ORAL ARGUMENT SCHEDULED DECEMBER 4, 2015

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Case No. 15-1063 (and
consolidated cases)

UNITED STATES TELECOM ASSOCIATION, ET AL.,

Petitioners,

v.

FEDERAL COMMUNICATIONS COMMISSION
AND UNITED STATES OF AMERICA,

Respondents.

ON PETITIONS FOR REVIEW OF AN ORDER OF THE
FEDERAL COMMUNICATIONS COMMISSION

**BRIEF FOR AMICUS CURIAE CHRISTOPHER S. YOO
IN SUPPORT OF PETITIONERS**

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August 6, 2015

CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

A.   Parties

Except for the following, parties, intervenors, and amici appearing in this Court and before the FCC are listed in the Joint Brief for Petitioners United States Telecom Association, National Cable & Telecommunications Association, CTIA – The Wireless Association®, American Cable Association, Wireless Internet Service Providers Association, AT&T Inc., and CenturyLink: Richard Bennett; The Business Roundtable, *et al.*; Center for Boundless Innovation; William J. Kirsch; Georgetown Center for Business and Public Policy; International Center for Law & Economics; Mobile Future; Multicultural Media, Telecom and Internet Council; Phoenix Center for Advanced Legal and Economic Public Policy Studies; and Telecommunications Industry Association.

B.   Ruling Under Review

The ruling under review is the FCC's Report and Order on Remand, Declaratory Ruling, and Order, *Protecting and Promoting the Open Internet*, 30 FCC Rcd 5601 (2015) ("*Order*") (JA__).

C.   Related Cases

Amicus curiae adopts the statement of related cases presented in the Joint Brief for Petitioners United States Telecom Association, National Cable & Telecommunications Association, CTIA – The Wireless Association®, American

Cable Association, Wireless Internet Service Providers Association, AT&T Inc.,

and CenturyLink.

STATEMENT REGARDING SOURCE OF AUTHORITY TO FILE, AUTHORSHIP, MONETARY CONTRIBUTIONS, AND SEPARATE BRIEFING

On July 14, 2015, amicus curiae filed a Motion for Leave to File Brief as Amicus Curiae in Support of Petitioners. *See* D.C. Cir. R. 29(b). On August 4, 2015, the Court granted this motion.

Pursuant to Fed. R. App. P. 29(c), amicus curiae states that no counsel for a party authored this brief in whole or in part. No party or its counsel, and no person other than amicus curiae, made a monetary contribution intended to fund the preparation or submission of this brief.

Pursuant to D.C. Cir. R. 29(d), amicus curiae certifies that no other brief of which he is aware analyzes whether the *Order* accords with how the Internet actually works as a technical matter, and how viewing the *Order* in light of the relevant engineering principles reveals that: (1) the interpretation of the statute embodied in the *Order* conflicts directly with the statutory text; and (2) the *Order* contradicts the technical principles that determined the Supreme Court's decision in *National Cable & Telecommunications Association v. Brand X Internet Services*, 545 U.S. 967 (2005). To the best of amicus curiae's knowledge, none of the other briefs amicus curiae overlap with the arguments presented herewith. Amicus curiae believes that other amici will submit briefs addressing First Amendment issues; the impact of the *Order* on broadband access, adoption,

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investment and innovation; the lack of evidence in the record to support the

Order; the implications of the *Order* from an engineering perspective; the

differences between mobile broadband and fixed broadband technologies for

regulatory purposes; the implications of the FCC's decision to treat services

offered by broadband service providers to edge providers and retail customers as a

single service; and whether the *Order* exceeded the FCC's delegated authority

under administrative law precedent.

In light of the different foci of these briefs, and the unique combination of

legal and technical perspectives amicus curiae brings to aid the Court in reaching

an appropriate decision in this case, amicus curiae certifies that filing a joint brief

is not practicable and that it is necessary to submit separate briefs.

<div style="text-align: right;">

/s/ Christopher S. Yoo
Christopher S. Yoo

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Cases

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[*]   Authorities principally relied upon are marked with an asterisk.

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GLOSSARY

Communications Act or Act	Communications Act of 1934, as amended, 47 U.S.C. § 151 *et seq*.
CDN	Content Distribution Network
DNS	Domain Name System
DNSsec	Domain Name System Security
FCC or Commission	Federal Communications Commission
ICANN	Internet Corporation on Assigned Names and Numbers
IP	Internet Protocol
IPv4	Internet Protocol version 4
JA	Joint Appendix
Order	Report and Order on Remand, Declaratory Ruling, and Order, *Protecting and Promoting the Open Internet*, 30 FCC Rcd 5601 (2015) (JA__)

INTEREST OF AMICUS CURIAE

Amicus curiae is the John H. Chestnut Professor of Law at the University of Pennsylvania, where he also serves as a professor of Computer and Information Science, Professor of Communication, and the Founding Director of the Center for Technology, Innovation and Competition. He has studied communications law and policy as a law professor since 1999. His research has focused on the issues surrounding the *Order* since 2004, when he authored the response to the article in which Tim Wu first coined the phrase network neutrality (and to which Professor Wu published a reply). Since that time, he has published more than two dozen books, book chapters, and articles exploring the issues surrounding the open Internet. He is also creating an innovative interdisciplinary program designed to ensure that Internet and telecommunications policy are based on a sound understanding of the underlying engineering principles. Amicus curiae actively participated in the agency proceedings below, submitting comments discussing how the relevant engineering principles should affect the legal analysis.

SUMMARY OF ARGUMENT

The *Order*'s reclassification of Internet access services as a telecommunications service conflicts with the Communication Act's requirement that the transmission be "between or among points specified by the user." 47 U.S.C. § 153(50). The plain meaning of "point" is a specific geographic location, and as the Supreme Court recognized in *Brand X*, in most cases it is the Domain

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Name System that selects the destination of most Internet transmissions, not the user. In fact, the *Order* concedes this fact. (JA _ n.997). In addition, as *Brand X* further noted, caching services represent another example where the Internet service provider selects one of the endpoints of the transmission rather than the user. Finally, the *Order*'s failed attempt to overcome these shortcomings by analogizing to other services makes the *Order* arbitrary and capricious.

ARGUMENT

I.   **THE RECLASSIFICATION OF INTERNET ACCESS AS A TELECOMMUNICATIONS SERVICE CONFLICTS WITH THE PLAIN LANGUAGE OF THE COMMUNICATIONS ACT**

The *Order*'s attempt to reclassify Internet access service as a telecommunications service represents an impermissible interpretation that conflicts directly with the plain language of the Communications Act. In determining whether an agency's construction of a statute is permissible, courts first ask "whether Congress has directly spoken to the precise question at issue." *Chevron USA Inc. v. Natural Res. Def. Council*, 467 U.S. 837, 842–43 (1984). In undertaking this inquiry, courts apply the "traditional tools of statutory construction." *INS v. Cardoza-Fonseca*, 480 U.S. 421, 446 (1987). "Under *Chevron*, the statute's plain meaning controls." *Scialabba v. Cuellar de Osorio*, 134 S. Ct. 2191, 2203 (2014). If Congress has directly addressed the issue, the agency is due no deference. *Id.* If the statute is ambiguous, courts defer to the agency's interpretation so long that it is reasonable. *Chevron*, 467 U.S. at 844.

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The statute defines "telecommunications service" as "the offering of telecommunications for a fee directly to the public." *Id.* § 153(53). "Telecommunications" is in turn defined as "the transmission, *between or among points specified by the user*, of information of the user's choosing, without change in the form or content of the information as sent and received." *Id.* § 153(50) (emphasis added).

Unless Internet access service falls within these definitions, reclassification of Internet access service as a telecommunications service would violate the statute and would be illegal. The plain meaning of "point" is a discrete physical location. *See* THE AMERICAN HERITAGE COLLEGE DICTIONARY 1055 (3d ed. 1993) (defining "point" as "a. A place or locality considered with regard to its position. B. A narrowly particularized and localized position or place; a spot."); WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 908 (1991) (defining "point" as "(1) a narrowly localized place having a precisely indicated position . . . (2) a particularized place: locality"); WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1749 (1986) (defining "point" as "a particularly narrowly limited part of a surface or of space that is singled out as occupying a usu[ally] precisely indicated spot and that has usu[ally] minimum extension or no relevant extension: a specific narrowly localized place having no relevant size or shape: a definitely precisely indicated placement or position of something"); 2 THE NEW SHORTER

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OXFORD ENGLISH DICTIONARY 2266–67 (rev. 3d ed. 1993) (defining "point" as "a thing having a definite position, without extension, a position in space, time, succession, degree, order, etc."). The unity of these definitions contradicts the *Order*'s claim that the term "point" is ambiguous. (JA _ ¶ 361).

An examination of the underlying technology and the reasoning of the Supreme Court's decision in *Brand X* both underscore that for Internet transmissions that use the Domain Name System (DNS) or caching, end users do not specify the endpoints of the communication. As such, Internet access services that rely on DNS and caching are not properly classified as telecommunications services.

A.   As the Supreme Court Recognized in *Brand X*, Internet Transmissions that Rely on the Domain Name System Are Not Telecommunications.

The glue that holds the Internet together is known as the Internet Protocol (IP).[1] First conceived by Vinton G. Cerf & Robert E. Kahn, *A Protocol for Packet Network Interconnection*, 22 IEEE TRANSACTIONS ON COMM. 637, 638, 641 (1974) (albeit under a slightly different name that was eventually refined), this protocol "requir[es] that a uniform addressing scheme be created which can be understood

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[1]   *See* JAMES F. KUROSE & KEITH W. ROSS, COMPUTER NETWORKING: A TOP-DOWN APPROACH 53 (5th ed. 2010); ANDREW S. TANENBAUM, COMPUTER NETWORKS 432 (4th ed. 2006); LARRY L. PETERSON & BRUCE S. DAVIE, COMPUTER NETWORKS: A SYSTEMS APPROACH 29 (4th ed. 2007).

by each individual network." *Id.* at 637. Each computer attached to the edge of

the Internet (known as hosts) must have a unique address. *Id.* at 639.[2] The header

of every packet passing through the Internet must provide "the address of the

source and destination HOSTS . . . in a standard format in every packet." *Id.* at 638.

Indeed, the common protocol requires that every packet must use this address

system to identify the source and destination of every packet passing through the

network. *Id.* at 638–39.

In other words, the heart of the Internet is the Internet Protocol. The Internet

Protocol routes transmissions based on IP addresses. And IP addresses represent

individual physical locations. Although some researchers have proposed

redesigning the network so that it routes transmission based on the name of the

rather than physical locations, *see* Lixia Zhang et al., *Named Data Networking*, 44

ACM SIGCOMM COMPUTER COMM. REV. 66 (2014), to date such systems have

never been deployed.

The initial version of this common protocol (known as IP version 4 or IPv4),

typically represents addresses as four numbers between 0 and 255 separated by

dots. For example, one of the IP addresses assigned to the University of

Pennsylvania is represented such as 128.91.34.233. Whois Results, Network

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[2]   Cerf and Kahn recognized that providers may use a pool of IP addresses and
dynamically assign them to individual hosts on a temproray basis. Cerf & Kahn
645–46. The temporary nature of this assignment does not undercut the fact that at
any particular moment, each address identifies a unqiue host.

Solutions, http://www.networksolutions.com/whois/results.jsp?ip=128.91.34.233.
In IPv4, the Internet uses this four-tuple of numbers to identify the source and the destination of every packet. The more recent version of the Internet follows the same principle with a greatly expanded address space.

Internet users typically do not use IP addresses when browsing webpages, sending email, or performing typical uses of the Internet. Instead of inputting IP addresses, consumers usually use *domain names*, which are more natural language versions that are easier to remember. For example, the URL for the University of Pennsylvania is www.upenn.edu. Determining which domain name corresponds to which IP address is done by a process known as the Domain Name System (DNS).

A consumer who browses the web of sends an email using a domain name does not in fact identify the endpoint to which they are sending their traffic. The location is specified by the domain name system. Indeed, the Supreme Court recognized as much in *National Cable & Telecommunications Association v. Brand X Internet Services*, 545 U.S. 967 (2005). when it observed, " user cannot reach a third-party's Web site without DNS, which (among other things) matches the Web site address the end user types into his browser (or 'clicks' on with his mouse) with the IP address of the Web page's host server." *Id.* at 999. In so holding, the Supreme Court rejected contentions that the DNS was simply a database of routing information. *Id.* at 999 n.3. This led the Court to conclude that

it was "*at least reasonable* to think of DNS" as providing sufficient additional functionality to remove Internet access providers outside the realm of telecommunications services and into the mutually exclusive realm of information services. *Id.* at 999. The inclusion of the phrase "at least" suggests that the Court recognized the possibility in addition satisfying *Chevron* step two, the conclusion that Internet access service did not constitute a telecommunications service was arguably compelled by *Chevron* step one.

A brief examination of the functions performed by DNS illustrates the point. As an initial matter, there is not a one-to-one correspondence between IP addresses and URLs that can be performed mechanically. Instead, the same domain name often consists of multiple IP addresses. To cite one example, the website for the University of Pennsylvania actually consists of two unique IP addresses: 128.91.34.233 and 128.91.34.234. It is the DNS that determines which location will serve a particular request, not the end user.

DNS also performs a wide range of other services. For example, different DNS providers provide different levels of security. Some use patterns of DNS lookups to identify computers that may be infected with malware. Some identify malware known as botnets that force infected computers to follow the instructions of another computer known as a bot controller. They do so by looking at suspicious patterns of DNS lookups that can identify the existence of a controller.

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_. Other systems look for DNS lookups of young or esoteric domains as well as lookup failures. Robert Lemos, *Got Malware? Three Signs Revealed in DNS Traffic*, DARK READING, May 23, 2013, *available at* http://www.darkreading.com/analytics/security-monitoring/got-malware-three-signs-revealed-in-dns-traffic/d/d-id/1139680. Different DNS providers took different approaches to addressing a major security flaw known as the Kaminsky vulnerability. Some simply added a level of randomization by randomizing the port numbers. Others took more extensive measures, such as identifying flurries of DNS lookup errors or by deploying the DNS Security protocol (also known as DNSsec).

Other firms rely on the DNS to provide differential benefits to consumers. DNS providers such as Open DNS, Nominum, and Google are all attempting to compete on the speed with which they resolve DNS queries. Some will also look at a consumer's location and redirect a domain name request to a different location in an attempt to anticipate the location the consumer really wants, such as redirecting a query directed at a foreign website to a domestic version maintained by the same company. Some attempt to identify typographical errors in domain names entered into the address bar and suggest alternatives that may be the correct spelling (known as web error redirection) with varying degrees of success. Still

others rely on DNS to provide parental controls to block access to adult websites and other unwanted content.

DNS providers are vying to convince consumers to adopt them as their DNS provider. In short, DNS is a competitive business in which different providers offer different services in an attempt to appeal to consumers. In every case, it is the DNS that determines the destination of the transmission, not the consumer. The fact that end users may choose to change DNS providers does not change the analysis. Shifting from one DNS provider to another simply transfers who gets to decide the destination of Internet traffic from one third party to another. It does not put the end user in the position of determining the destination IP address. Unless the end user operates a private DNS service or invokes IP addresses by number instead of relying on URLs, it is the third-party DNS provider that specifies the endpoint of the transmission, not the end user.

B. As the Supreme Court Recognized in *Brand X*, Internet Transmissions that Access Cached Content Are Not Telecommunications

The other example identified by the Supreme Court is content caching. *Brand X*, 545 U.S. at 999-1000. When content is cached, the Internet service provider stores copies of frequently access content locally and then redirects requests for content to the local cache. Geoff Huston, *Web Caching*, INTERNET

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PROTOCOL J., Sept. 1999, at 2, *available at*

http://www.cisco.com/web/about/ac123/ac147/archived_issues/ipj_2-3/ipj_2-3.pdf.

Content delivery networks (CDNs) provide another illustration of this

dynamic. CDNs store popular web content in thousands of locations around the

world. For example, market leader Akamai uses nearly 150,000 servers

throughout the network to serve 30% of the world's web content.[3]

II.   THE *ORDER*'S ATTEMPT TO RECONCILE ITS INTERPRETATION WITH THE COMMUNICATIONS ACT IS ARBITRARY AND CAPRICIOUS

The *Order*'s attempt to reconcile its position with the statutory requirement

that telecommunications services provide transmission "between or among points

specified by the user" is arbitrary and capricious. As an initial matter, the *Order*

simply asserts that "uncertainty concern the geographic location of an endpoint is

irrelevant for the purpose of determining whether a broadband Internet access

service is providing 'telecommunications.'" (JA _ ¶ 361). In so doing, despite the

claim that "there is no question that uses specify the end points of their Internet

communications," the footnote supporting this conclusion explicitly recognizes

that it is the "DNS [that] translate[s] the domain name into an IP address associated

with the edge provider." (JA _ & n.997). The *Order* thus concedes that it is a third

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3   Press Release, NanoTech's Nuvola NP-1 4K Streaming Media Player Demonstrated with Akamai Media & Delivery Solutions at NAB 2014 (Mar. 19, 2014), *available at* http://finance.yahoo.com/news/nanotech-nuvola-np-1-4k-204400686.html.

party rather than the user that chooses the destination of the traffic. In short, its

reasoning undermines rather than supports reclassification of Internet access

services as telecommunications services.

The other examples of services cited by the *Order* where consumers

typically do not know the geographic location of the party called (JA _ ¶ 361) do

not provide any support for treating Internet access services as a

telecommunications service. Cell phones are subject to common carriage by virtue

of 47 U.S.C. § 332(c)(1)(A), which does not depend at all on cell phones falling

within the definition of telecommunications service. Instead, it is sufficient that

the mobile service be interconnected with the public switched network. *Id.*

§ 332(d)(1)–(2). The complete difference in legal basis means that the fact that

cell phones are treated as common carriers provides no support for treating Internet

access as a telecommunications service.

Similarly, the *Order*'s claim that toll free 800 service represents another

telecommunications service where consumers typically do not know the

geographic location of the called party turns out to be wholly unsupported. The

FCC precedents cited in support of this proposition (*see* JA _ ¶ 361 & nn. 999,

1002) and the authorities that those decisions cite in turn simply assert without

analysis that toll-free service is a telecommunications service. At no point do any

of these precedents or any FCC precedent of which I am aware discuss how toll

free 800 service satisfies the statutory requirement that the transmission be

"between or among points specified by the user." Such an "*ipse dixit* conclusion

. . . epitomizes arbitrary and capricious decisionmaking," *Ill. Pub. Telecomm.*

Ass'n v. FCC, 117 F.3d 555, 564 (D.C. Cir. 1997), and cannot provide any support

for extending this conclusion to another technology.

Finally, the *Order*'s invocation of call bridging service as a

telecommunication service is wholly inapt. As the authority cited by the FCC

explicitly recognizes, consumers who avail themselves of call bridging services

know the exact location of the conference bridge they are calling. Order, *Request*

for Review by InterCall, Inc. of Decision of Universal Service Administrator, 23

FCC Rcd 10731, 10735 ¶ 11 (2008). Simply put, the *Order*'s citation of this

precedent is a *non sequitur*.

CONCLUSION

For the reasons stated herein, the Court should grant the petitions for review

of United States Telecom Association, National Cable & Telecommunications

Association, CTIA–The Wireless Association, AT&T Inc., American Cable

Association, CenturyLink, Wireless Internet Service Providers Association, Alamo

Broadband Inc., and Daniel Berninger and vacate the *Order*.

Respectfully submitted,

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August 6, 2015

CERTIFICATE OF COMPLIANCE

Pursuant to Fed. R. App. P. 32(a)(7)(C) and D.C. Cir. R. 32(e)(2)(C), I hereby certify that the foregoing brief complies with the type-volume limitation of D.C. Cir. R. 32(e)(3) and Fed. R. App. P. 29(d) because this brief contains 2573 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(a)(7)(B)(iii) and D.C. Cir. R. 32(e)(1). This certification is made in reliance on the word count function of the word processing system used to prepare this brief (Microsoft Word 2010).

Further, I certify that the foregoing brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6) because this brief has been prepared in a proportionally spaced typeface (14-point Times New Roman).

/s/ Christopher S. Yoo
Christopher S. Yoo

August 6, 2015

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CERTIFICATE OF SERVICE

I hereby certify that, on August 6, 2015, I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit using the appellate CM/ECF system. Participants in the case who are registered CM/ECF users will be served by the appellate CM/ECF system.

I further certify that, on August 6, 2015, a copy of the foregoing was mailed by first-class U.S. mail, postage prepaid, to the following:

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