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October 27, 2014

Ex Parte

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Protecting and Promoting the Open Internet, GN Docket No. 14-28

Dear Ms. Dortch:

On October 23, 2014, Nicolas Pujet, Senior Vice President, Corporate Strategy, and I, on behalf of Level 3 Communications, LLC (“Level 3”), met separately with (1) Priscilla Argeris, Legal Advisor to Commissioner Rosenworcel; (2) Rebekah Goodheart, Legal Advisor to Commissioner Clyburn; and (3) Claude Aiken and Matthew DelNero of the Wireline Competition Bureau and Scott Jordan, Chief Technologist, regarding the above-captioned matter. The attached presentation was provided to the Commission participants in the meetings.

Consistent with Level 3’s previous advocacy,¹ the Level 3 representatives discussed the need for the Commission to adopt rules to protect the Open Internet against threats posed by the largest consumer “eyeball” ISPs both with respect to actions those ISPs may take on their so-called last-mile networks as well as at the points of interconnection between their networks and the rest of the Internet. Adopting rules targeted only at the last mile will leave the Internet unprotected. Indeed, it is at the point of interconnection where some of the largest ISPs are even today harming their own customers’ Internet service in an effort to discriminate against competing services or to extract arbitrary access tolls. In addition, in response to a question from

¹ See Letter from Joseph C. Cavender, Level 3, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-28 (filed Sept. 8, 2014); Comments of Level 3, GN Docket No. 14-28 (filed July 15, 2014); Reply Comments of Level 3, GN Docket No. 14-28 (filed Sept. 15, 2014); Comments of Level 3, GN Docket No. 14-28, et al. (filed Mar. 21, 2014); Letter from Joseph C. Cavender, Level 3, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-28, et al. (filed Feb. 21, 2014); Letter from Joseph C. Cavender, Level 3, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-28, et al. (filed Apr. 24, 2014); Letter from Joseph C. Cavender, Level 3, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-28, et al. (filed May 5, 2014); Letter from Joseph C. Cavender, Level 3, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-28, et al. (filed May 13, 2014).

Commission staff, the Level 3 representatives urged the Commission to apply transparency rules to broadband service providers' interconnection practices. The Level 3 representatives recommended that, in order to protect and inform consumers, mass-market broadband providers should be required to disclose information relating to congestion on their points of interconnection, such as maximum sustained utilization rates.

In the 2010 *Open Internet Order*,² the Commission observed that large, bottleneck ISPs have the incentive and the ability to discriminate in favor of their own video and voice services and against over-the-top competitors, as well as to extract monopoly rents from all who wish to exchange traffic with their users.³ And to extract these rents and to effectuate this discrimination, ISPs have the incentive and ability to allow their “basic” level of service to congest and deteriorate, so as to force providers into a paid arrangement.⁴ Notably, the Commission observed, an eyeball ISP's ability to act on these incentives does not depend on it possessing market power with respect to end users—a terminating access monopolist controls the only means of access by which others may reach the end user regardless of whether the end user itself had a competitive choice—the possession of such market power with respect to end users would make the problem all the worse.⁵ In fact, market power over mass-market consumers is pervasive. As Chairman Wheeler recently observed, there is no effective competition for high-speed Internet access: the vast majority consumers have, at most, a single option for high-speed wired broadband, and virtually no households have more than two choices.⁶ The Commission's findings were affirmed by the D.C. Circuit, and they have not been seriously disputed in the years since.⁷

There are two ways ISPs can act on these incentives. The first is through actions taken “on the last mile” that target individual edge providers directly, such as blocking specified ports used by targeted applications or using technologies like deep-packet inspection to identify a particular target's traffic. The second, even simpler approach is to target providers like Level 3 with whom they exchange traffic, allowing their ports to congest and refusing to augment capacity unless the provider pays the ISP a toll.⁸ In other words, while ISPs are acting on the

² *Preserving the Open Internet*, GN Docket No. 09-191, et al., Report and Order, FCC 10-201, 25 FCC Rcd 17905 (2010) (*Open Internet Order*).

³ *See id.* ¶¶ 21, 24, 32.

⁴ *See id.* ¶ 29.

⁵ *See id.* ¶ 32.

⁶ *See* FCC Chairman: More Competition Needed in High-Speed Broadband Market, Fact Sheet, available at https://apps.fcc.gov/edocs_public/attachmatch/DOC-329160A1.pdf. And even those who are fortunate enough to have two options, who are technically expert enough to understand what performance problems are caused by their ISP's misconduct, and who are able to obtain reliable information that the other potential provider does *not* engage in similar misconduct, typically face significant switching costs. *See Open Internet Order* ¶ 27.

⁷ *See Verizon v. FCC*, 740 F.3d 623, 645-646 (D.C. Cir. 2014).

⁸ Notably, when providers choose this second option, they are attempting to degrade *all* of the Internet traffic crossing over the congested interconnection ports. The effects of this congestion vary from

same incentives whether they target edge providers directly or target providers like Level 3, and while the threat to the open Internet is the same no matter which approach the ISPs take, the *Open Internet Order* seemed to address only one of the ways ISPs might act on their incentives.

Unsurprisingly, some ISPs have taken that as permission to allow their interconnection points to congest, causing Internet performance for their own customers to deteriorate, in order to create leverage over edge providers. In Level 3's experience, several large eyeball ISPs have allowed their interconnection points with Level 3 to congest for years, degrading their own customer's experience significantly, even though the cost of eliminating the congestion at the point of interconnection would be *de minimis* and even though these ISPs claim that their own networks have more than adequate capacity to provide uncongested service to their customers. These eyeball ISPs refuse to augment interconnection capacity, even when Level 3 has offered to pay *all* of the costs of doing so, because doing so would eliminate their leverage to demand tolls from edge providers.

These eyeball ISPs control the only path through which their consumer subscriber can reach the Internet and through which the rest of the Internet can reach those consumers. They have a terminating access monopoly, and the largest ISPs control access to many, many millions of customers. It is no surprise that they are leveraging this enviable market position. Yet in doing so, they are deliberately harming their own customers' Internet experience and threatening the virtuous circle of innovation and investment simply to generate a new revenue stream, a revenue stream that has nothing to do with recovering costs and everything to do with exploiting their leverage as a bottleneck with control over access to their many millions of consumers.

Notwithstanding the seriousness of the problem, a solution is readily available that would involve only minimal regulation, essentially no enforcement, and that would leave the big broadband ISPs better off than a "fair" outcome would. The problem is that broadband consumers ISPs are threatening the open Internet to extract access tolls; the solution is to prohibit those ISPs from charging such access tolls.

More specifically, Level 3's proposed solution has these features:

- 1. Localization.** A requesting provider, Network A (e.g., a backbone network), would be entitled to exchange traffic with another provider, Network B (e.g., a large eyeball ISP), on a settlement-free basis if Network A is willing to exchange traffic with Network B in the local market nearest to the location of the customer of Network B with whom the traffic is being exchanged. This is known as "localizing" traffic. Receiving traffic in its local market means that Network B does not need to bear the costs of backhauling the traffic from a distant market. Network B could offer commercially negotiated "paid

application to application: streaming video and over-the-top voice services are particularly vulnerable, while for applications like electronic mail, the effect would likely be unnoticed. In this way, a provider choosing to congest its interconnection links discriminates effectively against services that depend on reliable, uncongested service as a class—all streaming video services using congested links (i.e., that have not paid for an uncongested link) are effectively targeted at once.

peering” to those entities that did not wish to deliver traffic to the local market. For such traffic, Network B itself would be bearing the backhaul costs, and, so long as the interconnecting entity Network A had the option to deliver the traffic to the local market on a settlement-free basis, it would be appropriate for Network B to impose a charge if the interconnecting entity chose not to do so.⁹ Of course, if Network B prefers to interconnect in fewer or more distant locations, that would be permissible, but it would not then be permitted to charge for traffic so exchanged.

- 2. Choice of Interconnection Location.** Network B, which received the request to interconnect, would be permitted to select the locations where it would offer settlement-free peering, although the locations must be reasonable, and should permit access to a reasonable number of consumers. If Network B chooses to interconnect in its own facility, it would be entitled to charge market-based prices for things like space, electricity, and cooling.¹⁰
- 3. Adequate Interconnection Capacity.** If interconnection capacity is congested at an interconnection point, Network B must be willing to promptly augment capacity without charging a fee for the augment.
- 4. Minimum Traffic Level.** Network B could require that any entity, to be eligible for settlement-free peering on these terms, must have an amount of traffic above some reasonable threshold so that the ISP would not be required to peer with all requesting entities. It is highly unlikely that a provider would ask to establish peering relationships under the proposed rule when doing so would be unreasonably burdensome for all involved, but this part of the proposal ensures that the rule could not be criticized as potentially allowing “everyone” to peer, including when doing so makes little sense from an economic or engineering perspective.
- 5. Providers Subject to Rule.** In Level 3’s experience, only the largest eyeball ISPs, those serving several million customers each, have congested their interconnection ports in an attempt to extract tolls. Accordingly, the Commission could reasonably decide to limit the rule to apply only to those ISPs that serve more than a stated number of mass-market consumers. Conversely, the Commission could apply the rule more broadly, although there is likely little cause to do so. Level 3, for example, would have no objection to the rule being applied to itself. Indeed, because this rule targets only the most extreme

⁹ In this sense, a paid peering arrangement is much like the purchase of IP transit service (but to a subset of destinations, rather than the entire Internet). If a customer wishes to purchase transit service from Level 3, it can have that service provisioned to the location of its choice.

¹⁰ The Level 3 proposal does not envision that the Commission would be called upon to make fine-grained distinctions about things like the reasonableness of electricity pricing. Significantly in that regard, if Network B sought to charge supracompetitive prices for collocation-related services, Network A would always have the option of deploying its equipment in a nearby building, connecting to Network B through a cross-connect that went between the buildings, so that it would not actually need any of those services from Network B. Thus the competitive market would ensure a reasonable result.

abuses of monopoly power, Level 3 believes that the vast majority of networks offer to peer on more generous terms than those required of providers under this rule.¹¹

This rule is not complicated, and it would be good for everyone.

- Consumers would get reliable, uncongested access to the Internet, including all the sites that are today innocent victims of the big ISPs' attempts to force providers like Netflix to pay. These consumers today can be harmed by congestion whether they—or even anyone in their neighborhood—have *ever* used Netflix or any other similar service.
- The eyeball ISPs themselves would get a better-than-fair deal. Under this proposal, even though ISPs have sold access to the *entire* Internet to their customers, there would be no requirement to bear *any* of the costs of backhauling Internet traffic. In other words, all they need to do, when they sell their customers access to the Internet at a certain speed, is to provide that speed to *somewhere that they themselves choose*, in that same local market, and the interconnecting parties like Level 3 will bear all the rest of the costs of delivering traffic to those locations.
- Content providers will have a choice of several competing providers (such as Level 3 and others, including the big retail ISPs themselves) to deliver traffic, all of whom will be competing on a level playing field. Or, if they wish and have a sufficient amount of traffic, they can make the investment to be eligible for settlement-free interconnection themselves.

While the Level 3 proposal is good for everyone, it does not aim to produce a “fair” outcome. Rather, it is designed to be easily administered, a backstop that curbs the worst aspects of the eyeball ISPs' market power. A more ambitious rule might aim to evenly balance the costs associated with interconnection between two networks. Instead, as noted above, the Level 3 proposal is a better-than-fair deal for the large eyeball ISPs. Even though these large ISPs have promised their users access to all of the Internet, not just a portion of it, at a certain speed, the proposed rule does not require ISPs to do virtually anything to make good on that promise. It does not require eyeball ISPs to become customers of other networks, purchasing connections to resources available elsewhere on the Internet. It does not even require ISPs to peer with other networks in a way that balances the costs of exchanging traffic. Rather than requiring the ISP to bear the cost of going out and establishing adequate interconnections with other networks, the Level 3 proposal says only that if the other networks of the Internet come to the ISP, the ISP cannot demand a toll before interconnecting with them and allowing its own users to access

¹¹ Note that under Level 3's proposal no entity can *both* demand settlement-free peering (a right of Network A) *and* select the reasonable locations for peering (a right of Network B) with respect to the same counterparty. If a network wishes to demand the right to interconnect settlement-free with another network, then the other network has the right to select the reasonable locations for interconnection. Of course, nothing in this proposal requires any network to demand interconnection with any other network, and nothing prohibits any two networks from agreeing on other terms for interconnection, either on a settlement-free or paid basis.

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those resources. The large eyeball ISPs have promised their customers more—they should be required to provide no less.

The Commission was right in the *Open Internet Order* to be concerned about the threats that bottleneck ISPs pose to the free and open Internet. Today, the largest eyeball ISPs exploit their market power—their control over access to millions upon millions of eyeballs—to the detriment of the Internet ecosystem. The Commission must not allow them to continue to do so. To ensure that its new rules actually achieve their goal and protect the Internet, the Commission must also prohibit ISPs from imposing access tolls for the privilege of reaching the ISPs' end users. The Commission should adopt Level 3's proposal, which, with costs so small they can hardly be measured, will solve this problem and improve the Internet experience for tens of millions of Americans almost immediately. It is time for the Commission to act.

Please do not hesitate to contact me if you should have any questions.

Sincerely,

/s/ Joseph C. Cavender

Joseph C. Cavender

cc: Claude Aiken
Priscilla Argeris
Matthew DelNero
Rebekah Goodheart
Scott Jordan

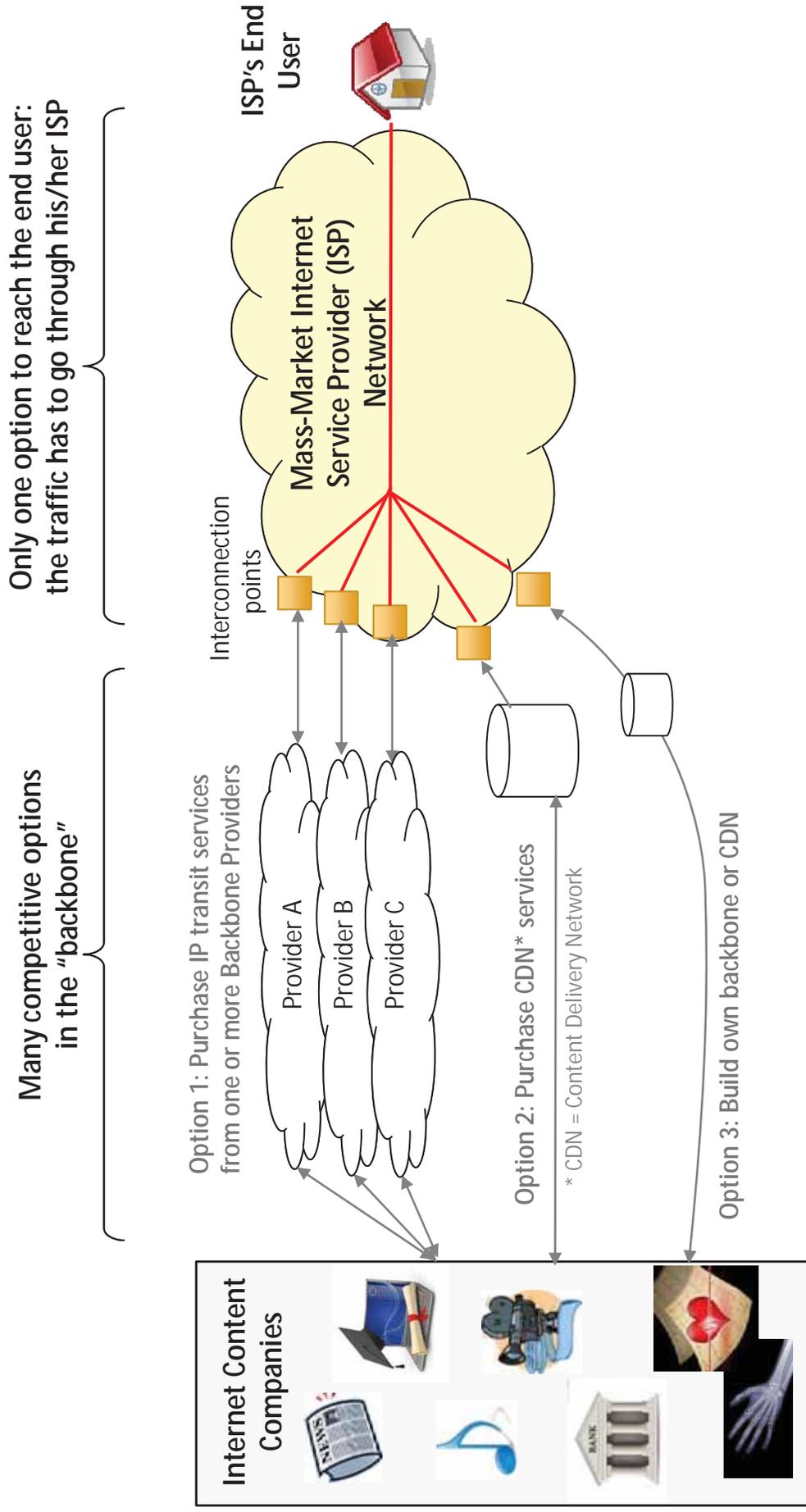


Protecting the Free and Open Internet: Internet Interconnection Policy

October 2014

“Eyeball” ISPs Have a Monopoly over Access to Their Subscribers

Content and backbone providers have several competitive options to reach an ISP
- but in all cases they then have to go through the ISP itself to reach its end-users



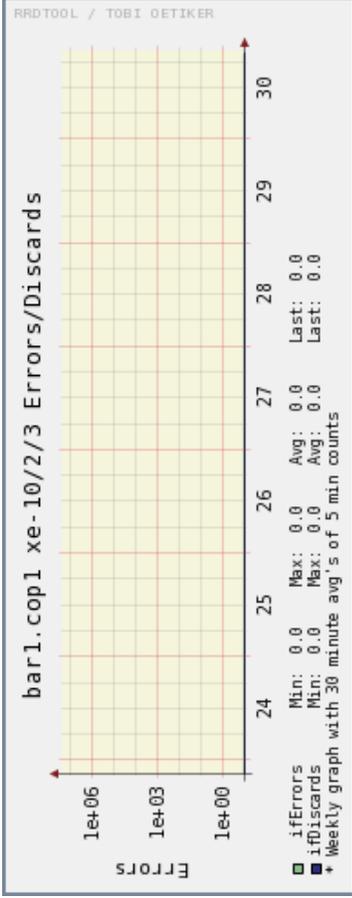
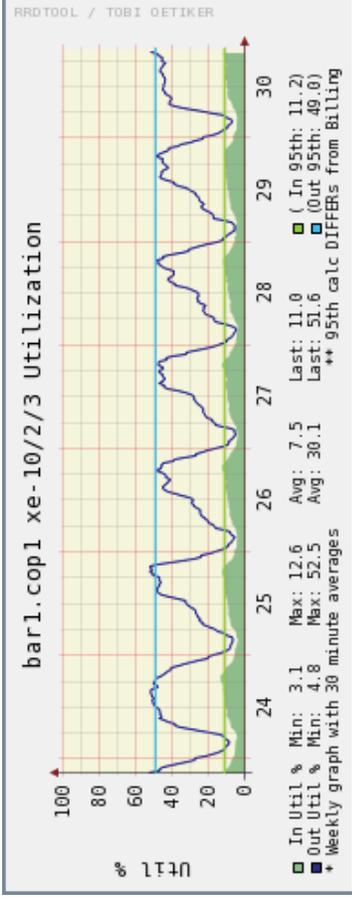


Large “Eyeball” ISPs Have the Incentive and Ability to Threaten the Open Internet

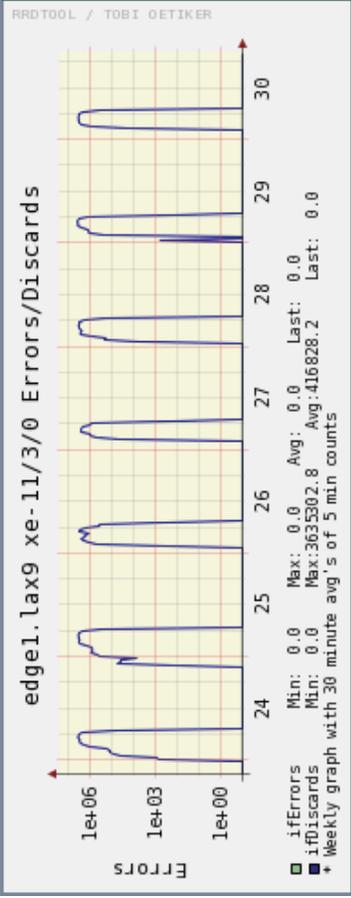
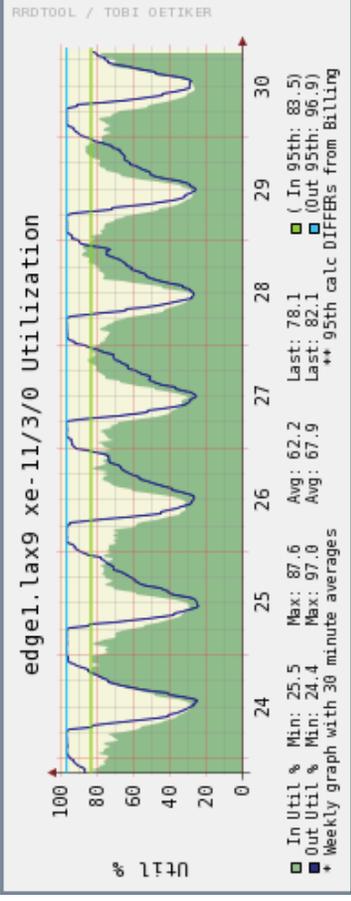
- The FCC found that eyeball ISPs have the incentive to (i) discriminate against competing services; (ii) charge access tolls; and (iii) degrade basic, no-toll service to force providers to pay tolls.
 - The DC Circuit agreed: ISPs have “powerful incentives” to collect tolls and the technical and economic ability, as a terminating monopolist, to collect them.
- ISPs can act on these incentives in two main ways:
 1. Technologies implemented within the ISP’s last-mile network, including, e.g., deep packet inspection, port blocking, and discriminatory data caps
 2. Allowing the ISP’s interconnections to the Internet to congest, degrading performance, with most significant effects on video, voice, and similar services
- The *Open Internet Order* focused on ISP threats on the last mile (#1), but did not prohibit ISPs from congesting interconnection ports (#2).
- Big ISPs have taken that as permission to demand tolls for interconnection capacity.

Some Big ISPs Demand Tolls to Augment Interconnections

How Interconnection Is Supposed to Look: 7-day view of utilization (left) and discarded data (right) on a port with a peer that provisions adequate capacity.



But Some ISPs Use Congestion as Leverage: 7-day view of utilization and discarded data on a port with a peer that is allowing its ports to congest.

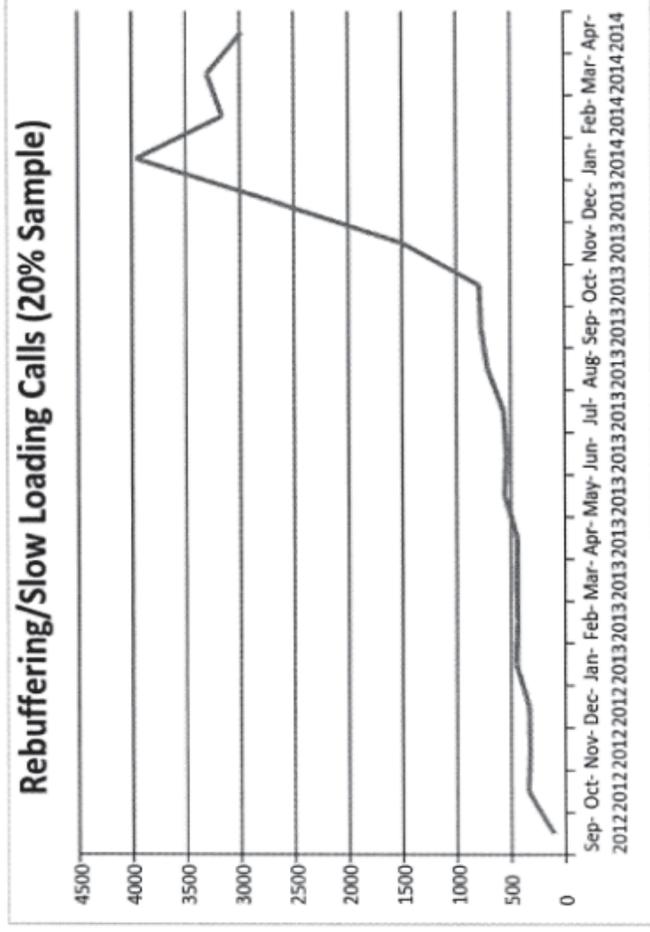


- Interconnection ports congest and users suffer. Video (including interactive video and live streaming), over-the-top voice, and similar services are particularly vulnerable.
- Consumers are trying to access applications and resources using Level 3's network, and Level 3 is ready to augment interconnection capacity to deliver it, but the ISP refuses to deploy the infrastructure necessary to meet its own users' demand unless Level 3 pays a toll.

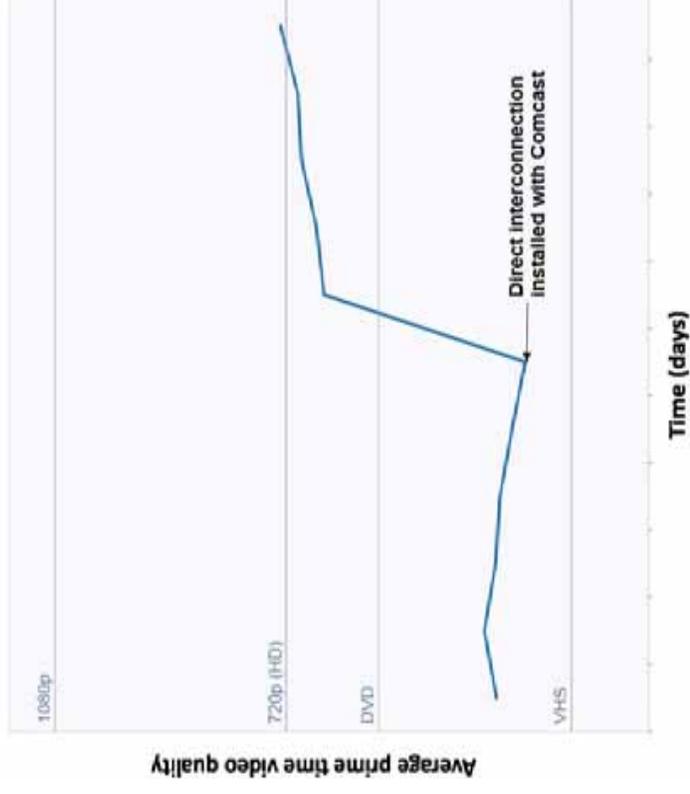
Netflix's Perspective: No Choice But to Pay the Toll

Congestion caused poor performance and customer complaints – but when they paid the toll, everything got better.

Calls to Netflix customer service escalated as congestion on last mile ISP interconnection points was getting worse



Service quality improved as soon as Netflix agreed to pay this ISP's tolls



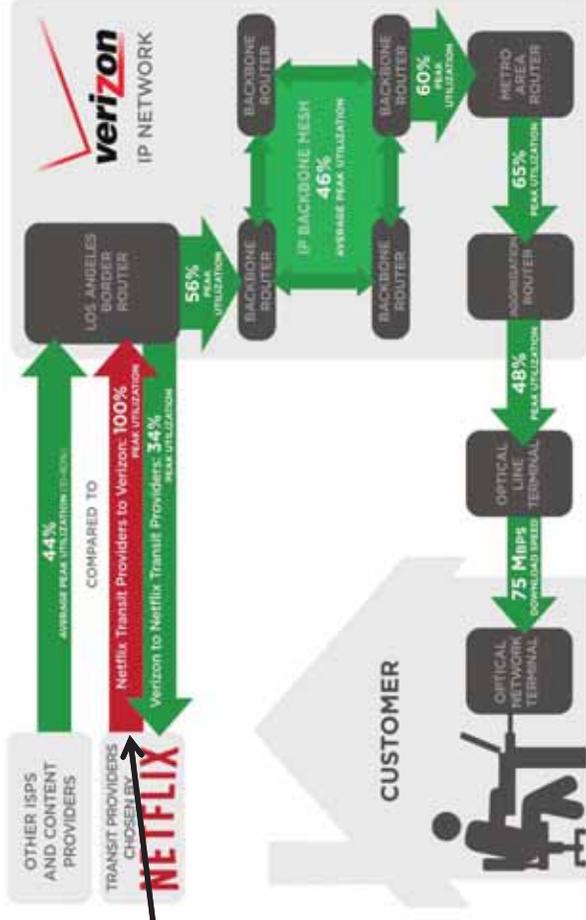
- Netflix saw its performance deteriorating as the last mile ISPs let interconnection links with Netflix's transit providers congest in order to force them to pay tolls. Many customers complained, canceled service "on the spot."
- Businesses that depend on reliable, uncongested interconnection have no choice but to pay the tolls - if they can afford it.

Sources: Florence Declaration (Netflix Pet. To Deny Comcast-TWC Merger); <http://blog.netflix.com/2014/04/the-case-against-isp-tolls.html>

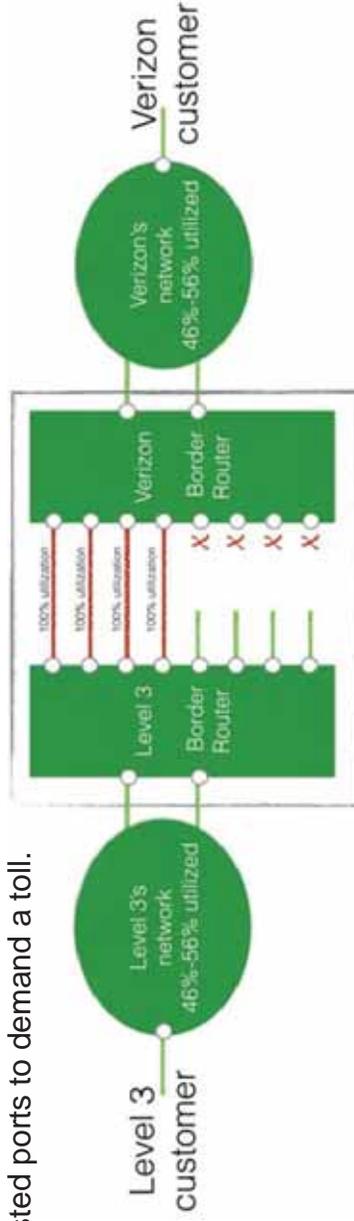
Verizon: Netflix Could Fix This, If They'd Just Pay Our Toll

Verizon: Our network has plenty of capacity; Netflix "is fully capable" of fixing the problem by paying us.

But the Level 3 network wasn't actually at 100% utilization...



A Fuller Picture: Verizon's network includes its border routers, where they have not provisioned adequate capacity to deliver traffic its customers have requested, even though the cost is *de minimis*. Verizon leverages its congested ports to demand a toll.



Sources: Verizon Blog: <http://publicpolicy.verizon.com/blog/entry/why-is-netflix-buffering-dispelling-the-congestion-myth>;
 Level 3 Blog: <http://blog.level3.com/global-connectivity/verizons-accidental-mea-culpa>

Why Are These Big ISPs Doing This?

Why are they refusing to provide their customers the service they paid for?

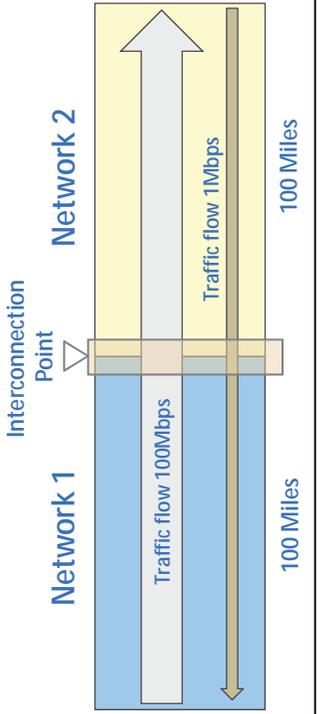
- It's not because providing adequate interconnection capacity is too costly.
 - Level 3 buys this equipment, too. It's not expensive. <\$5,000 per 10 Gbps port.
 - Cogent and Level 3 have both publicly offered to buy the interconnection equipment for the ISPs as a simple way to augment capacity. No takers.
- The big ISPs are doing it because they can. It allows them to generate new profits and advantage their own services versus their competitors.
 - They control access to many millions of eyeballs—and even when degrading their Internet service in this way, they gained subscribers in this uncompetitive market, despite their abysmal customer satisfaction ratings.
 - Netflix (and others) can't afford to say no.
 - Mid-size and smaller ISPs don't even try to charge tolls.
- The only way the big ISPs' strategy to extract tolls can work is for them to congest the “no toll” links.
 - Everyone who doesn't pay suffers. Not for any technical reason. Not because providing adequate capacity would be costly. Just to create leverage.

An Internet Traffic Exchange Red Herring: Traffic “Balance,” Send:Receive Ratios, and Costs

Costs are a function of distance and quantity, not direction of traffic

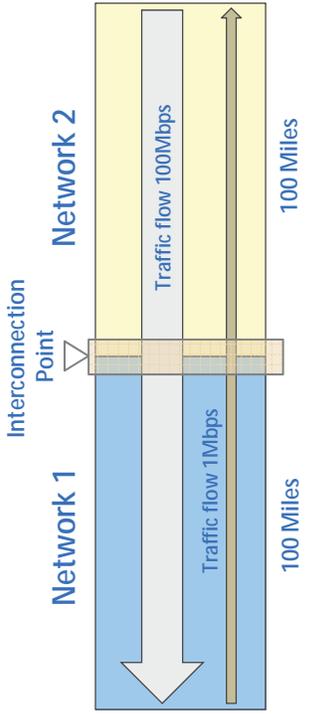
Example:

Send to receive ratio: 100:1
 Large ISPs are saying Network 1 should pay.
 Yet both networks carry the same amount of traffic (101 Mbps) the same distance (100 mi.)



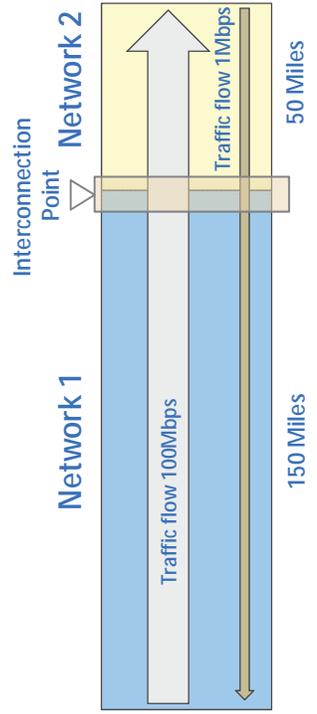
Reversing the direction of traffic flips the ratio, but has no impact on network costs!

Send to receive ratio is reversed, it is now 1:100
 Yet both networks still carry the same amount of traffic the same distance, with the same infrastructure and costs as before!



Moving the interconnect point changes relative network costs but not the ratio

Send to receive ratio is still 100:1
 But now Network 1 incurs three times the costs of Network 2!



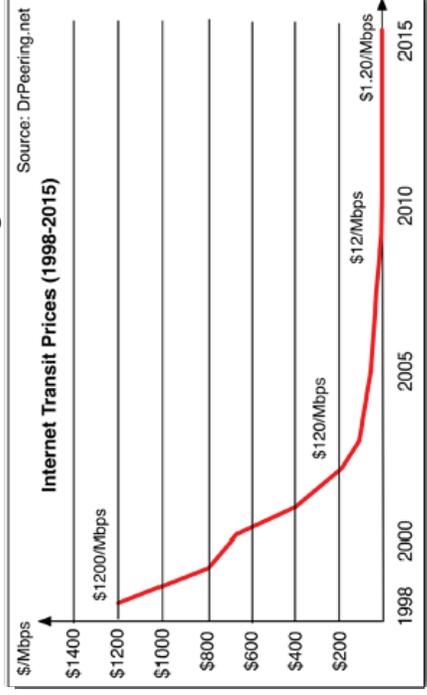
More evidence that ratios are not the real issue:
 Netflix offered to alter its service to make its send-receive ratio balanced (1:1). Big ISPs rejected the offer. They want to get paid by Netflix no matter what, and are using ratios as a pretext.



See: <http://blog.netflix.com/2014/03/internet-tolls-and-case-for-strong-net.html>

Interconnection Tolls Threaten the Internet Ecosystem

- Edge providers rely on transport services such as transit and CDNs to serve end-user customers.
- Dramatic declines in Internet transport prices have transformed the Internet, supporting new applications such as video streaming, videoconferencing, telemedicine, gaming, cloud services, etc.



Source: <http://DrPeering.net>

Year	Internet Transit Price	% decline
1998	\$1,200.00 per Mbps	
1999	\$800.00 per Mbps	33%
2000	\$675.00 per Mbps	16%
2001	\$400.00 per Mbps	41%
2002	\$200.00 per Mbps	50%
2003	\$120.00 per Mbps	40%
2004	\$90.00 per Mbps	25%
2005	\$75.00 per Mbps	17%
2006	\$50.00 per Mbps	33%
2007	\$25.00 per Mbps	50%
2008	\$12.00 per Mbps	52%
2009	\$9.00 per Mbps	25%
2010	\$5.00 per Mbps	44%
2011	\$3.25 per Mbps	35%
2012	\$2.34 per Mbps	28%
2013	\$1.57 per Mbps	33%
2014	\$0.94 per Mbps	40%
2015	\$0.63 per Mbps	33%

Interconnection tolls will put a floor on Internet transport prices, putting an end to dramatic pricing declines.

- If ISPs are allowed to impose interconnection tolls – which are not disciplined by competition or by regulation – they will establish an artificial floor on transport prices exceeding today’s competitive price.
- Artificially inflated transport prices harm the entire Internet ecosystem:
 - For innovators: raising costs and reducing returns for successful ventures.
 - For consumers: less innovation, degraded Internet experience for Internet services that don’t pay tolls.
 - For large and small businesses: a choice to either face higher costs or offer degraded service to users.
 - For libraries, universities, NGOs, governments and others: collateral victims of the ISPs’ demands for tolls from commercial entities, they will pay more for Internet access and have fewer resources available for their mission, or be relegated to the slower, unreliable, congested “second-tier” of the Internet.

A Serious Problem with a Simple Solution

- The problem is that large eyeball ISPs are leveraging congestion at their interconnection points to demand tolls.
- These practices harm the entire Internet ecosystem, including consumers, large and small businesses, nonprofits, and government entities; and threaten innovation and the virtuous circle.
- **Level 3’s proposal:** If a provider delivers traffic to the ISP’s local markets, the ISP must provide adequate interconnection capacity without charging a toll.
 - The ISP has sold Internet service to its customer at a specific speed. To fulfill that promise, they necessarily must provision capacity to support that speed from the end user to *some* reasonable aggregation location, at least within the local market. The Level 3 proposal requires no more—it allows them to interconnect at that location.
 - Under this proposal, no one gets a “free ride” on another network’s backbone.
 - ISPs could still offer services (CDN, transmission, etc.) in the competitive market.
- This rule works, and it’s good for everyone.
 - Consumers get uncongested access to the Internet.
 - Large eyeball ISPs get a better-than-fair deal. No backhaul costs; again, they must only provide adequate capacity to a reasonable point on their local network that they themselves choose.
 - Content and other edge providers have a robust, competitive market of transit options, or they can connect directly if they have sufficient traffic.
- Today, there are many “paths in” to an ISP’s network, but the ISP controls the costs of every one of those connections and can leverage that control to extract arbitrary tolls.
 - Under the Level 3 proposal, competition among those paths in sets the price.