January 13, 2015

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

Re: Notice of Ex Parte, GN Docket No. 14-28, *Protecting and Promoting the Open Internet.*

Dear Ms. Dortch:

On January 9, 2015, Joe Cavender of Level 3 Communications, LLC, Bob Beury of Cogent Communications Holdings, Inc., Corie Wright of Netflix, Inc., Chip Pickering, Angie Kronenberg, and Karen Reidy of COMPTEL, and Markham Erickson of Steptoe & Johnson LLP, on behalf of COMPTEL, met with Jonathan Sallet and Stephanie Weiner of the General Counsel's Office concerning the above-referenced proceeding. In addition, on January 12, 2015, Angie Kronenberg spoke with Daniel Alvarez in the Chairman's office concerning this meeting and the arguments made therein and discussed below.

In the meeting, the companies noted their support for strong Open Internet rules based on a light-touch policy framework for broadband Internet access service that uses Sections 201, 202, and 208 of the Communications Act, as discussed in a letter filed by COMPTEL, CCIA, Engine, and IFBA on December 30, 2014.[1] Two principles undergird the Commission's decade-long effort to protect and promote an Open Internet. First, the "virtuous circle" of innovation and investment in broadband networks and the services that run on top of them are best promoted when consumers can access the lawful online content services of their choice without interference from their broadband Internet access service providers. Second, consumers should get what they pay for.

The Commission's *2010 Open Internet Order* acknowledged that a virtuous circle of investment and innovation is critical to the success of the Internet.[2] Online content

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[1] *See* Letter from COMPTEL, CCIA, Engine and IFBA, GN Docket No. 14-28 (filed Dec. 30, 2014) ("*Dec. 30 Letter from COMPTEL et al.*").

[2] Preserving the Open Internet, *Report and Order*, 25 FCC Rcd. 17905, 17910 ¶ 14 (2010) ("*2010 Open Internet Order*") ("The Internet's openness is critical to these outcomes, because it enables a virtuous circle of innovation in which new uses of the network—including new content, applications, services, and devices—lead to increased end-user demand for broadband, which drives network improvements, which in turn lead to further innovative network uses. . . . Each round of innovation increases the value of the Internet for broadband providers, edge providers, online businesses, and consumers. Continued operation of this virtuous circle, however, depends upon low barriers to innovation and entry by edge providers, which drive end-user demand. Restricting edge

providers, transit providers, and content delivery networks ("CDNs") have spent billions of dollars creating the applications and services that consumers want and building the networks and infrastructure to ensure they are delivered efficiently and effectively. These investments have enabled the Internet to develop and flourish by driving supply and demand for innovative online services and for better and faster broadband connections. Some broadband Internet access service providers have encouraged the Commission to focus myopically (and erroneously) on their investments solely,[3] while ignoring the considerable investments made by others across the entire Internet infrastructure and ecosystem. Level 3's network alone represents more than $40 billion in invested capital, and both Level 3 and Cogent are recognized as two of the top five Internet networks in the world based on interconnectedness.[4] No U.S. broadband Internet access service provider makes the top five.

The Commission must also consider investments in the applications and services that drive demand for high-speed broadband. Netflix has made significant investments—approximately $400 million in technology improvements and $3 billion in content acquisition investment in 2014 alone.[5] All of these investments—network investments that enable the Internet to function and interconnect its many networks together, as well as investments in developing innovative and compelling services—have been predicated upon a strong Open Internet framework. And the Commission's adoption and implementation of a strong Open Internet Order will further encourage and promote such investments.

Ensuring that broadband Internet access service providers cannot block, discriminate against, or require payment for prioritization or access are integral to this virtuous circle.[6] The D.C. Circuit agreed that broadband Internet access service providers have the capability and the incentive to use their bottleneck control over access to their

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providers' ability to reach end users, and limiting end users' ability to choose which edge providers to patronize, would reduce the rate of innovation at the edge and, in turn, the likely rate of improvements to network infrastructure. Similarly, restricting the ability of broadband providers to put the network to innovative uses may reduce the rate of improvements to network infrastructure.") (citations omitted).

[3] As previously discussed by COMPTEL, certain broadband Internet access service providers have been disingenuous with the Commission concerning strong Open Internet rules and the impact it will have on their last mile investments. *See Dec. 30 Letter from COMPTEL et al.*, n. 3 (citing to articles and COMPTEL letter on the record describing these self-serving statements).

[4] A Baker's Dozen, 2013 Edition, *available at* http://research.dyn.com/2014/01/bakers-dozen-2013-edition/ (last visited Jan. 9, 2015) (Attachment 1).

[5] *See* Netflix Long Term View Letter, *available at* http://ir.netflix.com/long-term-view.cfm (last visited Jan 9, 2015).

[6] *See, e.g.*, *2010 Open Internet Order*, ¶¶ 1, 3 & 14.

subscribers to the detriment of services and applications on the Internet.[7] This capability does not exist solely on the last mile. Rather, broadband Internet access service providers can exercise (and have exercised) this bottleneck control at the point where Internet traffic is handed over to the provider. Accordingly, the Commission must ensure that its Open Internet policy cannot be thwarted at the interconnection point where traffic must be handed to the broadband Internet access service provider for delivery to the customer.

There is ample evidence already in the record that some broadband Internet access service providers already have used their terminating access monopoly to demand tolls at the point of interconnection, simply to allow content that their end users requested to be delivered at the speeds for which the end users have paid. They have allowed their ports with Level 3, Cogent, and others to congest, and refused to augment capacity until those providers pay. As discussed by the New America Foundation's Open Technology Institute, the M-Lab study clearly demonstrates congestion encountered by Tier 1 backbone providers at interconnection points with the largest broadband Internet access service providers and that those providers used the congestion as leverage in demanding tolls for delivering video traffic to their subscribers.[8] Consumers were not receiving the service from the broadband Internet access service provider that they paid for, and there was much confusion and frustration among consumers about these problems. Consistent with the Commission's earlier finding that switching costs are high,[9] even where consumers are aware of the cause of degraded performance, consumers facing such congestion did not switch broadband Internet access service providers to receive their Internet content without congestion.

Broadband Internet access service providers' use of their gatekeeper power to block or degrade traffic to demand tolls is a harmful practice that is contrary to the virtuous circle of innovation and investment on the Internet. It also denies consumers

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[7] *See Verizon v. FCC*, 740 F.3d 623, 645-47 (D.C. Cir. 2014).

[8] *See* Open Technology Institute Letter, GN Dockets Nos. 10-127, 14-28, MB Docket No. 14-57 (filed Dec. 22, 2014) (*citing* "Beyond Frustrated: The Sweeping Consumer Harms as a Result of ISP Disputes," Open Technology Institute, November 2014 and "ISP Interconnection and its Impact on Consumer Internet Performance," *Measurement Lab,* October 28, 2014.

[9] The Commission also noted the limited competition many consumers have to switch broadband Internet access service providers. *2010 Open Internet Order* ¶¶ 27, 32-34. Moreover, Chairman Wheeler recently observed that the vast majority of consumers have, at most, a single option for high-speed wired broadband, and virtually no households have more than two choices. *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 (last visited Jan. 13, 2015).

access to the lawful online applications and services of their choosing and the broadband connections they have paid for. When consumers do not get what they pay for the marketplace is distorted, the public interest is harmed, and the Open Internet is undermined.

The record is clear: broadband Internet access service providers have the incentive to demand tolls, and tolls are inconsistent with an Open Internet. The Commission's *2010 Open Internet Order* determined that:[10]

- "A broadband provider could force edge providers to pay inefficiently high fees because that broadband provider is typically an edge provider's only option for reaching a particular end user. Thus, broadband providers have the ability to act as gatekeepers." (Paragraph 24)

- "Broadband providers would be expected to set inefficiently high fees to edge providers because they receive the benefits of those fees but are unlikely to fully account for the detrimental impact on edge providers' ability and incentive to innovate and invest, including the possibility that some edge providers might exit or decline to enter the market." (Paragraph 25)

- "Fees for access or prioritization to end users could reduce the potential profit that an edge provider would expect to earn from developing new offerings, and thereby reduce edge providers' incentives to invest and innovate." (Paragraph 26)

- "Some concerns have been expressed that broadband providers may seek to charge edge providers simply for delivering traffic to or carrying traffic from the broadband provider's end-user customers. To the extent that a content, application, or service provider could avoid being blocked only by paying a fee, charging such a fee would not be permissible under these rules." (Paragraph 67)

These concerns over anticompetitive and arbitrary access tolls apply with even greater force today. Broadband Internet access service providers can *and have used* their terminating access monopoly to degrade traffic and demand tolls that are undisciplined by competitive market forces.[11] The Commission should again make clear that a

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[10] *See* Attachment 2. We distributed these excerpts of the *2010 Open Internet Order* during the meeting. The D.C. Circuit did not dispute these findings in its opinion.

[11] An online content provider may choose among multiple and competitive transit providers and CDN services to bring its data to a broadband Internet access service provider's last mile network. In contrast, only the broadband Internet access service provider can send content across its last mile to its subscribers. Third-party providers of transit cannot restrain what a broadband Internet access service provider charges for taking traffic from Comcast's doorstep to the subscriber's doorstep because they do not provide that service. For that reason, not only are broadband Internet access service providers <u>not</u> constrained by competition in the transit market, they have the power to

broadband Internet access services provider may not impose tolls to deliver the content and services requested by its subscribers.

To ensure that tolls are not simply "moved" to the point of interconnection,[12] the Commission should establish consumer-centric rules that recognize that the broadband Internet access service provider's interconnection facilities are part of its own network and under its control, and are part of the subscriber's broadband Internet access service. Such rules should ensure that consumers receive the Internet access they have purchased and that broadband Internet access service providers exchange traffic intended for their own subscribers in a just and reasonable manner.

Sincerely,

/s/Angie Kronenberg
Angie Kronenberg
Chief Advocate and General Counsel
COMPTEL

cc: Jonathan Sallet
Stephanie Weiner
Daniel Alvarez

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demand tolls from transit and CDN providers and to set a price floor in these otherwise competitive markets.

[12] To be clear, while there are many points of interconnection across the Internet, the only interconnection relationship the Commission need address as part of its Open Internet protections is the point of interconnection where an online content provider, or its agent transit or CDN, hands off Internet traffic to the broadband Internet access service provider for delivery to the provider's own subscribers.

Attachment 1

A Baker's Dozen, 2013 Edition

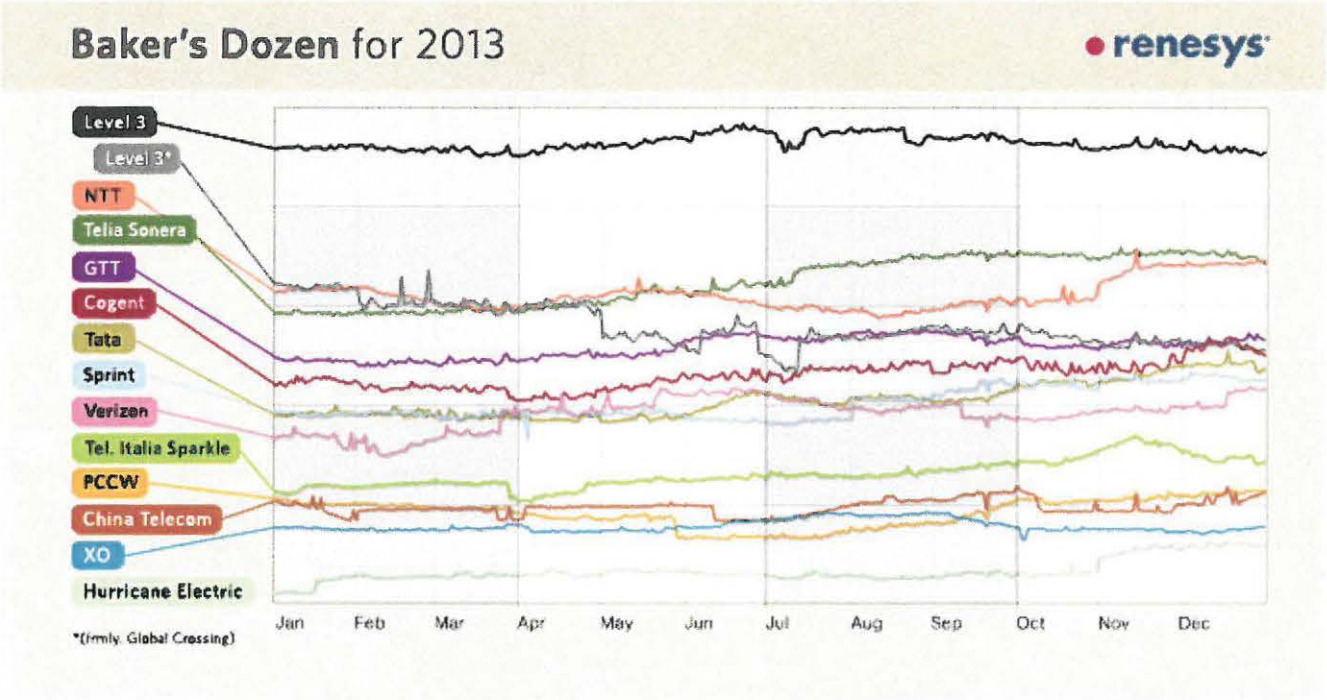
http://research.dyn.com/2014/01/bakers-dozen-2013-edition/

It has become an annual tradition at Renesys to provide a year-end review of how the Internet providers at the top of our Market Intelligence global rankings fared over the previous year. The rapid and continuous evolution of the Internet's structure and performance remains a huge blind spot for most enterprises, even those critically dependent on it for business operations. Renesys provides that insight, both real-time and historical, via its Internet Intelligence products. This blog reviews a single slice of our data related to the sizes of the top global players.

Back in 2008, we chose to look at the 13 providers that spent at least some time in the Top Ten that year, hence the name "Baker's Dozen". We looked at the top players again in 2009, 2010, 2011 and 2012. During this time, we've watched some predominantly US carriers exit the top spots as global demographics caught up with what has historically been a US-centric Internet. This year, Hurricane Electric joins this exclusive club, replacing CenturyLink. We've also observed surprising rebounds from Sprint and Verizon after years of not keeping up with the competition.

As you read this blog, keep in mind that all of the provider rankings we discuss are based on their success in offering services based on IPv4, the Internet protocol carrying essentially *all* Internet traffic. While we continue to measure the IPv6 "alternate Internet" in our Market Intelligence product offering, this nearly two decade old protocol continues to struggle for adoption, as we first noted back in 2006. And as we observed in 2011 (and it is still true today), the IPv6 "Internet" is not even fully connected, so attempting to rank a lightly used and partitioned network is questionable at best and misleading at worst.
Without further ado, then, let's highlight a few of the trends and changes we observed in 2013 on the *real* Internet we all use everyday.

And the Winners are ...

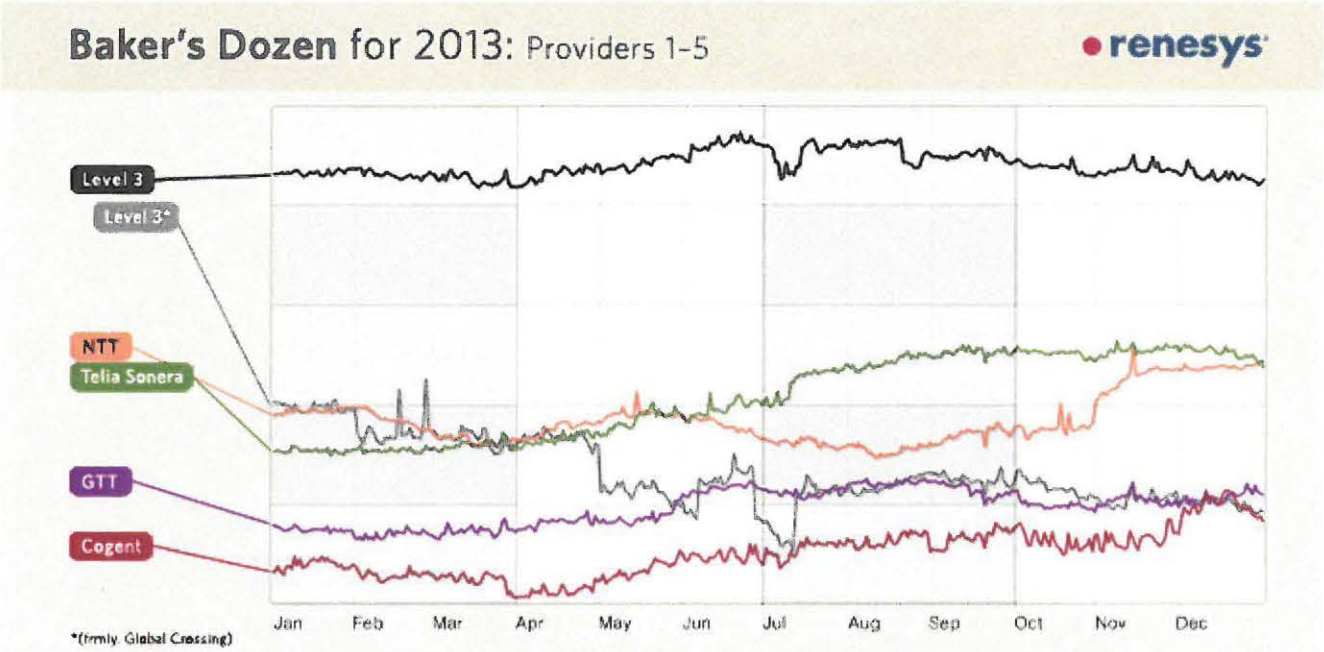


On their Heels

The above graph shows our global scores for the Baker's Dozen over the past year. As always, the absolute scores (computed from the quantity of transited IP space) are not meaningful in this context, so we omit the scale. While we see more or less steady growth and minor jockeying for position throughout 2013, the long term trends are anything but predictable. For example, if we go all the way back to 2006 (before we started blogging on this topic), our top 13 providers were Sprint, Level 3, Verizon, Savvis, AT&T, NTT, Global Crossing, Qwest, TeliaSonera, Tata, AboveNet, Cogent and Telecom Italia, in that order. During the subsequent eight years, Sprint fell from #1 to #7, Verizon declined from #3 to #8, and AT&T left the Baker's Dozen entirely, tumbling from #5 to #14. In 2012, AboveNet (formerly #11) was acquired by Zayo Group and now ranks #26 globally, just behind France Telecom.

Over this same eight-year period, Level 3 acquired various competitors, the most significant being Global Crossing, becoming the undisputed #1 ranked provider in the world. Meanwhile, TeliaSonera (#9 eight years ago) and NTT (formerly #6) now compete aggressively for the #2 global spot. Also during this time period, Cogent climbed from #12 to #5, Tata rose from #10 to #6, and Telecom Italia moved up from #13 to #9. But by far the biggest improvement in rank was made by GTT (AS 3257, formerly Tiscali), which catapulted from #34 in 2006 to an astonishing #4 in 2013. However, our focus in this blog is 2013, and to make sense of the tangled graphic above and this year's changes, we'll divide up the players into three tiers and zoom in on each.

Leaders of the Pack



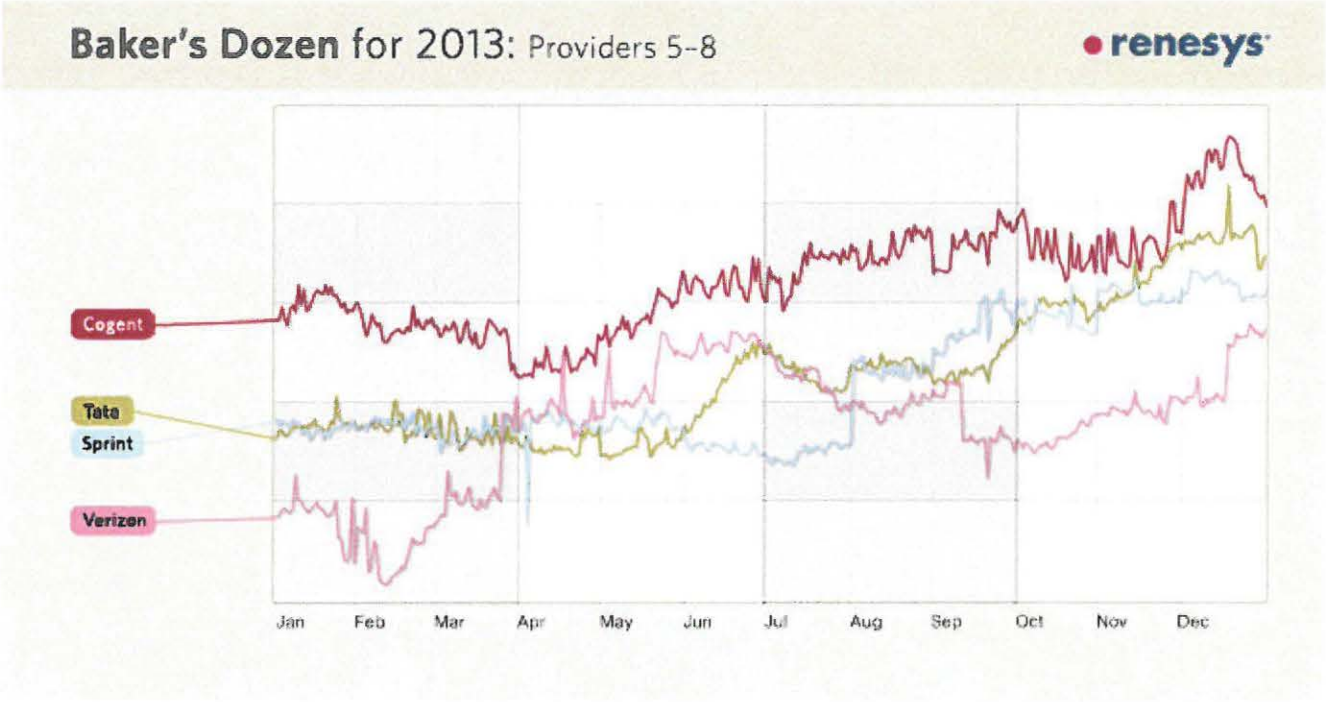
Level 3 (AS 3356) completed their acquisition of Global Crossing (AS 3549) in October of 2011. Over two years later, we continue to show them as separate entities, since their networks have not yet been merged. However, the integration process seems to have picked up steam in 2013 as the former Global Crossing tumbled in our rankings. While achieving some mid-year gains, Level 3 completed 2013 barely changed from where it started the year. As we discussed last year, perhaps its dominant post-acquisition position in the market is driving customers to other providers in an attempt to increase diversity?

The real battle is for the #2 spot, which NTT (AS 2914) gained control of near the end of 2012. For much of 2013, TeliaSonera (AS 1299) appeared to have handily secured the #2 spot from NTT, thanks to a sequence of customer wins. Nothing is assured on the Internet except brutal competition, however, and in the closing hours of 2013, NTT reclaimed second place by the thinnest of margins. Some of TeliaSonera's rise during the year

came from increases in transit from South Korea's SK Broadband (Hanaro, AS 9318) and Brazil's Embratel (AS 4230). Meanwhile, NTT saw year-end increases from India's Bharti Airtel (AS 9498) and Saudi Telecom (AS 39386), to name a few.

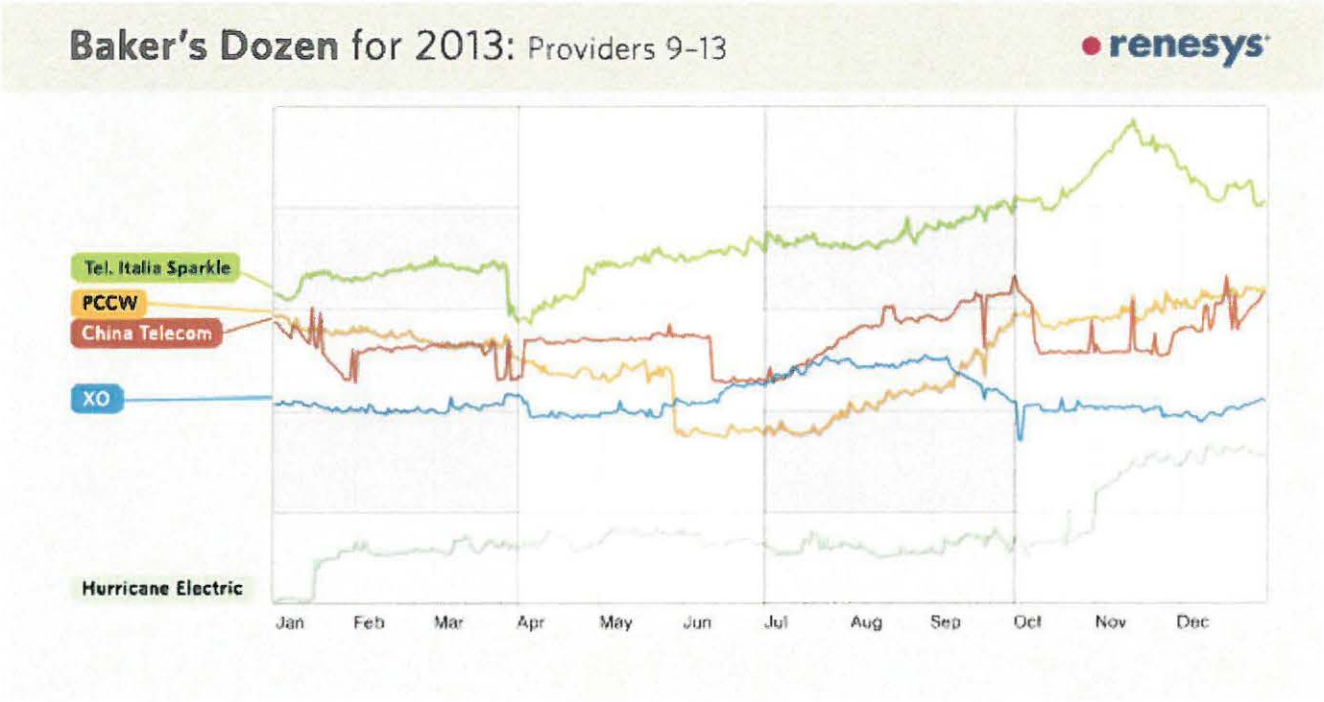
Cogent (AS 174), who has been on a tear for a few years now, broke into our top cluster for the first time, ending the year in the #5 spot and within easy striking range of GTT at #4. Cogent's gains could been seen throughout the world. They picked up PT Telekomunikasi Indonesia (AS 7713) as a customer, and acquired increased transit from Cox Communications (AS 22773), Saudi Telecom, Companhia de Telecomunicacoes do Brasil Central (AS 16735), Australia's Vocus (AS 4826), and many others.

Knocking at the Door



In our second grouping, we show Cogent again for context and to illustrate how close they are to #6 ranked Tata (AS 6453). Tata had a tremendous second half of 2013, increasing transit from Russia's Rostelecom (AS 12389) and India's #2 ranked retail provider, Bharti Airtel, among others. If they can maintain this growth, Tata could easily pass Cogent and break into our top group in 2014. Sprint (AS 1239), which has been steadily declining in our rankings for years, showed surprising signs of life late in the year. In part, this was due to increased transit from Japan's #2 ranked provider, Softbank Telecom (AS 4725).

Verizon (AS 701) also showed renewed vigor, increasing transit from China Netcom (AS 4837), China Mobile (AS 58453), Japan's National Institute of Informatics (AS 2907), and Time Warner (AS 4323), among others. They stumbled in early September, losing transit from Japan's Softbank, but regained that in December to close in on Sprint.



In our third grouping, we see Hurricane Electric (AS 6939) for the first time. They benefited from an increase in transit from the Communications Authority of Thailand (AS 4651) and Rostelecom (AS12389). Some of PCCW's mid-year drop and subsequent gains can also be attributed to changes in transit from Rostelcom. Later in the year, PCCW scored increases in transit from SK Broadband (Hanaro) and Vietnam's Viettel (AS 7552).

As in 2012, XO (AS 2828) was flat-lined for the year and is in danger of being passed yet again — this time by Hurricane Electric. China Telecom (AS 4134) ended the year only slightly above where they started, which is not indicative of the 10% increase we observed in transited Chinese IP addresses. Perhaps smaller providers are now looking for alternatives to this dominant incumbent?

Conclusions

As we've noted before, Westerners view the Internet as a commodity and ubiquitous access is taken for granted. Unsurprisingly, carriers win in this environment with either market dominance or cut-throat pricing. Organic growth now only comes from underserved markets, and today we see the battle for global Internet dominance playing out in Asia, with increasing activity in South America and Africa, as new cable systems are built and regional connectivity improves. Even the Middle East, long a waypoint for cable systems between Europe and Asia, may be on the verge of developing robust local options.
Increasingly, simply having inexpensive connectivity in our interconnected world is not enough. As enterprises become more sophisticated consumers of Internet transit, they seek connectivity alternatives that will keep their own customers happy. They're looking for providers whose global Internet service is truly fit for purpose: reliable without single points of failure, low latency and as direct as possible (i.e., not subject to snooping by hostile third parties). Any providers who can demonstrably meet these new expectations will undoubtedly gain customers and grow in our rankings. Stay tuned for an interesting 2014!

Attachment 2

affiliated businesses or those incumbent firms that paid for advantageous access to end users, some innovative edge providers that have today become major Internet businesses might not have been able to survive.[61]

24. *Second*, broadband providers may have incentives to increase revenues by charging edge providers, who already pay for their own connections to the Internet,[62] for access or prioritized access to end users.[63] Although broadband providers have not historically imposed such fees, they have argued they should be permitted to do so.[64] A broadband provider could force edge providers to pay inefficiently high fees because that broadband provider is typically an edge provider's only option for reaching a particular end user.[65] Thus broadband providers have the ability to act as gatekeepers.[66]

25. Broadband providers would be expected to set inefficiently high fees to edge providers because they receive the benefits of those fees but are unlikely to fully account for the detrimental impact on edge providers' ability and incentive to innovate and invest, including the possibility that some edge providers might exit or decline to enter the market.[67] The unaccounted-

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521, 571-72 (2010)). To the contrary, the empirical evidence and the misconduct that we describe below validate the economic theories that inform our decision today. Moreover, as we explain below, by comparison to the benefits of the prophylactic measures we adopt, the costs associated with these open Internet rules are likely small. *See infra* para. 39.

[61] *See, e.g.*, Letter from Barbara van Schewick to Marlene Dortch, Secretary, FCC, GN Docket No. 09-191 (filed Jan. 19, 2010) (van Schewick Jan. 19, 2010 *Ex Parte* Letter), Opening Statement at 4–7 (highlighting the risk that—in the absence of Internet openness norms—gatekeeper control and pay-for-prioritization would have prevented Skype and YouTube from surviving because of the threats they presented to the legacy business of telephone-based network providers and Google Video, respectively); Letter from M. Chris Riley, Free Press, to Marlene Dortch, Secretary, FCC, GN Docket No. 09-191 (filed Nov. 24, 2010), Attach., M. Chris Riley and Robb Topolski, "The Hidden Harms of Application Bias," at 3 n.7 and 7 (similar with respect to YouTube's threat to RealVideo).

[62] *See* Free Press Comments at 17 n.8; OIC Comments at 27; Vonage Reply at 53.

[63] *See, e.g.*, Free Press Comments at 3; Google Comments at 34; Red Hat Comments at 2; Google Reply at 36; IPI Reply at 4; Vonage Reply at 4.

[64] *See, e.g.*, AT&T Comments at 108–137; Comcast Comments at 38–39; TWC Comments at 54–55; Verizon Comments at 71–77.

[65] Some end users can be reached through more than one broadband connection, sometimes via the same device (*e.g.*, a smartphone that has Wi-Fi and cellular connectivity). Even so, the end user, not the edge provider, chooses which broadband provider the edge provider must rely on to reach the end user.

[66] Also known as a "terminating monopolist." *See, e.g.*, CCIA Comments at 7; Skype Comments at 10–11; Vonage Comments at 9–10; Google Reply at 8–14. A broadband provider can act as a gatekeeper even if some edge providers would have bargaining power in negotiations with broadband providers over access or prioritization fees.

[67] *See* Google Comments at 35, 59–61; OIC Comments at 20–30; IPI Reply at 2; Ad Hoc Comments at 7, 15–17; ALA Comments at 2; Google Comments at 34; IFTA Comments at 14; Netflix Comments at 3–4; PAETEC Comments at 24–25; PIC Comments at 50–51; Google Reply at 37–38; IPI Reply at 4; WCB Letter 12/10/10, Attach. at 115–130, Robin S. Lee & Tim Wu, *Subsidizing Creativity through Network Design: Zero Pricing and Net Neutrality*, 23 J. ECON. PERSPECTIVES, 61–76 (2009); WCB Letter 12/13/10, Attach. at 201–225, Nicholas Economides, *"Net Neutrality," Non-Discrimination and Digital Distribution of Content Through the Internet,* 4 I/S: J.L. & POL'Y FOR INFO. SOCIETY 209, 232 (2008); WCB Letter
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for harms to innovation are negative externalities,[68] and 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. Moreover, fees for access or prioritized access could trigger an "arms race" within a given edge market segment.[69] If one edge provider pays for access or prioritized access to end users, subscribers may tend to favor that provider's services, and competing edge providers may feel that they must respond by paying, too.

26. Fees for access or prioritization to end users could reduce the potential profit that an edge provider would expect to earn from developing new offerings, and thereby reduce edge providers' incentives to invest and innovate.[70] In the rapidly innovating edge sector, moreover, many new entrants are new or small "garage entrepreneurs," not large and established firms. These emerging providers are particularly sensitive to barriers to innovation and entry,[71] and may have difficulty obtaining financing if their offerings are subject to being blocked or disadvantaged by one or more of the major broadband providers.[72] In addition, if edge providers need to negotiate access or prioritized access fees with broadband providers,[73] the resulting transaction

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12/13/10, Attach. at 14–77, Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. ON TELECOMM. & HIGH TECH. L. 329, 378–80 (2007).

[68] A broadband provider may hesitate to impose costs on its own subscribers, but it will typically not take into account the effect that reduced edge provider investment and innovation has on the attractiveness of the Internet to end users that rely on other broadband providers—and will therefore ignore a significant fraction of the cost of foregone innovation. *See, e.g.*, OIC Comments at 20–24. If the total number of broadband subscribers shrinks, moreover, the social costs unaccounted for by the broadband provider could also include the lost ability of the remaining end users to connect with the subscribers that departed (foregone direct network effects) and a smaller potential audience for edge providers. *See, e.g.*, *id.* at 23. Broadband providers are also unlikely to fully account for the open Internet's power to enhance civic discourse through news and information, or for its ability to enable innovations that help address key national challenges such as education, public safety, energy efficiency, and health care. *See* ARL et al. Comments at 3; Google Reply at 39; American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009).

[69] *See, e.g.*, OIC Comments at 29; Google Reply at 40.

[70] *See, e.g.*, ALA Comments at 3–4; ColorOfChange Comments at 3; Free Press Comments at 69; Google Comments at 34; Netflix Comments at 4; OIC Comments at 29–30; DISH Reply at 10. Such fees could also reduce an edge provider's incentive to invest in existing offerings, assuming the fees would be expected to increase to the extent improvements increased usage of the edge provider's offerings.

[71] Ad Hoc Comments at 15–16; ADTRAN Comments at 17–18; American Composers Forum et al. (ACF) Comments at 3–6; ColorOfChange Comments at 3–4; Debra Brown Comments at 1; Google Comments at 12; Philadelphia Comments at 3; Red Hat Comments at 2.

[72] *See, e.g.*, Google Comments at 59–61; Union Square Ventures Comments at 1; Vonage Comments at 18; OIC Reply at 3–4.

[73] Negotiations impose direct expenses and delay. *See* Google Comments at 34. There may also be significant costs associated with the possibility that the negotiating parties would reach an impasse. *See* ALA Comments at 2 ("The cable TV industry offers a telling example of the 'pay to play' environment where some cable companies do not offer their customers access to certain content because the company has not successfully negotiated financial compensation with the content provider."). Edge providers may also bear costs arising from their need to monitor the extent to which they actually receive prioritized delivery.

costs could further raise the costs of introducing new products and might chill entry and expansion.[74]

27. Some commenters argue that an end user's ability to switch broadband providers eliminates these problems.[75] But many end users may have limited choice among broadband providers, as discussed below.[76] Moreover, those that can switch broadband providers may not benefit from switching if rival broadband providers charge edge providers similarly for access and priority transmission and prioritize each edge provider's service similarly.[77] Further, end users may not know whether charges or service levels their broadband provider is imposing on edge providers vary from those of alternative broadband providers, and even if they do have this information may find it costly to switch.[78] For these reasons, a dissatisfied end user, observing that some edge provider services are subject to low transmission quality, might not switch broadband providers (though they may switch to a rival edge provider in the hope of improving quality).

28. Some commenters contend that, in the absence of open Internet rules, broadband providers that earn substantial additional revenue by assessing access or prioritization charges on edge providers could avoid increasing or could reduce the rates they charge broadband subscribers, which might increase the number of subscribers to the broadband network.[79] Although this scenario is possible,[80] no broadband provider has stated in this proceeding that it

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[74] *See, e.g.*, Google Comments at 34–35; Shane Greenstein Notice of Ex Parte, GN Docket No. 09-191, *Transaction Cost, Transparency, and Innovation for the Internet* at 19, *available at* www.openinternet.gov/workshops/innovation-investment-and-the-open-internet.html; van Schewick Jan. 19, 2010 *Ex Parte* Letter, Opening Statement at 7 (arguing that the low costs of innovation not only make many more applications worth pursuing, but also allow a large and diverse group of people to become innovators, which in turn increases the overall amount and quality of innovation). There are approximately 1,500 broadband providers in the United States. *See* WIRELINE COMPETITION BUREAU, FCC, INTERNET ACCESS SERVICES: STATUS AS OF DECEMBER 31, 2009 at 7, tbl. 13 (Dec. 2010) (FCC Internet Status Report), *available at* www.fcc.gov/Daily_Releases/Daily_Business/2010/db1208/DOC-303405A1.pdf. The innovative process frequently generates a large number of attempts, only a few of which turn out to be highly successful. Given the likelihood of failure, and that financing is not always readily available to support research and development, the innovation process in many sectors of the Internet's edge is likely to be highly sensitive to the upfront costs of developing and introducing new products. PIC Comments at 50 ("[I]t is unlikely that new entrants will have the ability (both financially and with regard to information) to negotiate with every ISP that serves the markets that they are interested in.").

[75] *See, e.g.*, Verizon Comments at 33.

[76] *See infra* paras. 32–33.

[77] *See* Skype Comments at 11; *see also supra* paras. 24–25.

[78] *See* Skype Comments at 11-12; *see also infra* para. 34.

[79] *See* AT&T Comments at 114, 135–37; TWC Comments at 57-58; Verizon Comments at 47–48, 70–74.

[80] Economics literature recognizes that access charges could be harmful under some circumstances and beneficial under others. *See, e.g.*, WCB Letter 12/10/10, Attach. at 1–62, E. Glen Weyl, *A Price Theory of Multi-Sided Platforms*, 100 AM. ECON. REV. 1642, 1642–72 (2010) (the effects of allowing broadband providers to charge terminating rates to content providers are ambiguous); *see also* WCB Letter 12/10/10, Attach. at 180–215, John Musacchio et al., *A Two-Sided Market Analysis of Provider Investment Incentives with an Application to the Net-Neutrality Issue*, 8 REV. OF NETWORK ECON. 22, 22–39 (2009) (noting that there are conditions under which "a zero termination price is socially beneficial"). Moreover, the economic literature on two-sided markets is at an early stage of development. AT&T Comments, Exh. 3, Schwartz Decl. at 16; Jeffrey A. Eisenach (Eisenach) Reply at 11–12; *cf., e.g.*, WCB Letter 12/10/10, Attach. at 156–

(continued....)

not prevent or restrict a broadband provider from refusing to transmit unlawful material such as child pornography.[201]

65. We also note that the rule entitles end users to both connect and use any lawful device of their choice, provided such device does not harm the network.[202] A broadband provider may require that devices conform to widely accepted and publicly-available standards applicable to its services.[203]

66. We make clear that the no-blocking rule bars broadband providers from impairing or degrading particular content, applications, services, or non-harmful devices so as to render them effectively unusable (subject to reasonable network management).[204] Such a prohibition is consistent with the observation of a number of commenters that degrading traffic can have the same effects as outright blocking,[205] and that such an approach is consistent with the traditional interpretation of the Internet Policy Statement.[206] The Commission has recognized that in some circumstances the distinction between blocking and degrading (such as by delaying) traffic is merely "semantic."[207]

67. Some concerns have been expressed that broadband providers may seek to charge edge providers simply for delivering traffic to or carrying traffic from the broadband provider's end-user customers.[208] To the extent that a content, application, or service provider

[201] The "no blocking" rule does not impose any independent legal obligation on broadband Internet access service providers to be the arbiter of what is lawful. *See, e.g.*, WISPA Comments at 12–13; *see also infra* Part III.F.

[202] We note that MVPDs, pursuant to section 629 and the Commission's implementing regulations, are already subject to similar requirements that give end users the right to attach devices to an MVPD system provided that the attached equipment does not cause electronic or physical harm or assist in the unauthorized receipt of service. *See Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availibility of Navigation Devices*, Report and Order, 13 FCC Rcd 14775 (1998); 47 U.S.C. § 549; 47 C.F.R. §§ 76.1201–03. Nothing in this Order is intended to alter those existing rules.

[203] For example, a DOCSIS-based broadband provider is not required to support a DSL modem. *See* ACA Comments at 13–14; *see also* Satellite Broadband Commenters Comments at 8–9 (noting that an antenna and associated modem must comply with equipment and protocol standards set by satellite companies, but that "consumers can [then] attach . . . any personal computer or wireless router they wish").

[204] We do not find it appropriate to interpret our rule to impose a blanket prohibition on degradation of traffic more generally. Congestion ordinarily results in degradation of traffic, and such an interpretation could effectively prohibit broadband providers from permitting congestion to occur on their networks. Although we expect broadband providers to continue to expand the capacity of their networks—and we believe our rules help ensure that they continue to have incentives to do so—we recognize that some network congestion may be unavoidable. *See, e.g.*, AT&T Comments at 65; TWC Comments at 16–18; Internet Freedom Coalition Reply at 5.

[205] *See, e.g.*, DCIA Comments at 8; William Lehr et al. Comments at 13, 14, 20; Google Comments at 41, 58, 62, 77–78, 81–82; NAR Comments at 2; Red Hat Comments at 3; Vonage Comments at 17; DISH Reply at 8–9; Skype Reply at 13–14.

[206] *See, e.g.*, AT&T Comments at 8; OIC Reply at 9–10.

[207] *Comcast Order*, 23 FCC Rcd at 13053, para. 44.

[208] *See supra* note 63.

could avoid being blocked only by paying a fee, charging such a fee would not be permissible under these rules.[209]

2. No Unreasonable Discrimination

68. Based on our findings that fixed broadband providers have incentives and the ability to discriminate in their handling of network traffic in ways that can harm innovation, investment, competition, end users, and free expression,[210] we adopt the following rule:

> *A person engaged in the provision of fixed broadband Internet access service, insofar as such person is so engaged, shall not unreasonably discriminate in transmitting lawful network traffic over a consumer's broadband Internet access service. Reasonable network management shall not constitute unreasonable discrimination.*[211]

69. The rule strikes an appropriate balance between restricting harmful conduct and permitting beneficial forms of differential treatment. As the rule specifically provides, and as discussed below, discrimination by a broadband provider that constitutes "reasonable network management" is "reasonable" discrimination.[212] We provide further guidance regarding distinguishing reasonable from unreasonable discrimination:

70. *Transparency*. Differential treatment of traffic is more likely to be reasonable the more transparent to the end user that treatment is. The Commission has previously found broadband provider practices to violate open Internet principles in part because they were not disclosed to end users.[213] Transparency is particularly important with respect to the discriminatory treatment of traffic as it is often difficult for end users to determine the causes of slow or poor performance of content, applications, services, or devices.[214]

71. *End-User Control*. Maximizing end-user control is a policy goal Congress recognized in Section 230(b) of the Communications Act, and end-user choice and control are touchstones in evaluating the reasonableness of discrimination.[215] As one commenter observes, "letting users choose how they want to use the network enables them to use the Internet in a way that creates more value for them (and for society) than if network providers made this choice,"

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[209] We do not intend our rules to affect existing arrangements for network interconnection, including existing paid peering arrangements.

[210] *See supra* Part II.

[211] *See supra* note 172 (defining "consumer" for purposes of these rules).

[212] *See infra* Part III.D. We also make clear that open Internet protections coexist with other legal and regulatory frameworks. *See infra* Part III.F. Except as otherwise described in this Order, we do not address the possible application of the no unreasonable discrimination rule to particular circumstances, despite the requests of certain commenters. *See, e.g.*, AT&T Comments at 64–77, 108–12; PAETEC Comments at 13; *see also* AT&T Comments at 56 (arguing that some existing agreements could be at odds with limitations on pay for priority arrangements). Rather, we find it more appropriate to address the application of our rule in the context of an appropriate Commission proceeding with the benefit of a more comprehensive record.

[213] *See Comcast Order*, 23 FCC Rcd at 13058–59, paras. 52–53.

[214] *See, e.g.*, *id.* at 13058-59, para. 52.

[215] "The rapidly developing array of Internet and other interactive computer services . . . offer[] users a great degree of control over the information that they receive, as well as *the potential for even greater control in the future* as technology develops." 47 U.S.C. § 230(a)(1)–(2) (emphasis added).