Network Neutrality:
What A Non-Discrimination Rule Should Look Like

Barbara van Schewick[1]

Paper presented at the
38th Research Conference on Communication, Information and Internet Policy (TPRC 2010)
October 1 - October 3, 2010, Arlington, VA

Abstract

The debate over "network neutrality," i.e. the debate over whether governments should establish rules limiting the extent to which network providers can interfere with the applications and content on their networks, has become one of the hottest debates in Internet policy. Governments all over the world, including the European Union, the UK, France, Germany and the US, are investigating whether regulatory action is needed. Beyond rules that prevent network providers from blocking applications or content, non-discrimination rules are a key component of any network neutrality regime. There is, however, a lot of uncertainty about how to best distinguish harmful from beneficial discrimination. The paper sets out criteria for evaluating non-discrimination rules and uses these criteria to evaluate two proposals for a non-discrimination rule:

- A non-discrimination rule that would ban discrimination that causes harm to users or harm to competition. Whether these conditions (anticompetitive, harm to users) are met would be decided by the regulatory agency in case-by-case adjudication. Such a rule was part of the Google-Verizon legislative proposal.
- A non-discrimination rule that would ban all application-specific discrimination (i.e. discrimination based on applications or classes of applications), but would allow application-agnostic discrimination. This rule would allow certain, but not all forms of Quality of Service.

Only the second rule meets the criteria for a good non-discrimination rule: The rule protects the factors that have fostered application innovation in the past, ensuring that the Internet can continue to serve as an engine of innovation and economic growth in the future. It preserves the factors that have allowed the Internet to improve democratic discourse and to provide a decentralized environment for social and cultural interaction in which anyone can participate. The rule does not constrain the evolution of the network more than is necessary to reach the goals of network neutrality regulation. In particular, it allows certain, but not all forms of Quality of Service. It provides much-needed certainty for industry participants by making it easy to determine which behavior is and is not allowed and keeps the costs of regulation low.

---

[1] Associate Professor of Law and (by Courtesy) Electrical Engineering, Stanford Law School; Director, Center for Internet and Society, Stanford Law School. An earlier version of this paper was filed with the Federal Communications Commission in August 2010 as an attachment to a notice of an ex parte conversation. That version is available at http://fjallfoss.fcc.gov/ecfs/document/view?id=7020652515. A more complete discussion of alternative proposals for non-discrimination rules, including proposals that would ban discrimination based on application, but would allow discrimination among classes of applications (aka "like treatment") can be found in van Schewick (forthcoming 2010).

CRITERIA FOR EVALUATING NON-DISCRIMINATION RULES

A non-discrimination rule should meet the following criteria:

- It should protect the factors that have fostered application innovation in the past to ensure that the Internet can continue to serve as an engine of innovation and economic growth in the future.[2]
- It should protect the factors that have allowed the Internet to improve democratic discourse and to provide a decentralized environment for social and cultural interaction in which anyone can participate.[3]
- It should not constrain the evolution of the network more than is necessary to reach the goals of network neutrality regulation.
- It should make it easy to determine which behavior is and is not allowed to provide much-needed certainty for industry participants.
- It should keep the costs of regulation low.

WHAT THE NON-DISCRIMINATION RULE SHOULD NOT LOOK LIKE

I sometimes hear proposals for a non-discrimination rule that would ban discrimination that is anticompetitive and harms users. Such a rule may define certain behaviors as presumptively allowed or not allowed under these rules (e.g. user-controlled prioritization presumptively o.k.; application provider-paid prioritization presumptively not o.k.). Whether these conditions (anticompetitive, harm to users) are met and whether the presumptions should not apply to the behavior under consideration would be decided by the Federal Communications Commission (FCC) in case-by-case adjudication. The proposal for a legislative framework on network neutrality put forward by Google and Verizon in August 2010 constitutes an example of such a non-discrimination rule:

"Non-Discrimination Requirement: In providing broadband Internet access service, a provider would be prohibited from engaging in undue discrimination against any lawful Internet content, application, or service in a manner that causes meaningful harm to competition or to users. Prioritization of Internet traffic would be presumed inconsistent with the non-discrimination standard, but the presumption could be rebutted."[4]

Such a rule sounds good, but does not have the desired effect. That's because the substantive criteria do not capture the behavior that network neutrality proponents are concerned about.

[2] These factors are described in detail in van Schewick (2010a). For a short overview, see van Schewick (2010c).
[3] For a brief discussion of these factors, see van Schewick (2010a), pp. 359-365.
[4] Google & Verizon (2010), p.1.

Beyond that, agreeing on a rule that leaves all decisions about the legality of discrimination to case-by-case adjudication by future FCCs irrevocably tilts the playing field in favor of network providers. In combination with substantive criteria that do adequately protect values such as application innovation, user choice or the Internet's ability to serve as a platform for democratic discourse in the future, this will drastically reduce the likelihood that anybody will be able to successfully challenge discriminatory behavior in the future.

Substantive problems with the criteria

"anticompetitive": This criterion is intuitively appealing: it resonates with the notion that network providers may have an incentive to exclude applications that compete with their own applications. However, prohibiting only discrimination that is anticompetitive would only capture a subset of the cases in which network providers have an incentive to exclude applications.[5]

First, discrimination designed to exclude unwanted content or manage bandwidth on a network may often lack an anticompetitive motivation. In the examples of content-based discrimination that are often mentioned in the debate (e.g. Telus/Voices for Change; Verizon Wireless/NARAL Pro Choice),[6] none of the content providers whose content was blocked was competing with the network provider. Similarly, a network provider may have an incentive to exclude or slow down selected bandwidth-intensive applications to manage bandwidth on its network, even if the network provider does not offer a competing application itself. At the same time, the resulting harm – users' inability to participate in social, cultural or democratic discourse related to the blocked content, their inability to use the Internet in the way that is most valuable to them, or application developers' difficulty to obtain funding for an application – is caused by the blocking as such, not by the motivations that were driving it.

Second, even blocking that hurts a competitor is not necessarily prohibited by such a rule. Those who propose banning only "anticompetitive" discrimination import the term and its meaning from US antitrust law.[7] In US antitrust law, however, the term "anticompetitive" has a much narrower meaning than non-lawyers would expect: In particular, behavior that "harms a competitor" (e.g. by excluding the competitor from the market) is not necessarily anticompetitive. To be anticompetitive, the behavior needs to "harm competition."[8] For example, if a network provider excludes an application such as BitTorrent from access to the provider's Internet service customers, this only constitutes "anticompetitive" conduct under US antitrust law if it creates a "dangerous probability of success" that the network provider will monopolize the nationwide market for BitTorrent-like applications. That the network provider's customers cannot use BitTorrent, or that BitTorrent is excluded from a part of the nationwide market, is

[5] The following three paragraphs are based on van Schewick (2009), pp. 36-37.
[6] For a description of these examples, see van Schewick (2010a), pp. 266-269.
[7] For one example, see Farber, et al. (2007).
[8] See Farber, et al. (2007).

irrelevant in the context of antitrust law, but not in the context of the network neutrality debate that focuses on different types of harm. Also, US antitrust law usually has very stringent requirements about the degree of market power in the primary market that is required in order for exclusionary conduct to be problematic. By contrast, network neutrality proponents are usually concerned about any blocking by network providers, even if the network provider in question does not have a dominant position in the local or nationwide market for Internet services.[9]

Prohibiting only "anticompetitive" conduct will not prevent all relevant discrimination. To protect user choice and the Internet's ability to realize its economic, political, social and cultural potential, we need rules that prohibit blocking and discrimination of applications and content regardless of the underlying motivation and independent of the network provider's market share.

"harm to users:" This criterion is also intuitively appealing: it resonates with the notion that network neutrality is designed to safeguard users' ability to use the applications and access the content of their choice without interference from network providers. However, this criterion may not capture important instances of discrimination that network neutrality proponents are concerned about.

Consider the example of Comcast's blocking of BitTorrent. Network neutrality proponents usually agree that singling out specific applications to manage bandwidth on a network is not an acceptable form of discrimination (aka "reasonable network management") as long as other, application-agnostic ways of managing the network are available.

Now imagine how the proposed rule would apply to this case. The rule immediately raises lots of questions:

Who is a user? Only end users, or also application and content providers?

How do regulators determine whether a user is harmed? Do they focus on the individual user who cannot use the Internet as she would like, or do they focus on users as a group (similar to the way antitrust law defines harm to consumers when evaluating whether a certain conduct is anticompetitive)? For example, slowing down peer-to-peer file-sharing, a network provider may argue, may harm the file-sharing users and the provider of the file-sharing software, but, according to the network provider, is only done to protect the Internet experience of all the other innocent non-file-sharing users.

Does it matter that there are alternative, non-discriminatory ways of managing the network that are not similarly harmful to the users of the file-sharing software and the providers of the software, while maintaining the quality of the Internet experience for the non-file-sharing

[9] This concern is driven by the insight that a network provider may have an incentive to exclude applications even if it competes with other network providers in the market for Internet services. See van Schewick (2010a), pp. 255-264.

users? I don't think it matters under this formulation of the rule, but network neutrality proponents usually think it should.

What about the fact that peer-to-peer file-sharing is often used by individual filmmakers to inexpensively distribute their creative works, as we know from the Canadian proceeding that reviewed the Internet traffic management practices of Internet service providers? What about the fact that peer-to-peer file-sharing is often used by non-profits to distribute their video contributions to political debates? How would regulators integrate consideration of these societal benefits (fostering a more decentralized environment for democratic discourse and cultural production in which anybody can participate) into the assessment of the discriminatory behavior? Again, these considerations should matter, but are probably not captured by this formulation of the rule.

"anticompetitive and harm to users:" It is also unclear whether such a rule would require one or both criteria to be met in order for discrimination to be considered harmful. This may depend on the exact formulation of the rule – whether the rule bans discrimination that is "anticompetitive and harms users" or discrimination that is "anticompetitive or harms users."[10] If the rule says "and," both criteria need to be met. Given the difficulties of showing that behavior is "anticompetitive," the second criterion becomes effectively useless.

In sum, the rule's substantive criteria are open to interpretation. They do not accurately separate socially beneficial from socially harmful discrimination. In particular, the rule would not prohibit many instances of discrimination that network neutrality proponents are concerned about, leaving application developers and users without protection. The rule makes it impossible to consider the potential impact of discriminatory conduct on the Internet's ability to realize its social, cultural and political potential – important aspects that the network neutrality rules are intended to protect.

Problems with Case-by-Case Adjudication

The rule uses criteria that are open to interpretation. It does not indicate which economic theories of competition and user harm should guide the assessment of discriminatory behavior. Instead, it leaves all substantive judgments about the legality of discriminatory behavior to later adjudications. This may be appealing to parties looking for a compromise today, since the controversial questions ("Which forms of discrimination should be banned?") are not decided one way or the other.

From the perspective of the regulator, this strategy suffers from some important flaws:

First, it fails to provide much-needed certainty for industry participants. Network providers still won't know which forms of network management are acceptable, which

[10] The Google-Verizon Proposal for a legislative framework for network neutrality said "or." See the wording of the proposed non-discrimination rule on p. 2 of this paper.

constrains the evolution of the network more than necessary. Application developers still face the fundamental risk that the network will turn against their application at any time and block the application or slow it down, which will reduce their ability to get funding. At the same time, the existence of the non-discrimination rule provides little comfort to application developers who consider whether to realize their innovative idea or to investors who consider whether to fund them. After all, venture capitalists and other investors fund start ups so that they can build their product and better meet the needs of their users. Paying armies of lawyers and economists to clarify how to interpret an ambiguous non-discrimination rule in order to allow the application to reach its customers is not how they would like their funds to be used.

Second, it creates high costs of regulation and tilts the playing field against those – end users, application developers and start-ups – who do not have the resources necessary to engage in extended fights over the legality of specific discriminations in the future

Stakeholders cannot agree on what constitutes acceptable behavior today; it is unlikely that they will be able to do so in the future. Still, the strategy is appealing because each party can hope that it will prevail in the future. An ambiguous rule that leaves everything up for debate fits well with that goal (the Telecommunications Act of 1996 is a good example of that strategy in action). But for the regulator, who is charged with protecting the public interest, other considerations should matter. With an ambiguous rule like this that is applied in case-by-case adjudication, the party that can pay the most lobbyists, lawyers and economists wins. End users, low cost application developers and start-ups loose. They do not have the resources to pay for the lawyers and economists needed to win the fight over the correct interpretation and the application of the rule, first at the regulatory agency and later in the courts. They are, however, some of the key groups that network neutrality rules are intended to protect.[11]

Finally, insights from behavioral economics suggest that discriminatory behavior is more likely to be allowed under case-by-case adjudication than under an ex ante regime.

An ex ante regime is better suited to the consideration of the very fundamental values at stake. Network neutrality rules are based on very general trade-offs among competing values.[12] They are based on the view

- that fostering application innovation is critical for economic growth;
- that allowing users to choose how they want to use the network is important if we want to maximize the Internet's value for users, and for society;
- that we need to preserve the Internet's ability to foster democratic discourse and so on.

These goals are considered more important than

- the potential benefits of allowing the core of the network to evolve freely;

[11] On the importance of low cost innovators, see van Schewick (2010a), pp. 204-213, 300-308, 334-345. On new entrants and start ups, see van Schewick (2010a), pp. 319-334.
[12] For a detailed discussion of this trade-off, see van Schewick (2010a), pp. 355-371.

- the potential benefits of short-term optimization of the network in favor of the applications of the day; and
- network providers' profits.

While the benefits of the network neutrality rules are difficult to specify in detail (they will be realized in the future; we don't really know the applications which we will never get if we close down the network today; we don't really know which benefits a better platform for social, cultural and political interaction will bring), the costs are immediately apparent ("we would like to do X (i.e. manage bandwidth this way) and can't do it").[13] Insights from behavioral economics suggest that decision makers tend to undervalue future benefits, even more so if they are uncertain. In addition, for the decision maker, allowing one deviation from a general non-discrimination rule does not seem to make a big difference. This assessment may be mistaken; often, it may be impossible to immediately recognize the negative future consequences. Finally, on the Internet, many small deviations quickly add up to create big roadblocks for innovation.[14] For all these reasons, deciding whether to allow discrimination on a case-by-case basis makes it more likely that discrimination will be allowed than under an ex ante rule that resolves the above trade-off for all future cases at once.

WHAT THE NON-DISCRIMINATION RULE SHOULD LOOK LIKE

Legislators and regulators should enact a non-discrimination rule that bans all application-specific discrimination, but allows all application-agnostic discrimination. Discrimination is application-specific if the discrimination is based on the specific application or content (e.g. Skype is treated differently from Vonage), or based on classes of applications or content (e.g. Internet telephony is treated differently from e-mail).[15]

[13] For a more detailed description of the problem with pointers to the literature, see van Schewick (2010a), pp. 77-78, 374-375.
[14] For an example, see van Schewick (2010a), p. 78.
[15] By banning discrimination based on applications *and* classes of applications, the rule would ban a practice called "like-treatment." Under rules that require "like-treatment," network providers are required to treat like traffic alike: they are allowed to treat classes of applications differently, as long as they do not discriminate among applications within a class. For example, under rules that require like-treatment, network providers would be allowed to treat Vonage, an Internet telephony application, different from gmail, an e-mail application, but they would not be allowed to treat Skype, another Internet telephony application, differently from Vonage. As I show in van Schewick (forthcoming 2010), allowing network providers to treat classes of applications differently enables them to distort competition among applications or classes of applications, creates high costs of regulation, does not accurately meet user preferences and harms application innovation by requiring innovators to convince network providers that their application belongs to a certain class.

Protecting the factors that are at the core of the Internet's economic, social, cultural and political potential

Such a rule preserves the application-blindness of the network and the principle of user choice, two factors that have been central to the Internet's ability to foster innovation in the past.[16] By prohibiting application-specific discrimination, the proposed rule makes it impossible for network providers to distort competition among applications or classes of applications. The rule provides certainty to application developers and their investors that they will have a fair chance in the market place – that they will be able to reach users and compete with other applications on the merits, without interference from network providers. It allows users, not network providers to choose how they want to use the network and which applications will be successful. Letting users make this choice not only increases the value of the Internet for users and for society, it is also an important part of the mechanism that enables application-level innovation to function effectively. In addition, maintaining application-blindness and user choice is key to allowing the Internet to realize its social, cultural and political potential.

Allowing the network to evolve

The proposed rule does not constrain the evolution of the network more than is necessary to reach the goals of network neutrality regulation.

Quality of Service

It allows network providers to offer certain (though not all) forms of Quality of Service. In particular, it allows network providers to offer different classes of service if they meet the following conditions:

(1) the different classes of service are offered on a non-discriminatory basis, i.e. without regard to the identity of the sender or receiver, the specific application or content (e.g. Skype or Vonage), or the type of application or content (e.g. Internet telephony);

(2) the user is able to choose whether and when to use which class of service;

(3) the network provider is allowed to charge only its own Internet service customers for the use of the different classes of service.[17]

This type of Quality of Service offers the same potential societal benefits as other, discriminatory or provider-controlled forms of Quality of Service without the social costs.

[16] See van Schewick (2010a). For a short summary, see van Schewick (2010c).
[17] I explained the rationale for this criterion in van Schewick (2010b). While the first two conditions are a consequence of the proposed non-discrimination rule, the third condition would have to be encoded separately.

Network Management

The proposed rule allows network providers to freely engage in application-agnostic ways of managing congestion.[18] Network providers would be able to enforce fairness among users, allocating bandwidth among users in application-agnostic ways, but how a user decides to use its "share" of bandwidth, both in general and at a particular point in time would be decided by the user. To the extent that applications benefit from relative prioritization at times of congestion, network providers could allow users to choose which applications to prioritize within the user's bandwidth envelope during times of congestion. As long as the ability to prioritize is offered independently of the specific applications or classes of applications (i.e. not tied or restricted to specific applications or classes of applications) and the choice of which applications to prioritize is left to the user, this form of network management would be consistent with the non-discrimination rule proposed above.

Application-agnostic network management coupled with user-controlled prioritization maintains the quality of the Internet experience for all users, while preserving the application-blindness of the network and the principle of user choice, with beneficial economic, social, cultural and political consequences. From a technical perspective, application-agnostic network management has the added advantage of removing the incentive for users to masquerade their applications to evade or take advantage of certain application-specific treatment in the network, freeing resources at the network provider and at users.

Tools for application-agnostic congestion management are available today. As the experience of Comcast shows, it is possible to protect the quality of the Internet experience of all Internet service customers in application-agnostic ways.[19] Beyond Comcast's approach, vendors have developed network management solutions that allow the network provider to allocate bandwidth among users in application-agnostic ways, while letting users choose the relative priority of applications within the bandwidth allocated to them.

The proposed rule is also compatible with new standards that are currently being developed in the Internet Engineering Task Force.[20] These standards would evolve the Internet standards in a way that allows the network provider to determine how much a specific user is contributing to congestion at any point in time. This information would allow network providers to manage their networks based on a user's contribution to congestion – an application-agnostic criterion.

Problems that cannot be solved in application-agnostic ways (even if coupled with user-controlled prioritization) would be captured by the reasonable network management exception.

[18] For a longer explanation of the policy arguments in this subsection, see van Schewick (2008a), pp. 4-8 and van Schewick (2008b).
[19] Bastian, et al. (2010).
[20] These standards are being developed by the Congestion Exposure Working Group. See Internet Engineering Task Force (2010).

This exception would allow deviations from application-agnostic network management (and user-controlled prioritization) if the problem cannot be addressed in this way.

Certainty and Costs of Regulation

Since it is easy to determine whether a certain differential treatment is application-agnostic or not, the proposed rule clearly distinguishes acceptable from inacceptable behavior. As a result, the rule provides much-needed certainty to industry participants (including network providers, application developers and their investors) and keeps the cost of regulation low.

REFERENCES

Bastian, C., T. Klieber, J. Livingood, J. Mills & R. Woundy. 2010. "Comcast's Protocol-Agnostic Congestion Management System." Internet Draft IETF.

Farber, David, Michael L. Katz, Gerald Faulhaber & Christopher S. Yoo. 2007. "Hold Off on Network Neutrality." *Washington Post.* January 19. http://www.washingtonpost.com/wp-dyn/content/article/2007/01/18/AR2007011801508.html

Google, Inc. & Inc. Verizon. 2010. "Google-Verizon Legislative Framework Proposal." August 9. http://static.googleusercontent.com/external_content/untrusted_dlcp/www.google.com/en/us/googleblogs/pdfs/verizon_google_legislative_framework_proposal_081010.pdf

Internet Engineering Task Force. 2010. "Congestion Exposure (conex) Working Group Charter." https://datatracker.ietf.org/wg/conex/charter/

van Schewick, Barbara. 2008a. *Official Testimony at the Federal Communications Commission Second En Banc Hearing on Broadband Management Practices.* Federal Communications Commission.

van Schewick, Barbara. 2008b. *Oral Testimony at the Federal Communications Commission Second En Banc Hearing on Broadband Management Practices.* Federal Communications Commission.

van Schewick, Barbara. 2009. "Point/Counterpoint. Network Neutrality Nuances." *Communications of the ACM*, 52(2): 31-34, 36-37.

van Schewick, Barbara. 2010a. *Internet Architecture and Innovation.* Cambridge, MA: MIT Press.

van Schewick, Barbara. 2010b. *Opening Statement at the Workshop on Approaches to Preserving the Open Internet.* Federal Communications Commission.

van Schewick, Barbara. 2010c. *Opening Statement at the Workshop on Innovation, Investment and the Open Internet.* Federal Communications Commission.

van Schewick, Barbara. forthcoming 2010. *Network Neutrality - What is it and what should governments do about it?*