ORAL ARGUMENT SCHEDULED FOR FEBRUARY 1, 2019

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

No. 18-1051 (and consolidated cases)

MOZILLA CORPORATION, *et al.*,
Petitioners,

v.

FEDERAL COMMUNICATIONS COMMISSION
and UNITED STATES OF AMERICA,
Respondents.

On Petition For Review of an Order of the Federal Communications Commission

BRIEF OF *AMICI CURIAE* RICHARD BENNETT, *et al.*, IN SUPPORT OF RESPONDENTS

Tara M. Corvo
Jonathan Markman
Christen B'anca Glenn
MINTZ, LEVIN, COHN, FERRIS,
GLOVSKY AND POPEO, P.C.
701 Pennsylvania Ave., N.W.
Suite 900
Washington, DC 20004
Telephone (202) 434-7300
Facsimile (202) 434-7400

Counsel for Amici Curiae

October 18, 2018

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CERTIFICATE AS TO PARTIES, ORDERS, AND RELATED CASES

Pursuant to D.C. Cir. R. 28(a)(1), *amici* certify:

A. Parties and Amici

The list of parties is set forth in Respondents' opening briefs. All petitioners and respondents have consented to the filing of this brief.

B. Order Under Review

Amici support Respondents' defense of the FCC's decision as set forth in *Restoring Internet Freedom*, 33 FCC Rcd. 311 (2018) (JA___).

C. Related Cases

The list of related cases is set forth in Respondents' opening briefs.

CERTIFICATE OF COUNSEL REGARDING NECESSITY OF SEPARATE AMICUS CURIAE BRIEF

Pursuant to D.C. Cir. R. 29(d), *amici* hereby certify that they are submitting a separate brief from other *amici curiae* in this case due to the specialized nature of their knowledge related to the technical facts underlying the conclusions in this proceeding.

To the best of their knowledge, *amici* are the only ones presenting information regarding the technical underpinnings of the software that controls the flow of information on the Internet, and details regarding how the Commission's regulation of BIAS as an information service maps onto this architecture. Moreover, *amici* understand that other *amici curiae* intend to focus on other topics related to the *RIF Order*. Joining these divergent issues into a single brief would hinder, rather than streamline, the presentation of *amici*'s arguments. Accordingly, *amici* certify that filing a joint brief would not be practicable.

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*Authorities upon which *amici* chiefly rely are marked with asterisks.

GLOSSARY

BIAS	Broadband Internet Access Service, the Internet service provided to the general public
DNS	Domain Name Service, a distributed database that provides various information about Internet domains, addresses, and reputations
Edge Providers	Peer information services at the Internet's edges
FCC	Federal Communications Commission
HTTP	Hypertext Transfer Protocol
IP	Internet Protocol, the technical function that allows information to cross network boundaries. IPv4 and IPv6 refer to different versions of Internet Protocol
IPC	Inter-Process Communication
ISP	Internet Service Provider, a firm that joins customer networks to the Internet as a whole
PSTN	Public Switched Telephone Network. The network providing Plain Old Telephone Service
RIF Order	*Restoring Internet Freedom*, 33 FCC Rcd. 311 (2017)
TCP	Transmission Control Protocol
UDP	User Datagram Protocol

INTEREST OF *AMICI CURIAE*[1]

Richard Bennett. Richard Bennett is a 40-year veteran of network technology, standards, and product development with a vested interest in the Internet's continued progress. His career spans:

- development of the modern Ethernet architecture as vice-chairman of the IEEE 802.3 1BASE5 (StarLAN) task force that devised the foundational hub-and-spoke Ethernet standard;
- co-development of the initial Wi-Fi system architecture and inter-access point routing protocols, and subsequent co-development of the now-mandatory Wi-Fi frame aggregation scheme;
- extensive contributions to Open System Interconnection and Internet protocols; and
- development of leading-edge Local Area Network and Internet routing devices and systems.

Mr. Bennett filed comments and reply comments with the Commission in the underlying proceeding (WC Docket No. 17-108), and provided testimony at the

[1] Pursuant to D.C. Cir. R. 29(a)(4)(e), *amici curiae* state that no party's counsel has authored this brief either in whole or in part; that no party or its counsel contributed money that was intended to fund preparing or submitting the brief; and that no person other than these *amici curiae* and their counsel have contributed money intended to fund preparing or submitting the brief. Pursuant to D.C. Cir. R. 29(a), all petitioners, respondents, and intervenors in this proceeding have consented to the filing of this brief.

FCC En Banc Public Hearing on Broadband Network Management Practices in Cambridge on February 25, 2008 as an invited technical expert.

John Day. John Day is a computer scientist, Internet pioneer, and historian, having been involved in the development of computer networks since 1970. He was involved in the development of the communication protocols, from the data link layer to the application layer, underpinning the Internet and its predecessor, ARPANET. He also managed the design of the OSI Reference Model, which allows communications to be standardized across networks without regard to underlying internal structure or technology. He is the author of a book that has been called "the most important book on network protocols in general and the Internet in particular."

Tom Evslin. Tom Evslin has worked in telecommunications for 54 years. He was the co-founder of ITXC Corp., a Voice over Internet Protocol provider, and was responsible for the conception, launch, and operation of AT&T's first ISP ("Internet Service Provider"). He worked on the first commercial ACH software for banks, and was responsible for Outlook and Exchange development at Microsoft. He served as Chief Technology Officer for the State of Vermont from 2009 to 2010 and was a member of the FCC's 5^{th} Technical Advisory Council.

Shane Tews. Shane Tews is a fellow at the American Enterprise Institute specializing in cybersecurity and Internet governance issues. She is also the

President of Logan Circle Strategies, specializing in Internet, communications, and cybersecurity issues related to data protection, privacy, Internet governance, and technology policy. She has worked as a policy advisor for the domain name system since 2001, and has been involved in the development of processes for Internet infrastructure and governance on a global level. Ms. Tews filed comments with the Commission in the underlying proceeding (WC Docket No. 17-108).

Martin Geddes. Martin Geddes is a technologist and consultant focusing on the history and future of the Internet. He is an authority on network performance engineering and has a deep knowledge of information technology and the software underpinning the Internet.

INTRODUCTION AND SUMMARY OF ARGUMENT

Petitioners challenging the Federal Communications Commission ("FCC")'s *RIF Order* assert that Broadband Internet Access Service ("BIAS") providers market a service that can only be rationally classified as a telecommunications service under the law. They argue that the BIAS network at base is offering only transmission of data, and any information processing that occurs is incidental – merely a part of the management and operation of any network offering telecommunications service. Pet. Br. 16-18, 34-39, 41-46.

Petitioners also assert that functions performed by BIAS providers that form vital parts of the BIAS offering, such as Domain Name Service ("DNS") and data caching, are "ministerial functions" of no importance beyond telecommunications management. *Id*. Finally, they assert that BIAS has changed so much since 2000 that it has become an entirely different service and can no longer be classified as an "information service." *Id*.

In each respect, Petitioners are wrong. Petitioners' claims mischaracterize the history, nature, and architecture of the Internet as well as the objective properties of BIAS. The Internet as we know it today is a "paradigm shift" in communications, an entirely new way of interacting with information than existed in telecommunications service networks. Whereas traditional telecommunications services were oriented around interpersonal voice calls, the Internet is a computer-and software-oriented system in which transmission exists solely for the purpose of enabling each of the capabilities included in the definition of "information services" – that is, "generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information." 47 U.S.C. § 153(24). On the Internet, humans do not use transmission services directly; the use of transmission is always mediated by software. Indeed, a significant portion of the Internet's transmission function is not even provided by BIAS providers, but rather by third parties, as the Internet is a collection of private networks bound together by freely-negotiated technical and business agreements.

The mediating software used on the Internet incorporates and subsumes the transmission of information packets within information services, such as BIAS. Functions such as congestion management, DNS, caching and malware mitigation are not network management tools, as Petitioners contend, Pet. Br. 41-46, but are vital functions that enable the Internet and BIAS to run smoothly and offer value.

DNS, for example, is a general-purpose distributed database that exists to improve the quality of the BIAS offering by adding convenience to users and edge service providers, not for network management purposes. In BIAS offerings, DNS allows edge services to store content on multiple servers, so that BIAS networks can pick the closest (or otherwise best) one for each user session.

Similarly, Petitioners' argument that caching is a network management function because it merely reduces BIAS providers' costs by limiting the number of times they must transmit content from locations on the Internet, Pet. Br. 3, understates the role of caching. BIAS providers use caching in their networks because it improves the performance of content distributors by shortening the length of the path from content to consumer. This makes more content available to more people at higher quality, and so improves the overall value of the BIAS offering. As such, the FCC was correct to rule in the *RIF Order* that Internet transmission is "intertwined" or "integrated" with information service processing capabilities like DNS and caching. *RIF Order*, 33 FCC Rcd. ¶¶ 34, 41-42 (JA ___).

Neither the architecture nor the organization of the Internet has changed substantially since 2005, let alone the reference year of 2000 examined (incorrectly) by Petitioners. Nor has the nature of the service. BIAS is essentially the same service today as it was in 2005, nearly ten years after the first broadband Internet access services were marketed by the @Home Network, telephone companies, and America Online Broadband. As the factual particulars of BIAS have not materially changed over the years – and certainly not since the Supreme Court affirmed the classification of BIAS as an information service in *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967 (2005) – there is no reason for the service to be classified differently today than it was then. The *RIF Order* is a valid, reasoned exercise of the agency's authority to interpret the statute. The classification of BIAS as an information service should stand.

ARGUMENT

I. BROADBAND INTERNET ACCESS SERVICE INHERENTLY INTEGRATES TRANSMISSION WITH INFORMATION PROCESSING FUNCTIONS

The Internet takes an entirely different approach to the management of information resources than do traditional telecommunications networks, and so services offered over each of these types of networks perform very differently in how they act on information. The differences in the way the two types of networks operate – for example, in the way they manage traffic, handle congestion avoidance, or offer DNS, caching, or protection against viruses – are critical in placing BIAS squarely within the definition of "information service." At base, BIAS requires information-processing capabilities to perform essential network management functions while telecommunications service does not.

A. While Traffic On Telecommunications Service Networks Is Managed By The Network Provider, The BIAS Network Is Managed Collaboratively.

One of the most important aspects of any network is how traffic flows and how congestion is avoided and mitigated to protect the network from overload. On the Public Switched Telephone Network ("PSTN" – *i.e.*, a telecommunications service), the network prevents congestion by refusing to connect new calls unless it has sufficient unassigned resources to guarantee that it can transmit each bit of call information without undue delay. This is because, as a transport service, it must immediately transmit the information without change.

The Internet approaches this problem in an entirely different way, and this distinction makes all the difference in how the service is appropriately classified. Services using Internet Protocol, such as BIAS, do not have the concept of a "call" because Internet Protocol is a "connectionless protocol" – it is "always on." As traffic flows over the network, the Internet's Transmission Control Protocol ("TCP") directs traffic and addresses congestion by responding to signals from the BIAS provider network. The BIAS network signals the TCP to increase or reduce the rate at which packets of information are transmitted to the BIAS network when network loads change. *See* Van Jacobson and Michael Karel, *Congestion Avoidance and Control*, Symposium Proceedings on Communications Architectures and Protocols, Stanford, CA, 164 (1988).

By its nature, BIAS constantly self-monitors current traffic and resources to anticipate and mediate congestion and under-performance. Between any given pair of actively communicating endpoints (BIAS network customer and edge provider), the Internet has multiple paths or routes. BIAS provider networks dynamically switch traffic from highly-loaded to less-loaded routes to stave off congestion before it becomes critical, in a process known as load balancing.

Additionally, when BIAS provider networks perceive increased queueing delay at choke points in their own or in edge provider networks, they signal transmitters of an imminent congestion scenario by dropping packets that they are fully capable of transmitting. Edge provider networks do the same thing. This packet loss advises transmitters on both the provider network and the edge provider network to slow down – a clear service-to-information-service signal and response. Without this integration, BIAS – and Internet use – would be much less valuable.

These processes are seamlessly integrated with the Internet's transmission system by virtue of their dynamic qualities. There can be no transmission of data over the Internet unless these signal processes occur. By dynamically managing the rate at which information enters and exits the Internet in order to ensure stability, BIAS is offering a capability for "generating, acquiring, storing, transforming, processing, retrieving, utilizing and making available" information – a hallmark of an information service. 47 U.S.C. § 153(24).

Delving more deeply into the relationship of Internet applications and transmission makes clear the integrated nature of transport and information service functions on broadband networks. When BIAS users consume video entertainment from services such as Netflix, they interact directly with a portion of the Netflix system they have allowed into their homes in the form of an application ("app") running on a streaming television device (such as an Apple TV) or within a web browser.

The app with which they immediately interact communicates with a partner app running on a proprietary Netflix video server at a nearby location. The user tells the local Netflix app the movie they wish to watch, and Netflix makes it happen by verifying the account, locating an appropriate server, and matching the resolution of the user's device to the movie. The pair of Netflix applications – one local, the other remote – cooperate with each other so closely that they are considered a single, unified, "distributed application" by computer scientists. To the typical user, these two applications are simply a unified information service. The same basic processes take place inside every Internet application we use, from Facebook to Twitter to World of Warcraft.

The communication that takes place within computer operating systems and through the BIAS network's operating system is known as inter-process communication ("IPC"). *See* John Day, Ibrahim Matta, and Karim Mattar, *Networking is IPC: A Guiding Principle to a Better Internet*, CoNEXT '08, Proceedings of the 2008 ACM CoNEXT Conference at 1-3 (2008). The distributed applications engaged in IPC do not necessarily know whether their partner application is in the same device or across a network, because IPC functions in the same way in either case: it notifies the sending partner that its message has been sent, it delivers a signal when the message is received, and it delivers a correlated reply to the appropriate process. Sophisticated IPC systems prioritize signals and messages according to their relative urgency and tailor their behavior according to application needs.

In the BIAS network, IPC's role is to analyze, interact with, and react to the information it receives, not just serve a transmission function. Through their inherent packet multiplexing capability, BIAS networks support multiple concurrent IPC sessions to distinct IP endpoints and even to distinct processes within the same endpoint; multiplexing is outside the user's control on the PSTN. And just as IPC is not a transmission service when it takes place within a single device, it does not become one when performed over a larger network.

Put another way, the PSTN (a telecommunications service) is much like the railway system, where trains are controlled by operators, observing a strict schedule, and cargoes are chiefly differentiated by volume. But the Internet is more like trucking, where shippers are free to operate their own equipment, observe schedules of their own choosing, use shared roadways, and conform – or not – to traffic regulations. By interacting with the edge services and reacting according to what they learn and perceive, BIAS provider networks enable edge services to freely function as they see fit. This can only be characterized as an information service.

B. Broadband Internet Services Include Information Processing Capabilities Unrelated To Transmission Or The Management Of Transmission.

BIAS providers bundle the incomplete transmission function they utilize with additional information-processing capabilities that enable and increase the value of the offering as a whole. These capabilities include not only the signals and reports about the Internet's congestion state discussed above, but also DNS for store-and-forward communication between the two halves of each information service, anti-virus software, and store-and-forward caching of third-party content.

1. Domain Name Service is a vital function unrelated to transmission or the management of transmission.

DNS is a distributed database managed jointly by BIAS providers and owners of Internet domains, such as bennett.com, for the benefit of users and applications. Domain owners store information in a wide variety of formats in the DNS database, and users and applications ("apps") retrieve this information through database transactions. DNS is used for many purposes, the best known of which is the mapping of domain names (such as google.com) to IP addresses. Apps ask DNS to translate a domain name, and they receive answers and place the answers inside the IP data packets that they present to the BIAS provider for transmission to their partner apps. Thus, DNS plays a vital role in enabling user applications to prepare packets for transmission.

DNS also plays a vital role in email authentication. The Sender Policy Framework and DomainKeys Authenticated Mail systems rely on DNS for the storage and retrieval of domain identifiers and cryptographic keys to enhance security. *See* Dep't of Homeland Security, Binding Operational Directive 18-01, *Enhance Email and Web Security,* Oct. 16, 2017.

Each of these functions requires data processing or storage and retrieval of information from a distributed database – attributes that are the very essence of an information service. 47 U.S.C. § 153(24).

DNS is not, however, part of the transmission function, nor does it manage transmission. An app's DNS translation transaction ends *before* the BIAS transmission begins. While DNS allows edge services to store a given piece of content on multiple servers and helps the user-side application determine which server is the best source for access to that content by virtue of its location or load status, the app's DNS transactions do not provide the BIAS provider with information about the best path to the destination. The app's DNS transactions do not have the power to either optimize or impair the BIAS provider network. For all of these reasons, DNS does not manage the BIAS transmission function and is not part of managing a telecommunications service. Petitioners' attempt to dismiss the DNS function of BIAS as a management aspect of a telecommunications service, Pet. Br. at 43, must fail.

That DNS is not a network management function is confirmed by the fact that in some cases, BIAS providers are not even aware that DNS transactions have taken place, because apps may use their own DNS instead of the one offered by the BIAS provider. Google, IBM, and Cloudflare, for example, provide free DNS to anyone who wants it, and the newest versions of the Google Chrome and the Mozilla browsers direct users toward these non-BIAS provider DNS systems by using the "DNS over HTTP" protocol. *See* Google, *DNS-over-HTTPS* (Sept. 4, 2018) and Paul Hoffman and Patrick McManus, *Internet Draft: DNS Queries over HTTPS*, THE INTERNET ENGINEERING TASK FORCE 2-9 (Aug. 2018). Firms such as Google provide DNS to collect information about the behavior of Internet users and to prevent potential competitors for Internet advertising sales – the BIAS providers – from seeing this information.

While BIAS providers offer DNS functionality as part of their integrated service offering to consumers, and while the vast majority of end users use the DNS functionality offered by their BIAS provider, the fact that BIAS customers are free to use third-party DNS demonstrates that DNS is in no way a network management function. It would be irrational for BIAS providers to turn management of their networks over to edge services, and they do not do so, because edge services have no incentive to manage BIAS efficiently nor the best knowledge to do so.

Moreover, while Petitioners seek to dismiss DNS as a "routing function" merely because it supplies information services with destination addresses, Pet. Br. 3, DNS does many other things that make clear its capabilities are neither related nor restricted to telecommunications network management. DNS tells users the domain names of Internet addresses such as 2607:f8b0:4009:80f::200e (google.com). It can advise on the identities and reputations of email senders through blacklists, whitelists, and cryptographic authentication systems, such as Domain-based Message Authentication, Reporting and Conformance. And it does all of this not by interacting with Internet users directly, but when users run information service applications that interact with the DNS database. DNS is so seamlessly integrated into broadband Internet service that users are not even aware they are using it.

2. Caching is a vital function unrelated to transmission or the management of transmission.

Caching's storage and retrieval capabilities are also an indispensable part of offering BIAS service, and its use further demonstrates why BIAS is an information service.

BIAS providers routinely cache incoming content (*i.e.*, capture and store content in a place it can be more readily accessed) and make that content available as part of their BIAS to improve quality and reduce transmission expenses for themselves and others. Caching improves performance because it reduces the latency (the "delay") inherent in inter-process communication over long distances. Caching also makes bundled and proprietary information available to consumer applications at a high quality. Caching is a service that adds value to IP networks by dynamically moving information closer to the point of consumption. When BIAS providers use caching, it is simply part of how they deliver service; end users do not decide when or whether to accept cached content. And a data service offering "storage" capacity is clearly an information service. 47 U.S.C. 153(24).

Moreover, caching cannot be dismissed as a telecommunications network management function. Caching is indispensable to BIAS providers, especially those in rural areas, because it is the only mechanism that can overcome latency. The TCP protocol's dynamic load balancing feature penalizes far away sites. Regardless of the bits-per-second data rate of the transmission service, transit latency determines how quickly services can send data to clients. By storing popular content close to end users, caching reduces delay and increases performance. This is not a transmission management function: caching does not affect the transmission rate of bits on the network medium, but simply ensures that bits can be placed on the medium more expeditiously.

That caching is not a network management function is further demonstrated by the fact that caching is often done not by BIAS providers, but by third parties. Video streaming services, for example, offer caching devices to BIAS providers for placement inside the providers' networks. One well-known example is the Netflix Open Connect program, which the firm describes in terms of *quality*, stating that "The goal of the Netflix Open Connect program is to provide our millions of Netflix subscribers the highest-quality viewing experience possible." *See* Netflix Corp., *Netflix Open Connect*, NETFLIX.COM (2018).

In every instance of caching, whether by BIAS providers, edge providers, or third parties, DNS can work in concert with caching systems to determine which of several sources of a desired piece of content is likely to perform best at any given time. DNS and caching are related information services: DNS locates content and caching stores content.

3. Malware mitigation is a vital function unrelated to transmission or the management of transmission.

BIAS providers typically supply customers with free subscriptions to anti-virus services such as McAfee and Norton. They do this for the protection of customers from bad actors out to steal their identities and to enlist customer equipment in botnets (which are formed by transferring control of user equipment to bad actors and are used for extortion via Denial of Service Attacks). These anti-malware capabilities, which process and act on information acquired, also place BIAS squarely within the definition of an information service.

Anti-virus is an artificial intelligence-like activity of major computational intensity. BIAS providers perform and facilitate anti-virus processing for the general benefit of the Internet and all of its (not just their) users. They constantly monitor the Internet for active denial of service attacks and deal with them by notifying customers, taking accounts offline, and blocking traffic from or to affected destinations. *See* Vivek Ramachandran and Sukumar Nandi, *Bleeding Edge DDoS Mitigation Techniques for ISPs*, https://www.researchgate.net/publication/228818688_Bleeding_Edge_DDoS_Mitigation_Techniques_for_ISPs (2018). These activities amount to policing the Internet; they go far beyond any reasonable concept of transmission service or the management of transmission service.

II. NEITHER THE INTERNET ARCHITECTURE NOR BIAS HAS CHANGED SIGNIFICANTLY SINCE THE BRAND X DECISION

Petitioners assert that the very nature of the Internet, as well as the broadband services that provide access to it, have changed significantly since the Supreme Court issued the *Brand X* decision in 2005. *See, e.g.*, Pet. Br. 37 (noting that, in the period considered in *Brand X*, portals were common but "have not existed for quite some time") and 39 ("The FCC does not, and cannot, deny that the information services provided by ISPs have atrophied."). This claim is based on a flawed understanding of both the Internet and BIAS.

The structure, organization, and distribution of functions within the Internet that make up its architecture have remained constant since its inception. Today, as in 2005, the fundamental elements of the Internet are protocols: Hypertext

Transfer Protocol ("HTTP"), Transmission Control Protocol ("TCP"), User Datagram Protocol ("UDP"), and Internet Protocol ("IP").

Just as it was in 2005, these architectural elements are organized in modules or layers: HTTP at the application layer, TCP and UDP at the transport layer, and IP at the network layer. The application layer controls the selection and presentation of data on output devices such as displays. The transport layer ensures the end-to-end integrity of IP data packets and controls congestion in the Internet's internals. The network layer routes packets and identifies congestion. IP information packets are carried by data link layer facilities outside the scope of Internet architecture. RFC 791, Internet Protocol, DARPA (1981), https://www.rfc-editor.org/rfc/rfc791.txt, Figure 1.

The predominant Internet application today, as it was in 2005, is the World-Wide Web, an application that uses the HTTP, TCP, and IP protocols. Today, the Internet consists of some 40,000 networks around the world that interconnect with IP. While the number of networks has grown over time, the way those networks exchange routes – using Border Gateway Protocol ("BGP") – has not. Today, as in 2005, these networks meet in public facilities – Internet exchanges and peering centers – or at private facilities of their own choosing. Internet Society, Policy Brief: Internet Interconnection (2015) https://www.internetsociety.org/policybriefs/internetinterconnection/.

In fact, while some changes in emphasis have taken place since 2005, mainly as a consequence of there being more users, more applications, more bandwidth, more devices, and more mobility, the overall architecture of the Internet has remained constant. The Internet is as it has been since its privatization in the mid-1990s. This is for a very practical reason: the sheer scale of the Internet makes fundamental change extraordinarily impractical. Mark Handley *Why the Internet only just works*, 24 BT Tech. J. 3 (2006) 119, https://doi.org/10.1007/s10550-006-0084-z. Petitioners' claim that the way consumers interact with the Internet has fundamentally changed, Pet. Br. at 15, 37, 39, is simply wrong.

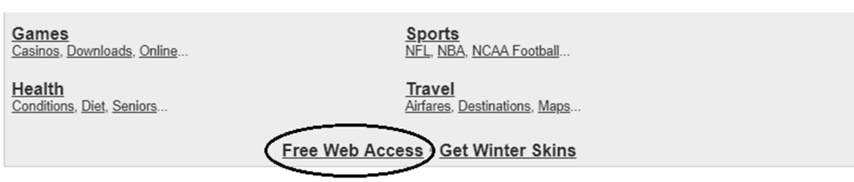
The way BIAS providers interact with the Internet to offer their service from a technical perspective is also virtually unchanged since 2005. BIAS providers interconnect with other networks in the same way, using the same protocols, and offering the same capabilities. BIAS providers continue to enable customers to join their home and office networks to the rest of the Internet, as both sources and consumers of information content and processing services. BIAS providers interconnect with other networks according to freely-negotiated technical and business agreements, just as they always have. The market for Internet edge services has become more concentrated and new technologies, such as mobile LTE, have emerged, but Internet technology has not fundamentally changed.

Importantly, while Petitioners argue that the BIAS offering is entirely different from the service examined in *Brand X* because "[c]onsumers initially reached the Internet through dial-up modems connecting to ISPs such as America Online over basic telephone lines provided by the phone company and regulated as common carriage," Pet. Br. 4, this is flatly wrong. America Online customers did not reach the Internet (or even the narrowband Internet service) over the telephone network exclusively or even primarily, but rather they dialed a local phone number that was assigned to a portal of the Telenet packet-switched data network. *See* Stuart Mathison, Lawrence Roberts, and Philip Walker, *The History of Telenet and the Commercialization of Packet Switching in the U.S.*, IEEE COMM. MAG. 50, no. 5, n.29 (May 2012) (explaining that Telenet was responsible for carrying customer and AOL data packets between the AOL complex in Reston, Virginia, and the customer's local calling area and that AOL paid Telenet to do this because its rates were significantly lower than common carrier offerings and because its billing structure – based on the number of packets exchanged – was better suited to the nature of information service interaction than the PSTN's connection time billing model).

While this observation may be a mere detail in a commonly told origin myth about Internet service, it illustrates an important fact: Title II has always been as much a barrier to consumer use of the Internet as an enabler. Just as packet-switched data networks were necessary means of avoiding the PSTN in the early days of public use of the Internet, broadband networks built for the sole purpose of supporting Internet access are necessary for Internet access today. The first and most important step toward bringing the Internet to the public was escaping the restrictions of the telephone network.

Further, Petitioners' claim that "early BIAS providers created their own information services and portals, such as Excite@Home and Roadrunner, largely following AOL's 'walled garden' model. Under that model, consumers had access to a number of information services within the garden; while they could access the broader Internet, too, that function remained supplemental," Pet. Br. 6-8, significantly misrepresents the nature of early broadband Internet access services.

In support of this claim, Petitioners (Pet. Br. 7) provide a screen capture of the Excite@Home portal page from 2000 with a portion highlighted:



Petitioners claim that this shows that the web access was a separate, secondary function of the service. But the circled link does not mean what Petitioners say it means. In fact, the Excite@Home portal page is *itself* a web page (located at http://excite.com) – meaning that Excite@Home customers were *already on the Internet* when they saw this page. And in fact, web archives show that the "Free Web Access" link at the bottom of the Excite@Home portal page simply goes to an advertisement. Excite@Home "Free Web Access" link, https://web.archive.org/web/20001018075944/http://freelane.excite.com:80/?ml_id=link:xcit:3600. Petitioners' suggestion that Excite@Home customers reached the Internet through the "Free Web Access" link and were really using Excite@Home and similar services for their (very limited) content offerings is simply wrong. The BIAS offering of 2005 was in all major respects the same offering that subscribers purchase today.

CONCLUSION

The telecommunications network assigns limited resources in a very egalitarian way: everyone who is on a call gets the same bandwidth, even if they want more. And everyone who is not on a call gets no resources. Callers are assigned the same quantum of bandwidth whether they are speaking or silent. This approach is egalitarian, but it is also rigid, arbitrary, and inefficient from the standpoint of distributed computing.

Broadband networks had to be created because distributed computing needs a different resource management strategy than the one devised for Title II telephone calls and enshrined in the Communications Act. The Internet's purpose is to support distributed applications and its theoretical origins are in operating systems research; the Internet is principally for computing, not for mere telecommunications. As the Internet continues to grow, its existence requires – indeed, depends on – having the greatest possible freedom for experimentation with new resource allocation strategies.

The Court should affirm the FCC's classification of broadband Internet access service as an "information service."

Respectfully submitted,

/s/ Tara M. Corvo
Tara M. Corvo
Jonathan Markman
Christen B'anca Glenn
MINTZ, LEVIN, COHN, FERRIS,
GLOVSKY AND POPEO, P.C.
701 Pennsylvania Ave., N.W.
Suite 900
Washington, DC 20004
Telephone (202) 434-7300
Facsimile (202) 434-7400

Counsel for Amici Curiae Richard Bennett et al.

CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitations of Fed. R. App. P. 32(a)(7)(B) because it contains 5,106 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(f).

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Dated: October 18, 2018

By: /s/ Tara M. Corvo

Tara M. Corvo
Jonathan Markman
Christen B'anca Glenn
MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C.
701 Pennsylvania Ave., N.W.
Suite 900
Washington, DC 20004
Telephone (202) 434-7300
Facsimile (202) 434-7400

Counsel for Amici Curiae Richard Bennett et al.

CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit by using the appellate CM/ECF system on October 18, 2018.

I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the appellate CM/ECF system.

By: /s/ Tara M. Corvo

Tara M. Corvo
Jonathan Markman
Christen B'anca Glenn
MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C.
701 Pennsylvania Ave., N.W.
Suite 900
Washington, DC 20004
Telephone (202) 434-7300
Facsimile (202) 434-7400

Counsel for Amici Curiae Richard Bennett et al.