Extracts from FCC 15-24 Report and Order ("Network neutrality") concerning "peering"

Footnote 482, page 86

As a general matter, Internet traffic exchange involves the exchange of IP traffic between networks. An Internet traffic exchange arrangement determines which networks exchange traffic and the destinations to which those networks will deliver that traffic. In aggregate, Internet traffic exchange arrangements allow an end user of the Internet to interact with other end users on other Internet networks, including content or services that make themselves available by having a public IP address, similar to how the global public switched telephone network consists of networks that route calls based on telephone numbers. When we adopted the *2014 Open Internet NPRM*, the Chairman issued a separate, written statement suggesting that "the question of interconnection ('peering') between the consumer's network provider and the various networks that deliver to that ISP . . . is a different matter that is better addressed separately." *2014 Open Internet NPRM*, 29 FCC Rcd at 5647. While this statement reflected the Notice's tentative conclusion concerning Internet traffic exchange, it in no way detracts from the fact that the Notice also sought comment on "whether we should change our conclusion," whether to adopt proposals to "expand the scope of the open Internet rules to cover issues related to traffic exchange," and how to "ensure that a broadband provider would not be able to evade our open Internet rules by engaging in traffic exchange practices that would be outside the scope of the rules as proposed."

Footnote 489, page 87

See, e.g., Verizon Reply at 58 (explaining that "new arrangements [are] emerging on a regular basis to provide for efficient network planning and traffic delivery, as well as improved service for customers as their demands for Internet services continues to grow"); AT&T Reply at 96 ("For more than two decades, such interconnection has taken the form of 'transit' and 'peering' agreements, and in recent years, 'on-net-only' agreements have arisen in response to growing demands for video and other forms of media-rich content."); *see also* Werbach, Kevin D., The Centripetal Network: How the Internet Holds Itself Together, and the Forces Tearing it Apart (2009), 42 U.C. Davis L. Rev. , 343, 371 (2009), http://ssrn.com/abstract=1118435 (anticipating the evolving interconnection ecosystem).

Paragraph 198, page 88

In addition, several large broadband Internet access service providers, such as AT&T, Comcast, Time Warner Cable, and Verizon, have built or purchased their own backbones, giving them the ability to directly interconnect with other networks and edge providers and thereby lowering and eliminating payments to third-party transit providers. These interconnection arrangements are "peering," involving the exchange of traffic only between the two networks and their customers, rather than paid transit, which provides access to the full Internet over a single interconnection.[493] Peering gives the participants greater control over their traffic[494] and any issues arising with the traffic exchange are limited to those parties, and not other parties over other interconnection links. Historically, broadband Internet access service providers paid for transit and therefore had an incentive to agree to settlement-free peering with a CDN to reduce transit costs;[495] however, where large broadband Internet access service providers have their own national backbones and have settlement-free peering with other backbones, they may no longer have an incentive to agree to settlement-free peering with CDNs in order to avoid transit costs. As shown below in Chart 1, the evolution from reliance on transit to peering arrangements also means an evolution from a traffic exchange

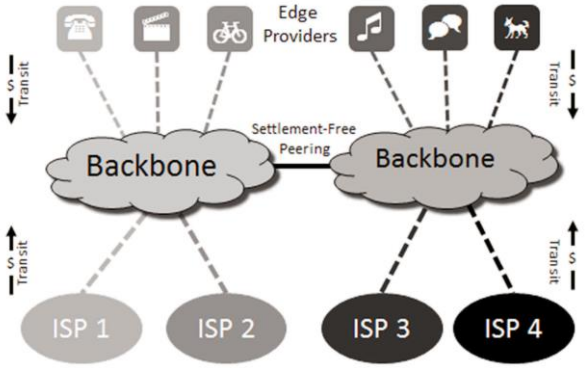
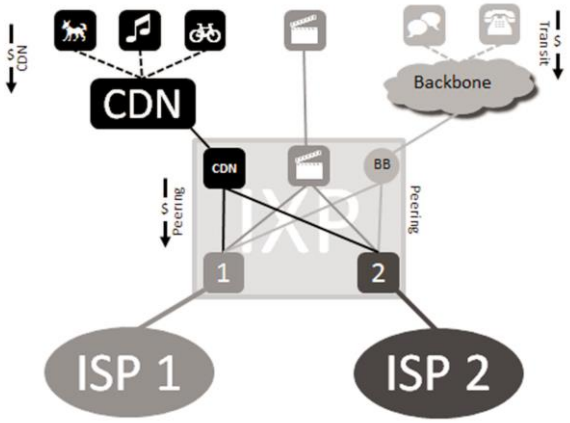
arrangement that provides access to the full Internet to a traffic exchange arrangement that only provides for the exchange of traffic from a specific network provider and its customers.

Footnote 496, page 88

J. Scott Marcus, *The Economic Impact of Internet Traffic Growth on Network Operators* at 4, WIK-Consult (Oct. 24, 2014), http://dx.doi.org/10.2139/ssrn.2531782 ("Very few ISPs are able, however, to use peering to reach *all* Internet destinations. Even well-connected ISPs typically purchase transit from one or two other IS s in order to reach destinations that are not covered by their own peering arrangements.") (emphasis in original).

Chart 1, page 89

Chart 1: Evolution in Transit Market

Transit in the 1990s	Paid Peering and CDNs Today
	

Paragraph 199, page 89-90

Recent Disputes. Recently, Internet traffic exchange disputes have reportedly involved not de-peering, as was more frequently the case in the last decade, but rather degraded experiences caused by congested ports between providers. In addition, these disputes have evolved from conflicts that may last a few days,[497] to disputes that have been sustained for well over a year,[498] and have gone from disputes between backbone service networks, to disputes between providers of broadband Internet access service and transit service providers, CDNs, or edge providers. The typical dispute has involved, on one side, a large broadband provider and on the other side, a commercial transit provider (such as Cogent or Level 3) and/or a large CDN.[499] Multiple parties point out, however, that interconnection problems can harm more than just the parties in a dispute.[500] When links are congested and capacity is not augmented, the networks—and applications, large and small, running over the congested links into and out of those networks—experience degraded quality of service due to reduced throughput, increased packet loss, increased delay, and increased jitter.[501] At the end of the day, consumers bear the harm when they experience degraded access to the applications and services of their choosing due to a dispute between a large broadband provider and an interconnecting party.[502] Parties also assert that these disputes raise concerns about public safety and network reliability.[503] To address these growing concerns, a number of parties have called for extending the rules proposed in the *2014 Open Internet NPRM* to Internet traffic exchange practices.

Paragraph 200, page 90-91

The record reflects competing narratives. Some edge and transit providers assert that large broadband Internet access service providers are creating artificial congestion by refusing to upgrade interconnection capacity at their network entrance points for settlement-free peers or CDNs, thus forcing edge providers and CDNs to agree to paid peering arrangements.[504] These parties suggest that paid arrangements resulting from artificially congested interconnection ports at the broadband Internet access service provider network edge could create the same consumer harms as paid arrangements in the last- mile, and lead to paid prioritization, fast lanes, degradation of consumer connections, and ultimately, stifling of innovation by edge providers.[505] Further, edge providers argue that they are covering the costs of carrying this traffic through the network, bringing it to the gateway of the Internet access service, unlike in the past where both parties covered their own costs to reach the Tier 1 backbones where traffic would then be exchanged on a settlement-free basis.[506] Edge and transit providers argue that the costs of adding interconnection capacity or directly connecting with edge providers are *de minimis*.[507] Further, they assert that traffic ratios "are arbitrarily set and enforced and are not reflective of how [broadband providers] sell broadband connections and how consumers use them."[508] Thus, these edge and transit providers assert that a focus on only the last-mile portion of the Internet traffic path will fail to adequately constrain the potential for anticompetitive behavior on the part of broadband Internet access service providers that serve as gatekeepers to the edge providers, transit providers, and CDNs seeking to deliver Internet traffic to the broadband providers' end users.

Paragraph 201, page 91-92

In contrast, large broadband Internet access service providers assert that edge providers such as Netflix are imposing a cost on broadband Internet access service providers who must constantly upgrade infrastructure to keep up with the demand.[510] Large broadband Internet access service providers explain that when an edge provider sends extremely large volumes of traffic to a broadband Internet access service provider—e.g., through a CDN or a third-party transit service provider—the broadband provider must invest in additional interconnection capacity (e.g., new routers or ports on existing routers) and middle-mile transport capacity in order to accommodate that traffic, exclusive of "last-mile" costs rom the broadband Internet access provider's central offices, head ends, or cell sites to end-user locations.[511] Commenters assert that if the broadband Internet access service provider absorbs these interconnection and transport costs, *all* of the broadband provider's subscribers will see their bills rise.[512] They argue that this is unfair to subscribers who do not use the services, like Netflix, that are driving the need for additional capacity. Broadband Internet access service providers explain that settlement-free peering fundamentally is a barter arrangement in which each side receives something of value.[513] These parties contend that if the other party is only sending traffic, it is not contributing something of value to the broadband Internet access service provider.

Paragraph 202, page 92-93

Mechanism to Resolve Traffic Exchange Disputes. As discussed, Internet traffic exchange agreements have historically been and will continue to be commercially negotiated. We do not believe that it is appropriate or necessary to subject arrangements for Internet traffic exchange (which are subsumed within broadband Internet access service) to the rules we adopt today. We conclude that it would be premature to adopt prescriptive rules to address any problems that have arisen or may arise.[514] It is also premature to draw policy conclusions concerning new paid Internet traffic exchange arrangements between broadband Internet access service providers and edge providers, CDNs, or backbone services.[515] While the substantial experience the Commission has had over the last decade with "last-mile" conduct gives us the understanding necessary to craft specific rules based on assessments of potential harms, we lack that background in practices addressing Internet traffic exchange.[516] For this reason, we adopt a case-by-case approach, which will provide the Commission with greater experience. Thus, we will continue to monitor traffic exchange and developments in this market.[517]

Paragraph 203, page 93

At this time, we believe that a case-by-case approach is appropriate regarding Internet traffic exchange

arrangements between broadband Internet access service providers and edge providers or intermediaries—an area that historically has functioned without significant Commission oversight.[518] Given the constantly evolving market for Internet traffic exchange, we conclude that at this time it would be difficult to predict what new arrangements will arise to serve consumers' and edge providers' needs going forward, as usage patterns, content offerings, and capacity requirements continue to evolve.[519] Thus, we will rely on the regulatory backstop prohibiting common carriers from engaging in unjust and unreasonable practices. Our "light touch" approach does not directly regulate interconnection practices. Of course, this regulatory backstop is not a substitute for robust competition. The Commission's regulatory and enforcement oversight, including over common carriers, is complementary to vigorous antitrust enforcement.[520] Indeed, mobile voice services have long been subject to Title II's just and reasonable standard and both the Commission and the Antitrust Division of the Department of Justice have repeatedly reviewed mergers in the wireless industry. Thus, it will remain essential for the Commission, as well as the Department of Justice, to continue to carefully monitor, review, and where appropriate, take action against any anti-competitive mergers, acquisitions, agreements or conduct, including where broadband Internet access services are concerned.

[Additionally, statements of individual Commissioners contain peering references.]
