

*Before the*  
**Federal Communications Commission**

*In the matter of*  
**Preserving the Open Internet**  
GN Docket No. 09-191  
**Broadband Industry Practices**  
WC Docket No. 07-52

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## Summary

Our initial comments identified several problems with the NPRM's narrow focus on "last mile" competitive concerns. We showed how a broadband access provider can evade last mile regulation by "outsourcing discrimination" deep in the network through selected interconnection agreements. We warned that if the FCC's final rules account only for packet discrimination inside the access network, then the rules would simply encourage access providers to select an adjacent network to discriminate for them.

The NPRM's proposed rule's short reach stems from the Commission's narrow conception of the internet's component markets. The Commission viewed the "Internet backbone" as a fluffy cloud of fiber and light, failing accurately to see it as a mass of interconnected networks subject to cascading economic and regulatory pressures. Without an understanding of interconnection markets, any FCC rule would be incomplete and arbitrary.

Due to this lack of understanding of interconnection markets, we urged the Commission to aim for complete transparency, by requiring disclosure of not only the access provider's internal traffic management (i.e. packet discrimination in the last mile) but also their external interconnection agreements. Armed with this complete transparency the newly informed customers can then discipline a broader range of access provider misbehavior. Similarly, the Commission, armed with a more complete understanding of internet traffic flow, could correct abuses *ex post*, in a way that would be flexible and responsive to the emerging norms and consumer expectations.

The record has confirmed our concerns and reinforced the need for comprehensive transparency. Consensus has emerged on the need for customer-centric disclosure.<sup>1</sup> But only our comments set forth the technical specification for this disclosure. It must be both flexible and standardized. Our proposal—requiring disclosure of both internal traffic management (by reference to the established DiffServ standard) as well as external interconnection agreements (in an open and accessible registry)—promises to make FCC policy both rational and effective.

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<sup>1</sup> See e.g., Comments of Electronic Frontier Foundation, GN Docket No. 09-191, WC Docket No. 07-52, at 24 (filed Jan. 14, 2010) ["EFF Comments"] ("Transparency is critically important."); Comments of Cox Communications, Inc., GN Docket No. 09-191, WC Docket No. 07-52, at 11 (filed Jan. 14, 2010) ["Cox Comments"] ("broadband providers should inform subscribers"); Comments of the Open Internet Coalition, GN Docket No. 09-191, WC Docket No. 07-52, at 88 (filed Jan. 14, 2010) ["OIC Comments"] ("The Commission should require broadband Internet service providers to disclose . . ."); Comments of Time Warner Cable, Inc., GN Docket No. 09-191, WC Docket No. 07-52, at 98 (filed Jan. 14, 2010) ["TWC Comments"] ("TWC supports and practices transparency"); Comments of Verizon and Verizon Wireless, GN Docket No. 09-191, WC Docket No. 07-52, at 50 (filed Jan. 14, 2010) ["Verizon Comments"] ("Thus, to the extent a 'problem' exists at all, increased transparency will address it."); Google and Verizon Joint Submission on the Open Internet, GN Docket No. 09-191, WC Docket No. 07-52, at 3 (filed Jan. 14, 2010) ["Google & Verizon Joint Submission"] ("Transparency will ensure an environment of informed user choice.").

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### I. The Interconnection Markets Cannot Be Ignored

The record agrees with our critique that the Commission has woefully oversimplified the internet's component markets. Many, including AT&T<sup>2</sup> and Time Warner<sup>3</sup>, have pointed out that the "Internet backbone" is not the stateless, cloud-like blob that the Commission suggests.<sup>4</sup> Further, the Open Internet Coalition (OIC) describes how an access provider fiddling with traffic must deal with the market reality of the interconnected intermediate networks which, at the other

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<sup>2</sup> See Comments of AT&T, Inc., GN Docket No. 09-191, WC Docket No. 07-52, at 21 (filed Jan. 14, 2010) ["AT&T Comments"]:

"[T]he Internet is not some homogenous "cloud" surrounded by hermetically isolated users at the edge, nor do those users rely passively on forces within the cloud to connect them with other users. The Internet is more aptly depicted as a growing, ever-shifting spaghetti tangle of thousands upon thousands of networks that interconnect in unpredictable ways, through efficient commercial arrangements, to forge better connections among their respective users."

<sup>3</sup> See *TWC Comments*, iii:

"If the Commission determines that regulatory intervention is necessary to preserve an open Internet, it would make no sense to focus exclusively on providers of so-called "last mile" access facilities."

<sup>4</sup> See Comments of Adam Candeub & Daniel John McCartney, Michigan State University College of Law Intellectual Property and Communications Law Program, GN Docket No. 09-191, WC Docket No. 07-52, at 4 (filed Jan. 14, 2010) ["Open Data for the Open Internet"]:

That cloud floating in the middle is, in fact, composed of interconnected networks. A CAS provider or an access provider (or any other network on the Internet) must maintain interconnection agreements with one or many other networks to get online in the first instance. This is not a graphical nit-pick. The policy implications are far-reaching. The Internet is not a fluffy cloud of fiber and light where, once connected, packets freely roam. Networks pay other networks to interconnect (see below). Economic or regulatory pressure on one network does not evaporate into the great Internet cloud – it cascades out onto adjacent networks. And when the Commission ignores these interconnections, it ignores the tactics that they enable for achieving discrimination. The Commission cannot proceed blind to the structure inherent to interconnected networks, that is, the structure inherent to the Internet itself.

end, have received payment from the source of the traffic – thus dismantling the myth of “free-rider” content providers.<sup>5</sup> We join these commenters in urging the Commission to recognize that any attempt to protect consumer internet access must include recognition of the importance of interconnection markets.

Instead of providing information about interconnection markets, the comments offer metaphoric generalizations (the Open Internet Coalition blithely references unnamed “Internet Backbone Providers” while AT&T calls it a “spaghetti tangle”<sup>6</sup>).

These metaphors and generalizations must not hide the fact that almost nothing is publically known about interconnection markets, an ignorance the record establishes. For instance, AT&T’s notes only two “sources” for information on the backbone networks: a 10 year old FCC working paper that itself bemoaned how “information about the nature of relationships between Internet backbone providers is protected by non-disclosure agreements”<sup>7</sup>, and the blog of a single networking consultant.<sup>8</sup> When the FCC report was written, the GAO confirmed the public ignorance: “In the absence of adequate information, it is difficult to fully ascertain . . . the extent of market concentration and competition in the Internet backbone market.”<sup>9</sup> Remarkably, ten years later, the FTC examined the issue and relied exclusively on the 10 year old FCC working paper. Because of this failure of oversight, interconnection policy “is not an informed discipline.”<sup>10</sup>

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<sup>5</sup> See *OIC Comments* at 27-28.

<sup>6</sup> *AT&T Comments* at 21 (“The Internet is more aptly depicted as a growing, ever-shifting spaghetti tangle of thousands upon thousands of networks that interconnect in unpredictable ways”)

<sup>7</sup> Michael Kende, *The Digital Handshake: Connecting Internet Backbones*, FCC, Office of Plans and Policy, OPP Working Paper No. 32, at 13 n. 51 (Sept. 2000), [http://www.fcc.gov/Bureaus/OPP/working\\_papers/oppwp32.pdf](http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp32.pdf) (last accessed Apr. 25, 2010).

<sup>8</sup> See *AT&T Comments* at 23 (citing *DrPeering.net: Why care about Transit Pricing?*, [http://drpeering.net/a/Peering\\_vs\\_Transit\\_The\\_Business\\_Case\\_for\\_Peering.html](http://drpeering.net/a/Peering_vs_Transit_The_Business_Case_for_Peering.html)).

<sup>9</sup> *Characteristics and Competitiveness of the Internet Backbone Market*, GAO-02-16, at 28 (Oct. 2001) available at <http://www.gao.gov/new.items/d0216.pdf> (last accessed Apr. 25, 2010).

<sup>10</sup> See Krioukov et al., *The Workshop on Internet Topology (WIT) Report*, 37 ACM SIGCOMM Computer Communications Review 69 (2007) (“In its current state, Internet topology research is not an informed discipline since available data is not only scarce, but also severely limited by technical, legal, and social constraints on its collection and distribution.”) available at <http://www.caida.org/publications/papers/2006/wit/wit.pdf> (last accessed Apr. 25, 2010).

In addition to this ten year old working paper, AT&T urges the Commission to base its policy on the blog of Bill Norton, the self-styled “Dr. Peering.”<sup>11</sup> While the blog is very interesting and seems aimed to inform, Dr. Peering admits that he reports only the data he can scrounge up, it is not reliable<sup>12</sup> and all the writings are “living documents.”<sup>13</sup> Dr. Peering apparently keeps an open ear during trade conferences. But when a backbone provider wishes to conceal local market dominance, they can do so by simply keeping their mouths shut around Dr. Peering at trade shows.

AT&T is a Tier 1 backbone provider. It is one of the few entities that has firsthand knowledge of the backbone market. By referencing “Dr. Peering” instead of reporting what they know, AT&T avoids making reliable disclosure about the real interconnection market. The Commission commits regulatory dereliction if it bases policy upon such scant and shaky evidence.

Given this ignorance, we renew our insistence on a complete disclosure to achieve true transparency. We believe that disclosure must be tailored to the various discriminatory tactics open to networks. As we explained in our comments, the access provider has 3 broad categories of discriminatory tactics: (1) selecting where and how to offer customer access, (2) selecting a quality of service (QoS) policy to classify and treat traffic, and (3) choosing interconnected networks and terms.<sup>14</sup>

The Commission’s recent Consumer Broadband Test is an excellent attempt to reveal Type 1 practices by securing real data from real users.<sup>15</sup> Type 1 discrimination involves an access provider’s discrimination along the dimensions of, among others, geography and technology, i.e., a provider decides where and what to buildout. And Type 2 discrimination – the configuration of routers to fiddle with traffic inside the access provider network – is the

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<sup>11</sup> See generally *DrPeering.net: About the Author*, [http://drpeering.net/a/About\\_wbn.html](http://drpeering.net/a/About_wbn.html) (last accessed Apr. 25, 2010).

<sup>12</sup> *DrPeering.net: Internet Peering*, [http://drpeering.net/a/Internet\\_Peering\\_White\\_Papers.html](http://drpeering.net/a/Internet_Peering_White_Papers.html) (last accessed Apr. 25, 2010) (“highly volatile and therefore out-of-date almost immediately”)

<sup>13</sup> *DrPeering.net: Research Methods*, [http://drpeering.net/a/Internet\\_Peering\\_White\\_Paper\\_Process.html](http://drpeering.net/a/Internet_Peering_White_Paper_Process.html) (last accessed Apr. 25, 2010) (“These research efforts are never ‘done’ but rather are considered living documents . . .”).

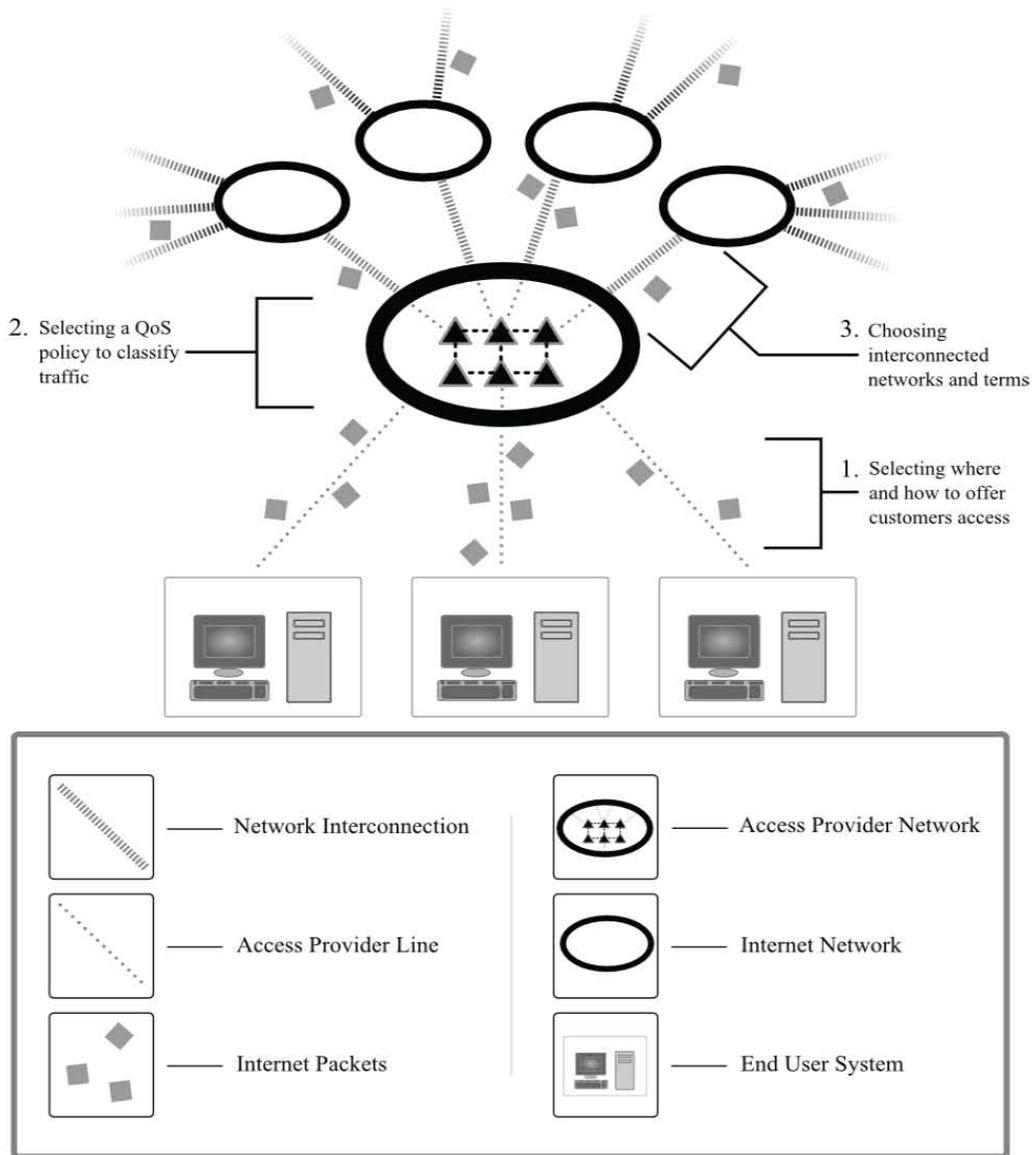
<sup>14</sup> *Open Data for the Open Internet* at 2-5.

<sup>15</sup> See *About the Consumer Broadband Test (beta)*, <http://www.broadband.gov/qualitytest/about/> (last accessed Apr. 25, 2010).

target of the bulk of this NPRM’s “nondiscrimination” rules and the cause of the Comcast-BiTorrent controversy.<sup>16</sup>

As we discuss above, Type 3 discrimination—which involve how broadband access providers interconnect with each other and the backbone, *i.e.*, *the interconnection market*,—remains a mystery and must be revealed to form rational policy. The following image depicts these 3 tactics for discrimination, together with a generalized arrangement of customers, the broadband access provider, and the interconnected networks.

## How Access Providers Discriminate



<sup>16</sup> See *Preserving the Open Internet / Broadband Industry Practices*, Notice of Proposed Rulemaking, 24 F.C.C.R. 13064 ¶ 118 (2009) [“Open Internet NPRM”].

The Commission aims to ensure that broadband Internet access is provided in a “nondiscriminatory manner”<sup>17</sup>, but it cannot do so without information about discrimination within interconnection markets, *i.e.*, Type 3 discrimination. It should expose these discriminatory tactics to the disciplining choice of the consumer by requiring complete transparency. “A disclosure without interconnection agreements is incomplete.”<sup>18</sup>

## **II. Access Providers Should Disclose Both Internal Traffic Management Policies and External Interconnection Agreements**

To balance consistency with flexibility the rules should order disclosure of (1) internal traffic management policies by reference to the standard architecture, DiffServ;<sup>19</sup> and (2) external interconnection agreements by participation in a public registry. This imposes no limit on the provider’s flexible adoption of new traffic management or of new interconnection agreements—it merely orders that any such changes be transparent.

## **III. The FCC Must Require Standardized, Real Time Disclosure**

The near-universal support for disclosure is not without variation. AT&T asserts that the form of disclosure need not be standardized.<sup>20</sup> And the Open Internet Coalition (OIC), for its part, argues that the timing of the disclosure be even earlier than our real-time suggestion: they would have it 30 days *before* implementation.<sup>21</sup>

To be effective, disclosure must be standardized because the “Internet” consumers experience depends on a multitude of networks, each with their own management and interconnection policy. Only aggregate information from all these networks can truly inform consumers. Such aggregation requires standardization. Finally, the Commission should not

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<sup>17</sup> *Id.* ¶ 106.

<sup>18</sup> *Open Data for the Open Internet* at 4-5.

<sup>19</sup> *Open Data for the Open Internet* at 7.

<sup>20</sup> *AT&T Comments* at 188 (“The Commission need not, however, dictate the precise categories of information that providers disclose, nor need it impose “standard labeling formats” or other detailed requirements.”), see also *Cox Comments* at 10 (insisting that the Commission should “encourage” transparency but not “focus on specific notification requirements”).

<sup>21</sup> *OIC Comments* at 90 (“Broadband Internet access providers’ traffic management techniques should be made available to the public 30 days *prior to being implemented.*”) (emphasis added)

surrender its push to empower consumers with transparency at the mere mention of vague, unsubstantiated fears from incumbents of unspecified “competitive” or “security” effects.<sup>22</sup>

**a. DiffServ: A Standard Form of Disclosure Balances Consistency with Flexibility**

AT&T is apparently of two minds on transparency. On the one hand they say no detailed disclosure is required<sup>23</sup>, but then they also say the Commission has not gone “far enough” in its transparency principles.<sup>24</sup> We agree with the angels of AT&T’s better nature: the consumer benefits from disclosure are “well worth the cost.”<sup>25</sup> Indeed “[o]nly with good information can competitive markets work their magic, and ensure that customers are in the driver’s seat.”<sup>26</sup> And we also agree that “cooperative solutions” – like those that emerge from standard practices – are likely to be the best solutions to inform consumer choice.<sup>27</sup>

This preference for emergent standards is precisely why we urge disclosure by reference to the DiffServ architecture. As AT&T emphasizes, “AT&T and other providers have long used DiffServ . . . to ensure differentiated service handling across diverse network facilities.”<sup>28</sup> It is already the standard. It is how networks are already configured, so it promises to minimize costs as the form for disclosure. The benefits to consumers of useful consistency far outweigh any (unspecified) provider’s costs of revealing configuration information that they have already prepared.

Thus we reiterate our warning to “beware of access provider’s mixed interests.”<sup>29</sup> An access provider who wants to conceal network management practices has an incentive to disclose the raw information using inconsistent forms to prevent the development of tools that analyze

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<sup>22</sup> There was some vague resistance to detailed disclosure by reference to “competitive” and “security” concerns. E.g., *CTIA Comments* at 48 (“[Disclosing] the specific tools and equipment used by wireless carriers presents both competitive and security concerns.”)

<sup>23</sup> *AT&T Comments* at 188 (“The Commission need not [impose . . .] detailed requirements.”)

<sup>24</sup> *AT&T Comments* Exhibit 1, Faulhaber & Farber, *The Open Internet: A Customer-Centric Framework*, at 16 [“AT&T Experts”] (“We are so strongly in favor of transparency that we must take the FCC to task for not driving the NPRM far enough on the issue.”); see also *id.* at 15 (“[W]e support compelling transparency via regulation should cooperative solutions fail.”).

<sup>25</sup> *AT&T Experts* at 16.

<sup>26</sup> *AT&T Experts* at 15.

<sup>27</sup> See *AT&T Comments* at 188-89; *AT&T Experts* at 15-16.

<sup>28</sup> *AT&T Comments* at 51-52.

<sup>29</sup> *Open Data for the Open Internet* at 6.

this data. This prevents comparison shopping by home users. It prevents oversight by government. And it frustrates application development.

If the disclosures take *inconsistent* forms then “the technical complexity of the disclosure might obscure more than it reveals.”<sup>30</sup> But by mandating consistency, the disclosures will inform both the comparison-shopping consumer and the nascent application developer – who both would otherwise be forced to decipher the countless variations of “disclosure” that go without the coordinating benefit of a standardized form.

The standardized disclosure also simplifies its comprehensiveness and reduces the need for any lead time on disclosure. This is why we disagree with the Open Internet Coalition. OIC would require 30-days lead on network management changes. Our disagreement stems largely from differences in what we would have disclosed. Whereas OIC seeks disclosure of a laundry list of worrisome network management practices<sup>31</sup>, we seek a specific and standardized disclosure of the precise DiffServ configuration.<sup>32</sup> OIC envisions the Commission’s collection of access provider’s disclosures, and then the Commission makes partial exposure of these to the public; we envision real-time exposure of network configuration to the consumer’s themselves.<sup>33</sup> At bottom, then, OIC seeks to have the networks self-interpret their network configuration to describe their deliberate intentions. But we want to let the network configuration speak for itself, without handcuffing networks to deal with problems as soon as they emerge. While we support OIC’s end, we think ours is a less-costly and more-usefully specific mode for revealing an access provider’s traffic discrimination.<sup>34</sup>

#### **b. Disclosure Does Not Raise Competitive or Security Problems, It Answers Them**

Nothing in our transparency proposal threatens competition or security<sup>35</sup>; indeed our proposal both encourages competition and helps to ensure security. By making complete

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<sup>30</sup> *Open Data for the Open Internet* at 3.

<sup>31</sup> *OIC Comments* at 88-89.

<sup>32</sup> *Open Data for the Open Internet* at 5-6.

<sup>33</sup> Compare *OIC Comments* at 89 (“The above information should be collected by the Commission on a periodic and ongoing basis. The Commission should make public as much of the data as possible.”) with *Open Data for the Open Internet* at 6 (“As quickly as the networks can be reconfigured, so quickly should the affected users be informed.”).

<sup>34</sup> Indeed the FCC’s recent Consumer Broadband Test demonstrates how a direct-to-consumer disclosure regime, such as ours, could be voluntarily and mechanically aggregated to provide the same systemic view that OIC seems to pursue. See *supra* note 15.

<sup>35</sup> *C.f. CTIA Comments* at 48 (“[Disclosing] the specific tools and equipment used by wireless carriers presents both competitive and security concerns.”); see also *supra* note 22 and accompanying text.

disclosure of network service limitations, customers are better informed. Disclosing the set of adjacent networks gives the customer a real view of service reliability. And these better informed customers can discipline networks to provide quality and reliability. If a network cuts corners and exposes itself to a single or few points of failure, then the customer will know it, and the customer can opt for a less vulnerable provider. In this way, disclosure promises to harness the competitive market to encourage firms to provide secure and reliable service to well-informed, demanding customers.

Cox Cable makes the ludicrous claim that it is their job to police the internet against viruses, malware, copyright infringement, and child pornography.<sup>36</sup> Time Warner Cable bemoans “hackers, spammers, and even terrorists”.<sup>37</sup> They wring their hands, worrying that any detailed transparency requirement might undermine their policing efforts.<sup>38</sup> Even if we ignore their prejudiced, ill-informed scorn for hackers<sup>39</sup>, the argument is silly.

Cable companies do not police the internet’s content—indeed if that is their job, they have failed miserably and need to answer for the glut of copyright infringement and child pornography that persists online. If an access provider is indeed monitoring people’s behavior to detect “infected” customers, then this monitoring threatens user privacy. At minimum, it should be disclosed to the people being watched.<sup>40</sup> And in any event, none of this justifies hiding network interconnections and traffic discrimination policies from a purchasing consumer.

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<sup>36</sup> See *Cox Comments* at 11 (“Cox and other broadband providers find it necessary to utilize a number of network management techniques to counter the distribution of spam, viruses, malware, unauthorized copyrighted material, child pornography, and other similar abuse materials”).

<sup>37</sup> *TWC Comments* at 101-102.

<sup>38</sup> *Cox Comments* at 11; *TWC Comments* at 102.

<sup>39</sup> If these *internet* service providers are unfamiliar with *internet* terminology, like “hacker”, we suggest they read the free manual (RTFM). See Gary Scott Malkin & Tracy LaQuey Parker, *Internet Users’ Glossary*, <http://www.apps.ietf.org/rfc/rfc1392.html> (defining “hacker” as “[a] person who delights in having an intimate understanding of the internal workings of a system, computers and computer networks in particular”). Hackers are not sensibly grouped with terrorists and spammers. *C.f.* *TWC Comments* at 101 (“In addition, it is an unfortunate fact of life that *hackers*, *spammers*, and *even terrorists* are keenly focused on ways to disrupt online services.”) (emphasis added); *Cox Comments* at 11 (worrying that “sensitive information [. . .] would enable *hackers* and others to circumvent security”) (emphasis added). To the extent the term “hacker” has become a shibboleth for clueful network administration, these internet service providers have both failed the test.

<sup>40</sup> Cox wrote that they “find it necessary” to monitor people’s behavior online. *Cox Comments* at 11. Necessary for what? This “necessity” as often reflects mere convenience or voyeurism. For a detailed examination of ISP surveillance motives see *Paul Ohm*, *The Rise and Fall of Invasive ISP Surveillance*, 2009 UNIV. ILL. L. REV. 1417, 1462 (2009) (“The Necessary, the Merely Convenient, and the Voyeuristic”).

Even if we were to accept CoxCable's and Time Warner Cable's erroneous and self-serving deputizing, neither they nor any other commenter has described *how* detailed disclosure would compromise security or any other legitimate network management goal. They simply conjure boogey men. The Commission must not be taken in.

The Competitive Enterprise Institute hopes that competitive rivalry will produce disclosure, and insists that transparency mandates are inferior.<sup>41</sup> Of course it is sometimes true that a market produces adequate disclosures on their own, but it is not always so, especially in concentrated markets.<sup>42</sup> Moreover, as Judge Richard Posner has pointed out, when a producer can provide, convey, or obtain the pertinent information at a lower cost than the consumer, mandatory disclosure can be appropriate.<sup>43</sup> Mandating disclosure then provides the market, in the cheapest way, the information that will allow consumers to reveal preferences by responding to these disclosures. Here, consumers have no reliable or cheap way of ascertaining the details of the connectivity they are about to purchase, whereas providers have this information at the ready.<sup>44</sup> So this disclosure will present consumers with the facts of their purchased product. This sharpens a consumer's willingness-to-pay as an accurate proxy for human welfare in the market's marvelous aggregation of efficient, contextualized choice.<sup>45</sup>

#### **IV. Given What We Don't Know, The Rules Should Be Enforced *Ex Post***

Finally, we reiterate our suggestion that the proposed rules be enforced *ex post*.<sup>46</sup> At this point the body of theory is too unsettled and the internet's markets are shifting too wildly to implement workable *ex ante* rules. Requiring preapproval of network management practices risks doing too much or, by introducing legalistic loopholes, risks doing too little.

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<sup>41</sup> See Comments of the Competitive Enterprise Institute, GN Docket No. 09-191, WC Docket No. 07-52, at 18 (filed Jan. 14, 2010) ["CEI Comments"] ("Forced disclosure is an inferior alternative to that driven by rivalry.")

<sup>42</sup> Richard A. Posner, *ECONOMIC ANALYSIS OF LAW* § 4.6 at 112 (6th Ed. 2003). 20 Id. ("A monopolist (or cartel) may have a greater incentive than a firm in a competitive industry to misrepresent the qualities of its product.")

<sup>43</sup> *Id.*

<sup>44</sup> Adam Candeub & Daniel John McCartney, *Network Transparency: Seeing the Neutral Network*, 8 Nw. J. Tech & Intell. Prop. \_\_\_, 9-14 (forthcoming Spring 2010) (detailing the technical limits on consumers ability to infer the relevant network configurations); *see also Open Data for the Open Internet* Appendix A.

<sup>45</sup> *See generally*, F. A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945) ("The economic problem of society is thus . . . a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of the utilization of knowledge which is not given to anyone in its totality."); *see also*, Competitive Enterprise Institute, *About CEI* ("We believe that the best solutions come from people making their own choices in a free marketplace . . .") available at <http://cei.org/about> (last accessed April 21, 2010)

<sup>46</sup> *Open Data for the Open Internet* at 6-7

The Open Internet NPRM asks whether the last mile access provider—the ISP, such as Comcast or Verizon—can or will block (or degrade) access to unaffiliated content providers, i.e. “vertical foreclosure.” The record shows that economics provides no clear answers.

Two approaches have dominated economists’ approach to answering this question: the single monopoly rent theorem and double sided markets. Neither lets either side declare victory.

The single monopoly rent theorem maintains that, under certain assumptions, a monopolist gains nothing from “leveraging” a dominant position into adjacent upstream or downstream markets, since he can extract only a single monopoly rent from the ultimate consumer. An alternate set of economic theory—double-sided markets—analyzes the scenario differently. The typical example of a double-sided market is credit cards. Consumers want cards that are accepted at as many merchants as possible, while merchants want to accept cards that are carried by as many consumers as possible. Double sided markets exhibit network effects, i.e., a credit card brand is worth more to merchants if more people have them and more to consumers if more merchants accept them. In order to capture this value created by networks and scale, the credit card company may—in theory—price one side of the market (credit card fees or merchant transaction fees) below a competitive level in order to get more people “on board.”

The NPRM cites an article by Barbara van Schewick that steps through these (and other) economic theories to justify internet regulation.<sup>47</sup> AT&T’s expert economist criticizes van Schewick’s article as having “wide gaps between the assumptions underlying the theories and the actual facts.”<sup>48</sup> Indeed AT&T’s expert is no doubt correct that there are wide gaps between theory and reality. But that is true for both critics and advocates of the single monopoly rent theorem. And AT&T, in its comments proper, invokes the single-monopoly-rent theorem yet fails to fill in the theory’s necessary underlying empirical assumptions.<sup>49</sup>

In failing to answer to any central questions, this economic debate powerfully demonstrates the danger of overbroad *ex ante* rules. Instead the Commission should allow experience to fill the policy vacuum that theory plainly cannot. Therefore we argue for *ex post*, case-by-case rulemaking to “lay[] the groundwork for growing a body of law that can serve to give reliable guidance going forward.”<sup>50</sup>

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<sup>47</sup> Barbara Van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. TELECOMM. & HIGH TECH. L. 329 (2007).

<sup>48</sup> *AT&T Comments Exhibit 3, Declaration of Marius Schwartz*, at 29.

<sup>49</sup> See *AT&T Comments* at 120-21 (“Modern antitrust analysis recognizes that, except in very specific contexts, even a *monopolist* in a platform market generally has little incentive to act anticompetitively towards unaffiliated application providers that wish to use its platform.”).

<sup>50</sup> *Open Data for the Open Internet* at 7.

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