



Response to Questions in the Fourth White Paper

"Network Interconnection"

by

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I. Introduction and Summary

Once again, we commend the Committee for undertaking its sustained effort to review and update the increasingly anachronistic Communications Act. This update is not only timely but necessary, given the rapid rate of technological change, and the concomitant change in communications and information services markets, since Congress last updated the law with the Telecommunications Act of 1996.

We also commend the Committee for using the Fourth White Paper to focus specifically on interconnection. We agree with the Committee's recognition that the interconnection of communications networks "has been at the heart of communications policy" for a century, and further, that it should be an integral component of any Communications Act update.¹ As twentieth-century communications networks give way to the all-IP-based networks of the future, there is still a useful role for a government

* While the signatories to this Response are in general agreement with the views expressed in these comments, their participation as signatories should not necessarily be taken as agreement on every aspect of the submission. The views expressed should not be attributed to the institutions with which the signatories are identified.

¹ "Network Interconnection" ("Fourth White Paper"), House Commerce Committee, at 1.

regulator to play in overseeing the interconnection of the various privately-operated networks that comprise the nation's communications infrastructure.²

But going forward, this role should be noticeably different – presumptively less interventionist – in scope than it is under the current Act. That conclusion is consistent with the transition to more competitive communications and information services markets. Rather than overseeing enforcement of a general duty to interconnect, as the current Act requires, the law should presume that interconnection agreements between IP-based networks will be negotiated on a voluntary basis, as they have been throughout the Internet's history with minimal disruption. The Commission should intervene only upon a finding that denial of interconnection poses a substantial, non-transitory risk to consumer welfare, and that marketplace competition is inadequate to correct the problem. And in those rare instances when intervention is necessary, the Commission should solve the impasse by using some form of dispute resolution mechanism, such as mediation or some form of arbitration, rather than by resorting to current rate case-like adjudicatory procedures. This revised interconnection mandate is consistent with our view of the FCC's future role, not as regulator of monopolistic common carriers subject to public utility obligations, but rather as a sector-specific competition authority protecting consumer welfare in a competitive and dynamic marketplace.

II. Modern Interconnection Markets Are Competitive and Dynamic

As the Fourth White Paper notes, the Telecommunications Act of 1996 sought to bring a “pro-competitive and deregulatory framework” to local telephone markets, in part

² See Free State Foundation Response to Questions in the First White Paper, "Modernizing the Communications Act" at 13 (January 31, 2014); Free State Foundation Response to Questions in the Third White Paper, "Competition Policy and the Role of the Federal Communications Commission" at 7-8 (June 13, 2014).

by loosening the reins on existing interconnection obligations.³ Section 251 placed a general duty on all telecommunications carriers to interconnect with one another,⁴ and it imposed additional duties on legacy incumbent local exchange carriers (ILECs) to negotiate in good faith, to connect at any technically feasible point in its network, to provide a level of service equivalent to what it delivers to itself, and on reasonable, nondiscriminatory terms.⁵ The law allowed networks to freely negotiate the terms of these interconnection agreements, but it subjected ILEC agreements to review by state regulators, and mandated compulsory arbitration by state regulators in the event of an impasse.⁶ This interconnection duty and the concomitant arbitration and review procedures were part of the Act's broader movement from a heavily-regulated local telephone monopoly to a regime of "managed competition" within largely intrastate local telephone markets.

While the 1996 Act represented progress toward a deregulated communications marketplace, since that time market developments have obliterated the line between local and long-distance service that in 1996 justified state-level involvement in interconnection negotiations. Indeed, contrary to the dominant expectations of the day, the wireline telephone sector as a whole has receded dramatically, replaced by wireless networks (which are subject only to Section 251(a)'s general duty to interconnect) and by IP-based networks. Because the Commission has classified IP networks as "information services" rather than "telecommunications services," they are not subject to the Act's interconnection duties.

³ Fourth White Paper at 1.

⁴ 47 U.S.C. § 251(a).

⁵ *Id.* § 251(c).

⁶ *Id.* § 252.

Interconnection has flourished despite—or perhaps more accurately, because of—this unregulated environment. Commentators often describe the Internet, accurately, as a “network of networks.” Interconnection agreements stitch this network together. The IP interconnection market is a “collection of 35 thousand autonomous systems bargaining with one another through arms-length transactions” to shuttle traffic among the Internet’s end-points.⁷ As one might expect, these agreements inevitably contain wide variations in the terms under which parties interconnect and exchange traffic with one another. Interconnection agreements can run hundreds of pages, governing a wide range of conditions, and they are typically covered by non-disclosure agreements that reflect the competitively sensitive nature of those terms. All are freely negotiated on a voluntary basis, without a regulator-enforced duty to interconnect or government review of an agreement’s terms.

The interconnection market is diverse, in part because of the flexibility of voluntary negotiations to respond to changing market conditions. The two dominant forms of interconnection are peering (in which two networks agree to provide reciprocal access to each other’s end-user consumers) and transit service (in which one network agrees to provide access to all Internet destinations). Many peering agreements between networks of comparable size are on a settlement-free basis, though the market has seen a rise in “paid peering” when traffic flows disproportionately in one direction. Transit is usually sold on a volume basis, with the sending network paying the receiving network to deliver its traffic to its destination. To avoid being dependent on one interconnection agreement or network, many content providers and transit networks sign interconnection

⁷ Christopher S. Yoo, *THE DYNAMIC INTERNET: HOW TECHNOLOGY, USERS, AND BUSINESSES ARE TRANSFORMING THE NETWORK* at 55 (2012).

agreements with multiple networks to route traffic to end-users, a practice known as “multi-homing.”⁸ The ability to forge these multiple pathways blunts the holdout power that any one carrier might have over the system, so that it is no longer appropriate to presume, as was done in 1996, that multiple parties had no choice in the pathway over which they transmitted their traffic. Competitive conditions, in a word, have been improved markedly by these advances in technology.

The interconnection market is also dynamic and evolving in response to changing patterns of Internet-based consumption. For example, the rise of Internet-based video services such as Netflix and Hulu has increased the volume and the vector of traffic flowing over IP networks, thus spawning alternatives to traditional peering and transit models. Content Delivery Networks such as Akamai maintain a distributed network of servers around the country, which store local copies of their clients’ content for delivery to consumers. Because the content traverses fewer interconnections, CDNs can be a high-quality, low-cost alternative to traditional transit for streaming video and other similarly-situated content providers. Some high-volume content providers have also begun to engage in self-provision, building their own server farms to store their content. This allows them to interconnect directly with end-user broadband networks rather than relying on transit providers for delivery. These innovations help provide lower-cost, higher-quality service for applications that need more than the “best efforts” delivery that marks the traditional public Internet. And as the “Internet of Things” of all manner of connected computing devices grows, one can imagine an entire class of network-based

⁸ *Id.* at 62-64.

services that could survive on less-than-best-efforts service.⁹ As traffic flows change, interconnection agreements negotiated on a voluntary basis have the flexibility to adapt to suit.

The underlying technology of IP interconnection is also more complicated than in prior communications network architectures. The transition from circuit-switched TDM networks to packet-switched statistically-multiplexed networks – the transition that has enabled much of what is described above – greatly increases the number of factors that interconnection must address. Previously, interconnection meant physically connecting two networks and providing a relatively simple method for allocating a circuit between endpoints for the duration of a phone call.

Today, interconnection still involves a physical connection between networks. But the algorithmic logic governing how that connection is used must make real-time routing decisions on a per-packet level, sometimes factoring in information about current network conditions; it must respond in real-time to configuration changes across the network; it must incorporate real-time resource allocation logic; it must respond to congestion events; it must have logic for buffering and sorting packets as they arrive at switches and routers. Importantly, many of these factors conflict: Making a network more resilient to congestion, for instance, can increase latency and jitter when congestion does occur. And there is no “one-size-fits-all” configuration that works well for all uses or users. In other words, interconnection among IP networks is precisely the sort of

⁹ The “Internet of Things” generally refers to a wide variety of connected devices with embedded computing capabilities, such as smart thermostats, heart monitoring implants, biochip transponders on farm animals, automobiles with built-in sensors, and field operation devices that assist fire-fighters in search and rescue.

relationship that is best negotiated on a case-by-case basis by parties that understand their particular needs and how those needs best map onto the underlying technology.

Finally, IP interconnection markets are competitive. Content providers have multiple options to deliver their content to consumers—from transit providers with nearly global footprints to regional providers that rely on interconnection agreements to route traffic onward to consumers.¹⁰ Some provide transit service only, while others provide complementary services as well. Although pricing schedules are often protected by nondisclosure agreements, there is a general consensus that competition has driven down Internet transit prices continuously and precipitously each year since the modern Internet's inception in the 1990s. Interconnection consultant William Norton calculates, based on informal surveys, that the average per-Mbps price for generic non-commit transit service has fallen from roughly \$1200 in 1998 to \$12 in 2008 and \$0.94 in 2014—an average rate of decline of over 30 percent each year.¹¹ TeleGeography similarly estimates that transit prices have fallen 26% annually from 2007 to 2012,¹² and Streaming Media Analyst Dan Rayburn has noticed similar trends in CDN prices.¹³

III. The FCC's Limited, but Important, Role in Interconnection

The key to the tremendous growth and complexity of IP-based networks has been the supplanting of a public utility regime by a free-market oriented regulatory model. Given the importance of interconnection to the healthy functioning of any

¹⁰ See Dan Rayburn, *How Transit Works, What it Costs & Why It's So Important*, Feb. 24, 2014, available at <http://blog.streamingmedia.com/2014/02/transit-works-costs-important.html>.

¹¹ William B. Norton, *THE INTERNET PEERING PLAYBOOK: CONNECTING TO THE CORE OF THE INTERNET* at 34 (2013).

¹² See TeleGeography Press Release, *IP Transit Prices Steepen*, Aug. 2, 2012, available at <http://www.telegeography.com/products/commsupdate/articles/2012/08/02/ip-transit-price-declines-steepen/>.

¹³ See Dan Rayburn, *The State of the CDN Market, May 2014*, available at <http://www.streamingmedia.com/dansblog/2014CDNSummit-Rayburn.pdf>.

communications system, we recognize that the Commission should continue to play a role in overseeing interconnection between network providers. But rather than the heavy-handed regulator of the 1934 Act or the competition “manager” of the 1996 Act, the future Commission’s interconnection authority should be circumscribed, and instances of actual intervention should be rare.

In our prior responses, we have noted that a future Commission should play a role with regard to interconnection. In light of a residual holdout problem, perhaps its role should be above and beyond the general role we envision for the Commission as enforcer of a sector-specific competition standard grounded in antitrust principles.¹⁴ Our position is informed by many of the concerns that animated the Digital Age Communications Act Working Group’s proposal in 2005.¹⁵ First, the Supreme Court’s *Trinko* decision leaves some uncertainty regarding whether one can order interconnection under an antitrust-based unfair competition standard.¹⁶ Second, denial of interconnection can sometimes be a rational economic strategy whereby a single network can attempt to dominate a market in a way that harms consumers.¹⁷ Finally, there are many non-economic social benefits to a unified communications network as an inclusive forum for news, education, free expression, access to emergency services, and facilitation of democratic self-government.

¹⁴ See, e.g., Free State Foundation Response to Questions in the First White Paper, "Modernizing the Communications Act" at 13 (January 31, 2014).

¹⁵ See Randolph J. May and James B. Speta, "Digital Age Communications Act," Proposal of the Regulatory Framework Working Group, Progress & Freedom Foundation, June 2005 ("DACA Working Group"). As before, we acknowledge the debt owed to the DACA Working Group, within which many of these proposals originated.

¹⁶ See *Verizon Communications, Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 415 (2004); Philip J. Weiser, *Goldwasser, The Telecom Act, and Reflections on Antitrust Remedies*, 55 ADMIN. L.J. 1(2003); James B. Speta, *Antitrust and Local Competition under the Telecommunications Act*, 71 ANTITRUST L.J. 99 (2003). But see *United States v. Terminal R.R. Ass'n*, 224 U.S. 383 (1912); *Otter Tail Power Co. v. United States*, 410 U.S. 366 (1972).

¹⁷ See DACA Working Group at 26.

The Commission has a role to play in safeguarding these positive externalities of increased interconnection.

But while interconnection mandates can sometimes correct market failures in ways that enhance social welfare, this gain must be balanced against regulation's own potential inefficiencies. As Michael Katz and Carl Shapiro have noted, private institutions such as new players or standards-setting bodies may arise to achieve coordination and internalize the externality without government intervention.¹⁸ Second, government intervention may unreasonably favor the status-quo, ossifying current practices at the cost of blocking or raising costs on innovative emerging technologies.¹⁹ Third, regulators often lack the information needed to determine which course maximizes total surplus.²⁰

Given these potential risks, we recommend that the Committee reject a general duty to interconnect with other IP-based networks. As an empirical matter, there appears no need to impose such a duty: content and application providers have a plethora of options available to deliver their content to consumers, and through multi-homing, they often leverage multiple options simultaneously to reduce the risk that any one network can exercise market power against them. There have been very few instances in which interconnection disputes have been brought to the Commission's attention, and those have largely been solved through private negotiations.²¹ Moreover, given the wide range of potential interconnection options, from peering (free or paid) or transit to CDNs, self-

¹⁸ *Id.* at 26; see Michael L. Katz & Carl Shapiro, *System Competition and Network Effects*, 8 J. ECON. PERSP. 93, 112-13 (1994).

¹⁹ Katz & Shapiro at 112-13.

²⁰ *Id.*

²¹ See Randolph J. May, "Testimony of Randolph J. May, President, Free State Foundation," Hearing on "Evolution of Wired Communications Networks," Subcommittee on Communications and Technology (October 23, 2013).

provision, and more, the contours of such a duty would be difficult to define and enforce. Attempts to do so could inadvertently lock-in existing practices and reduce the market's ability to respond dynamically to changing trends in content and application markets.

Accordingly, we recommend that the Commission be given the authority to intervene to address only those specific interconnection practices that pose a substantial and non-transitory risk to consumer welfare.²² The consumer welfare focus assures that the Commission's decision whether to intervene is based upon an explicit finding that the practice poses harm to competition generally, rather than to one specific competitor. The Commission's authority should further be premised upon an explicit finding that marketplace competition is insufficient to protect consumer welfare.²³

In those (hopefully rare) instances warranting intervention, the Commission should mimic private dispute resolution mechanisms rather than take on, in a new context, its traditional role as a public utility regulator. Typically, it should condition its intervention on a requirement that the parties first submit their dispute to mediation. If mediation is unsuccessful, the Commission should devise some form of arbitration process, perhaps, for example, some form of "baseball-style arbitration," in which each side submits a proposed "last and best offer" and the arbitrator then chooses one.²⁴ This approach limits the Commission's discretion to interfere in ongoing interconnection disputes and places the burden primarily on the parties themselves to find a solution to the impasse. There may be other dispute resolution models that ought to be considered as

²² DACA Working Group at 24.

²³ *Id.* at 24-25.

²⁴ See Randolph J. May, "Testimony of Randolph J. May, President, Free State Foundation," Hearing on "Evolution of Wired Communications Networks," Subcommittee on Communications and Technology (October 23, 2013).

well. And, whatever mechanism is chosen, the process must be such that there will not be undue delay in delaying resolution of the dispute.

We also strongly recommend the Committee reject calls by some to require public disclosure of the terms of interconnection agreements. Mandating the detailed disclosure of specific, confidential business-to-business agreements negotiated between sophisticated parties in a highly competitive market is likely to do more harm than good to competition. One reason is that any distinctive structure of these agreements could well contain important trade secrets whose value is lost if made public. A second reason is that, as the industrial organization literature emphasizes, the sharing of competitively sensitive information among rivals can facilitate tacit collusion on price. For this reason, the Supreme Court, antitrust authorities, and the Commission itself have long stressed that disclosure of pricing and cost information can be harmful to competition, especially in markets like telecommunications that involve significant barriers to entry.²⁵

Finally, state authorities should play a much more limited role with regard to interconnection than they do under the now obsolete 1996 Act regime. This is consistent with the evolution of telecommunications markets and the now almost-complete elimination of intrastate “local” markets as a competitively important classification. Today’s information networks are largely national in scope, and neither providers nor customers easily distinguish between interstate and intrastate communications. Attempts by state regulators to review or interfere with national interconnection agreements can have the unintended consequence of balkanizing the nation’s information infrastructure and of compromising the economies of scale generated by interstate operations. As noted

²⁵ See Daniel A. Lyons, *Compelled Disclosure of Internet Interconnection Agreements Creates Anticompetitive Risks*, FREE STATE FOUNDATION PERSPECTIVES Vol. 9, No. 22 (2014).

in our response to the First White Paper, state regulators should retain a prominent voice with regard to consumer protection issues.²⁶ And any state should have standing to bring an interconnection dispute to the Commission's attention if the dispute adversely harms that state's constituents. But the Commission should have final decisionmaking authority regarding whether to intervene, given that it normally is in a better position to assess the costs and benefits of intervention from a national scope.

IV. Conclusion

As the Committee moves forward with its review and update process, we urge it to carefully consider and implement the views expressed in this Response, as well as the previous Free State Foundation Responses. We look forward to continuing to play a constructive role in this process leading to a much-needed update of the Communications Act.

²⁶ See Free State Foundation Response to Questions in the First White Paper, "Modernizing the Communications Act" at 18 (January 31, 2014).