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

In the Matter of

Protecting and Promoting the Open Internet	)	GN Docket No. 14-28
Framework for Broadband Internet Service	)	GN Docket No. 10-127

Reply Comments of ITIF

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Information Technology and Innovation Foundation
1101 K Street NW, Suite 610
Washington, DC 20005

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I. Introduction and Summary

The Information Technology and Innovation Foundation ("ITIF")[1] has long been interested in appropriate methods to promote a dynamic and open Internet and welcomes this opportunity to comment in the above captioned proceeding.[2] ITIF has recommended a "third-way" approach to network neutrality,[3] recognizing that the Internet is not inherently "neutral" and that forms of "discrimination" can be either pro-innovation and pro-consumer or anti-innovation and anti-consumer. ITIF is encouraged by the support in the record for a flexible set of guidelines that can delineate the types of discrimination that are commercially reasonable and supportive of edge and core innovation from those that would harm innovation at the edge. The Commission should follow the commenters suggesting a case-by-case analysis under section 706 to both allow innovation and consumer-welfare enhancing prioritization while at the same time policing commercially unreasonable and anti-competitive conduct.

In many contexts, because not all Internet traffic has the same characteristics, prioritization can enable innovation in new forms of communication and should be supported, not prohibited. Many of the underlying assumptions behind comments arguing for an inflexible ban on any discrimination whatsoever are mistaken; there are undoubtedly forms of discrimination amongst different traffic flows that would be beneficial in overcoming the inherent architectural biases built into the Internet. While some regulations are justified to give

[1] The Information Technology and Innovation Foundation (ITIF) is a non-partisan research and educational institute – a think tank – whose mission is to formulate and promote public policies to advance technological innovation and productivity internationally, in Washington, and in the states. Recognizing the vital role of technology in ensuring prosperity, ITIF focuses on innovation, productivity, and digital economy issues.

[2] *Protecting and Promoting the Open Internet*, GN Docket No. 14-28 (May, 2014) Notice of Proposed Rulemaking.

[3] Robert D. Atkinson and Philip J. Weiser, "A 'Third Way' on Network Neutrality" May, 2006, http://www.itif.org/files/netneutrality.pdf.

an expert agency the tools to prevent commercially unreasonable conduct, ITIF rejects the premise that traffic discrimination is always problematic – taking the leap of faith to Title II in the hopes of enacting stronger rules would be counterproductive.

Title II, which some point to as the "cure" for net neutrality would almost certainly be worse than the disease, which to date has been no more harmful than one stubbed toe (Madison River). Thankfully, the Commission has been given clear authority to utilize section 706 to regulate this space. Section 706 gives the Commission a firm legal foundation, well supported in the record, to enact rules that will advance the so-called "virtuous cycle" of broadband investment, innovation, and consumer demand the *Verizon* court recognized.

II. There is Broad, Informed Support for Continuing to Utilize Title I to Promote and Preserve the Open Internet

The record shows virtually uniform support for the open Internet. Everyone recognizes the value of an Internet where ideas and innovations are able to spread on the basis of merit and not anti-competitive, back-room deals. ITIF would certainly oppose a regulatory framework that would allow the fears of net neutrality advocates to be realized: we oppose a bifurcated Internet where individual websites would have to pay ISPs for basic functionality or a regime that allows deals to negatively impact other services. However, we do not believe that these fears are legitimate and should certainly not drive dramatic shifts in policy.

As we explained in our opening comments, the commercially reasonable, individualized negotiations that the Commission should allow are those for applications with particular needs from the network. Applications that are highly sensitive to latency and jitter could benefit greatly from commercially reasonable prioritization, continuing to drive innovation in new, real-time applications. These sorts of arrangements help grow the Internet from a technology engineered

for email and web pages into the poly-service networks needed to support innovation throughout the twenty-first century.

Indeed, the real disagreement is far narrower than the vitriol of some commenters would indicate. A limited survey of the million plus comments indicates that even the simple fact that the Commission is working to put in place affirmative rules and equip itself with tools to protect the open Internet is lost on many. Unfortunately, some ideological groups have been surprisingly successful in reframing what was a narrow legal question into a much broader populist movement in an attempt to move towards further utility-style regulation of the Internet – a first step in their ultimate goal of a network uncorrupted by profit seeking.

A. The record supports using section 706 to regulate the open Internet

There is broad support in the record for moving forward with regulations under section 706 of the Communications Act. There is nearly uniform support among carriers, equipment manufacturers, and edge providers for "simple, light-touch rules" to protect the open Internet.[4] While ITIF doesn't want to put words in the mouths of other commenters, it is likely calls for "light-touch" regulation can safely be read as a signal for moving forward with the Commission's proposal under section 706, especially when compared with the potential regulatory morass of Title II.

Perhaps the comments from carriers cautioning against overly proscriptive regulation are unsurprising, but these companies are well positioned to understand the impact of potential regulations and their arguments should be addressed on the merits. In fact, ISPs continue to strongly support an open Internet, and most are not opposed to reasonable regulation of this space. AT&T, for example, states it "has no intention of creating fast lanes and slow lanes or of

[4] The Internet Association Comments at 16.

using prioritization arrangements for discriminatory or anti-competitive ends, as some net neutrality proponents fear."[5]

Equipment manufacturers likewise have been unequivocal in favoring section 706 over Title II.[6] These manufactures stress the importance of light-touch regulation to allowing investment to continue to flow into these networks. Such investment is a key part of the "virtuous cycle" – any potential regulations should carefully consider the impact to any part of the virtuous cycle of investment, innovation, and consumer demand and not just focus on the innovation at the edge.

Likewise, many sophisticated edge providers recognize the value of "light-touch" regulation in this space.[7] The Commission should try to keep its regulations narrow and flexible, while still giving edge providers large and small the certainty that they will not in any way be required to enter into any special arrangements. Those commercially reasonable, individually negotiated arrangements should not be feared as "breaking the Internet," but welcomed as a narrow, innovation enhancing, and an entirely appropriate predicate for jurisdiction.

Indeed, section 706 offers the Commission a solid legal foundation for moving forward with open Internet regulations. The *Verizon* decision gave the Commission wide deference to determine where the virtuous cycle of innovation, investment, and demand is compromised and the jurisdiction to police those arrangements. ITIF believes the original proposal of utilizing section 706 acknowledges that some forms of prioritization would enhance the virtuous cycle and lead to further broadband deployment, adoption, and utilization and urges the Commission to continue with that approach.

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[5] AT&T Comments at 3.

[6] *See, e.g.*, ACS Solutions, *et al*., Letter to Penny Pritzker, U.S. Secretary of Commerce (Sept. 9, 2014), *available at* https://www.ncta.com/sites/prod/files/TitleII-AssociationLetter-2014.PDF.

[7] *See* The Internet Association Comments at 16.

B. The arguments for Title II are ill-founded

In a world of rampant techno-populism it is unfortunate but not surprising that these complex questions of technology policy have spun so far out of control in the broader public sphere. A small collection of ideological groups have been quite successful in reframing the narrow question of whether a standard of "commercial reasonableness" under Title I would be better at policing anti-competitive discrimination than Title II's standard of "unjust and unreasonable." These groups have turned what should be a debate on the merits into a much broader populist movement where the open Internet itself that is at stake. In these group's own words, "cable companies want to slow down (and break!) your favorite sites, for profit."[8] Presumably holding a website ransom would be considered commercially unreasonable (not to mention punishable under anti-trust or consumer protection laws). These patently unfounded claims are clearly designed to stoke populist fears, deceiving Internet users into supporting common carrier regulation as if it were the only way to preserve an open Internet.

These tactics are remarkably effective if the goal is to set the record for proceeding with the most individual comments filed with the FCC, but extremely unhelpful if the goal is an informed policy debate. The Commission recognizes that it is an independent, expert agency tasked with making informed decisions backed with analysis. The decision of how to classify broadband is not a vote counting exercise, and, as such, the numerous ill-informed, emotional comments stating simply that ISPs should be classified as common carriers are unhelpful to say the least.

Turning from the hundreds of thousands of brief, "send off after watching John Oliver" comments, the more substantive comments supporting classifying broadband as a telecommunications service are also flawed. First of all, ITIF objects to the underlying assumption of many of these filings – that all forms of prioritization are bad. The types of paid

[8] *See* Battle For the Net, "Sept. 10th is the Internet Slowdown," https://www.battleforthenet.com/sept10th/.

prioritization most likely to pass the "commercially reasonable" test would be those narrowly focused on reducing latency and jitter. These types of arrangements will be good for consumers while having minimal impact on non-prioritized traffic, such as email or simple web browsing. ITIF has suggested in the past that "[p]ackets should be ordered logically with priority given to real-time applications first, streaming applications second, interactive applications third, and background applications last. In order for all applications efficiently and fairly share an Internet connection, those with higher duration and higher bandwidth consumption (e.g., P2P) are given lower priority than applications with lower duration and lower bandwidth consumption (e.g., VoIP applications)."[9]

Many advocates pushing for stiffer rules against prioritization have inaccurately portrayed the effect of potential prioritization. Through some clever sloganeering, these groups have branded traffic prioritization as the "fast lane," that "by definition" means all other traffic is left in a "slow lane."[10] To be clear, this is a purely semantic game contrasting the definitions of "fast" and "slow." As discussed below, this word-play, although well-designed to implicate broader notions of fairness, has little to do with actual networking technology and how prioritization would work in practice.

What is more, it is not clear that Title II offers any real advantages, even on net neutrality advocates' own terms. Granted, Title II allows for regulation of ISPs as "common carriers" and Section 706 does not, but it is not clear this distinction would have any real impact on the specific issue of net neutrality. Title II only allows the Commission to ban "unjust and unreasonable discrimination."[11] Indeed, a number of types of "discrimination" are allowed under

[9] George Ou, Managing Broadband Networks (Washington, DC: Information Technology and Innovation Foundation, 2008) www.itif.org/files/Network_Management.pdf

[10] As Free Press puts it, "every party that does not enter into a prioritized arrangement is *by definition* slowed down, and thus discriminated against." Emphasis added. Free Press Comments at 51.

[11] 47 U.S.C. § 202.

Title II.[12] The key difference between these two regimes is *not* that one opens up "fast lanes" and the other does not, as has been widely reported, but largely a difference between an attempting an *ex ante* ban on "unreasonable discrimination" (Title II) on the one hand, and, on the other, a case-by-case analysis that identifies and prevents conduct that is unreasonable (section 706).

C. Regulatory forbearance under Title II would be difficult

ITIF agrees with those commenters cautioning against the difficulties of forbearing from certain provisions of Title II.[13] As we discussed in opening comments, forbearance is not a simple or straightforward process, and the Commission and the courts would likely get bogged down in several line drawing exercises, delaying the opportunity for enforceable open Internet rules for years and guaranteeing prolonged uncertainty. Some may point to cases like Earthlink to support the argument that forbearance is easy[14] – the Commission should appreciate the irony of pointing to appellate level litigation as evidence that something is easy or straightforward. There will inevitably be areas of uncertainty and companies will have every right and reason to explore in court.

[12] *See, e.g., Orloff v. FCC*, 352 F.3d 415 (D.C. Cir. 2003) (upholding carriers' ability to offer differential discounts to retail customers); *Southwestern Bell Tel. Co. v. FCC*, 19 F.3d 1475, 1481 (D.C. Cir. 1994) (upholding carriers' ability to enter into individualized contracts); *Ameritech Operating Cos. Revisions to Tariff FCC No. 2*, Order, DA 94-1121 (CCB 1994) (upholding reasonableness of rate differentials based on cost considerations).

[13] In particular ITIF would direct the Commission to the TechFreedom & ICLE Legal Comments at 32-47.

[14] *See, e.g.*, Public Knowledge Comments at 81.

III. The Record Supports a Flexible Non-Discrimination Standard

A. We have moved beyond the "all packets are equal" debate

It is well recognized, at least in engineering circles, that not all packets are equal.[15] Different Internet applications have varying needs, and we must, at the very least, allow network operators the flexibility to be aware of and react to this variety.

Transportation metaphors have been prevalent in this debate, but "fast lanes," "slow lanes," and "toll booths" are poor analogies. Instead, consider a bicycle lane. Think of most cars and trucks as general best efforts traffic, and bicycles as a light-weight, real-time application such as VoIP. The bicycles do not have to wait behind the regular best efforts traffic, and in that sense are "prioritized," but it is not clear that the cars are "by definition" slowed down because bicycles get to go first. In fact, a recent study of dedicated bicycle lanes in New York City found that having a separate bike lane improved car traffic, even where the bike lane reduced the available space for vehicles.[16] The advantages of a dedicated bike lane seem obvious because bicycles have very different characteristics and expectations from transportation infrastructure. Similarly having a dedicated "lane" for railroads separate from highway traffic is a no-brainer.

Many "dumb pipe" advocates claim that adding additional capacity is the solution to these QoS concerns. While abundant bandwidth is certainly a worthwhile policy goal deserving of the (separate) questions of how to achieve it, additional bandwidth does not solve QoS. Here the appropriate transportation analogy is the emergency vehicle racing through traffic. If you want to ensure that an ambulance can make it to the scene of an accident in a timely fashion, it should have the means to prioritize itself by automatically changing traffic lights and signally

[15] See Richard Bennett, "Designed for Change: End-to-End Arguments, Internet Innovation, and the Net Neutrality Debate" (ITIF, 2009) www.itif.org/files/2009-designed-for-change.pdf.
[16] *See* Joseph Stromberg, "Bike lanes have actually sped up car traffic in New York City," *Vox* (Sept. 8, 2014), www.vox.com/2014/9/8/6121129/bike-lanes-traffic-new-york.

others to let it through. No one would suggest that we should build an over-abundance of traffic lanes so there is always one left empty for emergency vehicles. To ask engineers to design a network with so much capacity that buffer queues always sit empty is to ask for a wildly inefficient design. Abundant bandwidth is good, and can alleviate the need to discriminate based on throughput, but it is not a solution for latency, jitter, and start-time sensitive applications.

These different modes of transportation represent the differences in the wide and increasing variety of Internet applications. The imperative to separate different modes of transportation is intuitive because their physical characteristics are manifest. It would be laughable to insist that all trains, planes, and automobiles travel on the same highway system out of some duty of "fairness," so that no transportation system had an unfair advantage over another. In the realm of communications networks we lose our intuition because the differences in scale and operation between different applications' demands are more obscure. But the variety of applications' needs is no less real.

It shouldn't strike us as "unfair," for example, if VoIP packets cut ahead of BitTorrent traffic. In fact, BitTorrent voluntarily created its own protocol to back off when congestion is detected. This protocol, dubbed µTP, uses a novel congestion control algorithm to decrease the delay to other applications from bandwidth-hungry file sharing.[17] BitTorrent executives have acknowledged that this move was largely a business decision: allowing its protocol to "play nice" with other traffic made sense, even if it effectively limited their throughput.[18] This has a number of implications: first, different applications really do have different needs. BitTorrent was willing to relegate itself to a "scavenger class," utilizing bandwidth when available because

[17] *See*, Arvid Norberg, "uTorrent Transport Protocol," *BitTorrent.org*, http://www.bittorrent.org/beps/bep_0029.html; Dario Rossi, *et al.*, "Ledbat: the new BitTorrent congestion control protocol," Telecom ParisTech (Aug. 2010), http://perso.telecom-paristech.fr/~drossi/paper/rossi10icccn.pdf.

[18] *See* Remarks of Eric Klinker, "Comcast Ruling: Now What?," ITIF Event, June 1, 2010, *available at* http://youtu.be/Cv9qwChwzek?t=26m31s.

it made little difference to the performance experienced by BitTorrent users (but made a great deal of positive difference to users of other applications). Companies should be allowed such commercially reasonable flexibility, whichever layer of the Internet it is undertaken on. Second, BitTorrent changed its protocol after the *Comcast* decision, illustrating the power for parties to come to agreements that benefit themselves and consumers without direct regulation by the Commission.

Many commenters recognize the need for some forms of traffic management. Whether it be "application agnostic" or "user-directed" discrimination, or prioritization of emergency phone calls, it is now recognized that some forms of traffic discrimination can be good. Allowing the network to be aware of applications' needs allows for a far more economically efficient way to expand the uses broadband networks can serve. Networks that can efficiently manage the probability of packet loss or delay in a way that enhances overall user experience should overwhelmingly be preferred. Flexibility in traffic discrimination is the only way to achieve this goal in an economically viable way. This is an excellent indication that section 706 offers the best way forward to determine which forms of commercially reasonable, welfare and innovation enhancing discrimination should be allowed.

B. The Commission should allow commercially reasonable paid-prioritization, not only user-directed prioritization

AT&T proposes the Commission use section 706 to ban "non-user-directed" prioritization and only allow prioritization that the consumer affirmatively selects.[19] This proposed compromise is somewhat similar to Barbara van Schewick's proposal to allow for

[19] AT&T Comments at 26-37.

certain user-directed, application-agnostic discrimination.[20] ITIF believes this compromise goes too far. Companies should be allowed to approach network operators and develop a two-sided market for innovative offerings or use cases that expand the capability of the current network. However, if the Commission sees "user-directed prioritization" as the only available alternative to Title II regulation, of course it should be preferred. But there is little reason to avoid vertical relationships in this space, as long as they are determined to be commercially reasonable.

IV. Wireless Broadband Merits Different Treatment

A. Wireless networks require dynamic management

There are undeniable differences between wired and wireless networks with profound implications for how they should be regulated. Wireless relies on radio spectrum, a scarce resource with far more dynamic variables than fixed networks. The fundamental difference in capacity between a given set of channels a wireless carrier has access to and the much wider bandwidth available to a shielded wired link is the most important and obvious difference between the two types of networks. The significant difference in potential capacity of a radio link and a fiber optic cable alone requires much more active management from a technical perspective and likely justify business models that deviate from the commercial reasonableness standard in the wired context.

Beyond just the capacity restrictions, a wireless connection is subject to unpredictable interference and noise from a variety of sources. These networks are designed for user equipment

[20] *See* Barbara van Schewick, "Network Neutrality and Quality of Service: What a Non-Discrimination Rule Should Look Like" (June 2012), *available at* http://cyberlaw.stanford.edu/publications/network-neutrality-and-quality-service-what-non-discrimination-rule-should-look.

that is, of course, mobile. Users move from access point to access point and resources have to be shifted to maintain an adequate connection. Similarly, as the number of users connected to any given access point changes, resources need to be dynamically adjusted on both ends of the link. Furthermore, voice over wireless data networks requires prioritization.

As the Commission correctly notes in the NPRM, "one essential requirement for high quality VoLTE deployment is ensuring the delivery of low latency voice traffic within the provider's LTE network, which would require traffic discrimination using the QoS feature."[21] Traffic discrimination through QoS that enables similar real-time applications should likewise be allowed. As the "Internet of things" and machine-to-machine communications come online, more and more applications will require heightened levels of guaranteed service quality.

Furthermore, these networks will only continue to increase their complexity. In the 3.5 GHz band, for example, it would be reasonable to expect user equipment to prioritize connections with a database controller. Advances in signal processing, beam forming, and MIMO will allow carriers to direct information in unprecedented ways. Even if wireless broadband is no longer "nascent," there are advanced technologies that certainly are. These technologies may well be key in overcoming the so-called "spectrum crunch" and should be encouraged, even if it means traffic for different applications is treated differently.

Applying strict neutrality rules, dictating traffic management in the lower layers of a wireless network, is largely unworkable. These technological constraints are not small exceptions to be worked out as "reasonable network management" – these advanced traffic management techniques are fundamental to running a wireless network.

However, this does not mean that the technical uniqueness of wireless networks should be a shield to engage in commercially unreasonable behavior, such as blocking or degrading VoIP applications. If an application does not harm the network, it generally should be allowed,

[21] NPRM at fn 117.

with the understanding that most consumers will be subscribing to data plans with the price based on the quantity of data used. The Commission should have the tools to prevent blocking of applications that don't harm the network and allow, for example, over-the-top VoIP applications to flourish. Wireless carriers should of course be free to charge for those bits like any others, and should be free to prioritize voice traffic of any kind, but the Commission should, either through a narrow application of the commercially reasonable standard or through the no-blocking rule, be able to prevent blocking or degrading of applications that do no harm to the network.

Granted, wireless competition likely mutes many of these concerns – the wireless industry looks very different from the Bell network of *Carterfone* days. And, to be clear, ITIF believes such a rule should be limited to application level blocking by the network carrier, and not expanded to a broader *Carterfone*-like rule with respect to devices or restrictions or what applications make it into an "app store" ecosystem to begin with.

B. If applied, the purview of a commercial reasonableness standard should be limited to the higher layers of wireless networks

If the Commission decides to apply the same general section 706 framework to wireless networks, it should avoid having to second guess the network management that happens within the lower layers of the network. A flexible standard of commercial reasonableness could be applied to those Internet layers above the network layer, recognizing that, even at these upper layers, the differences in capacity and traffic management between wired and wireless networks would warrant different application of the standard. For example, it should be within the Commission's power to prevent blocking of applications that do no harm to the network. But, at the same time, wireless operators should have the flexibility to explore some types of non-exclusive "zero-rating" arrangements that can efficiently allocate the cost of bandwidth intensive applications.

It can be quite difficult to delineate those practices that are commercially reasonable from those that aren't. Take for example Virgin Mobile's recent offering, "Virgin Mobile Custom," whereby consumers can select buckets of unlimited data for particular applications.[22] In a lot of ways, these types of offerings look like the "cableization" fears of many net neutrality advocates. At the same time, these deals are likely welfare-enhancing, offering a service that meets consumer demand at a lower price point. Furthermore, the particular Virgin Mobile plan allows for purchase of "application neutral" buckets of data. This data not tied to any particular application serves a key function in allowing consumers to continue to access new innovations at the edge. These sorts of arrangements will likely not be black and white, and, if the Commission decides to apply the same general framework of commercial reasonableness to mobile, it should have a flexible process and rely on well-informed multi-stakeholder groups to make these fine distinctions.

V. Conclusion

The *Verizon* court opened the door for the Commission to develop strong, enforceable rules to protect and promote an open and innovative Internet. The Commission should move forward under section 706 to give itself the flexible tools that appreciate the subtle complexities and technological and economic realities of broadband networking. The Commission should recognize that there needs to be innovation in both the edge and the core and any rules should be designed to enable ISPs to develop "smart," not "dumb" pipes. Moreover, the Commission should not be driven into a Title II morass by wild over-reaction and misunderstanding that would likely stifle innovation and delay the development of enforceable rules for years to come.

[22] *See* Virgin Mobile, "custom: make it yours," http://www.virginmobileusa.com/custom/#/.

Doug Brake
Telecom Policy Analyst

Rob Atkinson
President

Information Technology and Innovation Foundation
1101 K Street NW, Suite 610
Washington, DC 20005