rule, established by Art. 3(3), subparagraph 1 and Art. 3(3), subparagraph 3, first sentence, that requires traffic management to be application-agnostic. As a result, the requirements established by subparagraph 2 and 3 need to be interpreted strictly to prevent the exception (i.e. class-based traffic management) from swallowing the rule (i.e. application-agnostic traffic management). This includes the requirements that the traffic management measure has to be “necessary” and “proportionate.”

While Recital 9 clarifies that “[t]he requirement for traffic management measures to be non-discriminatory does not preclude providers of internet access services from implementing, in order to optimize the overall transmission quality, traffic management measures which differentiate between objectively different categories of traffic,” such measures still need to meet the other requirements established by Art. 3(3), subparagraph 2, including the need for traffic management to be “necessary” and “proportionate.”

In order to bring the guidelines in line with the regulation, the following amendments are necessary. First, the guidelines currently place a stronger emphasis on the precedence of application-agnostic measures when discussing traffic management under Art. 3(3) subparagraph 3 than when discussing traffic management under subparagraph 2. However, the proportionality requirements which require regulators to consider the potential harms from traffic management measures and establish a precedence for application-agnostic traffic management measures apply equally to all forms of traffic management.

Second, the draft guidelines could be read to allow reasonable measures under Article 3(3), subparagraph 2 to be based on application type or application layer protocol, which only have to be “linked” to QoS requirements.⁷² Interpreted this way, the draft guidelines would be rendering moot the distinction between traffic management under Art. 3(3), subparagraph 2 and subparagraph 3 established by the regulation: As indicated above, Art. 3(3), subparagraph 2 at most allows ISPs to differentiate based on the objective technical requirements of categories of traffic, while Art. 3(3), subparagraph 3 allows ISPs to go further (if that is necessary and all of the other requirements of that subparagraph are met) and distinguish between application types as long as equivalent categories of traffic are treated equally. To reflect that distinction, the guidelines should state that reasonable measures under Art. 3(3), subparagraph 2 can only be based on broad categories of traffic that are defined based on QoS requirements, as envisioned in the regulation.

Third, as outlined above, BEREC should acknowledge the potential harms from class-based traffic management when describing the proportionality assessment under Art. 3(3), subparagraph 2 in Paragraph 58. Common proportionality requirements are crucial for realizing the digital single market.

⁷² Paragraph 63 draft implementation guidelines.

Finally, given the central importance of application-agnostic traffic management, BEREC should add a definition of application-agnostic traffic management measures to contribute to a harmonized implementation of the regulation.⁷³ Such a definition could read:

Traffic management is application-agnostic when it is not based on specific applications, on categories of applications or on criteria that depend on an application’s characteristics (“application-specific criteria”).⁷⁴ For example, application-agnostic traffic management includes consumption-based congestion management or user-controlled forms of traffic management.⁷⁵ The latter is only application-agnostic if the ISPs provides different classes of service / different levels of priority without restricting for which applications or when they can be used, and if users choose whether, when, and for which application to use which class of service / level of priority.

Network Neutrality and Quality of Service

The network neutrality debate is often framed as a debate for or against Quality of Service.⁷⁶ However, the reality is much more nuanced. Some proposals take an all-or-nothing approach to discrimination. They ban or allow all forms of discrimination and, consequently, Quality of Service. Most proposals take a more nuanced position. They allow some, but not all forms of Quality of Service, with different proposals drawing the line between acceptable and unacceptable forms of Quality of Service in different ways.

For an in-depth analysis of the relationship between network neutrality and Quality of Service, see the attached paper “Network Neutrality and Quality of Service: What a Nondiscrimination Rule Should Look Like.” For a shorter overview, see the attached paper “The Case for Meaningful Network Neutrality Rules.”⁷⁷

Ban provider-controlled Quality of Service to individual applications within a class of like applications⁷⁸

Most network neutrality proponents agree that allowing network providers to offer Quality of Service exclusively to one or more applications within a class of like applications should be prohibited, and the paper shares that view. For example, a network provider should not be

⁷³ For a more detailed definition and discussion of the concept of “application-agnostic” discrimination, see van Schewick (2015e), pp. 124-131, including Box 19.

⁷⁴ Application-specific criteria include the application-layer protocol or transport-layer protocol the application is using (e.g., Session Initiation Protocol (SIIP) vs. Skype’s proprietary protocol, or TCP vs. User Datagram Protocol (UDP)), or the application’s technical requirements (e.g., latency sensitive vs. non-latency sensitive applications). van Schewick (2015e), p.125.

⁷⁵ On application-agnostic traffic management, see van Schewick (2015e), pp. 137-140; on user-controlled Quality of Service, see van Schewick (2015e), pp. 133-137, 143-152.

⁷⁶ For an in-depth analysis of the relationship between network neutrality and Quality of Service, see van Schewick (2015e). For a shorter discussion, see van Schewick (2015b), pp. 17-23 (discussing user-controlled Quality of Service and discrimination among classes of applications).

⁷⁷ For an in-depth analysis of the relationship between network neutrality and Quality of Service, see van Schewick (2015e). For a shorter discussion, see van Schewick (2015b), pp. 17-23 (discussing user-controlled Quality of Service and discrimination among classes of applications).

⁷⁸ The following summary in this section is taken from van Schewick (2012).

allowed to offer a low-delay service only to its own Internet video application, or only to selected unaffiliated video application

Ban Quality of Service to provider-defined classes of applications, even if the provider treats like traffic alike

By contrast, many network neutrality proponents see no problems with allowing network providers to offer different types of service to different provider-defined classes of applications, as long as the network provider treats like traffic alike. In other words, they would allow network providers to provide different types of service to different provider-defined classes of applications that are not alike, as long as they do not discriminate among classes of applications that are alike or among applications within a class of like applications. (This requirement is often called “like treatment.”) Under this approach, a network provider would be allowed to offer low-delay service to Internet telephony, but not to e-mail, as long as it does not treat Vonage differently from Skype, or Gmail differently from Hotmail.⁷⁹ In the US, the *AT&T BellSouth Merger conditions* and *various draft bills in Congress* allowed this form of Quality of Service.

The positive stance towards forms of Quality of Service that provide like treatment is based on the assumption that discriminating among classes of applications that are not alike is socially harmless and should therefore be allowed. As the paper shows, this assumption is not correct. Contrary to what is commonly assumed, forms of Quality of Service that respect the principle of like treatment do not adequately protect the values that network neutrality is designed to protect and should not be allowed under a network neutrality regime.

Allow certain forms of user-controlled, user-paid Quality of Service

By contrast, Quality of Service architectures where (1) network providers make different types of service available equally to all applications and classes of applications, (2) users choose whether and when to use which type of service, and (3) the network provider charges only its own Internet service customers for the use of the different classes of service do not raise similar concerns. As the paper shows, this type of user-controlled Quality of Service offers the same potential social benefits as other, discriminatory or provider-controlled forms of Quality of Service without the social costs. With [appropriate restrictions on charging](#) and with provisions that protect the quality of the baseline service from dropping below unacceptable levels, this type of Quality of Service should be allowed under a network neutrality regime. Under the non-discrimination rule proposed in the paper, these are the only forms of quality of Service that network providers would be able to offer.

Opponents of network neutrality regulation have created the impression that policy makers need to choose between protecting users and application innovators against interference from network providers on the one hand and innovation in the network and the needs of network providers on the other hand. As the paper shows, it is possible to protect users and innovators while giving network providers the tools they need to manage their networks and allowing the network to evolve. Thus, regulators can have their cake and eat it, too.

⁷⁹ Internet telephony is sensitive to delay, but e-mail is not, so the two classes of applications are not alike.

Attachments

- van Schewick, Barbara. 2015. The Case for Meaningful Network Neutrality Rules. Report submitted as Attachment to Barbara van Schewick's Ex Parte in the Matter of Protecting and Promoting the Open Internet submitted February 20, 2015 to the Federal Communications Commission GN Dkt. No. 14-28.
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