

ORAL ARGUMENT NOT YET SCHEDULED

**Nos. 18-1051, 18-1052, 18-1053, 18-1054, 18-1055,
18-1056, 18-1061, 18-1062, 18-1064, 18-1065, 18-1066, 18-1067,
18-1068, 18-1088, 18-1089 and 18-1105**

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

MOZILLA CORPORATION,

Petitioner,

v.

FEDERAL COMMUNICATIONS COMMISSION, et al

Respondent.

On Petition for Review of an Order of the
FEDERAL COMMUNICATIONS COMMISSION

***AMICUS CURIAE* BRIEF OF PROFESSORS SCOTT JORDAN
AND JON PEHA IN SUPPORT OF PETITIONERS**

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GLOSSARY

1996 Act	Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56
<i>2005 Wireline Order</i>	Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, <i>Report and Order and Notice of Proposed Rulemaking</i> , 20 FCC Rcd. 14853 (2005)
<i>2015 Order</i>	Protecting and Promoting the Open Internet, <i>Report and Order On Remand, Declaratory Ruling, and Order</i> , 30 FCC Rcd. 5601 (2015), <i>aff'd sub nom. United States Telecom Association v. FCC</i> , 825 F.3d 674
BIAS	Broadband Internet Access Service
<i>Brand X</i>	<i>Nat. Cable & Telecomms. Ass'n v. Brand X Internet Servs.</i> , 545 U.S. 967 (2005)
<i>Broadband PCS Order</i>	Amendment of the Commission's Rules to Establish New Personal Communications Services, <i>Second Report and Order</i> , 8 FCC Rcd 7700 (1993) (Broadband PCS Order)
<i>Cable Modem Order</i>	Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, <i>Declaratory Ruling and Notice of Proposed Rulemaking</i> , 17 FCC Rcd. 4798 (2002)
Caching	Caching is the storage of “content that can be accumulated by the ISP through . . . retrieval of information from websites” <i>Order</i> ¶ 42
<i>Communications Act</i>	Communications Act of 1934, as amended, 47 U.S.C. § 151 <i>et seq.</i>
<i>Computer II</i>	Amendment of Section 64.702 of the Commission’s Rules and Regulations (Computer II), <i>Tentative Decision and Further Notice of Inquiry and Rulemaking</i> , 72 F.C.C.2d 358 (1979) (<i>Tentative Decision</i>), 77 F.C.C.2d 384 (1980) (<i>Final Decision</i>), <i>aff'd sub nom. Computer and Comm’n Indus. Ass’n v. FCC</i> , 693 F.2d 198 (D.C. Cir. 1982), <i>cert. denied</i> , 461 U.S. 938 (1983)
CDN	Content Distribution Network
CPE	Customer Premises Equipment

DNS	Domain Name System, a function that “matches the Web site address the end user types into his browser . . . with the IP address of the Web page’s host server,” <i>Nat. Cable & Telecomms. Ass’n v. Brand X Internet Servs.</i> , 545 U.S. 967 (2005)
Edge Provider	Third party companies providing ISPs’ users content, applications, and services over the Internet
FCC or Commission	Federal Communications Commission
<i>Fleet Call</i>	Fleet Call, Inc., <i>Memorandum Opinion and Order</i> , 6 FCC Rcd 1533 (1991)
ICANN	Internet Corporation on Assigned Names and Numbers
IETF	Internet Engineering Task Force
IP	Internet Protocol
ISP	Internet Service Provider
LTE	Long Term Evolution
MAC	Medium Access Control
<i>MFJ</i>	<i>U.S. v. Am. Tel. & Tel. Co.</i> , 552 F. Supp. 131 (D.D.C. 1983), aff’d sub nom. <i>Maryland v. U.S.</i> , 460 U.S. 1001 (1983).
NANP	North American Numbering Plan
<i>Narrowband PCS Order</i>	Amendment of the Commission's Rules to Establish New Narrowband Personal Communications Services, <i>First Report and Order</i> , 8 FCC Rcd 7162 (1993)
PSTN	Public Switched Telephone Network
<i>Order</i>	Restoring Internet Freedom, <i>Declaratory Ruling, Report and Order, and Order</i> , 33 FCC Rcd. 311 (2018)
<i>Second Land Mobile Service Order</i>	An Inquiry Relative to the Future Use of the Frequency Band 806-960 MHz; and Amendment of Parts 2, 18, 21, 73, 74, 89, 91 and 93 of the Rules Relative to Operations in the Land Mobile Service Between 806 and 960 MHz, <i>Second Report and Order</i> , 46 FCC 2d 752 (1974)

<i>Stevens Report</i>	Federal-State Joint Board on Universal Service, <i>Report to Congress</i> , 13 FCC Rcd 11501 (1998)
<i>US Telecom</i>	<i>United States Telecom Ass'n. v. FCC</i> , 825 F.3d 674 (D.C. Cir. 2016)
VoIP	Voice over Internet Protocol

STATEMENT OF IDENTITY AND INTEREST

Amicus curiae Scott Jordan is a Professor of Computer Science at the University of California, Irvine; he served as FCC's Chief Technologist from September 2014 through December 2016. *Amicus curiae* Jon Peha is a Professor of Electrical and Computer Engineering and a Professor of Engineering and Public Policy at Carnegie Mellon University; he served as FCC's Chief Technologist from October 2008 through July 2010. Their research has focused on technological aspects of networking since the 1980s, and on open Internet issues since 1999. Together, they have published over 400 peer-reviewed articles on related topics. They have participated in the proceeding below.

STATEMENT REGARDING AUTHORSHIP

Pursuant to Fed. R. App. P. 29(a)(4)(E), *amicus curiae* states that no party's counsel authored this brief in whole or in part. No party or its counsel, and no person other than *amicus curiae* or their counsel, made a monetary contribution intended to fund the preparation or submission of this brief.

CERTIFICATES AS TO AUTHORITY, PARTIES, STATUTES, RULINGS, AND RELATED CASES

I. AUTHORITY, PARTIES, AND AMICI

As indicated in their August 21, 2018, Notice of Intent to File, all the parties and intervenors to this appeal either consent or do not oppose the filing of an *amicus* brief by Professors Jordan and Peha in this case. Except for amici

Professors Jordan and Peha and any other amici who have not yet entered an appearance in this Court, all parties and amici appearing before the district court are listed in the Brief for Petitioners.

II. RULINGS UNDER REVIEW AND STATUTES

References to the rulings at issue appear in the Brief for Petitioners. All applicable statutes, regulations, orders, and other authorities., are contained in the Brief for Petitioners.

III. RELATED CASES

References to related and consolidated cases appear in the Brief for Petitioners. Other than those cases, and so far as counsel are aware, this case has not previously been filed with this Court or any other court, and counsel are aware of no other cases that meet this Court's definition of related.

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ARGUMENT

I. The Order’s classification of BIAS as an information service relies on technical assumptions that are no longer valid.

In the 1990s, when dial-up services prevailed, ISPs attracted customers with promises of great content and useful applications, such as ISP-hosted e-mail, chat rooms, and ISP-commissioned news articles. *Stevens Report* ¶ 76. This led FCC to conclude in its 1998 *Stevens Report* that dial-up ISPs offer information services as defined by the 1996 Act. *Id.* at ¶¶ 80-81. To reach this conclusion, the *Stevens Report* relies on examples of information services offered from ISP computers that FCC considered to be inherent parts of Internet access.

- “When subscribers store files *on Internet service provider computers* to establish ‘home pages’ on the World Wide Web, they are” using an information service. *Stevens Report* ¶ 76 (emphasis added).
- “The same is true when Internet service providers offer their subscribers access to Usenet newsgroup articles. An Internet service provider receives and stores these articles ... *on its own computer facilities*. ... In providing this service, an Internet service provider offers” an information service. *Id.* at ¶ 77 (emphasis added)
- “(E)lectronic mail utilizes data storage as a key feature of the service offering. The fact that an electronic mail message is *stored on an Internet service provider's computers* in digital form offers the subscriber extensive

capabilities for manipulation of the underlying data. ... This service thus provides” an information service. *Id.* ¶ 78 (emphasis added)

Subsequent classifications of Internet access service as information services were founded on facts and assumptions from the *Stevens Report*. The 2002 *Cable Modem Order* relied heavily on this report to conclude that a cable modem service was also an information service, that included telecommunications. *See Cable Modem Order* ¶¶ 37-38. Portions of the Supreme Court’s *Brand X* decision also rely on the conclusion that Internet access is at least in part an information service, which comes either directly from the *Stevens Report* or indirectly via the *Cable Modem Order*. *See Nat. Cable & Telecomms. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967, 968 (2005).

Technology and services have changed over the decades. Consumers can no longer expect Usenet newsgroup articles or personal webpages as part of Internet access service. Consumers today turn almost entirely to providers other than their ISP for e-mail service, web page hosting, discussion forums, and countless other content and application services. *2015 Order* ¶¶ 348-349. When a BIAS subscriber uses Gmail, no email is “stored on an Internet service provider's computers” as the *Stevens Report* assumed; Google stores the email, so it is Google that provides the information service. Similarly, it is usually some entity other than the ISP that provides an information service by storing user home pages, and

the modern equivalent of newsgroup articles. *Id.* The *Stevens Report*'s proof is no longer valid.

Since 1998, we have also seen a convergence of telephone networks and the Internet. In 1998, the Internet employed a packet-switched technology called Internet Protocol (“IP”), whereas telephone networks used a different technology based on circuit switching. Today, the telephone services most Americans receive use IP. In 1998, it was clear which network links and capacity were used for telephony and which were used for Internet. Today, Internet and telephone traffic travels intermixed over the same physical infrastructure. *See* Electronic Frontier Foundation *Ex-Parte*, WC Docket No. 17-108 at 3 (Dec. 6, 2017) . In 1998, consumers thought of telephone service for audio and Internet for text. Today, many people use a mobile telephone service primarily to exchange text and use BIAS, to have voice conversations over services like Skype, and to listen to music or watch video. Since the differences in technology, infrastructure, and applications have disappeared, it is clear that telephone and Internet access services should be classified the same – *i.e.* as telecommunications services.

Internet technology and usage have changed such that the assumptions in the *Stevens Report* are no longer valid to justify the classification of BIAS today. In 2015, FCC reexamined the facts and concluded that BIAS met the definition of telecommunication service. *2015 Order* ¶ 356. In 2017, FCC reversed that

conclusion, *Order* ¶ 28 (JA____), even though the facts had not changed in any meaningful way from 2015 to 2017.

II. BIAS is a telecommunications service because Internet standards dictate that the fundamental purpose and function of BIAS is telecommunications and because Internet standards dictate that this telecommunications must be separable from Internet applications.

A. Internet standards dictate that the fundamental purpose and function of BIAS is telecommunications.

The *Order* acknowledges that BIAS includes telecommunications and that “[t]he fundamental purpose of broadband Internet access service is to ‘enable a constant flow of computer-mediated communications between end-user devices and various servers and routers to facilitate interaction with online content.’” *Order* ¶ 31 (JA____). However, the *Order* fails to analyze what components of BIAS constitute telecommunications.

Internet standards dictate that this flow of computer-mediated communications be implemented by the Internet Protocol (“IP”), which the standards require to transmit, between or among points specified by the user, information of the user’s choosing, without change in the form or content of the information as sent and received.

Subscribers typically use an ISP merely to move information from her device to one owned by some other entity, and vice versa. That entity might be another consumer, as occurs with applications like Skype, or a commercial content

provider, like Netflix.

Information moves through the Internet in chunks of data known as IP packets. Every website a consumer visits and every email that is sent, is transmitted as a series of packets. Packets are the basic unit of information exchange in the Internet, as well as in most modern telephone systems.

The fundamental purpose and function of BIAS is the transfer of one or more IP packets from sender to recipient, known as IP packet transfer. *See* Cherry & Peha Comments, GN Docket No. 14-28 (Dec. 22, 2014). A network provides IP packet transfer when it transfers IP packets from a network ingress point that receives IP packets from a sender, to a network egress point that transmits IP packets to the intended recipient.

Each IP packet includes “payload” information, *i.e.* information that the sender wishes to transfer, and “control” information, including the IP address of the intended recipient. Packets are created by the sender, and then transmitted to the ISP. This is true for both fixed and mobile BIAS.

According to the 1996 Act, “the term ‘telecommunications’ means 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.” 47 U.S.C. § 153(50). IP packet transfer meets this definition.

First, IP packet transfer transmits information between or among points

specified by the user. The user places the IP address of the packet's intended recipient in each IP packet, and this is how the end point(s) are "specified by the user." Peha Comments, WC Docket No. 17-108 at 9, 16-17 (July 17, 2017) ("Peha Comments"). The destination IP address plays an analogous role in the Internet that the telephone number plays in telephone service. In some cases, the sender knows the recipient's IP address already, and in some cases the sender obtains the IP address through a DNS lookup described in II.D. Either way, the end user—not the ISP—specifies the end point.

Second, the user (not the service) chooses what information to put in each packet, and the information is transmitted without change in the form or content. *Id.* at 16. It is the very nature of IP packet transfer that the "form and content of the information" must remain precisely the same from the moment it is transmitted to the moment it is received.¹

If the packet's sender and recipient are both customers of the same ISP, that is the entire story. The Internet is a network of networks, however, and this is not always the case. If an IP packet travels through several networks before reaching its destination, collectively these networks send the packet to the point specified by the sender. Individually, each network sends packet to an egress point that is en

¹ Internet Engineering Task Force, Internet Protocol (IP) Specification, RFC 791 (Sept. 1981), <https://tools.ietf.org/html/rfc791> (IP Standard).

route to the point specified by the user. This is essentially the same as long-distance calls on the traditional telephone network, where information travels through a local exchange carrier, then through a long-distance carrier, then through another local exchange carrier. Peha Comments at 16-17. Each of these telephone carriers provides telecommunications. Thus, the same is true of each ISP that provides IP packet transfer.

“The term ‘telecommunications service’ means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.” 47 U.S.C. § 153(53). By definition, a commercial BIAS is offered “for a fee directly to the public, or to such classes of users as to be effectively available directly to the public.” The core offering of BIAS is IP packet transfer, which is telecommunications.

B. ISP bundling of BIAS with applications is not sufficient to classify BIAS as an information service because Internet standards dictate that the telecommunications underlying Internet applications must be separable from those applications.

Under *Brand X*, the Commission must determine whether an offering of both the telecommunications component of BIAS and bundled applications is solely an information service (BIAS bundled with applications, as described in the *Order*), or both an information service (applications) and a separate and distinct

telecommunications service (BIAS, as described in the *2015 Order*). *Brand X*, 545 U.S. at 989. The *Brand X* court did not understand FCC as saying that “any telecommunications service that is priced or bundled with an information service is automatically unregulated under Title II.” *Id.* at 997. Instead, the *Brand X* court concluded that “[t]he entire question is whether the products here are functionally integrated (like the components of a car) or functionally separate (like pets and leashes).” *Id.* at 991.

The *2015 Order* determined that telecommunications is separable from applications that do not fall within the telecommunications system management exception. *2015 Order* ¶ 376. These include the applications cited in the *Cable Modem Order* and the *2005 Wireline Order*, namely email, webpage hosting, and access to newsgroups. *Id.* ¶¶ 377-378. These also include cloud-based storage, spam protection, and customized homepages. *Id.* ¶¶ 348, 377.

In contrast, the *Order* claims that the telecommunications is inseparable from information service capabilities offered as part of what the *Order* interprets as BIAS. *Order* ¶¶ 33 n. 99, 45 (JA____). The *Order* claims that such applications are “functionally integrated information processing components that are part and parcel of the broadband Internet access service offering itself,” *Id.* ¶ 33 (JA____), and that “information processes must be combined with transmission in order for broadband Internet access service to work,” *Id.* ¶ 49 (JA____).

However, the *Order* provides no analysis or evidence for why applications are inextricably intertwined with the telecommunications component of BIAS. The claim is incorrect and ignores the record to the contrary. Jordan Reply Comments, WC Docket No. 17-108 at 23-28 (Aug. 30, 2017); Peha Comments at 18; van Schewick Reply Comments (corrected), WC Docket No. 17-108 at 23-28 (Aug. 31, 2017); Open Technology Institute at New America Comments, WC Docket No. 17-108 at 26-27 (July 17, 2017) (OTI Comments). As explained below, Internet standards dictate that the telecommunications underlying Internet applications (the IP packet transfer service) *must* be separable from Internet applications.

Both *Computer II* and the *MFJ* had envisioned that information service functionality may be intertwined with the telecommunications to the extent that an information service no longer transmits intelligence of a customer's own design and choosing, and thus is no longer telecommunications. *See Computer II* ¶ 120. Such intertwining was appropriate for the distributed computing applications of the 1980s and 1990s, in which a distributed computing provider would procure telecommunications from a telecommunications service provider, combine it with computer processing, and sell the combined information service to the consumer. *See Computer II* ¶ 110; *MFJ* ¶ 179; Jordan Reply Comments at 25.

In contrast, the central tenet upon which the Internet is designed is that

network services are organized into *network layers* and that the interfaces to the lower-layer network services are *standardized*.² Layering is a form of modular architecture, which frees designers of one module from needing to understand the way in which services provided by other modules are implemented.

The Internet Engineering Task Force (IETF) develops Internet standards, including the Internet Protocol (IP) used by all Internet communications. These protocols have standardized functions and standardized interfaces to other protocols. Standardized software interfaces are the software equivalent of the standardized modular telephone plugs. They make possible interoperability of devices and software designed by different entities. Jordan Reply Comments at 25-26.

The IP standard dictates that IP packet transfer service *must* be separable from Internet applications.³ This end-to-end transfer of packets cannot depend on the application. Separability of applications and IP packet transfer is also apparent from Internet standards for applications such as e-mail and web browsing⁴, none of

² Internet Engineering Task Force, Requirements for Internet Hosts – Communications Layers, RFC 1122 (Oct. 1989), <https://tools.ietf.org/html/rfc1122>.

³ IP Standard.

⁴ Internet Engineering Task Force, Simple Mail Transfer Protocol, RFC 5321 (Oct. 2008), <https://tools.ietf.org/html/rfc5321>; Internet Engineering Task Force,

which contains any details related to how IP packets are moved from one part of the Internet to another.

Modularity and interface standardization make the Internet possible. Edge providers can design applications without coordination with or permission from BIAS providers who offer the lower-layer IP packet transfer service. Edge providers know that BIAS providers will provide an IP packet transfer service in accordance with the Internet's IP standard, thereby transferring packets to recipients without change in form or content, and that is all an edge provider needs to know. Similarly, BIAS providers select equipment without coordination with or permission from providers of applications and content. Thus, BIAS and applications are separable by design.

Moreover, the relationship between network services is not symmetric. In a layered architecture, while a service at one layer may rely on services provided by lower layers, it cannot rely on services provided by higher layers: e.g., an email application relies on IP packet transfer to route the packets that comprise an email, but IP packet transfer cannot rely on applications such as email. Jordan Reply Comments at 26. Thus, an email service is useless without Internet access service.

Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing, RFC 7230 (June 2014), <https://tools.ietf.org/html/rfc7230>; Internet Engineering Task Force, Network News Transfer Protocol (NNTP), RFC 3977 (Oct. 2006), <https://tools.ietf.org/html/rfc3977>.

However, an Internet access service is useful without an email service. This lack of symmetry is fundamental to Internet design, and to the separability of telecommunications service from information services.

The end-to-end transmission of IP packets is not “functionally integrated (like the components of a car)” with applications like email, web browsing, or cloud storage. Thus, any claim that applications are “functionally integrated” with and “inextricably intertwined” with the underlying telecommunications, and hence that the telecommunications are inseparable from applications, is factually wrong. The *Order* fails to meet the test put forth in *Brand X* for determining that the telecommunications component of the service is inextricably intertwined with any information capabilities of the service.

Finally, the *Order* also argues that BIAS telecommunications is inseparable from applications because BIAS providers offer a service that is understood by consumers to include such bundled applications. *Order* ¶ 46 (JA____). In reality, consumers understand that most content and applications they want are provided by third parties. Even when consumers get useful applications from their BIAS provider, these applications are at best of secondary interest. It is incredulous that consumers purchase BIAS in order to use a BIAS provider’s email, webpage hosting, or cloud-storage services.

C. The information processing functions necessary for, and bundled with, BIAS are not sufficient to classify BIAS as an information service because they fall within the telecommunications systems management exception.

Like telephone services, BIAS require some mechanisms for management, control, or operations that involve the storage or processing of information. For example, ISPs use stored collections of information to produce monthly bills, determine the network route from sender to recipient, and assign IP addresses to customers. This is irrelevant to the classification of BIAS. Providers of telephone service have analogous or identical mechanisms and the statute specifies that any mechanism “for the management, control, or operation of a telecommunications system or the management of a telecommunications service” is not an information service when bundled with a telecommunications service. 47 U.S.C. § 153(24).

The *Order* explicitly disregards this statutory limitation in concluding that “ISPs offer a single, inextricably intertwined information service” and that “information processes must be combined with transmission in order for broadband Internet access service to work, and it is the combined information processing capabilities and transmission functions that an ISP offers with broadband Internet access service.” *Order* ¶¶ 49, 51 (JA____). Viewing all information processes as information services is incorrect. The only “information processes” that are inextricably intertwined with BIAS are intertwined precisely because they support “management, control or operation” of IP packet transfer,

which is a telecommunications service; and therefore, falls within the telecommunications systems management exception.

Other than management, control or operation mechanisms, IP packet transfer does not involve “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information.” Thus, neither IP packet transfer nor BIAS is an information service.

D. The domain-name-to-IP-address-translation service provided by DNS is not sufficient to classify BIAS as an information service because (i) DNS is not inextricably intertwined and (ii) the DNS service falls within the telecommunications systems management exception.

The Domain Name System (“DNS”) is the global directory service that allows users to map human-readable domain names such as “www.fcc.gov” into IP addresses. These IP addresses can then be placed in the header of an IP packet, so that the IP packet transfer system can send the packet to the recipient. The non-profit Internet Corporation for Assigned Names and Numbers (ICANN) oversees a global distributed database system of DNS servers that provides IP addresses upon request from any Internet user for free. No assistance is required from BIAS providers. Nevertheless, it is common but not essential for BIAS providers to place servers in their network that also respond to requests for an IP address, and thereby facilitate this function for subscribers.

The *Order* claims that the DNS is “an indispensable functionality of broadband Internet access service,” and that “DNS is a core function of broadband

Internet access service.” *Order* ¶ 34 (JA____). It also claims that a DNS service is an information service when offered in conjunction with BIAS. *Id.* ¶ 35 (JA____). These assertions are incorrect.

There are three reasons why BIAS does not become an information service simply because the BIAS provider operates DNS servers. First, DNS is not inextricably intertwined with BIAS. Internet architects deliberately created DNS to be entirely independent from the IP packet transfer function.⁵ Indeed, DNS service should be viewed as just another application, which is separable by design from IP packet transfer. If BIAS does not include its own DNS service, then BIAS customers can simply make DNS requests to someone other than their BIAS provider. The change would be trivial. Indeed, this happens every day. In addition to DNS servers overseen by ICANN, BIAS customers can obtain DNS services from Google, Cloudflare, OpenDNS, and others. Google has provided DNS service for free to all Internet users since 2009, and as of 2014, was receiving four billion DNS requests per day.⁶ If a BIAS provider neither operated its own

⁵ Internet Engineering Task Force, Dynamic Host Configuration Protocol, RFC 2132 at 7 (Mar. 1997), <https://tools.ietf.org/html/rfc2132>. In fact, per the protocol a BIAS provider need not specify a DNS server at all; *see* Internet Engineering Task Force, Dynamic Host Configuration Protocol, RFC 2131 at 5 (Mar. 1997), <https://tools.ietf.org/html/rfc2131>.

⁶ Google, “Google Public DNS and Location-Sensitive DNS Responses,” Dec. 15, 2014. <https://webmasters.googleblog.com/2014/12/google-public-dns-and-location.html>

DNS server nor designated an unaffiliated DNS server, the operating system on the customer's device would prompt the user to select one in the initial one-time set-up of the device. Thus, a BIAS provider's DNS is an extraneous capability, like e-mail, not required for the core service.

Second, even when offered by an ISP, DNS capability is only there in support of the core function—IP packet transfer—which is telecommunications. According to the 1996 Act, a function that might otherwise be an information service will not be considered as such if it is merely used “for the management, control, or operation of a telecommunications system or the management of a telecommunications service,” which is the case here. 47 U.S.C. § 153(24). A BIAS provider benefits from operating a DNS server, since this reduces the volume of DNS queries passing through its network.

Third, DNS is to BIAS what directory-assistance service is to telephone service. In both cases, users provide the name of the entity they want to communicate with and the service provides the corresponding number that the network requires. Peha Comments at 19. Both involve storing and processing information. Both services make the network more valuable to users, but do not affect the transfer of information from sender to recipient without change of form or content. Both services are offered by third parties having nothing to do with the network. For FCC to rule that BIAS is an information service because that BIAS

includes DNS, and not simultaneously rule that every telephone service that includes 411 directory assistance is also an information service, is arbitrary and capricious.

E. Even where BIAS bundles caching services it is not sufficient to classify BIAS as an information service because caching falls within the telecommunications systems management exception.

The *Order* asserts that caching provided by BIAS providers is an information service, that DNS and web caching are “part and parcel of the broadband Internet access service,” and that BIAS providers offer caching because “broadband Internet access service would be a significantly inferior experience for the consumer” without caching. *Order* ¶ 42 (JA____). All these assertions are wrong.

Some networks store popular webpages in caches. When a user requests a webpage, it is sometimes possible to respond using information stored in a cache close to the user, rather than from the original source which may be thousands of miles away. This mechanism is hidden from the user requesting the information. (Indeed, the word “cache” comes from the French *cache* – to hide.)

The primary reason that a BIAS provider would choose to employ caching is to reduce the BIAS provider’s costs. Peha Comments at 14. If a web page is stored close to the end user, then the BIAS provider can sometimes avoid transferring the web page more than once over an expensive backhaul link or avoid

paying the transit cost. Although caching sometimes has the added benefit of reducing response time to the end user, BIAS providers do not employ caching to attract or retain customers, because customers have no way of knowing which BIAS provider offers better caching. Most customers are not aware of whether the provider is caching because it does not affect traditional “speed” tests that measure the quality of an Internet service and they can never tell if any of the web pages they receive came from an ISP-operated cache. *Id.* Thus, end users cannot choose their BIAS provider or choose to pay extra based on caching, and deploying caches is unlikely to affect a provider’s market share. A rational profit-maximizing ISP will decide whether to use caching based primarily on whether the reduction in its transmission costs exceeds the costs of caching.

Given that providers employ caching to reduce their own costs, and BIAS customers have no way of knowing whether caching has occurred, it is reasonable to conclude that caching falls within the telecommunications systems management exemption. Indeed, BIAS providers themselves routinely describe such caching practices as “network management” practices.⁷ Thus, it is not an information

⁷ AT&T describes its caching as a “a reasonable network management video optimization technique” in “Information About the Network Practices, Performance Characteristics & Commercial Terms of AT&T’s Mass Market Broadband Internet Access Services,” <https://www.att.com/gen/public-affairs?pid=20879>; Sprint describes its caching as a “reasonable network

service to consumers in its own right.

Finally, the *Order* confuses caching with a content delivery network (CDN) service when it claims that the BOC provision (circa 1988) of “storage space in their gateways for databases created by others and lease that space to information service providers,” *United States v. West. Elec. Co., Inc.*, 714 F. Supp. 1, 19 (D.D.C. 1988), “appears highly analogous to caching.” *Order* ¶ 43 (JA____).

Although both caches and CDNs attempt to provide information from servers close to the requesting users, and both mechanisms are hidden from the end user, a critical difference is that content providers pay CDN operators to include content in the CDN. Thus, the customers for a CDN service are content providers, primarily those providing large volumes of content. Leasing of storage space to edge providers is the service provided by CDNs. It is not caching. As both the

management practice[] ... consistent with mobile broadband industry standards and guidance provided by the Federal Communications Commission (FCC)” in “Open Internet Information,” https://www.sprint.com/legal/open_internet_information.html; T-Mobile describes its caching as a “network management practice” to “manage the flow of data on its network” in “Important Information About T-Mobile’s Broadband Internet Access Services and T-Mobile’s Open Internet Disclosures,” <https://www.t-mobile.com/company/company-info/consumer/internet-services.html>; Verizon Wireless explains that its caching is a “network management technology ... designed to transmit data more efficiently, ease capacity burdens on the network, primarily from video files, and improve the user experience with faster downloads and decreased Internet latency” in “Explanation of Video Optimization Deployment,” <https://www.verizonwireless.com/support/video-optimization/>.

2015 Order and the *Order* explain, CDN service is distinct from the type of caching by a BIAS provider at issue here and is separate from broadband Internet access service. *2015 Order* ¶ 372; *Order* ¶ 24.

Moreover, although some providers operate their own CDN, CDN market leaders such as Akamai are not BIAS operators, so CDN service is currently separable from BIAS. Thus, if a network operator chooses to offer both BIAS and CDN services, these are properly viewed as separate offerings to different sets of customers, and such provider-offered CDN services do not change the classification of BIAS.

III. Mobile BIAS is a commercial mobile service because it is provided for profit and makes interconnected service available to the public.

By statute, mobile BIAS is a *commercial mobile service* if it is a “mobile service ... provided for profit and makes interconnected service available ... to the public,” where *interconnected service* is defined by statute as “service that is interconnected with the public switched network ...” 47 U.S.C. § 332(d).

A. There is a single public switched network that includes networks used to provision telephone exchange service, telephone toll service, mobile voice service, and BIAS.

The *Order* claims that there is a common carrier switched network (the PSTN) that includes local exchange carriers, interexchange carriers, and mobile voice service providers, and that uses NANP in connection with the provision of

switched services; that there is a separate common carrier switched network (the Internet) that includes mobile data service providers, and that uses public IP addresses in connection with the provision of switched services; and that the PSTN and the Internet are not interconnected. *Order* ¶¶ 75-77, 79 (JA____). The *Order* provides no analysis or evidence for this claim and ignores the record to the contrary.

Technologically, there is a single network that includes both PSTN and Internet, and that is used to provision both telephone service and BIAS. Under the Communications Act and a long string of Commission Orders, as well as in the technical literature, there is a distinction between the communications network used to provision a telecommunications service and the telecommunications service itself. Jordan Reply Comments at 29-30 ; *See, e.g., Second Land Mobile Service Order* (allocating spectrum to cellular systems for both public telephone service and public dispatch service); *Narrowband PCS Order* (allocating spectrum to PCS networks for both advanced paging service and data messaging services); and *Broadband PCS Order* (allocating spectrum to PCS networks for both mobile advanced voice service and data communications service that was a precursor to mobile BIAS). The same communications network may be used to provision multiple telecommunications services, as well as other services.

The existence of a single network rests on the characteristics of the network,

not on the services provisioned over the network. Fixed phone service, mobile phone service, fixed BIAS, and mobile BIAS are not only provisioned over interconnected physical infrastructure; these services are often provisioned over the same physical infrastructure. Jordan Reply Comments at 31; Electronic Frontier Foundation *Ex Parte* at 3. Fixed telephone and BIAS are provisioned over the same copper or fiberoptic cables from the subscriber premises to the central office or cable head-end. Mobile telephone and BIAS are provisioned over the same wireless links from the subscriber's device to a cell tower. All of these services are provisioned over the same regional infrastructure, which interconnects central offices and cell towers, and over the same national infrastructure, including terrestrial fibers that run from east coast to west.

A single network does not necessitate that all devices use a uniform addressing space (*e.g.* NANP). Networks using different addressing spaces are connected to form a larger single network. The PSTN uses NANP addresses in the wireline portion of the PSTN, paging MAC addresses in paging networks, and a variety of formats of cell phone MAC addresses in cell phone networks. Jordan Reply Comments at 32-33. In addition, a device often implements several communications protocols and is often assigned multiple network addresses. For instance, a mobile smartphone may be assigned a NANP address, a private IP address, and an LTE MAC address. *Id.* Still, the multiplicity of network addresses

does not fragment the public switched network. When a page is sent, the telephone number of the pager is translated into the pager's MAC address so that the paging message may be routed from the wireline portion of the PSTN onto a paging network. *Id.* Similarly, when a call is placed to a mobile phone, the telephone number of the mobile phone is translated into the mobile phone's MAC address so that the call may be routed from the wireline portion of the PSTN onto the cell phone network. *Id.*

B. Mobile BIAS is interconnected with the public switched network.

Interconnected service is defined by statute as “service that is interconnected with the public switched network ...,” 47 U.S.C. § 332(d), and defined by regulation as “service that is interconnected with the public switched network ... that gives subscribers the capability to communicate to or receive communication from all other users on the public switched network ...,” 47 C.F.R. § 20.3 (1994). Under the 2015 regulatory definitions of *public switched network* and *interconnected service*, there is no doubt that mobile BIAS is an *interconnected service*.

Moreover, even under the *Order*'s return to the 1994 definitions, mobile BIAS remains an *interconnected service*. Mobile BIAS is *interconnected* with the public switched network because it is “connection ... through technologies such as store and forward ... to permit the transmission or reception of messages ... to or

from points in the public switched network.” Mobile BIAS also gives subscribers the capability to communicate to or receive communications from *all* other users on the public switched network, providing that the parties have acquired the necessary telecommunication services and customer premises equipment (CPE).

An end user who has subscribed to mobile BIAS has the capability to communicate to and from all other users who are subscribers to BIAS and are using devices capable of using that service. *United States Telecom* at 67. In addition, an end user who has subscribed to mobile BIAS also has the capability to communicate with all other users who are subscribers to other interconnected services (*e.g.* telephone exchange service, telephone toll service, and mobile voice service), providing that the parties have acquired the necessary services and CPE. Jordan Reply Comments at 35-38.

There are many options for doing so. First, mobile BIAS subscribers may obtain and use an app that is capable of addressing, configuring, and maintaining connections with communicating parties. *Id.* Several such apps are available, including Skype, Google Voice, Cisco WebEx, and GoToMeeting. *Id.*; OTI Comments at 84-87. Second, the party with which the mobile BIAS subscriber wishes to communicate may use a voice forwarding service, such as an email-to-voice service. Jordan Reply Comments at 36.

The *Order* asserts that “the service in question must itself provide

interconnection to the public switched network using the NANP to be considered an interconnected service.” *Order* ¶ 80 (JA____). The *Order* is wrong. A telecommunications service does not by itself offer subscribers the ability to meaningfully communicate. A telecommunications service is the offering of *telecommunications*. However, in order for end users to meaningfully communicate, they must (i) obtain the services that entitle them to transmit information between each other, and (ii) obtain CPE sufficient to address messages to each other and to encode and decode these messages. Jordan Reply Comments at 34-35; Open Technology Institute at New America Reply Comments, WC Docket No. 17-108, 55-59 (July 17, 2017) (OTI Reply Comments).

The requirement for users to obtain interoperable services is nothing new. Voice communication between two parties in different telephone exchanges requires that both parties have subscribed to telephone exchange service and that the calling party has subscribed to telephone toll service. Jordan Reply Comments at 34-35.

Similarly, successful transmission of a paging message requires that the source has subscribed to telephone exchange service and that the destination has subscribed to paging service. *Id.*

The requirement for end users to obtain interoperable CPE is also nothing new. Addressing and maintaining connections with communicating parties is the

traditional functionality of CPE. A subscriber to mobile voice service cannot engage in meaningful communication with a fax machine on the public switched network, and yet mobile voice service is an interconnected service. *Id.*; OTI Reply Comments at 55-59. A subscriber to a one-way paging service may not transmit messages to or from another subscriber to a one-way paging service, and yet one-way paging is an interconnected service. Jordan Reply Comments at 34-35; OTI Reply Comments at 55-59.

In addition, the major mobile service providers no longer offer voice-only cell plans. OTI Reply Comments at 59-62. Even their most basic plans include data.⁸ Thus, anyone with almost any cell phone⁹ on almost any recent cell phone plan has access to mobile BIAS.

The *Order*'s claim that a service must itself provide interconnection to the public switched network using the NANP to be considered an interconnected service contradicts the plain language of the statutory definition of *interconnected service* as "service that is interconnected with the public switched network." This

⁸ See e.g., Sprint, "Sprint single line cell phone plans," <https://www.sprint.com/en/shop/plans/single-line-cell-phone-plans.html> ("2GB plan - \$40/mo./line. The lowest price entry plan among national carriers."); Verizon, "Single Basic Phone Plan," <https://www.verizonwireless.com/plans/single-device-plan/> ("Unlimited Talk & Text, plus 500MB of data for \$30/mo.").

⁹ Today, even most basic (or "feature") phones are capable of transmitting and receiving data.

issue is over the capability of interconnectedness, not that a BIAS provides the functionality of interconnectedness. By definition, it takes multiple service providers that are interconnected before a subscriber can use an interconnected service, so it is ridiculous to assert that one service provider must be able to do it alone. According to the Commission's own regulatory definition, a service is an *interconnected service* if it "is interconnected with the public switched network, or interconnected with the public switched network *through an interconnected service provider*, that gives subscribers the capability to communicate to or receive communication from all other users on the public switched network." 47 C.F.R. § 20.3 (italics added).

The *Order's* claim also contradicts the statute itself. When Congress created Section 332(c), it explicitly rejected the Commission's prior interpretation that "the primary test for inclusion in the private and mobile radio service is that a licensee not resell interconnected telephone service for a profit." H.R. Rep. No. 103-111, 260 & n.2 (1993) (in part quoting *Fleet Call*). Henceforth, the test for inclusion in the private mobile service would *not* be resale of *interconnected telephone service*; Congress replaced this test with one of making *interconnected service* available to the public. The *Order* invokes an interpretation that Congress explicitly rejected.

Finally, note that mobile voice service remains an interconnected service. An end user who has subscribed to mobile service has the capability to receive

communications not only from subscribers to telephone exchange service and mobile service, but also from subscribers to BIAS. One option for doing so is for a subscriber to BIAS to use an app that is capable of addressing communicating parties, configuring, and maintaining connections with communicating parties, as discussed above. Jordan Reply Comments at 37. Another option, offered by most major mobile service providers, is an email-to-text feature of the service, in which a BIAS subscriber may send an email to a mobile service subscriber and that message will be received as a text message.¹⁰ Yet another option, which works with any mobile service provider, is to use an operating system such as Windows 10 that offers the ability to send text messages.¹¹

¹⁰ See e.g. AT&T, “Send email as text message,” <https://www.att.com/esupport/article.html#!/wireless/KM1061254> (“Send an email message to anyone with an AT&T wireless number that will be received as a text message on their phone or device”); T-Mobile, “Learn about text and picture messaging,” <https://support.t-mobile.com/docs/DOC-3309> (“You can send messages to any email address, and you can have email sent to your mobile device via text message”); Verizon, “How to send text messages to Verizon customers from your PC,” <http://www.verizon.com/about/news/vzw/2013/06/computer-to-phone-text-messaging> (“Here’s how to send a text message from a computer to fellow Verizon Wireless customer”).

¹¹ See e.g., Microsoft, “Send a text message,” <https://support.microsoft.com/en-us/help/17266/windows-10-mobile-send-text-message> (“To send a text, on Start, select Messaging, and then New message . Enter a phone number or contact, type your message, and then select Send.”).

CONCLUSION

The bases for the *Order* to reclassify BIAS as an information service are flawed. First, the technical assumptions on which reclassification are based are invalid today. Second, Internet standards dictate that the main purpose of BIAS is the transmission of information among user-determined points without change to form or content. Third, bundling BIAS with applications, conducting certain information processing functions, and providing DNS or caching services, are not sufficient to reclassify BIAS as an information service because Internet standards dictate that these offerings are separable, not inextricably intertwined, or they fall within the telecommunications systems management exception. Finally, mobile BIAS must be deemed a commercial mobile service because it is provided for profit and makes interconnected service available on the single public switched network.

Respectfully Submitted,

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CERTIFICATE OF SERVICE

I hereby certify that an electronic copy of the foregoing brief was served on all counsel of record via the Court's electronic filing system on August 27, 2018.

/s/

THOMAS H. VIDAL

CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitation of Fed. R. App. P. 29(a)(5) and 32(a)(7) because this brief contains 6496 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(a)(7)(B)(iii).

This 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 using Microsoft Word v. 16 in 14-point Times New Roman font, including footnotes. The undersigned has relied on the word count feature of this word processing system in preparing this certificate.

/s/

THOMAS H. VIDAL