

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of:)
)
Protecting and Promoting the Open Internet) **GN Docket No. 14-28**
)

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The following comments address five claims that have emerged in the last round of public comment in the FCC’s NPRM for the Open Internet. The claims are listed below.

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While it is true that internet service providers (ISPs) have the ability to degrade the Internet for their customers, that they have an incentive to do so is not supported in the academic literature or by empirical evidence. The second claim, that without open internet rules the value of the internet would decline, is conjecture. Such a claim has limited support in the academic literature and no empirical evidence. The third and fourth claims could be investigated, but such analysis should be undertaken before a regulatory regime is imposed. Having little to no academic or empirical support for claims 1-4 at this time, it is not justified to take a step further than the 2010 Open Internet Order and reclassify broadband as a Title II service nor is it justified to increase regulation on wireless.

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Claim #1: Internet Service Providers have the ability and incentive to degrade Internet openness.

The Electronic Frontier Foundation, Senator Al Franken, the New America Foundation, Public Knowledge and Level 3 support this claim. Specifically Public Knowledge notes in its filing, “ISPs have the means and incentives to break the open internet.”² Level 3 refers to the FCC’s 2010 Open Internet rules where the Commission itself makes this observation. Specifically the charge comes in four scenarios.

- (1) That an ISP competes with edge providers for services and content (e.g. Comcast and Netflix for video, or Verizon and WhatsApp for messaging);
- (2) That the ISP is an anticompetitive “gatekeeper” to either charge arbitrary tolls or degrade access for not paying tolls
- (3) That the ISP could charge fees so high that edge providers exit
- (4) That consumer switching is not enough to deter this activity, as users don’t have enough information to know that such tactics are not present elsewhere.

It’s important to remember that just because an ability and incentive is present, does not mean there is abuse. Any human being may have the ability and incentive to kill another person. But there are strong disincentives and punishments to deter such activities. Let us take each of the FCC’s pronouncements in turn.

It is true that ISPs compete with edge providers for services, but this does not mean ISPs foreclose competitors. The entire internet protocol (IP) world we enjoy today is that traditional networks (e.g. telephone and cable) have been transitioned and upgraded to offer multiple services. It would be a tremendous barrier to entry, and quite an inefficiency, if every online video service had to build its own network to reach a user base. Instead an online video entrepreneur can focus on innovating because a network is already present. The joining of two separate but complementary assets is a key theory of innovation (Teece)³. For example, Apple may have a 4G phone, but the features on that phone need a 4G network in order to be realized.

The relationship between a network owner and an “over the top” or OTT service is mutually interdependent. It is better described as “co-opetition”⁴ where firms both cooperate and compete. Co-opetition exists in a number of industries, for example the auto industry where competing car

² <http://apps.fcc.gov/ecfs/document/view?id=7521480282>

³ David Teece, “Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy,” *School of Business Administration, University of California, Berkeley, CA 94720, U.S.A.*, June 1986, http://www4.lu.se/upload/CIRCLE/INN005/Teece_Reflections.pdf.

⁴ Adam Brandenburger and Barry Nalebuff, *Co-Opetition* (Currency Doubleday, 1997).

manufacturers may share the same input (e.g. chassis), but each markets the car they produce under their own name.

Comcast and Netflix may compete for video services, but the presence of Netflix makes Comcast's network more valuable. Indeed it is for this reason—and the presence of other compelling content, services, and applications--that Comcast can offer broadband subscriptions. Comcast could degrade the quality of Netflix for anti-competitive reasons, but if it does so, it threatens its fastest growing source of revenue, broadband.

An ISP's incentive to degrade openness is overrated and increasingly minimized. In fact ISPs have a strong incentive not to degrade openness. Since the opening of the net neutrality debate a decade ago, ISPs now operate in an environment with increased expectations and norms about proper behavior and traffic management. The threat of increased regulation is a strong deterrent not to engage in abusive behavior. Unhappy customers quit, and ISPs lose revenue.

In addition to the study of co-opetition, the relationship between an ISP and OTT services can also be explored through the literature of two-sided markets. This is a robust literature of some 360,000 articles covering a variety of industries, including the internet. The theory of two-sided platforms, first promoted by Rochet & Tirole,⁵ have an inherent incentive to price efficiently, meaning that market failures are unlikely to occur. It is not inherent that firms will attempt to act in way that deters consumer welfare, innovation, or efficiency. Platforms want to get both sides of the market “on board” so they tend to maximize—not foreclose—the participation of the parties. Anything that an ISP does to foreclose one side or the other reduces its profits.

If it was the intention of Comcast to foreclose a competitor such as Netflix, then it would have done so already. It makes no sense that Comcast would nurture a competitor into a global player, only to foreclose it later when it becomes even more expensive and difficult. On the contrary, Netflix has grown into the world's leading streaming video provider precisely because Comcast and other American broadband providers offer networks and subscribers to Netflix.

The claim that an ISP is a “gatekeeper” that charges arbitrary tolls is based upon a potent but imaginary scenario, that ISPs would charge fees to content, application, or service providers in order to access its subscribers. Again in two-sided markets, ISPs have the incentive to maximize the participation of both sides of the platforms, that of the users, and that of the content/application/service providers. The price of access to the platform is based upon supply and demand.

There are millions of sources of content, services, and applications on the internet. End users buy a subscription to access them under best efforts conditions. In general it is not in the ISPs interest to make a contract with every possible sender of information on its network. The transactions costs are simply too high.

⁵ Jean-Charles Rochet and Jean Tirole, “Platform Competition in Two-Sided Markets,” *Journal of the European Economic Association* 1, no. 4 (2003): 990–1029.

It is the case, however, that a handful, maybe a dozen websites/services are particularly popular and highly demanded above others. It becomes the case that the ISP must deliver these services or the end users won't subscribe to the network. It could be the case in the future that Netflix could demand payments from the ISP in order to deliver its content to the ISP's network. In any event, as the FCC is aware, the interconnection agreements are such that parties exchange traffic on a settlement free basis as long as the amounts are roughly the same. When then amount exceeds the balance, then the sending party pays a fee.

With the case of certain services, e.g. Netflix, it offers a streaming video service that consumes some 30% of a network's capacity and frequently impinges on other, non-Netflix users' ability to enjoy the network. It is in these cases, that ISPs need to provision additional access. Because the Netflix subscribers are a small portion of any one network's user base, the ISP would like the Netflix to participate in the cost of delivering the service, so it does not have to impose the cost across all its subscribers, especially those that do not desire Netflix.

In other instances, a content provider may want to subsidize the delivery of its content so that it can maximize viewing and viewers. We see this in the case of a health provider which wants to ensure that low-income pregnant women watch a series of pre-natal videos, a preventative form of health care that improves infant and mother outcomes. Similarly a health care provider would be willing to subsidize a mobile subscriptions of its members to encourage adoption of preventative health care and monitoring tools. The cost of avoiding an adverse health event is well worth the price of a broadband subscription. The health care member benefits with better health outcome and the health care provider reduces costs. This is clearly a win-win for the parties.

We can see with Google's search engine, and any number of websites supported by advertising supported, there is a desire from the service side to subsidize the cost of access and information to the end user. Content and service providers of all sizes participate in these models. In fact the digitization of platforms has brought down costs so significantly that even end users can advertise their posts on Facebook.

So the claim that such models are inherently discriminatory is false. While we can imagine a scenario that could be discriminatory, we have no certainty that it will ever happen, so an outright bans on business models can be welfare-reducing. It should also be noted that many partnerships are tried but don't succeed because consumers don't value them. This is the essence of competition. In any event it can't be justified to allow content and service providers to enjoy the benefits of two-sided markets, but not ISPs.

Most important, net neutrality is not needed to adjudicate these markets. Two-sided markets exist in media, credit cards, insurance, video games, internet platforms, nightclubs, and so on. Disputes in these markets are frequently managed with competition law, which can also work for broadband providers. Moreover any content/service provider also has the power of public relations and social media to bring attention to abuse. This public "naming and shaming" can frequently be more swift and effective than regulator action. In any case, it is a powerful deterrent to anti-competitive behavior.

There is no net neutrality violation on record where a startup or established company has been denied access to a network.

The claim that consumers don't switch is not true. Quarterly reports from Leichtman Research attest to consumer switching.

If anything, the FCC contradicts itself in its argumentation about openness.⁶ On the one hand it asserts that ISPs have the ability and incentive to degrade openness, and at the same time, it asserts that a "virtuous circle" in which the growth of content and application is driving ISPs' revenue through increased subscriptions. Clearly this is a broken logic that ISPs are simultaneously supporting an open internet while foreclosing it.

Here is an instance where data and observation can help inform the inquiry. Research undertaken by MIT and UCSD investigated the interconnection market and specifically looked at Comcast and Netflix, two parties which had a disagreement about transit. The study found that in general content providers do not have a problem accessing Comcast's customers. There are over 40 peering and transit paths into Comcast. The MIT-UCSD study did find that Netflix occasionally had an issue connecting with Comcast, but there was no reason to consider it a widespread problem. The study "Measuring Internet Congestion: A Preliminary Report" offers the following preliminary conclusions,

*Congestion at interconnection points does not appear to be widespread. Apart from specific issues such as Netflix traffic, our measurements reveal only occasional points of congestion where ISPs interconnect. We typically see two or three links congested for a given ISP, perhaps for one or two hours a day, which is not surprising in even a well-engineered network, since traffic growth continues in general, and new capacity must be added from time to time as paths become overloaded... congestion does not always arise over time, but can come and go essentially overnight as a result of network reconfiguration and decisions by content providers as to how to route content."*⁷

In the case of large content providers or "hypergiants" such as Netflix, congestion may occur because of its enormous content loads that amount to a third of network traffic. That one of millions of content providers should have an issue with congestion from time to time is not a reason to conclude that the market interconnection is not working. The issue is whether Netflix will maintain interconnection norms and negotiate commercial terms with broadband providers such as Comcast, or whether it will abuse the regulatory process to win price controls and favorable business conditions at the expense of all broadband subscribers, even those that don't subscribe to its service.⁸

⁶ Verizon v. FCC, 740 F. 3d 623 (Court of Appeals, Dist. of Columbia Circuit 2014).

⁷ MIT, Measuring Internet Congestion: A Preliminary Report, Page 2
<https://ipp.mit.edu/sites/default/files/documents/Congestion-handout-final.pdf>

Adam Thierer, "Unnatural Monopoly: Critical Moments in the Development of the Bell System Monopoly," *Cato Journal*, 1994.

⁸ To read about Netflix's practices, see <http://www.usnews.com/opinion/economic-intelligence/2014/07/03/netflixs-net-neutrality-double-standard>

It should be noted that with its Comcast agreement, Netflix was able to get better interconnection conditions, presumably lower costs because otherwise it would not have entered into it, and improved quality for its customers, as its own [speed index](#) reports. It should be noted that these two large parties resolved their dispute with adjudication. There is no market failure here that needs remedy. It is also worth noting that only Netflix is essentially the only content provider that complains about interconnection. For the most part, the other major content providers have not called on the FCC to intervene in the interconnection market.

The market for interconnection works on the forces of supply and demand, just like any other market. Most traffic is exchanged for free, as long as it roughly equal, which is used as a proxy for the contribution of similar value by the two parties. However some traffic is more highly demanded and comes in a greater quantity than other traffic. Netflix traffic is the best example of this.

However Comcast is bounded by the demands of its customers, and if it doesn't deliver Netflix, it will lose customers. As such Comcast faces a strong incentive to find an equilibrium with Netflix. There is no doubt that ISPs have the ability to degrade the internet experience of their customers. They could block certain content, applications, and content. Indeed ISPs for the purpose to eliminate spam, malware, and other security threats, may block certain ports or senders. In addition governments can require that ISPs block certain objectionable material such as child pornography. It is also possible that an ISP could throttle or slow certain data, for example so ensure that a user does not reach a data cap and incur extra fees. In general, these are practices that fall under the heading of reasonable network management and are necessary to support good user experience and security for all network users and are disclosed.

The instances to which the FCC can evidence deliberate degradation are extremely limited and do not constitute market failure. There was an incident in which Comcast slowed peer-to-peer application BitTorrent to maintain the experience of the rest of the users on the network. Though the practice was justified, Comcast did not disclose it properly. That incident has since been rectified, and Comcast now abides by the 2010 Open Internet Report & Order. Time Warner Cable, AT&T, and DirecTV have all indicated that they can support the 2010 rules.

The other instance involved the rural telephone company Madison River blocking a competing voice over internet protocol (VoIP) service. The FCC resolved the matter quickly and issued a fine. It should be noted that Madison River is no longer in business. This instance speaks to a rare situation where there may be literally one broadband provider.

These two instances over some ten years and quadrillions of internet experiences show that violations almost never happen, but more largely, speak to the improved operating norms and expectations that internet users have of their internet providers. It can be observed that the net neutrality movement has succeeded to make this an expectation of users.

Perhaps more notable is that blocking of certain mobile services has been observed in Europe. This can be explained better by the terminating regime rather than net neutrality. The US uses "bill and keep" while the EU operates under calling party pays. The European system incentivizes the user to avoid

calling another party, so when free OTT VOIP and messaging services evolved, users elected to use them instead of the operators' proprietary services for which they paid by the minute or message. This has largely not been an issue in the US because American operators quickly evolved to sell smartphones with data packages with unlimited voice and messaging. The operator is assured a user fee and does not care which services are used. In the European case, because operators remained in the voice/SMS paradigm, they suffered loss of revenues. In any case, net neutrality groups have prevailed in Europe to name and shame the blocking practice, and it has declined significantly.

We have established that an ISP has the ability to degrade traffic, however we can see that its incentive to do so are limited. The question is whether regulation is needed to protect against the small risk that an ISP could behave in an anticompetitive way.

In the FCC's 2010 Open Internet order, the FCC could identify only a few instances of a threat to "openness", and those few instances were all very different alleged problems. These issues did not constitute a pattern, nor were there any repeat offenders or offenses. The FCC reports that the US has some 1700 broadband providers and FCC data⁹ show that there might be potential problems with less than 0.25% of all broadband providers. Such a low probability suggests that ex post adjudication is appropriate, especially when violations have not occurred.

As a general preventative measure, competition in marketplace precludes bad behavior. Competition almost always provides a more efficient outcome than regulation, and we will come to that discussion later in the paper. We have also seen that the FCC, even without net neutrality rules, has power to curtail such practices. Madison River Telephone Company was quickly and properly disciplined.

We can weigh the costs of regulation versus its benefits. The cost of regulation including monitoring across a sector, which itself imposes a cost on taxpayers and the lost opportunities of using those resources for other activities such as digital skills education, rural broadband investment, public safety networks, and the like.

Another piece of the needed information is the cost of the consumer harm incurred. Its extent could vary significantly whether it is one user or many; a one-time, periodic, or frequent incident; the type of network; the type of service being blocked. From the user side, we would need to know whether the user would prefer a situation to never experience a blockage versus whether the user might appreciate a reward that comes from handling the problem himself. For example, the user could get a refund of part or all of his subscription. The user could experience psychic rewards by publishing the incident on social media, complaining to the provider, or complaining to the FCC. In the former case, the user might not have any monetary gain.

Another challenge with regulation is that we are not assured that such monitoring could necessarily detect a violation if it happened. In any case all of these costs should be weighed against the benefits created by regulation, or rather, the preclusion of adverse events. Again, this is difficult because we have very almost no evidence of violation on which to develop these models. Given that two events were so short and discrete, they are not likely to amount to great consumer benefit in their avoidance.

⁹ http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-321076A1.pdf

However there is an important cost of regulation that the FCC needs to consider, that of the cost of making a mistake in regulation, or regulatory errors. The FCC risks assigning a problem to the market that is not there and applying a remedy that is not needed.

It bears mention that the cost of regulatory errors are even higher in emerging industries. It is also clear that the broadband market is quickly changing, which also creates a problem for regulation to keep up. Additionally the FCC approach which carves out a discrete part of a highly intertwined value chain creates unnecessary fragmentation, which itself leads to arbitrage. Different companies may find opportunities to game the system because of regulatory distortions.

The broadband market is too complex and uncertain to benefit from a categorical approach to regulation. Intervention should be flexible and adaptable to specific circumstances. Because broadband as an emerging market is subject to above average-uncertainty, prone to network effects and dependent on investment, but not necessarily to the same extent at all times, antitrust law and regulation should be applied flexibly and on a case by case basis.

It is doubtful that net neutrality rules can be designed so that they are understandable, accurate in their objective, well-defined and consistent. It could be problematic to define congestion on the Internet, not to mention Internet traffic associated with managed or specialized services. And it is not enough to require access to the Internet without issuing rules for the calculation of non-discriminatory rates and conditions for such access. Experience shows that the state-run general rules for the calculation of rates and conditions will lead to errors, lower the incentives for innovation, distort competition, and reduce growth and welfare. The same applies to state-based rules for what is meant by non-discrimination in a market with different content, services and apps, and with the emergence of new innovative services every day.

Claim #2: In the absence of Open Internet rules, the value of the Internet would decline, and edge providers would suffer.

Online retailer Etsy claims that Open Internet rules are needed to protect the internet innovation system.¹⁰ I find it curious that only recently have startups and internet companies entered the net neutrality debate. To date, it seems that many companies have been happy to ignore policy discussion. As long as regulation does not affect them, they have been happy to ignore Washington. Indeed many companies declare that the lack of regulation, and being left alone to enjoy “permission-less” innovation has allowed their enterprises to emerge and grow.

My colleague at the American Enterprise Institute Gus Hurwitz¹¹ reviewed the claims of Etsy and complimented the company on its attempt to quantify possible harm in a world without net neutrality by citing an empirical figure. However the empirical figure used, reduced page loading time, is a

¹⁰ <http://apps.fcc.gov/ecfs/document/view?id=7521372050>

¹¹ <http://www.techpolicydaily.com/communications/net-neutrality-arguments-facts-figures/>

function of webpage design, not network management. Moreover the figures come from materials that are more than five years old and were developed to guide edge providers in improving their platforms for ecommerce. They are not appropriate materials for network management discussions. Etsy does not provide any evidence that they are being harmed; they only suggest that there is a theoretical possibility.

It's worth mentioning that if there were no networks in the first place, Etsy would have never gotten off the ground. Etsy likely uses a prioritization system, a "fast lane" web acceleration system to speed its credit card transaction or a content delivery network to upload its website and inventory. It's not clear why should Etsy get to enjoy these tools and not other providers. In any case no net neutrality rules are in place today, and Etsy continues to grow.

The notions of openness, innovation, and investment are at the heart of my research. One of the challenges in doing this research is that net neutrality and openness are not well-defined.¹² Also, these terms have different meanings in different countries, making cross country comparisons also difficult. Fundamentally there are opposing views on the benefits of a neutral, "open" internet and even whether it ever existed.

Additionally "openness" is not unambiguously good or bad. There are instances where openness can have benefits, but it can also impose costs. By definition, many users enjoy non-open experiences, such as walled gardens, zero rating, sponsored data, exclusive device promotions etc. From the perspective of national innovation strategies, China provides an example where a non-open strategies have produced considerable economic benefits and consumer welfare. This is not to suggest that the US should take the Chinese approach, but only to underscore that such black and white distinctions, an open internet or nothing at all, may sound good on the surface, but does not stand up to critical analysis. Given that openness is so poorly defined, it makes a shaky foundation for a regulatory regime.

In its Open Internet Report & Order, the FCC presented the theory of the "virtuous circle of innovation"¹³ as an argument in support of network neutrality. In the virtuous circle theory, one key actor is the innovator who has free rein to invent and is assured a network where he can distribute his invention to users. The virtuous circle along with the end to end principle by Lemley & Lessig are proffered as support for net neutrality, but these two concepts are under-theorized in the academic literature, at best some 500 citations altogether. Other theories such as creative destruction, diffusion of innovation, disruptive innovation, and the theory of complementary assets, have been cited tens of thousands of times. These theories have more academic weight to explain innovation on the internet.

Nevertheless, any one theory, however salient, is still a theory. For a policy to have salience and efficacy, it should likely be supported by evidence. Furthermore from a scientific perspective it should

¹² http://www.cmi.aau.dk/digitalAssets/91/91510_cmi_working_paper_4.pdf

¹³ FCC Open Internet Report & Order 10-201, December 21, 2010. Paragraph 14.
https://apps.fcc.gov/edocs_public/attachmatch/FCC-10-201A1_Rcd.pdf

be possible to observe the theory in action and ideally to design experiments where the theory can be proven. We do not have this sort of empirical evidence when it comes to “openness” and net neutrality. Thus it is unwise to develop a regulatory regime on unproven theories.

The key takeaway from the relevant technical and economic literatures is that “openness,” in whatever forms it may take, is rarely unambiguously good or bad. It is unquestionably the case that open access can facilitate certain types of innovation. It reduces R&D and other transaction costs (especially search and negotiation costs to get permission or access to use existing infrastructure) and reduces opportunities for rent extraction by those who otherwise control an infrastructure. On the other hand, it makes some forms of innovation more expensive or difficult to implement.

There are substantial literatures showing the benefits of vertical integration¹⁴ and the importance of defining proper modular boundaries. Nowadays, however, this point can be made more simply by analogy: Apple’s hardware and software designs are part of a tightly-controlled, vertically integrated, closed product ecosystem. Apple would not exist if we had the equivalent of network neutrality for computer hardware or software. This does not mean that either an open or a closed model is necessarily better in any given case; it does mean that we want a more nuanced approach than one that mandates either approach in every situation.

Moreover the same company can pursue both open and closed approaches to innovation. Which model a company uses depends on a variety of factors related to technology, research, product development, marketing, and so on. There is nothing that suggests that internet companies or ISPs should be any different. In fact a mandate that all models must be open could prove detrimental to innovations in many firms.

Consider that most of the well-known internet firms have significant intellectual property and operate closed R&D and product development departments. One cannot waltz into Mountain View and request a copy of Google’s search algorithm, which changes with every search performed. To be sure, Google publishes in broad strokes information¹⁵ about how its search platform works, but this does not mean that Google search is an “open” platform. Furthermore it’s not clear that it would benefit consumers more if Google search were open. Indeed Google’s ability – and incentive – to create incremental innovation may have much to do with its ability to control its proprietary algorithms.

Indeed supporters of so-called openness and neutrality may change their policy position when governments begin to demand that platforms become open and unbundled. It is illogical to require openness and neutrality to only the broadband network if the rest of the internet – the operating systems, the devices, the platforms (search engines, social networks etc) – can remain proprietary and closed. The French government has realized this contradiction, and their Digital Council had recently

¹⁴ See also Skorup & Theirer, *Uncreative Destruction: The Misguided War on Vertical Integration in the Information Economy*, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2162623.

¹⁵ *How Search Works*, available at <http://www.google.com/intl/en/insidesearch/howsearchworks/algorithms.html>.

published a report¹⁶ on platform neutrality, which was commissioned the Ministry of Economy and Digital Affairs and the Secretary of State on Digital Affairs.

The French report on platform neutrality singles out what Minister Delegate for Small and Medium Enterprises, Innovation, and the Digital Economy Fleur Pellerin calls the “American giants” or GAFTAM (Google, Apple, Facebook, Twitter, Amazon, Microsoft). The report declares that platforms maintain their dominant position by three activities: acquisition, diversification and exclusion. Their size and capital allows them to buy startups long before they ever become a competitive threat. Their scale allows them to diversify into a number of complementary products and distribute those products at little to no cost. Finally the reports suggests that platforms exclude competitors, citing the example that the launch of Google Maps and Shopping, which lowered the ranks of competing GPS and commerce applications.

There is no doubt that platforms can have market power, but there is also evidence that consumers benefit from the bundling effects of platforms. The point is openness and neutrality can provide both welfare enhancing and welfare reducing effects, but blanket fiat standard applied to just one part of the internet are not only inconsistent, but will likely have negative consequences for consumers. As such, it is better to adjudicate any anti-competitive behavior on an ex post, case by case, basis to ensure that consumers are not deprived by the preclusion of any technology or business model.

In any case, Etsy is a successful online business and does not face barriers today. It’s charge is that net neutrality is needed to prevent a “theoretical” threat in the future which we have established is quite rare. Rather than rely on conjecture, we should look to see whether content, apps, and services face barriers from network providers. In fact we see the opposite. A key example is Netflix, which transitioned itself form a DVD by mail company into the world’s leading online streaming service with 50 million subscribers. If there were network blockages, the transformation would have not been likely.

As for upstart firms, their main costs to getting online are the nominal fees of hosting, storage, and servers. Where upstart firms face barriers it is generally competition from other content, apps, services where it competes on search engine platforms and app stores. Indeed the practices of SEO (search engine optimization) and ASO (app store optimization) are designed to help upstarts overcome these barriers. In fact if there was ever a neutral internet, there would be no need for such practices or for marketing. Consumers would blithely traverse the neutral internet without the intermediation of search engines or social networks.

¹⁶ *Platform Neutrality*, available at <http://www.cnnumerique.fr/plateformes/>.

Claim #3: The marketplace suffers from a lack of competition, particularly because of high switching costs and consumer lock-in.

Public Knowledge asserts that “U.S. residential customers have little broadband choice”, though they admit the situation has improved since 2010.¹⁷ Public Knowledge states that slightly more than half of all census tracts had 3 or more providers offering speeds of at least 10 Mbps, but it is not clear which number of providers are needed to satisfy Public Knowledge’s definition of competition. The filing also notes that there are different traffic management practices on the networks (e.g. data caps for mobile), so the competitors are not perfect substitutes.

There is no doubt that the FCC’s statistics are helpful and important, but they are also hotly debated, for example, whether 4 mbps or 10 mbps is the appropriate minimum threshold for broadband, and how measures are collected, e.g. by household, census tract, subscriber etc. However the focus on these measures obscure the larger and more important picture which is harder to measure, but nevertheless, important: how well does the society use broadband to be more productive.

The FCC reports more than some 1700 providers of broadband in the country.¹⁸ There are hundreds of providers that account for two-thirds of connections provided by cable and DSL in the US.¹⁹ The FCC²⁰ itself reports the following

- 99% of households (in census tracts) have two or more wired broadband providers as of Jun 31, 2013.
- 78% of households have three or more wired broadband providers as of June 31, 2013.
- Between December 2012 and June 2013 data, there was an extraordinary increase in broadband choice. The FCC notes, *The reported data show a 30% annual increase in the number of residential fixed- location connections that are at least 6 Mbps downstream and 1.5 Mbps up stream, (from 34.5 million in June 2012 to 45 million in June 2013) and a 31% annual increase in the number of connections that are at least 10 Mbps downstream and 1.5 Mbps up stream (from 34.1 million in June 2012 to 44.8 million in June 2013).*

¹⁷ Supra

¹⁸ Ajit Pai (FCC commissioner), “The IP Transition: Great Expectations or Bleak House?” (remarks before the Internet Innovation Alliance, Washington, DC, July 24, 2014), <http://www.fcc.gov/document/commissioner-pai-remarks-internet-innovation-alliance>.

¹⁹ Leichtman Research Group, “2.6 Million Added Broadband from Top Cable and Telephone Companies in 2013,” Press Release, March 17, 2014, <http://www.leichtmanresearch.com/press/031714release.html>.

²⁰ FCC, Internet Access Services: Status as of June 30, 2013, June 2014 (Release Date) at p. 9. Jun 2013 Data <http://www.fcc.gov/document/fcc-releases-new-data-internet-access-services-1> Dec 2012 Data <http://www.fcc.gov/document/fcc-releases-new-data-internet-access-services-8>

Despite what critics claim, there is vibrant competition in access to broadband, and given the accelerated investment by AT&T and CenturyLink to upgrade their networks to VDSL and fiber to the premises (FTTP), and Google Fiber's entry into several markets, the choice and competition enjoyed by consumers will only increase. Furthermore some 99 percent of Americans can access wireless broadband speeds of 16 Mbps download via satellite, four times the minimum defined by the FCC and higher than most of the world's broadband connections.

But competition should not be measured just in the number of firms; it should be measured by the variety of networks and the level of technology. The United States has a more evenly distributed subscribership across broadband technologies (DSL, cable, 4G/LTE mobile, fiber). Only a handful of countries, mainly small, highly populated European countries and city-states (Malta, Netherlands, Belgium, Luxembourg) have higher penetration of different networks.

As such, the United States should not aspire to have many providers simply for the numbers' sake. It is important to make a distinction between static and dynamic competition.

Dynamic competition refers to technology that drives competition, not the number of providers for a given product or service. Dynamic competition is characterized by innovation, investment, and product differentiation. That is, competition comes from creating different solutions and platforms. We can see dynamic competition in the way that Netflix competes with cable; how Uber, an intelligent transportation application, competes with the traditional regulated taxi industry; and how the online accommodations platform AirBNB competes with hotels. An understanding of dynamic competition means that a market can't be judged with a static snapshot of counting the number of players. The level of technology must be considered.

The elementary idea of a perfectly competitive market is one with many buyers, many sellers, perfect information, a homogeneous good, no taxation, and no barriers to entry. These conditions exist almost nowhere in the world in any industry. The textbook examples of perfect competition typically involve at least two farmers selling the same crop. This might be termed as neoclassical or static competition, multiple firms competing to deliver the same or similar products. However as soon as new farming methods are introduced, the competitive forces change. Two farmers could sell the same crop, but one of the farmers could employ a technology enhancements such as a tractor, fertilizer, or better seeds.

The notion of dynamic and static competition in the broadband market has to do what degree firms are allowed to compete on technologies. On account of the high fixed costs and entrance barriers, traditional telecommunications was run as a government monopoly. Most countries in the world began their telecom industry as a government monopoly. Since 1990, the number of telecom regulators in the world has exploded from 14 to 155, as countries transitioned their state-owned networks to regulated monopolies. Regulators were tasked with creating static competition through a framework that provides entrant firms access to the old network.

The trade-off of static competition is to favor superficially low end user prices over the forces of dynamic competition. It's a short term win that shortchanges consumers in the long term. Consumers and internet companies lose because no firm has the incentive to invest in new networks or competing technologies. The incumbent firm does not want to invest because it has to offer access to its competitors, and entrants see no need to deploy capital when a network service is readily available for reselling.

The US experience is different. The beginnings of America's telecommunication industry were marked by a number of competing providers. A governmental decree turned AT&T into a monopoly and subsequent legislation such as the 1934 Communications Act enshrined how the monopoly would operate. Once the Act was promulgated, it took 50 years to undo its deleterious effects. Finally in 1984 the Ma Bell monopoly was broken apart.²¹ After some time, new telecom providers emerged and seeing the advantages of television, experimented with technologies to deliver data and video over telephone wires, and the technology of DSL (digital subscriber line) was born.

Cable emerged in the late 1940s as a project to connect America through television. As remote parts of the country could not be reached by terrestrial TV signals, cable lines were brought to many homes. While many companies emerged locally, they eventually merged to deliver increasing innovation and cost efficiencies to customers. It has been observed that telecommunication regulation was used as a way to stymie the development of the cable industry which represented significant competition to telecom providers.²²

The game changer for cable was Data over Cable Service Interface Specification, or DOCSIS, in 1997, a standard for data delivery across coaxial cable. This, along with the cable modem, which provides bidirectional communication, allowed cable providers to turn themselves into broadband providers. The cable industry has developed a hybrid fiber coaxial (HFC) cable network, making it a full-fledged broadband provider, offering high-speed data as well as voice in addition to television.²³

Cable's strategy in its competition with Internet television has been to make the cable experience richer, better, and more diverse. The cable industry has innovated its offering so that television appears in high definition, not standard definition. It also provides a number of tools and devices to improve the viewing experience, such as content discovery. Finally, cable also offers TV everywhere, through the ability to stream cable and broadband content to connected devices.

Subscribers use cable technology not just for television and Internet access, but also for telephony. Some 26 million Americans selected cable as their voice provider as of 2012. Cable operators now

²¹ Adam Thierer, "Unnatural Monopoly: Critical Moments in the Development of the Bell System Monopoly," *Cato Journal*, 1994.

²² <http://www.cato.org/publications/commentary/are-we-really-deregulating-telecom>

²³ "Evolution of Cable Television," Federal Communications Commission, March 14, 2012, <http://www.fcc.gov/encyclopedia/evolution-cable-television>.

make up five of the top ten residential phone companies in the country.²⁴ Users can purchase services a la carte, but many opt for a value-priced bundle of cable television, broadband Internet, and voice in a single subscription, also called triple play. Thus the US provided an example early on that competition can come from new technology, arguably more efficiently, than from government fiat.

Dynamic competition is a notion partly arrived from the work of Joseph Schumpeter in his re-interpretation of Marx in *Capitalism, Socialism and Democracy*²⁵ in 1942. Giving the example of the dearth of wood forcing a need to find energy substitutes, he promoted the idea that necessity creates invention. Rather than see the business cycle as a Marxist process of accumulation and annihilation of wealth, Schumpeter proposed creative destruction as an engine of renewable economic growth. Creative destruction is a force “that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one”. Schumpeter saw entrepreneurs as creating economic growth and destroying established industries and monopolies. He would have likely celebrated the emergence of over the top technologies (OTTs).

With different technologies a broadband market can have just a few private players—for example, a cable and a DSL provider—and still be competitive. Cable companies and DSL providers continue to upgrade their networks with fiber while employing different technologies to deliver broadband, such as DOCSIS and very fast bit rate rate or VDSL. This cycle of investing to beat the other is a highly legitimate form of competition in markets where technology is quickly evolving.

Competition in the market is driven not just in the networks themselves, but the services over the top of the network. This is where we see Skype competing with voice for long distance; Netflix competing with cable for video; and WhatsApp competing with mobile operators’ proprietary messaging platforms.

Another upstart is Roku, a standalone set-top box that brings hundreds of channels to an Internet device via broadband. There are a number of other providers with different business models including YouTube, Hulu, Amazon, and Vimeo. With such a robust, indeed disruptive, market for broadband, it is curious that regulators should want to legislate the video market rather than allow the consumer-driven interplay with providers to continue to evolve.

Cable providers have continued to innovate and invest in their platforms, increasing speeds, coverage, and content. In 2011 Comcast unveiled a hybrid-coaxial cable network reaching gigabit speeds.²⁶ This network platform will continue to yield bandwidth increases for the foreseeable future. With node

²⁴ “Impact of Cable,” National Cable and Telecommunications Association, accessed January 15, 2014, <http://www.ncta.com/impact-of-cable>.

²⁵ J.A. Schumpeter, *Capitalism, Socialism, and Democracy*. (Harper, 1942).

²⁶ Tony Werner, “Comcast CEO Brian Roberts Demonstrates 1Gbps Speed Broadband Connection and Next Generation Video Product,” Comcast, June 16, 2011, <http://corporate.comcast.com/comcast-voices/comcast-ceo-brian-robert-demonstrates-1gbps-speed-broadband-connection-and-next-generation-video-pro>.

splitting, spectrum utilization, better modulation, 24-channel bonding, and DOCSIS upgrades, cable coaxial networks can continue to meet consumer demand for many years. The scale of cable provider Comcast has allowed it to invest in another broadband technology, neighborhood Wi-Fi. Comcast is turning the homes and neighborhoods of its subscribers into millions of Wi-Fi hot spots around the country. Using unlicensed spectrum, Comcast's neighborhood Wi-Fi program is an important innovation and creates competition for mobile broadband providers.²⁷

To be sure, dynamic competition and disruptive innovation do not fit into a tidy box for regulators. New competitors are not under traditional obligations such as interconnection requirements, data portability, licensing, and so on. In an era marked by rapid change, regulators should have the courage to allow the industry to evolve and retire regulations when they are obsolete.

It's not surprising that soon after Comcast announced its proposed transaction, it was followed by a transaction announced by AT&T and DirecTV. This is indicative of the competition not just in the broadband market, but by OTT video providers. This is an encouraging trend that illustrates how quickly companies can evolve in the marketplace.

It appears that Public Knowledge prefers the static competition world over dynamic competition. This is essentially where there may be one network service, probably DSL over copper, with tens if not hundreds of resellers on top of that network. This is the situation in Europe today where 74% of all broadband connections are DSL.²⁸

This scenario likely gives comfort to some public interest advocates, as it is easier to measure competition "by the numbers". But this approach yields far less data consumption than the dynamic approach. Americans consume about one-third more internet traffic per person per megabyte than people in the EU, and the US is on track to surpass South Korea as the world's most connected nation by this measure. The virtue of the static approach is that it delivers a lower-price for a slower network that delivers less data. If, however, the goal is enable increasing speed and bandwidth, then the dynamic approach is better.

Public Knowledge also notes that the various network options are not perfect substitutes, pointing out the data caps on mobile make it an imperfect replacement for wireline broadband. It can be observed however that wireline broadband is limited to its fixed location. One has to be at home to use it, while mobile broadband goes where the user goes. There is no doubt that each of the networks have different features and advantages, but these differences create more diversity and dynamism in the marketplace. A wireline broadband is less useful for certain telemedicine applications which need to be on the user's

²⁷ "Comcast Unveils Plans for Millions of Xfinity WiFi Hotspots through Its Home-Based Neighborhood Hotspot Initiative," Comcast, June 10, 2013, <http://corporate.comcast.com/news-information/news-feed/comcast-unveils-plans-for-millions-of-xfinity-wifi-hotspots-through-its-home-based-neighborhood-hotspot-initiative-2>.

²⁸ Roslyn Layton, *The European Union's Broadband Challenge* (American Enterprise Institute, February 2014), http://www.aei.org/files/2014/02/18/-the-european-unions-broadband-challenge_175900142730.pdf.

person. To be sure, a wireline infrastructure may work better for the first time of seeing a movie. However for the second and third viewing of a film, users are pleased to use a mobile device with a lower speed and definition.

Public Knowledge also asserts that “U.S. customers face significant switching costs” and that 80% of consumers purchase broadband as a bundle. On the face of it, that broadband is purchased as part of a bundle is not problematic. It suggests that broadband is increasingly falling in cost and becoming commoditized. Do we complain that we cameras are increasingly bundled with phones? To be sure, we can purchase standalone cameras, but having a camera in a phone has advantages and the cost to bundle the two together is frequently cheaper than buying each separately. This offer enhances value for the customer. In any case, all providers offer a standalone broadband product.

With regard to switching costs, Public Knowledge notes the following types of switching costs

1. *search costs for finding and researching new service,*
2. *uncertainty costs relating to the potential quality of new service,*
3. *compatibility costs of owned equipment that may be rendered obsolete,*
4. *contractual costs,*
5. *transaction costs (the direct costs of making the transition).*
6. *Early termination fees (a contractual cost);*
7. *the inconvenience of ordering, installation, and equipment setup (transaction costs);*
8. *temporary interruption of service (a transaction cost); problems learning a new service (a learning cost),*
9. *and the potential loss of a personal website or email address (a transaction cost)*
10. *The commonplace practice of telecommunications bundling—in which customers receive discounted service if they purchase telephone, internet, and/or pay-television services from the same provider—intensifies many of these costs.*

It is helpful for Public Knowledge to outline these costs. In fact such an outline forms the basis of an inquiry which the FCC could undertake to investigate the validity of the claim. However should not be acceptable to build a regulatory regime without gathering solid evidence for the claim.

Switching costs are common across a range of industries, products and services. It can be argued that switching costs for internet applications may even be higher than those of broadband. At least broadband providers allow number portability. When a person cancels a Google, Facebook, or Apple account, he cannot transport readily his data to a new platform.

Search costs and uncertainty are largely mitigated through price comparison websites and online forums where various broadband plans and providers are rated and discussed.

Contractual and transaction costs are endogenous to any number of services and are not unique to telecommunications. Indeed the upfront contractual costs of a broadband purchase are part of the requirements to ensure greater consumer value and protections. As the consumer is paying for specific services, those terms and requirements are disclosed up front.

It can be observed that internet applications with their terms of service may provide lower switching costs upfront but impose higher costs in the long term because consumers unwittingly barter their privacy in exchange for a free service.

There is no doubt of the challenge of compatibility with different devices, but we also find this challenge with operating systems. One cannot readily port operating system data from an Android device into an Apple one or vice versa.

Early termination is largely an issue associated with handset subsidies, and consumers who bring their own devices can mitigate this charge.

No one likes to have their service interrupted, but it is a cost that ISPs have an incentive to lessen, if not eliminate. For mobile service, the length of interruption may be less than an hour. Frequently a change of plans is effected immediately. Wireline service can take longer, but ISPs also have an incentive to speed the installation and set-up process so that they can start billing customers. This is an area where providers compete, and those companies who have better customer service can find a way to reduce churn.

The loss of an email address associated with an ISP is not necessarily a major cost. Any consumer may have a number of email addresses from different providers.

In a number of countries the length and termination of broadband contracts are indexed to the provider's cost of customer acquisition. That is the provider is allowed at least to recover the cost of acquiring the customer through the length of the contract. In the US, customer acquisition costs are high. Operators may spend up to 25% of revenue on sales and marketing in an effort to win new customers, not to mention significant expenditure on device subsidies. It is not uncommon for these costs to take months if not 1-2 years to be recovered.

Consumers who do not want long contract life can easily purchase prepaid contracts.

A type of service that is similar in setup and cost to broadband are health club memberships. Such programs have contract length requirements and termination penalties. However these services are not high on the agenda of net neutrality advocates or regulators. It is interesting to note that consumers more for housing, transportation, education, clothing, food, discretionary vacations, and even water and electricity than they do for broadband. Consumers can recover many times the value of their monthly broadband expenditure by improved choices in other areas of their spending. Indeed broadband is likely one of the best value services that a consumer can purchase. Given the value of connectivity it is

more likely that we pay too little for it, rather than too much. This was asserted by David Clark,²⁹ one of the key architects of the ARPANET, forerunner of the internet, and co-author of the original end-to-end principle.

For a data reference, consider the findings of the International Telecommunications Union (ITU) also recognizes that American prices are reasonable. According to its 2013 report “Measuring the Information Society,” broadband prices should be no more than 5 percent of income. The United States scored third in the world in 2012 for entry-level affordability of fixed-line broadband. It is tied with Kuwait, with fixed-line broadband prices at just 0.4 percent of gross national income per capita. This means that for as little as \$15 per month, Americans could get a basic broadband package at purchasing power parity in 2011 (\$48,450 annual income).³⁰ A basic package of broadband that ensures access to essential services for health, education, employment, and e-government are accessible on 4 Mbps or less, the FCC’s definition of broadband. High speeds are not required for these services, and presently the only services for which consumers need high speeds are essentially for real time entertainment.

It is worth noting that municipal broadband projects advocated by many net neutrality supporters actually come with increased lock-in and switching costs. When a local government decides to get into the broadband business, it can impose fees on all residents whether they support the project or not. If the government gets into the broadband business in a particular location, it can generally be expected that firms will exit, and no new firm will invest in that area. So if a user is unhappy with a government provider of broadband, she has even less choice than under a market framework.

The ability of broadband providers to offer competitive fees is also predicated on being able to run an efficient business which allows costs to be covered. Regulatory burdens which may seemingly protect consumers can increase operators’ overall operating costs, so broadband providers have to raise prices to ensure break even under the new regulatory regime.

The law of demand states that as the price of a good or service increases, demand will decrease. It follows that if broadband prices are too high without commensurate value, consumers will demand less. They will downgrade from high speed packages to low speed packages. Alternatively they will find substitutes, e.g. 4G/LTE, DSL, wifi etc.

However the opposite is happening in the broadband market. Consumers are tending to upgrade their packages, buying packages that cost more, but offer more value in terms of speed, services, content, and functionality. In this way, consumers are getting lower unit costs for their broadband consumption. The comparative data that I referred to earlier from the ITU and the FCC clearly establishes this as a fact.

²⁹http://techpolicyinstitute.org/events/register/116.html?utm_source=WhatCounts+Publicaster+Edition&utm_medium=email&utm_campaign=IFS+Event+Alert&utm_content=her

³⁰ “Measuring the Information Society,” International Telecommunications Union, 2013, 82, http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2013/MIS2013_without_Annex_4.pdf.

A study by Boston Consulting Group showed that Americans' perceived value of the Internet ranged between \$1,456 and \$3,506 per year, which is an estimate of what they would be willing to pay for the Internet if they did not have a broadband subscription.³¹ Indeed, most consumers pay significantly less than this for broadband, so this measure shows that consumers get more value than what they pay.

Another study is the "Broadband Bonus" by Shane Greenstein and Ryan McDevitt, published by the OECD in 2012, which measured the consumer surplus of broadband in 30 OECD countries. It estimates the percentage of GDP per capita that is a "broadband bonus" or consumer surplus. In 2010, 0.28 percent of GDP per capita, or \$135.40, was the average excess benefit for each American. This percentage gradually increased from 2006 to 2010. The study suggests that this trend will continue as Internet traffic in the United States increases.³²

Claim #4: ISPs have a terminating access monopoly

Public Knowledge asserts that "Access networks have terminating monopolies over residential broadband."³³ The concept of the terminating access monopoly had currency in the Ma Bell era where a single entity controlled the telephony value chain: the network, the service, and the device. Now all of those components are disintermediated by multiple providers. The terminating monopoly argument is essentially a fancy way to impugn competition in the American broadband market. The FCC has acknowledged in its reports the multiple providers for broadband. A variety of authoritative sources provide indicators of competition in the American broadband marketplace including the OECD, the ITU, the White House, and even the European Union. The extent to which competition is assured, the issue of a terminating access monopoly is eliminated.

Level 3 takes this terminating argumentation a step further with its assertion that consumers can't take advantage of "multi-homing" as enterprise customers do. They assert, "In Internet terms, these mass market customers are "single-homed," meaning they draw service from a single ISP. This contrasts with enterprise users, who are frequently "multi-homed," meaning that they can access the Internet through more than one ISP."³⁴

But the fact of the matter is that many consumers take advantage of multi-homing, both because it is easy and economical and because consumers may want discrete broadband subscriptions for certain tasks and devices. A key example is the market for pre-paid mobile services. Consumers may purchase a range of pre-paid products in exchange for or in supplement to a family broadband plan. It could be

³¹ Dean et al., "Internet Economy in the G-20," 13.

³² Shane Greenstein and Ryan McDevitt, "Measuring the Broadband Bonus in Thirty OECD Countries," *OECD Digital Economy Papers* 197 (April 19, 2012): 19.

³³ <http://apps.fcc.gov/ecfs/document/view?id=7521480282>

³⁴ <http://apps.fcc.gov/ecfs/document/view?id=7521489301>

that a child or an elder adult has such a subscription, and such products are desirable because of their spending limitations.

In any case, it makes little sense to discuss a terminating access monopoly without acknowledging the existence of an originating access monopoly, of which there are many on the internet. If one wants to consume “House of Cards” legally, she needs to order Netflix. It is not available on Hulu, Vimeo, or Amazon Prime. Similarly when Level 3 makes a contract with a content provider, Level 3’s competitors do not have access to those customers.

Whether it is with broadband access or transit services, customers choose their provider.

Claim #5: The internet will not be safe unless broadband is reclassified as a Title II service, and additional regulations should be added to wireless services.

As has been noted, no violations of net neutrality have been brought during the period that the FCC’s 2010 Open Internet rules were in place. Meanwhile investment and innovation in broadband networks have continued, along with increasing broadband speeds and adoption. Even in the period of the last 9 months with no net neutrality rules in place (save for a transparency provision), there have been no formal complaints to the FCC about net neutrality. Thus it appears that the 2010 rules were adequate, and no further regulation such as Title II reclassification is needed.

Today’s mobile wireless networks are extremely complex and evolving. 4G/LTE networks have to be actively managed in order to work. The FCC’s net neutrality rules have a limited understanding of the technical and engineering challenges of these networks and are not flexible to account for the minute to minute changes and reconfigurations that occur. This represents a classic information problem in which regulators are simply not equipped to address. Furthermore it doubtful that regulation on this front would add value to consumers. Network management enhances consumer welfare, ensuring that all subscribers have an optimal experience on the network.