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

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In the Matter of	)	
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Protecting and Promoting the Open Internet	)	GN Docket No. 14-28
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COMMENTS OF LEVEL 3 COMMUNICATIONS, LLC

Joseph C. Cavender
Level 3 Communications, LLC
1220 L Street NW Suite 660
Washington, DC 20005
(571) 730-6533

Counsel for Level 3 Communications, LLC

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I. INTRODUCTION AND SUMMARY

As the Commission recognizes in the Notice of Proposed Rulemaking, "[t]he Internet is America's most important platform for economic growth, innovation, competition, free expression, and broadband investment and deployment."[1] "These benefits flow, in large part, from the open, end-to-end architecture of the Internet, which is characterized by low barriers to entry for developers of new content, application, services, and devices and a consumer-demand-driven marketplace for their products."[2] The Internet, though, is not a single thing, constructed by a single entity, but a network of interconnected networks that interoperate and communicate. As Chairman Wheeler has pointed out, "the manner in which networks interconnect to exchange Internet traffic is a part of . . . the Network Compact, those values that have traditionally governed successful networks."[3] Without robust interconnection, a free and open Internet cannot be sustained. With Internet traffic continuing to grow, interconnection must keep pace.

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[1] *Protecting and Promoting the Open Internet*, Notice of Proposed Rulemaking, FCC 14-61, 29 FCC Rcd. 5561, 5563 ¶ 1 (2014) ("NPRM").

[2] *Id*.

[3] Chairman Tom Wheeler, *Finding the Best Path Forward to Protect the Open Internet*, Official FCC Blog (Apr. 29, 2014), http://www.fcc.gov/blog/finding-best-path-forward-protect-open-internet (last visited July 14, 2014).

Level 3 Communications, LLC ("Level 3") focuses its comments on the need for the Commission to provide the regulatory oversight necessary to ensure that the large "eyeball" ISPs —those who provide mass-market retail broadband Internet access services to large numbers of residential and small business users—act in a reasonable manner[4] with respect to Internet interconnection and do not choke these interconnections in an attempt to extract oligopolistic rents, as some have done. As the Chairman observed in a recent statement, "Consumers must get what they pay for."[5] When consumers purchase Internet access, they do not purchase "good" access to some parts of the Internet and choked access to others. They expect it all to work seamlessly, at the speed they have purchased from their provider.

Moreover, given that, in the Internet's network of networks, many edge providers will interconnect to "eyeball" (i.e. mass-market retail) ISPs through other ISPs, driving up the costs of traffic exchange through the imposition of interconnection fees in order to reach the mass-market retail ISP's customers has the same impact on edge innovation as imposing fees on the edge providers directly. Establishing rules addressing "direct" charges imposed by ISPs on edge providers but not for "indirect" charges levied on the edge providers' ISPs through interconnection is a roadmap for evasion of new Open Internet rules.

Accordingly, in order to adequately safeguard a free and open Internet, when the Commission adopts final rules it should adopt rules ensuring that the largest mass-market ISPs interconnect on reasonable terms. Notably, rules addressing mass-market ISP's interconnection practices would fit within the Commission's definition of the proper scope for Open Internet

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4 In these comments, "reasonable" includes "commercially reasonable."

5 Press Release, Federal Communications Commission, Statement by FCC Chairman Tom Wheeler on Broadband Consumers and Internet Congestion (June 13, 2014), *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-327634A1.pdf.

rules: ISP conduct that relates to conduct and facilities within, not beyond, "'the limits of a broadband provider's control over the transmission of data to or from its broadband customers.'"[6] Broadband ISPs directly control their interconnection facilities, including determining how much capacity to make available, to whom, where, and on what terms, and when to increase such capacity, and in so doing control the flow of traffic from outside their network to their broadband customers.

II. LARGE MASS-MARKET RETAIL ISPS HAVE MARKET POWER AS COMPARED WITH ALL OTHER INTERNET INTERCONNECTORS.

Notwithstanding their protestations to the contrary,[7] the largest mass-market retail ISPs stand in a uniquely favorable place in the Internet ecosystem: they control access to several million users who cannot be reached through alternate routing. In Internet terms, these mass-market customers are "single-homed," meaning they draw service from a single ISP. This contrasts with enterprise users, who are frequently "multi-homed," meaning that they can access the Internet through more than one ISP.[8]

The picture below, which is a high-level diagram of the Internet, demonstrates the significance of single-homing for mass-market broadband users.

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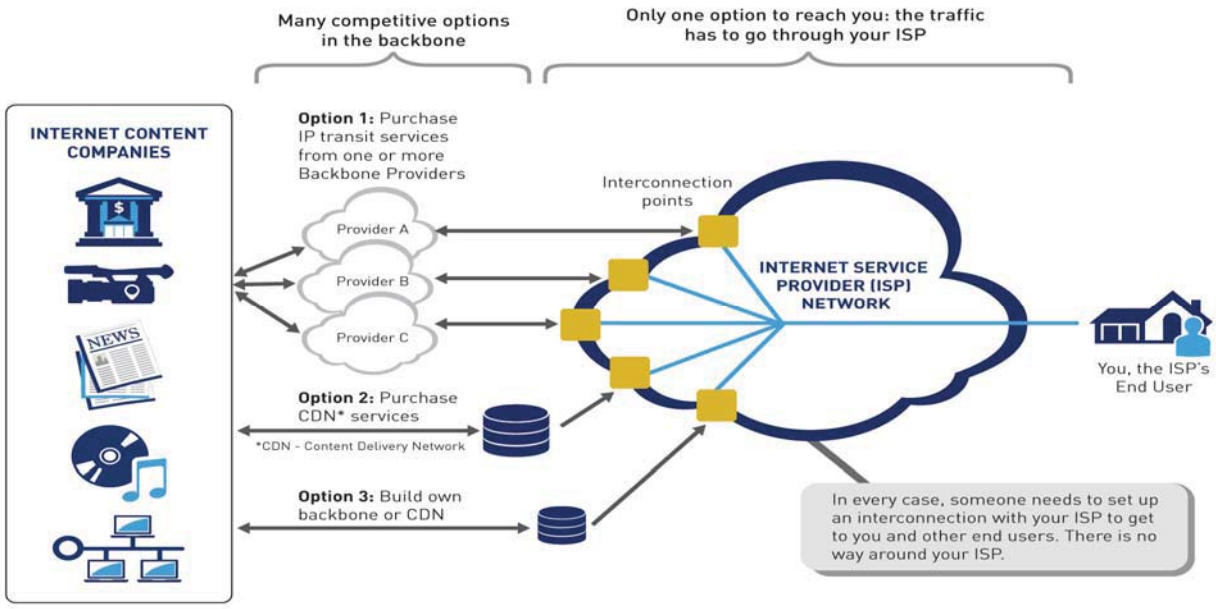
[6] NPRM, 29 FCC Rcd. at 5582 ¶ 59, *quoting Preserving the Open Internet, Broadband Industry Practices*, Report and Order, FCC 10-201, 25 FCC Rcd. 17,905, 17,933 ¶ 47 n.150 (2010) ("*Open Internet Order*").

[7] *See e.g.*, Ex Parte Letter from Christopher M. Heimann, General Attorney, AT&T, to Marlene H. Dortch, Secretary, FCC, Attachment at 17, WC Docket No. 10-90, CC Docket No. 01-92, GN Docket No. 14-28 (filed June 30, 2014) ("AT&T Ex Parte").

[8] For example, when Level 3 and Global Crossing merged, Level 3 and Global Crossing estimated that 86 to 88 percent of their combined customers were multihomed to Internet backbones other than Level 3/Global Crossing. Joint Opposition and Reply Comments of Level 3 Communications, Inc., and Global Crossing Limited at 14, IB Docket No. 11-78 (filed July 21, 2011).

Figure 1



Notably, on the left side of this chart, there is robust competition to transport Internet content from Internet content companies to the mass-market retail end user's ISP. The vibrant competition to reach the retail end user's ISP is reflected in charts of rapidly declining prices for IP Transit services.[9] For the single-homed mass-market broadband consumer, however, the right side of the chart tells a different story. All Internet traffic from that end user and all Internet traffic to that end user must route through the mass-market ISP. In this situation, the mass-market ISP is positioned to act as the "gatekeeper" for Internet traffic bound for the mass-market end user.[10]

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9 *See e.g.*, AT&T Ex Parte, attachment at 10.

10 Contrast this with the situation for a multihomed end user. In that case, if one ISP were to deny or degrade an end user's access to Internet content, the multihomed end user could still obtain that content through the other ISP. In the absence of coordinated behavior, a single ISP cannot as readily act as a "gatekeeper."

When the Commission last considered its Open Internet rules, the Commission observed that large retail ISPs have both the incentive and the ability to act to reduce openness. First, an ISP has an incentive to degrade services offered by edge providers that compete with the ISP's own services or the services of an affiliate.[11] This is the concern that, for example, an ISP that has an affiliated video service (which all of the largest ISPs do) might degrade service to competing online services like Netflix, Hulu, YouTube, Amazon, and others.

In addition, the Commission found that ISPs have an incentive to act as gatekeepers, charging access fees or tolls to those who wish to deliver traffic to the ISP's customers, and to degrade or decline to improve performance for those who do not pay fees.[12] In contrast to an ISP's incentive to discriminate against services that compete with its own, this incentive simply to generate access revenues applies broadly to *any* traffic its users might request, whether that traffic competes with a service the ISP offers or not.[13] And ISPs "would be expected to set inefficiently high fees" for access to their users—which could be expected to cause some innovative edge providers to exit the market or to decline to enter it.[14] The Commission further found that the resulting "harms to innovation … are likely to be particularly large because of the rapid pace of Internet innovation, and wide-ranging because of the role of the Internet as a general purpose technology."[15] Moreover, the harms would be particularly acute given that many new or potential entrants and innovators are small, and "particularly sensitive to barriers to

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[11] *See Open Internet Order*, 25 FCC Rcd. at 17,915 ¶ 21.

[12] *See id*. at 17,919, 17,922 ¶¶ 24, 29.

[13] *See id*. at 17,919 ¶ 24.

[14] *Id*. at 17,919-20 ¶ 25.

[15] *Id*.

innovation and entry."[16] The Commission also found that assertions that access charge revenues could be used by ISPs to offset charges to consumers were purely speculative, and that in any event, because of the other harms that access charges would cause, the possibility of reduced end-user charges did not justify allowing ISPs to charge such fees.[17]

The D.C. Circuit, on review, upheld these core findings. The court found "no basis for questioning" the determination that "the preservation of Internet openness is *integral* to achieving the statutory objectives set forth in section 706."[18] The court further agreed that retail mass-market ISPs have the incentive and ability to discriminate against competing services.[19] Moreover, the court agreed, "broadband providers have *powerful incentives* to accept fees" from those who wish to deliver traffic to the ISPs' end users as well as the ability to impose those fees.[20]

The Commission also found that the theoretical possibility that consumers might switch broadband providers would be unlikely to discipline ISPs.[21] As the Commission observed, among other things, many end users may not know whether the charges or service levels an ISP is imposing are different from those imposed by an alternative provider—assuming there *is* an alternative provider that offers broadband sufficient to support applications like streaming video—and even if the end users did know, they might find it costly to switch.[22] Nor could the

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16 *Id*. at 17,920-21 ¶ 26.

17 *See id*. at 17,921-22 ¶ 28.

18 *Verizon v. F.C.C.*, 740 F.3d 623, 645 (D.C. Cir. 2014) ("*Verizon*") (emphasis added).

19 *See id*. at 645-46.

20 *Id.* (emphasis added). The court agreed that Commission's findings on this last point were "based firmly in common sense and economic reality." *Id*. at 646.

21 *See Open Internet Order* at 17,921, 17,924-5 ¶¶ 27, 34.

22 *See id*.

court find any reason to quibble with the Commission's determination that the theoretical possibility of losing end users to a competitor was unlikely to deter retail mass-market ISPs from engaging in harmful conduct.[23]

III. DEGRADING INTERCONNECTION DENIES CONSUMERS THE INTERNET ACCESS FOR WHICH THEY HAVE PAID, JUST THE SAME AS IF THE MASS-MARKET RETAIL ISP DEGRADED LAST-MILE TRANSMISSION BASED ON SOURCE OR CONTENT.

In his statement accompanying the NPRM, Chairman Wheeler put forward a simple, consumer-focused test for a commercially unreasonable practice that denied consumers what they thought they had paid for: "Simply put, when a consumer buys specified bandwidth, it is commercially unreasonable—and thus a violation of this proposal—to deny them the full connectivity and the full benefits that connection enables."[24] Yet unless the proposed Open Internet rules reach a mass-market retail ISP's interconnection practices, that is exactly what can occur.

Unfortunately, Level 3 has real-world experience with how ISPs are even today denying consumers the Internet access that they thought they were purchasing. As Level 3 has explained, some big mass-market ISPs are attempting to exploit their control over access to their customers to extract interconnection tolls from providers like Level 3—at levels that frequently equal or even exceed the entire price that Level 3 charges its customers for transit to reach those ISPs' networks as well as the rest of the Internet.[25] Because Level 3 has refused to pay these tolls, these ISPs have refused to augment interconnection capacity to Level 3's network, and the interconnection points between the Level 3 network and these ISP networks have become

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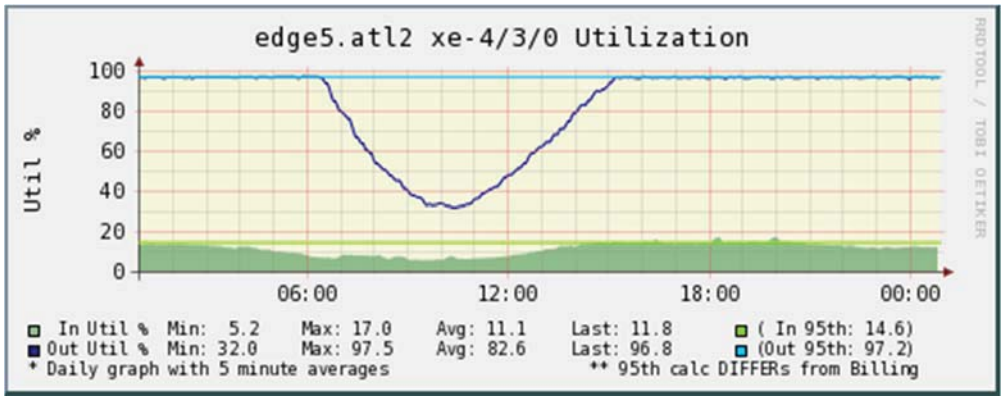
[23] *See Verizon* at 646-47.

[24] NPRM, 29 FCC Rcd. at 5647, Statement of Chairman Tom Wheeler (emphasis in original).

[25] Comments of Level 3 at 7-8, GN Docket Nos. 14-28 and 09-191 (filed Mar. 21, 2014).

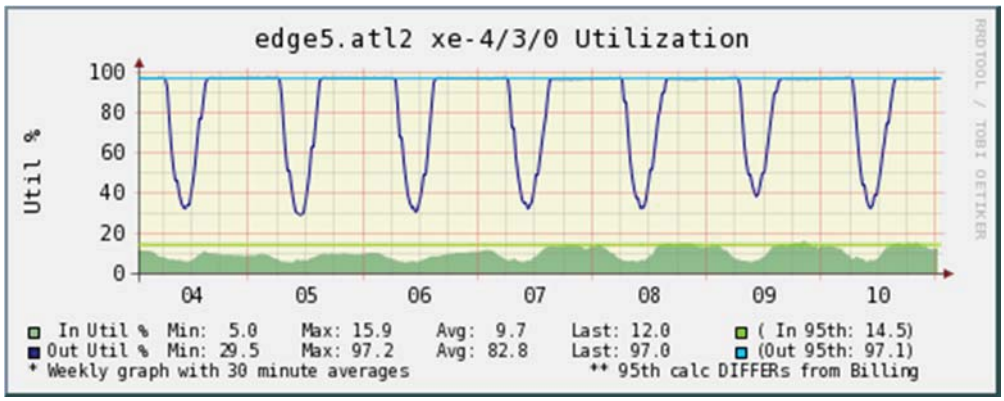
extremely congested, well beyond the point where any reasonable network engineer would agree that interconnection capacity must be augmented. Figures 2 and 3 below show the output of an internal Level 3 tool called "3map," which can generate a graphical report of the utilization level for a particular Level 3 interconnection port. The port shown in both figures is the same port: a typical interconnection port with one large ISP ("ISP X") that has many millions of end-user customers. ISP X has refused to augment interconnection capacity unless Level 3 agrees to pay a toll, which Level 3 has declined to pay. Figure 2 shows the port over a 24-hour period; Figure 3 shows the same port over a one-week period.

Figure 2



One of many Level 3 interconnection ports with ISP X, a large ISP that has refused to augment interconnection capacity unless Level 3 agrees to pay a toll. The chart shows the utilization of the port over a 24-hour period. Times are in GMT; this graph was generated on Thursday, July 10, 2014.

Figure 3



The same interconnection port showing data over a one-week period. This graph was generated on Thursday, July 10, 2014.

In these Figures, the blue line shows utilization, as a percentage, of the port's capacity to deliver traffic from the Level 3 network to the interconnected ISP X network; the blue-green shaded area shows the utilization of the port's in-bound capacity, receiving traffic from ISP X's network. As Figures 2 and 3 show, each day, the interconnection port shown spends most of the day at a "plateau" at maximum utilization. That is, ISP X's customers have requested access to resources on the Internet that are available via the Level 3 network, and the Level 3 network is trying to deliver the data those users have requested. But ISP X's users have requested far more data than can be delivered through the existing interconnection ports. Again, Level 3 is ready and willing to increase interconnection capacity, but ISP X has refused, and the result is that the existing ports have become extremely congested. The consequences of that congestion are well understood: data packets that cannot be transmitted when the port is congested are dropped, often by the millions.

By contrast, if interconnection were properly sized, the blue line would show a series of peaks during busy periods of the day, but those peaks would not typically come near, much less reach, 100 percent utilization. The pattern of consistent congestion shown in Figures 2 and 3 is

the hallmark of that handful of large mass-market ISPs that have refused to augment interconnection capacity, attempting to force Level 3 (and presumably others) to pay arbitrary tolls.

The effect on the consumer of dropped packets varies according to the application, but can be dramatic for performance-sensitive applications. If dropped data packets are part of an email, then there might simply be a short delay in the delivery of that message as those packets are re-sent and delivered later. However, if the packets are carrying information for a performance-sensitive application like a voice phone call, streaming video, or even interactive browsing and online transactions, the impact on the user experience can be much more significant. For example,

- VoIP telephone calls may not be connected, may be disconnected if connected initially or, while connected, may have poor quality or be unintelligible. This includes 911 calls.
- Access to online video applications (like Netflix, Sony, Apple, Google, Amazon and others) or live video streaming services (Major League Baseball, for example) can be affected, resulting in an inability of subscribers to use those services. These problems can be particularly bad at peak usage times.
- Interactive web browsing can be adversely affected. Subscribers and businesses using the Internet to complete banking transactions, access medical records, cast a vote, visit social networking sites or access employer data and systems while working from home (or telecommuting) will find that their applications are running slowly, and in cases of extreme congestion, browsing sessions may fail completely. Users may also get error messages, causing them to wonder whether whatever transaction they were trying to complete—such as online purchases or banking—were even concluded.

In these circumstances, rather than degrading the transmission of competing over-the-top voice or video providers as data packets pass through the mass-market retail ISP's network, the ISP has accomplished the same goal—degraded performance for a competitor's product—by degrading interconnection capacity. In fact, in many ways it is simpler to target edge providers by targeting their ISPs than by specifically singling out those edge providers' content. By attacking through the ISP interconnection arrangements, the mass-market retail ISP need not implement any

particular technological solution to target specific traffic. Instead, given the natural growth in Internet traffic, it can just "do nothing" and let its ports congest. And the ISP can also deny that it is affirmatively targeting any particular edge provider competitor, or discriminating against edge providers and in favor of its own services, even though such discrimination is the unavoidable consequence of its purportedly neutral conduct.

Globally, Level 3 has chronically congested ports with only a handful of its 51 peers. Of those, all but one are in the United States, with congestion persisting for more than a year and the peer refusing to augment interconnection capacity.[26] Notably, all chronically congested peers are large mass-market retail ISPs. By failing to augment interconnection capacity, these large mass-market retail ISPs are degrading their broadband customers' access to all Internet content that crosses that interconnection.

All of this demonstrates that, with an Internet of interconnected networks, the Commission cannot effectively address threats to the free and open Internet if it excludes from the scope of its rules the mass-market retail ISP's interconnection facilities. And again, to use the Commission's formulation, these facilities are not "beyond 'the limits of a broadband provider's control over the transmission of data to or from its broadband customers.'"[27] Accordingly, they are within the Commission's own understanding of the proper scope for rules to protect the free and open Internet.

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[26] The other chronically congested peer is in Europe.

[27] NPRM, 29 FCC Rcd. at 5582 ¶ 59 *quoting Open Internet Order*, 25 FCC Rcd. at 17,933 ¶ 47 n.150.

IV. ARGUMENTS ABOUT NETWORK COSTS DO NOT JUSTIFY EXCLUDING INTERCONNECTION FROM THE SCOPE OF A MASS-MARKET RETAIL ISP'S INTERNET ACCESS FACILITIES THAT WOULD BE SUBJECT TO A BAN ON COMMERCIALLY UNREASONABLE PRACTICES.

Some may argue that substantial interconnection fees are justified by the additional costs that interconnection "imposes" on the large mass-market retail ISP, and thus are always reasonable.[28] This argument fails for several reasons.

First, the cost of the augmenting interconnection points is nominal. Peers interconnect in locations such as carrier hotels and other similar points at which both are already present. Adding and maintaining cross-connects in these locations is not a significant cost. Moreover, the cost of adding additional ports, if ones are needed, is quite modest. The costs of physical interconnection facilities do not come near to accounting for the amount of tolls sought by the large mass-market retail ISPs.

Second, assuming the mass-market retail ISP is not deliberately trying to throttle consumer Internet demand, it will at a minimum have to provision adequate capacity between some point at which it would obtain Internet content and the broadband consumer. This includes both last mile and some amount of at least local transport. These capacity costs must be incurred whether the content provider is a customer of the retail ISP or another ISP; they are not "caused" by interconnection in any way. Or put another way, if a retail ISP sells a certain speed of broadband service to a consumer, the retail ISP necessarily must provision capacity to support that service at least from the end user's location to *some* point on its network, and that cost is unrelated to any costs due to interconnection.

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[28] *See* AT&T Ex Parte, Attachment at 17.

Third, with respect to longer distance transport, it could be reasonable for an ISP to negotiate regarding the location at which it exchanges Internet traffic with its peers. We are long past the era in which "hot potato" routing (in which traffic is handed to the destination ISP at the earliest possible point) defined Internet interconnection. Using alternative approaches, such as "cold potato" routing (where traffic is handed off at the last possible point) for traffic brought to the mass-market ISP, or setting up additional interconnection points in local markets, can substantially mitigate the amount of backbone transport that the large mass-market retail ISP would need to provision when interconnecting with a content-heavy provider.

Fourth, the argument that the Internet content provider or its ISP are "imposing" costs on the retail mass-market ISP—and thus must bear the associated costs—harkens back to the "calling party pays" mentality of legacy access charges, in which the party initiating the call (i.e., the calling party) was expected to pay the cost of establishing the transmission path. This argument is flawed. For one thing, in the Internet context, the "calling party" would properly be the ISP's own end user, who is the one initiating the data transmission both out from the ISP's own network (e.g., sending a request to a server to stream a movie) and the transmission going back the other way (e.g., sending the movie to the user). That is, streaming video sites are not like telemarketers—they only send traffic that the "calling party" user *requested*. But even setting aside the question of who "caused" the traffic to be sent in the first place, both the broadband consumer and the content provider benefit jointly from the interaction between them, just as with the joint benefit to a telephone call in the context of traditional circuit switched voice traffic. This joint benefit led the Commission, in the context of voice telephony, to reject the

"calling party pays" model in favor of "bill and keep" in which each connecting party bears the costs of reaching the point of interconnection.[29]

To be clear, Level 3 is not advocating supplanting negotiated peering agreement with some kind of tariffed regime, and is not arguing that paid peering is inappropriate in all cases. Indeed, when one peer is actually performing a service for the other (such as, for example, carrying the greater cost burden on its backbone because of the way the peers are exchanging traffic), payment may be appropriate.[30] However, in the context of the bottleneck control that retail mass-market ISPs have with respect to reaching several million single-homed Internet users, those relationships should be subject to an overall test of reasonableness, to limit abuses of that bottleneck control that deprive consumers of access to the whole Internet.

V. TARGETED, LIGHT-TOUCH OVERSIGHT OF INTERCONNECTION WITH LARGE MASS-MARKET ISPS DOES NOT REQUIRE INTRUSIVE REGULATION OF INTERNET PEERING AGREEMENTS.

Protecting the free and open Internet from threats posed by these large mass-market ISPs' interconnection practices need not involve intrusive regulation. Internet peering arrangements should remain negotiated; they should not be subject to burdensome tariffing rules. Indeed, there is no evidence of a problem with interconnection arrangements between the various backbone providers, and so there is no need for regulation of these arrangements. But in the limited context of the largest mass-market ISPs, with their many millions of single-homed customers,

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[29] *See Connect America Fund, et al.*, Report and Order and Further Notice of Proposed Rulemaking, FCC 11-161, 26 FCC Rcd. 17,663, 17,907 ¶ 744 (2011).

[30] As an example, "bit-mile" interconnection, which is discussed in in Level 3's IP Traffic Exchange Policy, and which it has implemented commercially with several companies, provides for the possibility of payment in just such circumstances where one peer is carrying more of the "bit mile" burden of the traffic exchange than the other. *See* Level 3 Communications, LLC, *IP Traffic Exchange Policy*, Legal, http://www.level3.com/en/legal/ip-traffic-exchange-policy/ (last visited July 14, 2014).

some bounds on their ability to exercise market power to harm competitors and extract tolls are appropriate. The Commission's guiding principle in this context should be to ensure that consumers receive the Internet access that they expect: access to the entire Internet, including content not located on their ISP's own network.

To fully protect the free and open Internet and ensure that consumers are in fact getting what they expect, the Commission should adopt simple, straightforward interconnection rules, which would serve as a backstop, with interconnecting parties free to agree to alternative arrangements.[31] Specifically, the Commission should require large, mass-market ISPs to interconnect on reasonable terms. Reasonable interconnection means, at a minimum, the following:

1. <u>If Internet content is delivered locally—in the mass-market retail ISP's local market closest to the location of the ISP's customer requesting the content—the mass-market retail ISP must accept the traffic and deliver it to its customer without charging a fee</u>. The mass-market retail ISP could require the aggregation of some minimum amount of traffic to avoid an obligation to interconnect with "everybody." And it could choose more distant interconnection points, although those would be its decisions, and its costs to bear. In this way, no one should get a "free ride" from the mass-market retail ISP—or from anyone else. Under this proposed rule, large mass-market retail ISPs must interconnect with content companies and backbone providers without charging them a toll, but those content and backbone companies must also do their fair share of the work to deliver content to the ISP.

2. <u>The local interconnection locations can be selected by the ISP, but they must be reasonable</u>. At a minimum, for example, each location must allow content delivered there to reach a stated minimum number of the ISP's customers, and the location must be served by several different (and therefore competing) metro transport service providers.

3. <u>If interconnection capacity is congested at any interconnection location, it must be promptly augmented</u>.

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[31] An example of a voluntary alternative arrangement is "bit-mile" interconnection, noted above, *see IP Traffic Exchange Policy*, *supra* n.30.

These rules are not complicated, and they work. We know this because Level 3 already has similar arrangements with several ISPs.

This solution is good for everyone:

- Consumers get reliable, uncongested Internet access to the content of their choosing.
- The ISPs eliminate costs by not having to carry traffic from region to region, just on their local networks, which are presumably adequate to accommodate the speeds they have promised to their paying subscribers.
- Content providers can buy services from multiple, competitive providers who can deliver content to the ISPs' network over uncongested links. The ISPs remain free to compete for this business as well, although they must do so on a level playing field.
- Internet backbone providers continue to compete with one another (and the ISPs) for connectivity around the Internet and to the ISPs, but without the barriers created by artificially congested interconnection links into the Internet's last mile.

VI. CONCLUSION

To ensure that the Internet remains the vital platform for social, civic, and economic life it has been, the Commission must take action to protect it. Critical to doing so is ensuring that mass-market retail ISPs, particularly the largest ones that control access to many millions of consumers, cannot engage in unreasonable discrimination in interconnection. Failure to include interconnection within the scope of the Commission's Open Internet rules will substantially undermine those rules, as it will permit easy evasion through failure to augment interconnection as necessary to keep up with traffic growth. A few simple rules, backstopped by an expeditious complaint process, would be close this backdoor, while preserving the commercial negotiation and flexibility that has characterized Internet peering agreements to date.

Respectfully submitted,

/s/ Joseph C. Cavender
Joseph C. Cavender
Level 3 Communications, LLC
1220 L Street NW Suite 660
Washington, DC 20005
(571) 730-6533

Counsel for Level 3 Communications, LLC

July 15, 2014