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# Crafting a Grand Bargain Alternative to Title II: Net Neutrality With Net Adoption

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BY DOUG BRAKE & ROBERT D. ATKINSON | OCTOBER 2015

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*There is a historic opportunity to establish open Internet rules by statute while at the same time appropriating significant new funding for a national digital divide initiative.*

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Net neutrality advocates hailed the Federal Communications Commission’s decision to classify broadband Internet access as a “telecommunications service” that it can regulate under Title II of the Communications Act as the most important Internet policy development since the National Science Foundation privatized the Internet. In reality, the “victory” not only hurts network innovation and investment, but could very well prove pyrrhic if the courts or the next administration overthrow the decision. Meanwhile, there has been meager progress on a truly pressing broadband policy issue: the severe digital divide in which a large number of Americans are not yet online. These circumstances create a unique political opportunity to simultaneously rebound from the Title II misadventure, put widely agreed-upon open Internet protections on firm ground, and commit real resources to bridging the digital divide.

This report argues that both political parties and the various camps involved in the net neutrality and digital divide debates should seize the moment by coming together to support legislation that does several things:

- Clarifies that broadband Internet access service is not a “telecommunications service” under Title II of the Communications Act;

- Puts widely agreed-upon open Internet protections, including no-blocking, no-throttling, and transparency, on firmer legal ground;
- Allows pro-competitive traffic differentiation for applications that require it, while preventing anticompetitive abuses of prioritization;
- Gives the FCC reasonable, but bounded, jurisdiction to enforce open Internet rules and accelerate deployment of advanced telecommunications capabilities; and
- Significantly expands the scope and funding of digital literacy and broadband adoption programs such as the National Telecommunications and Information Administration’s Broadband Adoption Toolkit, the administration’s ConnectHome initiative, a broadband-focused Lifeline program contemplated by the FCC, and initiatives to build out broadband in rural areas with no wired infrastructure.

For congressional Democrats, this represents an opportunity to use their unique and likely short-lived legislative leverage over Republicans not only to lock in net neutrality protections, but also to finally enact policies that could bring substantial progress in closing the digital divide, a goal most on the left have long supported. And for Republican opponents of Title II, it is a way of regulating net neutrality (and avoiding a presidential veto) that is less onerous in its impact on network innovation and investment.

Broadband Framework Options	FCC Approach	ITIF Proposal
<b>Description of Framework</b>	“Title II for the 21st Century”; common carrier regulation of broadband providers.	Grand Bargain uniting appropriate jurisdiction for open Internet rules with broadband adoption and digital literacy programs.
<b>Impact on Investment</b>	Likely drag on investment.	Predictable, light-touch rules and increased broadband users will encourage infrastructure investment.
<b>Impact on Open Internet</b>	Attempt to protect is likely short-lived.	Locks in jurisdiction to protect and promote.
<b>Impact on Innovation</b>	Chills network innovation.	Stable clarity for innovation at both core and edge.
<b>Impact on Individuals</b>	None.	Greatly expanded programs for digital literacy and broadband adoption.

**Table 1: Impact of Regulating Net Neutrality Under Title II of the Communications Act Versus a New “Grand Bargain” for Net Neutrality With Net Adoption**

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As the Information Technology and Innovation Foundation (ITIF) has argued previously, Title II classification is a poor long-term solution to preserving the open Internet, not the unalloyed win some proponents claim. It does nothing to change the competitive dynamic driving broadband deployment; if anything, it will have a moderately negative effect on existing providers' investment levels and raise the risks for new entrants. Title II was written assuming a static system that did one thing—switch telephone calls. As such, it will likely chill innovation and experimentation in new networking technologies designed to support a dizzying variety of services, consigning us to the broadband of today, not tomorrow.

Moreover, while the FCC's classification of broadband as a "telecommunications service" under Title II attempts to lock in the "strongest possible" net neutrality protections, those protections could very well prove ephemeral, if the U.S. Court of Appeals for the D.C. Circuit overthrows them next year or if a Republican president is elected in 2016.

For all the noise and uncertainty around the FCC's decision, one thing is clear: It significantly changed the political economy of telecommunications policy. So it should be seen as an opportunity to discover newly opened areas of broad agreement or available avenues of negotiation. The legislative alternatives to Title II discussed to date have been too narrow in their focus, looking only at specific net neutrality rules and the jurisdiction needed to enact them.

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The "grand bargain" that ITIF proposes here represents a new path forward. The real question is whether both sides of the aisle will be able to move beyond ideological and political rigidities to embrace a truly win-win solution. For Democrats, the challenge will be going against the net neutrality advocates who place Title II ahead of less onerous, but equally effective and more certain net neutrality protections. But there should be a great deal of appeal among Democrats for using this issue as leverage to finally get real funding for digital literacy and broadband adoption programs. For Republicans, who rightly want legislation that sheds the weighty baggage of Title II while providing some reasonable FCC jurisdiction over protections against net neutrality abuses, this bargain represents a way to get legislation enacted and signed by the president. If both parties can overcome their reservations, then the winners will be all current and potential broadband users across America.

After first examining the potential impact of Title II on network investment and innovation—and explaining why alternative jurisdiction for open Internet rules would be beneficial—this report then discusses the very real uncertainty over existing Title II net neutrality rules. The report then focuses on the need for and potential shape of federal digital divide initiatives. Finally, it outlines ITIF's recommendations in detail and discusses the political realities involved in achieving such a grand bargain.

## **POTENTIAL NEGATIVE IMPACT OF TITLE II ON INVESTMENT**

One of the challenges of broadband policy is providing an environment conducive to the infrastructure investment needed to drive continued increases in speed, competition, and

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deployment. These investments require large, up-front financial commitments that only realize returns over long periods of time, if ever.

In 2013, Jason Furman, then newly appointed as chairman of the White House Council of Economic Advisors, explained that “investments in infrastructure depend critically on a stable, predictable, and light touch regulatory regime.” While there are many legitimate goals of regulation, he said, this need for stability and predictability has historically been “the motivation for the approach this administration and the Federal Communications Commission have taken in a wide range of areas like the open Internet.”<sup>1</sup>

A consistent, light-touch approach to Internet regulation has been the bipartisan consensus since the Clinton administration, and was formally codified in the 1996 Telecommunications Act.<sup>2</sup> This approach has seen robust success: Telecommunications companies consistently make some of the highest capital-expenditure investments.<sup>3</sup> The sector overall has invested more than \$1.4 trillion in capital expenditures since 1996.<sup>4</sup>

But the predictable hand of the federal government that Furman described came to an end on February 26, 2015, when the FCC decided to regulate broadband access providers as common carriers under Title II of the Communications Act.

The impact of Title II on broadband investment has long been a subject of controversy, and understandably so.<sup>5</sup> The impact of classifying broadband as a common carrier under Title II on investment is not just a touchstone for policy decisions going forward; it will also represent an important question in the pending challenge of these rules in front of the D.C. Circuit Court of Appeals.<sup>6</sup>

Title II classification is likely to have negative consequences for broadband investment, largely due to the heightened uncertainty surrounding a variety of Title II provisions. Particular sections of the law, especially those pertaining to network unbundling and price regulation, are onerous enough that the increased possibility of their implementation alone could very well deter investment. The FCC has attempted to forbear from these sections to some extent, so they do not apply to broadband “for now,” but this policy could be changed by a subsequent administration or possibly even by judicial fiat. Enacting net neutrality legislation that keeps the problematic provisions of Title II off the table would give the entire broadband sector a firmer foundation to make long-term investments that will drive continued growth throughout this dynamic system.

### **The Challenge of Measuring Investment Impact**

Long-term empirical analysis of the effect of any regulation is difficult, and measuring the investment impact of the FCC’s Open Internet Order is particularly hard. Providing telecommunications is an incredibly complex business, with constantly changing inputs, shifting consumer demand, and ever-advancing technology. Changing inputs make assessing the impact of regulations on investment challenging, too: There are simply too many variables for a straightforward measurement.

For example, broadband investment is cyclical as companies (or the entire industry) may invest significantly more during a step change in technology. This can make comparisons

across time challenging. The rapid innovation in various inputs adds further complexity, as does changing customer demand and competitive dynamics. Other, more banal factors such as corporate taxes or availability of capital also play an important role in investment decisions.

Comparing investment as a function of regulation across countries is also difficult, as deployment costs may depend on a variety of factors in addition to regulatory policy. For example, population density, consumer demand, zoning regulations, road layout, existing infrastructure, industry structure, and access to capital can all play a role in how aggressively a company invests.

Initial financial data shows U.S. capital investment across wireline ISPs has dropped by 12 percent on average compared with 2014.<sup>7</sup> Most notably, AT&T's capex was down 29 percent in the first half of 2015 compared with the first half of 2014.<sup>8</sup> A 12 percent average decline—or \$3.3 billion—is especially troubling considering there have only been two other periods in which ISP capital expenditures have declined relative to the year before: the dot-com bust and the Great Recession. (See figure 1.)

Note it is unlikely that the entire recent decline is due to Title II, and it is difficult to tell exactly what drives investment decisions. It is entirely possible that broadband providers, perhaps in reaction to Title II, would direct capital toward projects not within its regulatory reach—hiding the empirical impact of the new regulations.<sup>9</sup> But for practical purposes, the relevant question is not whether broadband investment is up or down compared with years past, or even before and after the regulations. The real question of interest should be how the FCC's open Internet rules that *rely on Title II* would compare with rules based on an alternative source of legal authority, either section 706 of the Communications Act, as the FCC initially planned, or a new jurisdiction provided through legislation.<sup>10</sup>

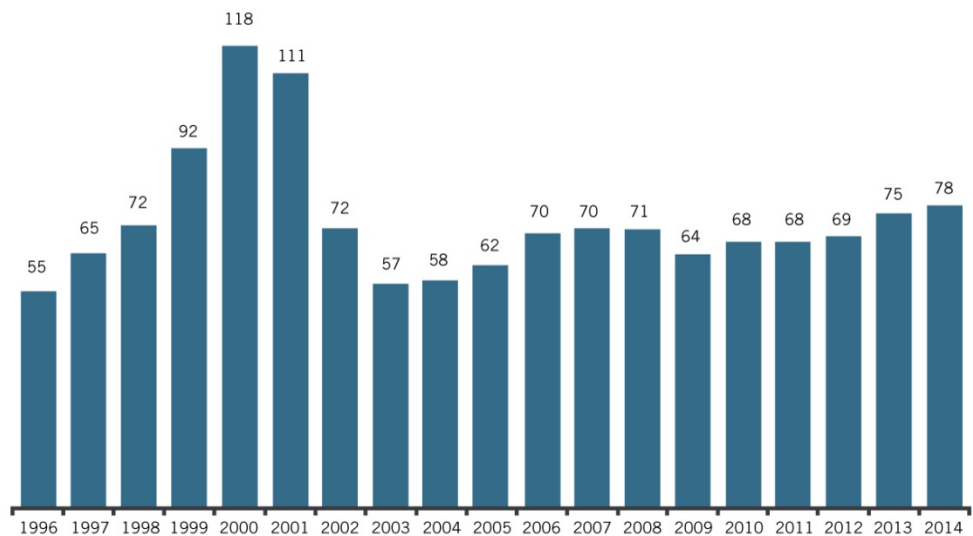


Figure 1: U.S. Broadband Provider Capex (\$billions)<sup>11</sup>

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The signal-to-noise problem in empirical investment data is magnified by selection bias of many advocates. For example, advocates of common carrier regulation make absurd arguments that the high levels of investment in network infrastructure after the earlier classification of DSL under Title II regulation show that Title II does not harm investment.<sup>12</sup> Advocates, such as Free Press, who believe unbundling to be good policy saw the opportunity to use the public support for “net neutrality” as a stalking horse to take a big step in advancing their ultimate goals of open-access networks.<sup>13</sup> For these groups, Title II offers an incremental advance toward their ultimate goal of government-owned, open-access networks; as such, any damage from Title II must be denied at all costs.

### **Title II Regulatory Uncertainty Discourages Investment**

Instead of basing policy on difficult interpretations of past trends, we should focus attention on a more obvious concern: policy uncertainty. Uncertainty raises investment risk and ultimately investment costs. Broadband infrastructure investment is particularly affected by uncertainty, as it requires enormous fixed-cost investment; companies will scale down risks accordingly when of the level of future returns is unpredictable.

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There is ample reason to believe that Title II will lead to moderately lower rates of investment than we would otherwise see compared with a net neutrality regime under an alternative legal authority. We don’t mean to be “Chicken Littles.”<sup>14</sup> But we do believe Title II, even as “modernized” by the FCC, will have a net-negative effect on broadband investment compared with other options.

There are costs involved in any regulation, and net neutrality is no different. The important question is whether the benefits of those regulations outweigh the costs. The problem here is that much of the regulatory “cost” involved in reclassification stems from Title II provisions that have nothing to do with net neutrality. There are complex trade-offs to consider when designing a net neutrality regulatory regime. Getting the institutional design right by finding the mix of norms, expectations, and rules that achieves the best possible balance of political, economic, and technological goals is a real challenge in the context of the open Internet alone.<sup>15</sup> Title II needlessly complicates the picture, adding 80-plus years of baggage to an already challenging problem.

The most significant problems of the FCC’s Open Internet Order arise purely because of the jurisdictional hook it chose. While ITIF continues to believe that paid traffic differentiation, with proper guidelines and oversight, presents a far smaller risk and far greater upside than is commonly believed, it is clear that the greatest risk to investment flows from the classification of broadband as a Title II telecommunications service, and not the bright line prohibitions on paid prioritization. (ITIF has long supported net neutrality rules that would ban throttling and blocking and do not believe that these rules would limit investment, if they were implemented outside of Title II.) The same rules issued under different legal authority would be far less problematic.

In addition to broad, basic common carrier provisions,<sup>16</sup> Title II also contains other provisions that could deter investment. Of particular concern are the rules around retail rate regulation and network unbundling that were designed for the telephone monopoly

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era. If these provisions were applied to broadband, they would be far more disruptive to broadband investment than a simple net neutrality regime.

There is widespread agreement among experts that network unbundling or “open access” policies are inappropriate for broadband regulation. For example, Blair Levin, former FCC Chief of Staff (and ITIF board member), examined the open access question while acting as lead author of the National Broadband Plan. He ultimately “rejected this option, believing it would not lead to investments to deploy the next generation networks necessary to deliver the affordable, abundant bandwidth America needed.”<sup>17</sup> He points to the rise of Google Fiber and other new gigabit networks, saying, “[i]f the government had required open access that required Google to share its infrastructure with competitors, Google Fiber would have been stillborn.”<sup>18</sup> There is plenty of economic literature to support this view and that common-carrier utility regulations have negative consequences for broadband investment.<sup>19</sup>

The concern is that the FCC, having usurped the legal authority to implement such regulations, could be pressured in that direction. The current implementation of Title II leaves too much policy uncertainty surrounding its future application to broadband markets. The increased possibility of the extensive regulatory intervention possible under Title II alone is likely to dampen investment.

To the FCC’s credit, the commissioners attempted to forbear from some sections of Title II most likely to hurt investment, but forbearance is unlikely to be enough to prevent all negative effects. First, the fundamental components of Title II—sections 201 and 202—are incredibly broad, requiring that “all charges, practices, classifications, and regulations” of broadband access be “just and reasonable.”<sup>20</sup>

Indeed, the basic provisions of Title II leave considerable room for FCC expansion into rate regulation, leading Craig Moffett, a leading investment analyst, to downgrade his rating on cable stocks, saying:

“It would be naïve to suggest that the implication of Title II, particularly when viewed in the context of the FCC’s repeated findings that the broadband market is non-competitive, doesn’t introduce a real risk of price regulation.”<sup>21</sup>

Reasonable people could differ on the likelihood of a future FCC attempting retail rate regulation—but the relevant question is not a yes/no “will the FCC initiate a proceeding to regulate broadband rates anytime soon?” (The answer to that question is no.) Instead, one must imagine deciding on the level of investment in a network upgrade or new deployment, and ask whether the following facts would change how many billions of dollars one would want to sink into the ground: This investment will not see returns for years; rate regulation is the historical sine qua non of the current broadband regulatory regime; there is a clear trend of increasing political populism; and the FCC reversed course in the Open Internet Proceeding in the face of such populism.

In their examinations of the likely impact on broadband investment, Kevin Hassett and Robert Shapiro point to “threshold events”—new regulations reversing established



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policy—as having particularly detrimental effects on investment.<sup>22</sup> Title II classification makes clear broadband policy is now open to unpredictable swings driven by politics.

The uncertainty deriving from unpredictable enforcement of the broad mandate of Title II is compounded by sections retained by the FCC authorizing private right of action to enforce the Title II rules.<sup>23</sup> This is perhaps the largest wildcard of all—private citizens or market competitors, encouraged by potential damages, could sue to enforce broad, vague provisions that generalist judges may be ill-equipped to understand. This uncertainty demands policy attention from Congress. Providing the FCC with jurisdiction for a simple set of balanced rules and oversight to preserve the open and innovative Internet ecosystem, while simultaneously removing the potential threat of rate regulation and unbundling, would guarantee the certainty necessary for further investment and flourishing of this key technology. In fact, the core problem is that the 1996 Telecommunications Act never really made a home for broadband. Title II was for plain old telephone service. Title I is for general provisions. Section 706 (of Title I) is a catchall provision that leaves the FCC with too little guidance and too much discretion. The answer should have been a new title to the Communications Act that specifically addressed broadband.

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## IMPACT OF TITLE II ON INNOVATION

In comparison to other policy options, the direction taken in the FCC’s Open Internet Order is likely to diminish not only investment, but also innovation, both within and on top of networks, in a number of different ways. First, the flat ban on paid prioritization will diminish the capability of real-time, “edge” applications to flourish on the open Internet. These applications—such as telepresence or connected cars—are not like Web surfing or accessing email; they need low latency to perform adequately. Second, the paid prioritization ban, as well as the vague catchall “no unreasonable interference/disadvantage” standard will diminish engineers’ capacity to make beneficial trade-offs to make networks more robust, reliable, and effective as well as businesses’ ability to experiment with innovative pricing solutions to make IP services more affordable and better allocate costs. Third, regulation of broadband providers as common carriers may well have unintended consequences internationally, reducing innovation in the open Internet abroad.

Title II is a set of laws designed for a static network that did one thing: route phone calls. The core provisions (sections 201 and 202) retained by the FCC in its so-called “Title II for the 21st Century” were written assuming a monopoly telephone system. By attempting to apply this general type of regulatory thinking—proscriptive, up-front rules constraining behavior of particular actors—will almost certainly have unintended consequences for possible uses of the rapidly changing technology that makes networks function.

### The Need for Prioritization

Though this point has long been made in the net neutrality debate, it bears repeating: Not all prioritization is harmful. This point is quickly lost when the discussion sinks to the level of catch phrases such as “fast lanes” and “slow lanes.” The fundamental engineering of the Internet and its basic protocols are limited in the types of services they can reliably support without some specialized treatment of traffic. The real issue should not be prioritization versus no prioritization, but what kind of traffic can be prioritized under what business arrangements.



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Users' demand for broadband capacity is "bursty" in that it rapidly changes as they perform different tasks on the Internet.<sup>24</sup> As you move from a single user's link deeper into the network, different IP-based communications are joined together in a process called multiplexing.<sup>25</sup> But each piece of equipment and link of a network has a limitation on the capacity it can handle. In order to economize on performance, operators make sophisticated predictions about how much capacity will be needed at any given point of the network, setting it to a level that total instantaneous peak demand will only occasionally exceed capacity. That is much more efficient than building the equivalent of a 20-lane freeway to handle the occasional Sunday traffic coming from the football game. But even given these predictions, random combinations of traffic spikes come together to create congestion.<sup>26</sup>

In most circumstances, for most applications, unpredictable congestion is no cause for alarm. Operators take steps to minimize it, and the basic protocols of the Internet detect if a packet has been dropped as a result of congestion and send it again. However, these protocols are not a cure-all—in fact, sometimes the relatively large control loop built into these protocols can exacerbate the problem.<sup>27</sup> The result is an increase in delay as a result of a few lost packets, but users generally don't notice or care if it takes a few extra milliseconds to, say, receive an email.

The key problem is that some applications simply cannot tolerate too much delay (latency) or too much variance in delay (jitter). Generally these are real-time services—such as Voice over Internet Protocol (VoIP) or teleconferencing. We are of course able to make real-time services work to some degree without specialized prioritization—Skype and FaceTime are obvious examples. But we are also all probably familiar with a Skype call gone awry. If you are on a poor connection, or calling someone far away, it is difficult to use real-time applications with much confidence. For example, a high-resolution teleconference with attendees in different countries is unlikely to go well without some form of prioritization.<sup>28</sup>

To date, we have been able to muddle through with this "best-efforts" system, but many of the exciting innovations around the corner will increasingly require reliable low-latency connections. And while some applications affirmatively need prioritization or some kind of differentiation, other applications can easily tolerate delay or jitter. Bulk file transfers such as software and operating system updates do not care about delay. Whether your operating system is updated now or two minutes from now or even two hours from now makes no difference to most users, and hence the vast majority of applications, including the "next Google" born in the garage will be more than satisfied with the best-efforts Internet, especially given that broadband speeds have been consistently increasing on the order of 25 percent annually.<sup>29</sup>

One-sided net neutrality regimes, like that imposed by the FCC, try to protect only innovations at the upper layers of the Internet that are relatively immune to fluctuations in packet loss and delay from some hypothetical risks in the future. Such a model represents a cynically narrow view of what types of services a network of networks can enable in the future. Prioritization mechanisms provide the stable environment needed to develop higher-order systems on top of broadband platforms.

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A classic example where prioritization would be either beneficial or necessary is that of high-frequency trading. Financial institutions engaging in high-frequency trading care about latency—the amount of delay before information reaches its destination—a lot. A few milliseconds can make a difference of millions of dollars.<sup>30</sup>

Online gaming provides another illustration. Riot Games, the company behind the extremely popular online game “League of Legends,” has endeavored to build its own national fiber backbone optimized for reduced latency and packet loss.<sup>31</sup> In a forum post titled “Optimizing the Internet for League and You,” the gaming company explains:

“Currently, ISPs focus primarily on moving large volumes of data in seconds or minutes, which is good for buffered applications like YouTube or Netflix but not so good for real-time games, which need to move very small amounts of data in milliseconds.”<sup>32</sup>

A video game company deciding to build its own national fiber network shows that there is a real need for treating different types of traffic differently.<sup>33</sup> It also shows why we should change the way we think of the “level playing field” of the open Internet. When it comes to competing on network performance, a small start-up gaming company will not be able to blanket the world with servers all connected with a private, optimized fiber network. Similarly a small video company will not have the resources to duplicate the extensive content delivery networks (CDNs) used by a YouTube or a Netflix. Not that these CDNs are in any way unfair—the point is that large companies will always have an advantage in this space. After all they are large.<sup>34</sup>

A wide variety of innovative “edge” applications will greatly benefit, if not outright require, specialized treatment. Take, for example, virtual or augmented reality. Leading experts in VR and AR, such as John Carmack at OculusVR and Michael Abrash at Valve, have explained that extremely low latency is fundamental to effective VR and AR experiences.<sup>35</sup> A steady total system latency of no more than 20 milliseconds is generally considered necessary for acceptable experience.<sup>36</sup> Reliably delivering a connection with such low latency will likely require specialized treatment of traffic. Other, similar examples abound.<sup>37</sup>

In its recent report, “Differentiated Treatment of Internet Traffic,” the Broadband Internet Technical Advisory Group observed that, as a technical fact, differentiated treatment of traffic can produce a net improvement in the quality of users’ experiences.<sup>38</sup>

“When differentiated treatment is applied with an awareness of the requirements for different types of traffic, it becomes possible to create a benefit without an offsetting loss. For example, some differentiation techniques improve the performance or quality of experience (QoE) for particular applications or classes of applications without negatively impacting the QoE for other applications or classes of applications.”<sup>39</sup>

Similar to how creating dedicated bike lanes can improve traffic flow of vehicles, there is real opportunity for net gain for all applications—traffic differentiation simply is not a zero-sum game.

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The segmentation of separate networks simply to make high-frequency financial trades, or connect gamers or cars, is a sign of the coming balkanization of separate facilities for specialized services. Specialized services, which run on IP-based networks separate from the open Internet, will see investment siphoned off general Internet infrastructure into private networks.

Prominent academics have raised concerns about these sorts of potential unintended consequences of overly broad net neutrality regimes. For example, David Clark of MIT and kc claffy of UC San Diego argue that coordination problems combined with “current regulatory resistance to enhanced services” will force a “natural response” by ISPs to shift capital to private networks enhanced with Quality of Service (QoS) mechanisms to meet “the nation's need for a stable network infrastructure.”<sup>40</sup>

These separate networks represent a waste of scarce societal resources when the existing networks could in most cases adequately handle the specialized needs of these applications efficiently were it not for the FCC rules. A piece of legislation should aim to allow clear flexibility for traffic differentiation for applications that require it and avoid the unintended consequences of a flat ban on prioritization.

### **Engineers Before Lawyers**

The Open Internet Order will have the effect of forcing regulated entities to run any questionable decisions by their regulatory lawyers. This is exacerbated because beyond the straightforward ban on any form of paid prioritization, the FCC's rules also include a general conduct standard they refer to as the “no unreasonable interference or unreasonable disadvantage standard for Internet conduct,” which states that broadband providers:

“[S]hall not unreasonably interfere with or unreasonably disadvantage (i) end users' ability to select, access, and use broadband Internet access service or the lawful Internet content, application, services, or devices of their choice, or (ii) edge providers' ability to make lawful content, applications, services, or devices available to end users.”<sup>41</sup>

A charitable interpretation of the FCC's decision to include this general-catchall would be that the Commission requires flexible rules to adapt in a fast-changing environment. In the abstract, such flexibility is unobjectionable.<sup>42</sup> In the absence of a flat ban on paid traffic differentiation, such case-by-case analysis of the technical and economic specifics of carrier practices would be sensible. But with the already over-broad flat ban on these practices, the general conduct standard appears more of a vague jurisdictional hook than a nuanced tool.

The vagueness of the general conduct standard will undoubtedly see a general shift away from engineers and economists toward lawyers when it comes to regulated entities' decision-making. Acceptable practices won't be determined by engineering trade-offs or cost-benefit analyses, but by the ability of lawyers and lobbyists to get their favored traffic management practices approved by regulators.

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These new constraints will inevitably slow down innovations, even ones that do not present any anticompetitive concerns or trigger any concerns about the vibrancy of speech, commerce, entertainment, or innovation on top of these networks.

ISPs, especially wireless ISPs, should have the flexibility to bring innovative traffic management techniques to bear on the ever-increasing demand for data.<sup>43</sup> Instead, companies will be forced to do a regulatory risk analysis, second-guessing any technique that treats different data flows differently. This flexibility is not a “loophole” to institute “tollbooths” on the Internet, but breathing room for the engineering necessary to allow broadband to continue to grow.

### **The Right Regulation Could Make Sense**

All this is not to say that broadband service providers should have free rein. For almost a decade, ITIF has argued that there are legitimate points on both sides of the net neutrality debate, and it makes sense to have basic rules in place.<sup>44</sup> There is widespread agreement that ISPs should not block or throttle legal traffic (though some argue legal rules aren’t necessary). Relatively simple rules and ongoing oversight can protect against anticompetitive behavior and unintended consequences.

ITIF believes that rules should leave room for paid traffic differentiation. Prioritized services over regular Internet infrastructure would be a new frontier—price signals and (regulated) markets would do well to discover what is possible and appropriate. ITIF remains steadfast in its belief that paid prioritization can ultimately enhance many IP-based services without threatening the openness of the Internet itself.

At the same time, ITIF recognizes that the FCC’s Open Internet Order may well have shifted the goalposts so far as to make allowing for paid traffic differentiation a political impossibility in a new grant of authority. Even still, there remains an opportunity for a win-win legislative solution that offers clear flexibility for innovative arrangements around services that require some sort of traffic differentiation. Broad allowances for specialized services are not “loopholes” but necessary provisions for efficient delivery of services.

### **THE UNCERTAIN FUTURE OF TITLE II ITSELF**

As discussed above, there is tremendous uncertainty regarding the potential direction of regulations under the new Title II rules. There is additional uncertainty over the staying power of the new rules themselves. Advocates of strong net neutrality rules celebrated the FCC’s decision as a historic milestone. Happy days were finally here and were going to stay. In fact, there is considerable uncertainty about the staying power of these rules, and if net neutrality advocates truly wanted to lock in a long-term solution, they would support legislation.

The obvious big uncertainty is the looming court challenge. Virtually all of the broadband industry—both access providers and equipment manufacturers—has challenged the order, either directly or through trade associations. Compare this with the relatively uncontroversial 2010 FCC rules, which only Verizon challenged in court.

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There are many ways in which the order could fall in court beyond the fundamental questions of whether broadband can be classified as a Title II telecommunications service. In a recent paper in the *Federal Communications Law Journal*, FCC Commissioner Ajit Pai lays out why he believes “procedural defects and substantive flaws will prevent the FCC’s decision from standing up in court.”<sup>45</sup>

Appropriate process and notice is an issue: In the initial questions asked by the FCC, the possibility of Title II was an afterthought, referenced in passing on a few occasions. Whether this was a deliberative process based on evidence and analysis rather than a kludge of a solution forced by political pressure will be an important factor the court will consider.

The level of cost-benefit analysis will now be all the more salient in the wake of *Michigan v. EPA*, a decision the Supreme Court handed down in July that effectively requires federal agencies to consider costs of their rules when regulating. As Cass Sunstein writes, that case is “a kind of a rifle shot, with potentially major effects on a host of future regulations.” He points to the FCC likely finding itself “in legal jeopardy,” noting, with considerable understatement, “many of their regulations have not been accompanied by careful cost-benefit analysis.”<sup>46</sup>

There is also political uncertainty about the current rules. A future Republican administration would likely appoint an FCC chair who would make it a first and most important priority to undo the Title II classification. There is already some momentum building for a much-needed update to the Communications Act itself. Fred Upton (R-MI) and Greg Walden (R-OR) have distributed a series of white papers on communications policy as a “first step toward modernizing the laws governing the communications and technology sector.”<sup>47</sup> It is understatement to say that it is unlikely that a modernization of our broadband laws will start with Title II.

Any way you look at it, the FCC’s Title II order is a temporary kludge, not a permanent solution. With one side of the debate interested in locking in real net neutrality rules, and the other wanting a more appropriate jurisdictional framework, this is a rare opportunity for meaningful legislation that everyone can support.

## **DIGITAL LITERACY AND BROADBAND ADOPTION**

There have only been a handful of net neutrality controversies, all but two of which were resolved without any FCC involvement. And ISPs profess no interest in paid prioritization arrangements. Compare these facts with a stark reminder that one-quarter of American adults go without a broadband connection in their home. This indicates there has been a serious misallocation of political capital in recent broadband policymaking. There is now a clear political opportunity to address the much more legitimate policy issue of broadband adoption and digital literacy.

As more and more services migrate online, realizing the full promise of the digital economy requires that the vast majority of citizens use the Internet. However, recent surveys show that roughly 15 percent of American adults do not use the Internet at all, and about 25 percent do not have an Internet connection at home.<sup>48</sup>

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*Perhaps most striking in the net neutrality debate was the extent to which left-of-center advocacy groups spent virtually all their political capital on pushing for a Title II net neutrality solution.*

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Broadband adoption is a complex social issue, with no single panacea. The most important factor is a basket of issues that include lack of relevance, lack of interest, and inadequate digital literacy.<sup>49</sup> According to Pew research, roughly one-third of Internet non-adopters did not go online because they had no interest or did not think the Internet was relevant to them.<sup>50</sup> Another third of nonusers said the Internet was too difficult to use.<sup>51</sup> Cost was also an explicit barrier for some non-adopters: Almost 20 percent cited the expense of Internet service or owning a computer as a reason for not subscribing to broadband services.<sup>52</sup>

The Broadband Opportunity Council, formed in response to a recent presidential memorandum, examined the “digital divide” challenge, explaining that it is “better understood as a series of digital divides based on geography, income and other demographics factors. Seniors, people with disabilities, those with less than a high school degree, and people with low income levels are among the groups with lower than average adoption rates—and therefore lower rates of access to the benefits associated with digital information and services.”<sup>53</sup>

But what is perhaps most striking about the net neutrality debate was the extent to which left-of-center advocacy groups, the very groups that claim that they are interested in more widespread digital opportunity, spent virtually all their political capital on pushing for a Title II net neutrality solution, rather using their leverage with congressional Republicans to negotiate a grand bargain: their support for a non-Title II solution to net neutrality in exchange for a serious and sustained national digital divide program.

Title II is a great starting point if the overriding goal of U.S. broadband policy is to regulate ISPs strictly, constrain potential business models, and attempt to control innovation. If instead the goal is to create an environment that best leverages IP networks to drive productivity and economic growth for all Americans, policymakers should start elsewhere. Digital literacy and broadband adoption should be front-and-center of a new broadband agenda. To be sure there are some programs now, but they need significantly more scale, which only a congressionally authorized and appropriated program can do.

Lifeline is one such program that provides a key building block for a broadband adoption policy. The FCC is discussing reforms to the Lifeline program, aiming to transition a subsidy that now helps low-income Americans pay for telephone service to one aimed at broadband. Indeed, income appears to be a key factor in adoption: A recent report from the Council of Economic Advisors found a gap of almost 20 percentage points in adoption rates between wealthy and low-income neighborhoods in major cities, and that Americans in the lowest quartile for household income are 24 percentage points less likely to subscribe to broadband than those in the top income quartile.<sup>54</sup>

Lifeline will be a valuable tool to help drive adoption, but it cannot do all the work. For one, it only targets a subset of non-adopters—those who qualify for the program and seek out the benefit. When surveys find it is roughly only a third of non-adopters who cite cost as the predominant barrier of going without broadband, with the monthly ISP charge and the cost of a computer being some of the elements that go into cost, a wider focus is necessary to get almost everyone online. Furthermore, the budget and potential size of the Lifeline program is uncertain and constrained. As envisioned, this subsidy would continue

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to depend on universal service fund (USF) contributions levied on telephone bills—fees which are likely to be expanded to broadband in the future. This sort of cross-subsidization, imposing fees on communications services to encourage broadband, is far from ideal; it would be better to draw support from general appropriations funds than to raise the cost of broadband for other users.

Another program a legislative package should build upon is the White House’s ConnectHome initiative.<sup>55</sup> With ConnectHome, the Department of Housing and Urban Development collaborates with organizations to build local partnerships and work with the private sector to bring broadband, technical assistance, and digital literacy training to students living in public and assisted housing in 27 cities and 1 tribal nation.<sup>56</sup> The administration has correctly diagnosed the problem, but instead of passing the hat in 28 locations, such programs should have real funding behind them. We should also establish a national clearinghouse for adoption best practices and then provide federal funding for the best programs.

Finally, such an agenda also should work toward closing the access divide in high-cost rural areas, perhaps by establishing a one-time allocation for high-speed broadband build-out that is strictly limited to places without current access to wired broadband. Receipt of such funding should come with the condition that the broadband provider recipient would forgo all future universal service subsidies.

## ELEMENTS OF A GRAND BARGAIN

To simultaneously create a better approach to net neutrality regulation than the telephone-based Title II regime, permanently establish widely agreed-upon open Internet protections, and commit the resources necessary to finally bridge the country’s digital divide, ITIF proposes a “grand bargain” legislative package with provisions that accomplish the following:

- **Clarify that broadband Internet access service is not a “telecommunications service” under Title II of the Communications Act.** Congress should first and foremost remove Title II from the broadband picture. It should either add a new title to the Communications Act or rely on existing Title I jurisdiction to cover broadband with rules that are properly tailored for a dynamic telecommunications network, not plain old telephone service.
- **Put widely agreed upon open Internet protections, including no-blocking, no-throttling, and transparency, on firm ground.** These baseline rules are widely agreed upon and if implemented properly can do most of the heavy lifting of protecting the open Internet without negatively impacting innovation and investment in the network or at the edge.
- **Allow pro-competitive traffic differentiation for applications that require it, while preventing anticompetitive abuses of prioritization.** Under the FCC’s current decision, the flat ban on paid prioritization is too broad, and the general conduct standard is too vague. Legislation should rectify this by allowing clear flexibility for traffic differentiation for applications that require it, avoiding the



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unintended consequences of a flat ban on prioritization while clearly prohibiting anticompetitive conduct.

- **Give the FCC reasonable, but bounded, jurisdiction to enforce open Internet rules and accelerate deployment of advanced telecommunications capabilities.** Specifically, a new broadband title of the Communications Act should find a compromise on the scope of jurisdiction to give the FCC, but focus narrowly on open Internet rules and bridging the digital divide, while leaving a broader update to the Communications Act for another day.
- **Expand the scope and funding of existing digital literacy and broadband adoption programs.** Legislation should expand support for existing adoption programs, such as NTIA’s Broadband Adoption Toolkit, the administration’s ConnectHome initiative, and the FCC’s Lifeline program, as well as increase funding for broadband deployment in un-served rural areas. Legislation should also establish a national clearinghouse to support local digital literacy and adoption initiatives.

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*Net neutrality should not be a partisan issue, but it has unfortunately been swept up in America’s increasingly bitter culture wars.*

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## POLITICAL REALITIES

ITIF has long argued that net neutrality should not be a partisan issue, but unfortunately it has been swept up in America’s increasingly bitter culture wars, with one side touting absolute freedom for ISPs and the other advocating that communication networks are inherently governmental functions with private ownership anathema to democracy. For the latter, Title II is essential because it is a first step toward eventual public ownership of networks.

To be sure, there are legitimate concerns presented on both sides of the argument (edge providers need to be able to innovate without ISP permission or “tolls,” while operators need to be able to innovate in their networks), but the decision by the FCC, under mounting political pressure, to redefine its most expansive regulatory power to cover broadband, has tilted too far in the direction of the “inherently government” side, with, as described above, potential negative impacts on investment and innovation.

Republicans have been forthcoming in their desire to find an alternative to Title II. For instance, Representative Marsha Blackburn (R-TN) has introduced the “Internet Freedom Act,” now with 52 cosponsors (all Republicans), that would prevent the FCC from using Title II to regulate broadband as well as dismantling net neutrality regulations altogether.<sup>57</sup> But even if they could convince the Senate to pass such a bill, President Obama would surely veto it, at least in its present form.

Republicans have also sought to use appropriations riders to prevent the FCC from using government funds to enforce the new net neutrality rules—a sign of just how controversial Title II classification really is.<sup>58</sup> Instead of using the appropriations process to stymie the new rules, we should be looking for areas of compromise. Senators John Thune (R-SD) and Greg Walden (R-OR) have sought bipartisan support for a proposal giving the FCC specific jurisdiction over broadband for net neutrality rules while limiting the very broad section 706 authority and taking Title II off the table. Ultimately there will have to be

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compromise over the scope of FCC jurisdiction that comes out of a bill if it has a chance of Senate passage.

Some Democrats appear open to a deal. Senator Bill Nelson (D-FL), ranking member of the Senate Committee on Commerce, Science, and Transportation, has called for a “Title X” giving the FCC authority over broadband.<sup>59</sup> Others are open to legislation, but are quieter with their support. If there is to be enough Democratic support for a legislative solution, it will likely involve making real progress on a national digital divide agenda, something most Democrats and supporters have long argued for, even if most have prioritized net neutrality over closing the digital divide.

We hope this proposal can help bring recognition to the benefits of legislation on these issues, particularly if Democrats see this “grand bargain” as a way to finally address a key policy concern they have of reducing the digital divide.

## CONCLUSION

The time has come to clarify the FCC’s jurisdiction with regard to broadband and give it the tools of precision it needs to ensure the Internet continues to be the fount of innovation and creativity we enjoy today. Unfortunately, the FCC has now redirected its broadest and most powerful provisions, Title II, to regulate broadband. Where we need a scalpel, the FCC has picked up a sledgehammer. All while the digital divide remains largely unaddressed.

Not only is Title II overly broad, it also introduces significant uncertainty into the system. It is unclear how courts will view this unprecedented move; it is unclear how future Commissions will treat this authority; and it is unclear how these changes will affect innovation throughout the entire network. Title II reclassification risks untold unintended consequences, including higher network costs, reduced network performance, and reduced network investment.

Because there is broad agreement on the high-level principles of net neutrality, and Congress can easily bring closure to this debate, we should seek to leverage this opportunity to address a much more pressing broadband issue: the digital divide. A legislative solution can easily offer the FCC alternative and more legally sound jurisdiction for net neutrality rules while putting the focus on the tools needed to ensure broadband benefits all Americans. This will foreclose years of uncertainty, preserving the predictable light-touch needed for infrastructure investment.

Our goal 10 years from now should be a better, smarter network than the one we have today—one that supports a rich diversity of applications that virtually all Americans are actually online to take advantage of.

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## ENDNOTES

1. Jason Furman, “Total Factor Productivity and Telecommunications: Policy Ingredients for Shared Growth” (speech, AEI’s Center on Internet, Communications and Technology Policy, Washington, DC, September 17, 2013), [https://www.whitehouse.gov/sites/default/files/docs/aei\\_jf\\_telecom\\_9.17.13.pdf](https://www.whitehouse.gov/sites/default/files/docs/aei_jf_telecom_9.17.13.pdf).
2. 47 U.S.C. § 230(b), stating that “[i]t is the policy of the United States—to promote the continued development of the Internet...[and] preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, unfettered by Federal or State Regulation.”
3. Diana Carew and Michael Mandel, “U.S. Investment Heroes of 2014: Investing at Home in a Connected World” (Progressive Policy Institute (PPI), September 2014), <http://www.progressivepolicy.org/issues/economy/u-s-investment-heroes-2014-investing-home-connected-world/>.
4. Patrick Brogan, “Broadband Investment Gains Continued in 2014,” (research brief, US Telecom, July 2015), <http://www.ustelecom.org/sites/default/files/documents/Investment-2014-Research-Brief-July-2015.pdf>.
5. For a good example of this back-and-forth, see Mitchell Shapiro, “A Reminder Why the Quello Center Net Neutrality Impact Study Is Important,” Quello Center (September 5, 2015) <http://quello.msu.edu/a-reminder-why-the-quello-center-net-neutrality-impact-study-is-important/>; see also Mitchell Shapiro, “Multiple Methods & Mutual Respect: Key Ingredients for Good Policy Research,” Quello Center (September 8, 2015) <http://quello.msu.edu/multiple-methods-mutual-respect-key-ingredients-for-good-policy-research/>.
6. If there were less-costly methods to achieving the commission’s goal, such as through section 706 of the Communications Act, that would be grounds to vacate the order. This analysis takes on enhanced importance in the wake of *Michigan v. EPA*. For discussion, see Berin Szoka and Gus Hurwitz, “Supreme Court Checks Agency Overreach, Signaling Trouble for FCC,” *The Hill*, July, 2015, <http://thehill.com/blogs/congress-blog/technology/246587-supreme-court-checks-agency-overreach-signaling-trouble-for>.
7. Hal Singer, “Does the Tumble in Broadband Investment Spell Doom for the FCC’s Open Internet Order?” *Forbes*, August 25, 2015, <http://www.forbes.com/sites/halsinger/2015/08/25/does-the-tumble-in-broadband-investment-spell-doom-for-the-fccs-open-internet-order/>.
8. *Ibid.* AT&T has since revised its 2015 guidance from \$18 to \$21 billion. See AT&T Analyst Conference Presentation, August 12, 2015, <http://phx.corporate-ir.net/phoenix.zhtml?c=113088&p=irol-EventDetails&EventId=5200605>.
9. For example, investment in refining and deploying, say, IP-based video platforms, enterprise IoT services, or cable’s expansion into business services are all growing areas of investment that would not fall under Title II. In this vein, Free Press’s statement on the announcement that Verizon would purchase AOL, saying that the merger “makes no sense” and that that investment should be directed towards FiOS broadband, shows an impressive blindness to the consequences of common carrier classification. S. Derek Turner, “Verizon-AOL Merger Makes No Sense,” Free Press, <http://www.freepress.net/press-release/106980/verizon-aol-merger-makes-no-sense>.
10. Thus the interesting investment question is counterfactual; in theory, investment could be up after the Open Internet Order (though it is not at this time), but not up as much as it would have been if regulations were made under alternative jurisdiction. We would be hard-pressed to “prove” this counterfactual, but think there is good reason to believe a different source of authority for similar rules would ultimately better preserve the “stable, predictable, and light touch regulatory regime” on which broadband infrastructure investment critically depends.
11. US Telecom, (Historical Broadband Provider Capex, October, 23 2015), <http://www.ustelecom.org/broadband-industry-stats/investment/historical-broadband-provider-capex>.
12. Note it was technically only the underlying transmission component that was classified under Title II. Free Press claims that “[w]e can say with extreme confidence that a return to Title II would not harm broadband investment because ...[t]he historical data shows that the period of time following the implementation of the 1996 Act produced the greatest level of investment in the telecom industry that this country has ever seen.” S. Derek Turner & Matthew F. Wood, “Comments of Free Press: In the Matter of Protecting and Promoting the Open Internet et al,” (GN Docket No. 14–28, July 17, 2014), [https://www.freepress.net/sites/default/files/resources/Free\\_Press\\_14-28\\_Comments\\_7-18-2014.pdf](https://www.freepress.net/sites/default/files/resources/Free_Press_14-28_Comments_7-18-2014.pdf). This is absurd. First and foremost, the tremendous investment through the late 1990s to the dot-com

- crash were driven by wild over-valuations throughout the tech sector and an assumption of “build it and they will come.” The irrational exuberance that drove the investment does little to tell whether Title II classification added to or subtracted from overall investment. Secondly, Title II then applied to the underlying transmission component of ILEC xDSL, and not the enhanced services offered by ISPs, and certainly not in long-haul fiber—where most of the investment of those years was directed. See Federal Communications Commission, “Memorandum Opinion and Order, and Notice of Proposed Rulemaking, in the Matter of Deployment of Wireline Services Offering Advanced Telecommunications Capability et al.” (CC Docket No. 98–147, paragraph 36, August 7, 1998), [http://transition.fcc.gov/Bureaus/Common\\_Carrier/Orders/1998/fcc98188.pdf](http://transition.fcc.gov/Bureaus/Common_Carrier/Orders/1998/fcc98188.pdf). Moreover, much of the investment during this period was due to the policy in the 1996 Telecom Act of artificially inducing investment by competitive local exchange carriers (CLECs), most of which was duplicative and wasteful; it is not clear that these policies produced the type of investment that drives network upgrades.
13. Free Press has long pushed for open access network policies. For example, S. Derek Turner, “Broadband Reality Check” and “Broadband Reality Check II.”
  14. Tom Wheeler (remarks as prepared for delivery, NTCA Fall Conference, Boston, Massachusetts, September 21, 2015), [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2015/db0921/DOC-335375A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0921/DOC-335375A1.pdf).
  15. See, for excellent discussion of this institutional design challenge, Johannes M. Bauer and Jonathan A. Obar, “Reconciling Political and Economic Goals in the Net Neutrality Debate,” *The Information Society: An International Journal* 30, no. 1 (January 2014), <https://www.msu.edu/~bauerj/papers/bauer-obar-netneutrality-tis-2014.pdf>.
  16. 47 U.S.C. § 201, 202.
  17. Blair Levin, “What Have We Learned From Google Fiber,” *CNET*, July 31, 2015, <http://www.cnet.com/news/what-have-we-learned-from-google-fiber/>.
  18. *Ibid.*
  19. As Jean-Jacques Laffont and Nobel laureate Jean Tirole explained in their 2000 analysis of telecommunications competition, “there is in general a trade-off between promoting [service] competition to increase social welfare once the infrastructure is in place and encouraging the incumbent to invest and maintain the infrastructure.” J.J. Laffont and J. Tirole, *Competition in Telecommunications*, Cambridge, MA: The MIT Press. (2000). Research since then has shown it is incredibly difficult, if not impossible, to calibrate any sort of “ladder of investment” to leverage open-access networks into facilities-based competition. For example, Grajek and Röller provide econometric analysis showing that the European Union’s attempt at local loop unbundling is poorly designed and likely not to lead to expanded facilities based competition. Michal Grajek and Lars-Hendrik Röller, “Regulation and Investment in Network Industries: Evidence from European Telecoms,” *Journal of Law and Economics* 55, no. 1 (2012), [http://econpapers.repec.org/article/ucpjlawec/doi\\_3a10.1086\\_2f661196.htm](http://econpapers.repec.org/article/ucpjlawec/doi_3a10.1086_2f661196.htm). This type of theoretical examinations are born out in broader data comparing a wide range of metrics across different nations in reports from the OECD, Akamai’s State of the Internet reports, Christopher Yoo’s comparison of next-generation networks in the EU and US, and ITIF’s findings over the years. See, for example, Richard Bennett et al., “The Whole Picture: Where America’s Broadband Networks Really Stand” (Information Technology and Innovation Foundation, February 2013), <http://www2.itif.org/2013-whole-picture-america-broadband-networks.pdf>.
  20. 47 U.S.C. § 201; Section 202 is just as broad, requiring that carriers not “make any unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services for or in connection with like communication service, directly or indirectly, by any means or device, or to make or give any undue or unreasonable preference or advantage to any particular person, class of persons, or locality, or to subject any particular person, class of persons, or locality to any undue or unreasonable prejudice or disadvantage.”
  21. Mike Farrell, “Moffett Downgrades Cable Sector on Title II Woes,” *Multichannel News*, February 17, 2015, <http://www.multichannel.com/news/news-articles/moffett-downgrades-cable-sector-title-ii-woes/388046>.
  22. Kevin A. Hassett and Robert J. Shapiro, “Regulation and Investment: A Note on Policy Evaluation Under Uncertainty, With an Application to FCC Title II Regulation of the Internet” (policy paper,

- Georgetown University McDonough School of Business, July, 2015), [http://cbpp.georgetown.edu/wp-content/uploads/HassettShapiro\\_Policy-EvaluationunderUncertainty.pdf](http://cbpp.georgetown.edu/wp-content/uploads/HassettShapiro_Policy-EvaluationunderUncertainty.pdf).
23. 47 U.S.C. §§ 207, 208, specifically.
  24. For example, loading a web page will open several data streams at once, fetching several images, advertisements, and text from a web page's server. The load on the consumer's broadband pipe peaks as those resources are loaded, then returns to baseline as the consumer scrolls through the page. Streaming video adds considerably to this load, putting a constant stream of data onto the channel. As consumer's broadband subscriptions have been increasing in speed, the demands of the average websites have grown, with more and more streaming video advertisements and resource-intensive designs, resulting in large, random spikes of capacity demand over short time scales.
  25. This technique allows for a single communication channel to be shared by a number of different data streams at the same time. Multiplexing results in tremendous gains to efficiency, as the down time between any one user's bursts of traffic are smoothed out and available capacity is more fully taken advantage of.
  26. Similarly, denial-of-service attacks, network failures or unexpected routing changes, or cell overload in the mobile context can all cause congestion. For the most part, users' instantaneous capacity demands are not correlated—we are talking much shorter time scales than the general ebb and flow of traffic patterns throughout the day. Intermittent congestion is perhaps more likely when everyone comes home from work and flips on their favorite streaming service, but this type of congestion, while fleeting, is largely unpredictable, and different from the more lasting congestion at points of interconnection that has been in the news. For good discussion of congestion at points of interconnection, see David Clark et al., "Measurement and Analysis of Internet Interconnection and Congestion," (paper, CSAIL, MIT & CAIDA, University of California, San Diego, September 9, 2014), <http://groups.csail.mit.edu/ana/Measurement-and-Analysis-of-Internet-Interconnection-and-Congestion-September2014.pdf>.
  27. In TCP, oversimplifying a bit, the sender waits for an acknowledgement from the intended receiver. If it is not received in time, the sender backs off its sending rate, assuming packets are lost due to congestion. However, the control loop is so large, and the effect of a few dropped packets so severe, that this mechanism serves more to avoid congestion collapse for the overall system and does not optimize for any one application.
  28. One way to think about some types of applications effectively ruled off the public Internet by the Commission's net neutrality rules is by comparing a VoIP call to carrier-grade voice. Indeed, it's odd that net neutrality advocates celebrate a flat ban on paid prioritization when it effectively locks entrepreneurs out of providing carrier-grade services. Daniel Berninger, who has challenged the new FCC regulations in court, is a prime example of those hit by this chill on innovation. Berninger, who did early work on VoIP technology at Bell Laboratories and founded the Voice Exchange Communication Committee to promote IP-based HD Voice service, is familiar with the engineering it takes to offer new types of high-quality services. In his court filings, Berninger explains: "Because latency, jitter, and packet loss in the transmission of a communication will threaten voice quality and destroy the value proposition of a high-definition service, it is imperative that network operators prioritize this traffic.... The best efforts model associated with existing IP interconnection agreements does not enable the relevant implementation requirements necessary to support high-definition voice." *U.S. Telecom Association, et al., v. Federal Communications Commission and United States of America*, Case No. 15-1063, U.S. Court of Appeals for the District of Columbia Circuit (declaration of Daniel Berninger), [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2015/db0730/DOC-334664A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0730/DOC-334664A1.pdf).
  29. Cartesian, "US Broadband: Speeds Have Been Rising 25% Annually," <http://www.cartesian.com/us-broadband-speeds-have-been-rising-25-annually/>.
  30. High-frequency trading may actually be so demanding of low latency response times to require special treatment beyond prioritization. Firms have turning to microwave and laser based networking technologies to shave fractions of a second off the time fiber takes to wind its way between two trading endpoints. See Joab Jackson, "Microwave Vies with Fiber for High-Frequency Trading," *Computerworld* (December 10, 2012), <http://www.computerworld.com/article/2493686/financial-it/microwave-vies-with-fiber-for-high-frequency-trading.html>.

31. For discussion of the network and reasoning behind it see Nancymon, “NA Server Roadmap,” on Riot Games Support, last modified September, 25, 2015, <https://support.riotgames.com/hc/en-us/articles/204246204-NA-Server-Roadmap>.
32. Riot Ahab, “NA Server Roadmap Update: Optimizing the Internet for League and You,” on League of Legends Boards: Help & Support, Riot Games, February 2015, <http://boards.na.leagueoflegends.com/en/c/help-support/AMupzBHW-na-server-roadmap-update-optimizing-the-internet-for-league-and-you>.
33. This point is fundamental: the “fast-lane, slow-lane” meme that captured public attention is misleading—it inaccurately portrays data traffic as all alike, as all cars on a road. In reality, the diversity of applications and the different demands they place on the network for successful performance means strong net neutrality would be more like placing all forms of transportation, bicycles and freight trains alike, in the same “lane” for the sake of “fairness.”
34. This “flattening” is a significant shift in the big-picture architecture of the Internet that requires careful consideration of potential consequences of common carrier classification. We have to divorce questions of unfair competition or abuse of market power from those of *neutrality*. Locking in a single “best-efforts” network will make it vastly more difficult for new services that actually require a particular network performance to get off the ground when they are competing against companies that can afford their own global private infrastructure.
35. See for example Michael Abrash, “Latency – the *Sine Qua Non* of AR and VR,” *Ramblings in Valve Time*, December 29, 2012, <http://blogs.valvesoftware.com/abrash/latency-the-sine-qua-non-of-ar-and-vr/>; “John Carmack Delivers Some Home Truths on Latency,” *Oculus Rift-Blog*, accessed October 23, 2015, <http://oculusrift-blog.com/john-carmacks-message-of-latency/682/>.
36. Ibid.
37. A recent ITU report examines the coming “Tactile Internet”—applications that rely on secure, robust, and extremely low-latency connections. The report identifies, in addition to VR and AR, robotics, telepresence, telemedicine, connected cars, smart grid, and a wide variety of interactive sensors and actuators as technologies that will place extreme demands on networks. These are innovations that we should encourage, not slow with bureaucracy. “The Tactile Internet,” (ITU-T Technology Watch Report, August 2014), [http://www.itu.int/dms\\_pub/itu-t/oth/23/01/T23010000230001PDFE.pdf](http://www.itu.int/dms_pub/itu-t/oth/23/01/T23010000230001PDFE.pdf).
38. Broadband Internet Technology Advisory Group (BITAG), “Differentiated Treatment of Internet Traffic,” (uniform agreement report, October 2015), [http://www.bitag.org/documents/BITAG\\_-\\_Differentiated\\_Treatment\\_of\\_Internet\\_Traffic.pdf](http://www.bitag.org/documents/BITAG_-_Differentiated_Treatment_of_Internet_Traffic.pdf).
39. Ibid.
40. David Clark and kc claffy, “Adding Enhanced Services to the Internet: Lessons for History,” (paper presented at the 43rd Research Conference on Communication, Information and Internet Policy, September 8, 2015), [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2587262](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2587262).
41. Federal Communications Commission (FCC), *Open Internet Order*, (report and order on remand, declaratory ruling, and order, paragraph 136, March 2015).
42. For discussion of the need for such flexibility, see Douglas North, “Effect of Institutions on Market Performance at FCC,” YouTube video, 4:31, posted by “fccdotgovvideo,” June 30, 2003, <https://www.youtube.com/watch?v=A2xhmlpUKd8>.
43. In an interview, Marcus Weldon, president of Bell Labs, discusses how to achieve wireless connectivity that offers “seemingly infinite capacity”—not 1 Gbps or 10 Gbps, but where the perception of bandwidth constraints melt away entirely. He explains that, in addition to more spectrum and more antennas, engineers must optimize how specific data flows interact with the each radio: “If it’s a very high capacity flow, you’d use a high capacity interface; if it was a highly mobile flow, you’d use an air interface that had very good coverage as well as capacity... [i]t would have the idea of guiding the flows depending on their characteristics, which isn’t just bandwidth and latency.” Carol Wilson, “Bell Labs’ Weldon on Infinite Bandwidth,” *Light Reading*, April 9, 2015, <http://www.lightreading.com/mobile/5g/bell-labs-weldon-on-infinite-bandwidth/d/d-id/714952>.
44. Robert D. Atkinson and Philip J. Weiser, “A ‘Third Way’ on Network Neutrality,” (Information Technology and Innovation Foundation, May 30, 2006), <http://www.itif.org/files/netneutrality.pdf>.



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45. Ajit Pai, "The Story of the FCC's Net Neutrality Decision and Why It Won't Stand Up in Court," *Fed. Common Law Journal* 67 (2015) 147, *available at* [http://www.fclj.org/wp-content/uploads/2015/08/67.2.1\\_Pai.pdf](http://www.fclj.org/wp-content/uploads/2015/08/67.2.1_Pai.pdf).
  46. Cass R. Sunstein, "Thanks, Justice Scalia, for the Cost-Benefit State," *Bloomberg View* (Jul. 7, 2015), <http://www.bloombergview.com/articles/2015-07-07/thanks-justice-scalia-for-the-cost-benefit-state>.
  47. United States House of Representatives, Energy & Commerce Committee, "#CommActUpdate," <http://energycommerce.house.gov/CommActUpdate>.
  48. Monica Anderson and Andrew Perrin, "15% of Americans Don't Use the Internet. Who Are They?" (Pew Research Center: FactTank, July 28, 2015), <http://www.pewresearch.org/fact-tank/2015/07/28/15-of-americans-dont-use-the-internet-who-are-they/>; "Offline Adults," (Pew Research Center: Internet, Science & Tech; accessed October 23, 2015), <http://www.pewinternet.org/data-trend/internet-use/offline-adults/>.
  49. Kathryn Zickuhr, "Who's Not Online and Why," (Pew Research Center: Internet, Science & Tech, Sept. 25, 2013), <http://www.pewinternet.org/2013/09/25/whos-not-online-and-why/>; *see also*, Octavian Carare *et. al.*, "The Willingness to Pay for Broadband of Non-Adopters in the U.S.: Estimates from a Multi-State Survey," *Information Economics and Policy*, (Nov. 18, 2014).
  50. *Ibid.*
  51. *Ibid.*
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