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Public Consultation on *Anteproyecto de Lineamientos para la gestión de tráfico y administración de red a que deberán sujetarse los concesionarios y autorizados que presten el servicio de acceso a internet*

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My name is Christopher Yoo, and I serve as the John H. Chestnut Professor of Law, Communication, and Computer & Information Science and the Founding Director of the Center for Technology, Innovation and Competition at the University of Pennsylvania. I have been involved in the debate over traffic management and network administration since 2004, when I authored the primary response to the article generally credited with coining the term, “network neutrality.”¹ Since then, I have authored more than twenty scholarly articles and book chapters on net neutrality and addressed the topic at length in two books. My curriculum vitae is attached for your information.

I would like to express my appreciation to IFT for providing the opportunity the public to provide comments on the Draft Guidelines. The Draft Guidelines are a major accomplishment for which IFT is to be congratulated. They adopt a forward-looking, innovation-oriented approach that is well suited to accommodate the changes to both the technology and the business models that will inevitably emerge in the future.

My comments will focus on four areas: (1) traffic management and network administration, (2) differentiated services, (3) specialized services, and (4) privacy. I will pay particular focus on the insights gained from international experiences dealing with COVID-19 and impending deployment of 5G.

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¹ Christopher S. Yoo, *Would Mandating Network Neutrality Help or Hurt Broadband Competition?: A Comment on the End-to-End Debate*, 3 JOURNAL ON TELECOMMUNICATIONS & HIGH TECHNOLOGY LAW 23 (2004), available at <https://ssrn.com/abstract=495502> (responding to Timothy Wu, *Network Neutrality, Broadband Discrimination*, 2 JOURNAL ON TELECOMMUNICATIONS & HIGH TECHNOLOGY LAW 141 (2003)).

Traffic Management and Network Administration

One strength of the Draft Guidelines is their recognition of an appropriate role for traffic management and network administration policies. Importantly, Article 3 of the Draft Guidelines recognizes the key role that these policies play in encouraging commercial innovation as a key consideration in addition to ensuring that the quality and speed of Internet service and preserving the integrity and security of the network. In addition, the speakers at the roundtable convened on June 9 generally agreed that efficient operation of networks depends on some degree of traffic management.

1. Short-Term Traffic Management and Network Administration Policies

Traffic management and network administration is particularly important when unexpected events create unanticipated changes in network demand. The most salient current example is the COVID-19 pandemic. The widescale issuance of stay-at-home orders led many employees to shift their Internet usage from their workplaces to their residences. It also caused a change in the types of applications being consumed: traffic associated streaming video, online gaming, and social networking each represented roughly 2% larger share of total network traffic in 2020 than in 2019.²

The pandemic has caused important changes to the patterns of bandwidth consumption as well as to the total amount. The period of peak consumption shifted from the evening to include the business day.³ Moreover, the expansion of the use of videoconferencing caused a greater increase in the demand for upstream band than in the demand for downstream bandwidth, although the total demand for downstream bandwidth remained far larger the demand for upstream bandwidth.⁴

Most importantly, stay-at-home orders also caused an increase in consumption of entertainment content. Streaming video, which was already the largest component of network traffic in 2019 at 55.4%, saw the largest increase, swelling to 57.6%.⁵ These changes in network demand emerged so quickly that expanding capacity to meet the demand was not an option. Some form of traffic management designed to address the problem in a pragmatic manner represented the only feasible option.

Consider European regulators' solution to the problem. When their networks began to struggle to deal with the additional load, the European Union's Internal Market and Services

² Sandvine, *The Global Internet Phenomenon Report: COVID-19 Spotlight 6* (May 2020), available at <https://davidellis.ca/wp-content/uploads/2020/05/Sandvine-COVID-Internet-Phenomena-Report-may2020.pdf>.

³ *Id.* at 5.

⁴ For example, data collected by Open Vault indicate that downstream usage rose from 4.46 GB in January 2020 to 6.35 GB during the week ending April 7, 2020, an increase of 42%, while upstream usage rose from 0.215 GB to 0.392.35 GB, an increase of 82%. By early April, traffic had plateaued and already begun to recede. The amount of downstream traffic continued to exceed the amount of upstream traffic by a ratio of 16:1. Open Vault, *COVID-19 Broadband Usage Reaching a Plateau, Says Open Vault* (April 7, 2020), <https://openvault.com/covid-19-broadband-usage-reaching-a-plateau-says-openvault/>.

⁵ Sandvine, *supra* note 2, at 6.

Commissioner Thierry Breton asked Netflix and YouTube (which as the two largest consumers of bandwidth represent 27.4% of all Internet traffic worldwide⁶) to reduce the bandwidth those services generated by reducing the resolution of their video streams from high definition to standard definition.⁷

Perhaps the most striking aspect of the European solution is its conflict with an overly rigid conception of permissible traffic management and network administration. Singling out particular ACSPs (Netflix and YouTube) and a particular application (streaming video) for throttling violates the absolutist approaches to net neutrality advanced in many policy debates. And yet no net neutrality advocate raised any complaints about the EU's actions.

The manner in which the EU's solution benefitted consumers presumably explains this silence. This episode underscores the benefits to consumers of taking a pragmatic approach to traffic management and network administration. As noted earlier, streaming video represents 57.6% of all network traffic, with YouTube and Netflix between them constituting 27.4% of all traffic. A solution that reduces these two sources of network traffic went a long way to alleviating the problem that European Internet users were facing.

In addition, the EU's approach implicitly recognizes technological differences between applications that create solutions that work for some, but not for others. While reducing resolution quality is a viable approach for streaming video, it does not work for other applications.

The EU's response to COVID-19 demonstrates the value of approaches that take a pragmatic approach to what forms of traffic management and network management are permissible. At the same time, it illustrates the shortcomings of insisting on equal treatment of all sources of traffic and all applications under every circumstance.

2. Longer Term Traffic Management and Network Administration Policies

Approaches that allow the use of traffic management and network administration policies in response to unexpected developments thus provide real benefits to end users and consumers. There are circumstances that justify longer-term use of these types of policies.

One of these examples was discussed favorably at the IFT's June 9 roundtable on traffic management. The discussion highlighted the role that Deep Packet Inspection (DPI) plays in preserving network safety and security. These network management techniques are ongoing and

⁶ *Id.* at 7.

⁷ Hadas Gold, *Netflix and YouTube are slowing down in Europe to keep the internet from breaking*, CNN BUS. (March 20, 2020, 10:57 AM ET), <https://www.cnn.com/2020/03/19/tech/netflix-internet-overload-eu/index.html>. Interestingly, the U.S. approach that took a lighter touch approach to net neutrality that balanced those concerns against the need for investment in new network capacity had an easier time meeting the surge in demand. Christopher S. Yoo, *Coronavirus Crisis Vindicates the FCC's "Net Neutrality" Rollback*, WALL STREET JOURNAL (April 14, 2020, 7:25 PM ET), <https://www.wsj.com/articles/coronavirus-crisis-vindicates-the-fccs-net-neutrality-rollback-11586906742>.

are widely recognized as essential to protecting consumers against various forms of unwanted traffic and malware.

Another example comes from the world of Wireless Internet Service Providers (WISPs). The entire debate over how networks should handle traffic presumes the existence of a network in the first place. Many parts of Mexico (and indeed parts of every country world) lack basic connectivity. The policy challenge in these areas is quite different. The problem is not what limits to place on ISPs, but rather how to provide service in areas that are too sparsely populated to support conventional business models. WISPs often operate in these areas, relying on small slivers of spectrum to offer basic service in areas that otherwise would have none.

As such, WISPs can play an important role in mitigating the digital divide. Their primary challenge is their relative lack of bandwidth. One WISP operating in the rural U.S. state of Wyoming reports how its network was nearly crippled when all of the computers attached to the network attempted to download a large Windows update at the same time. Its solution was to hold some of the traffic coming from Microsoft and to make the update available to its user base a little at a time.⁸ Importantly, this intervention is temporary in that it is periodic, but may well have to be reapplied continually over the long term. Throttling traffic coming from a particular ACSP violates dogmatic conceptions of net neutrality, but provides immense benefits to consumers. But prohibiting such a practice would have the effect of denying any effective service in hyper-rural areas that would not otherwise receive service, a need made all the more acute by the closure of schools and workplaces during a pandemic.

Article 5 of the Draft Guidelines provide a framework that is flexible enough to accommodate both of these practices if it is interpreted broadly enough. Allowing ISPs to implement traffic management and network administration policies that affect access to content, applications or services can enable these solutions if the word “temporarily” is construed to permit their repeated, periodic imposition. If so, DPI would fit comfortably in Section I’s authorization of practices to address technically verifiable risks to the integrity and security of the network. The temporary delay of some Windows updates would arguably be authorized by Section II’s approval of practices to address exceptional or temporary network congestion, provided that Section II’s nondiscrimination mandate is construed flexibly.

These examples underscore the important role that traffic management and network administration play in ensuring that consumers receive access to the Internet on which modern life increasingly depends. The COVID-19 pandemic has made the importance of extending connectivity to as much of the country as possible even clearer. Closing the digital divide depends on applying these rules with the welfare of consumers in mind rather than an inflexible adherence to an abstract set of principles that serve as their own justification.

⁸ Charles L. Jackson, *Wireless Efficiency Versus Net Neutrality*, 63 FEDERAL COMMUNICATIONS LAW JOURNAL 445, 455-56 (2011), available at http://www.fclj.org/wp-content/uploads/2013/01/Vol.63-2_2011-Mar_Art-05_Jackson.pdf.

Differentiated Services

Another strength of the Draft Guidelines is their recognition of the manner in which differentiated services can benefit consumers, particularly when their consumption exceeds their data caps. Support for differentiated services received broad agreement during the June 16 roundtable on the digital divide regarding the benefits of sponsored data as well universal recognition during the July 7 roundtable on zero rating and sponsored data that differentiated services provide benefits to consumers.

Particularly welcome is Article 7's acknowledgement of how differentiated services can promote the management of public series; educational, financial and labor inclusion; and digital capacity building. Again, the COVID-19 pandemic provides an excellent illustration. Dozens of regulatory authorities around the world are approving broader use of zero rating to support access to health-related, education-related, and other services.⁹

An approach that rigidly insists that all content be treated equally would bar more permissive treatment for health-related and education-related services that have proven so important in responding to the coronavirus. The more approach reflected in Article 7 opens up the number of ways that the Internet can benefit consumers.

Specialized Services

Another positive aspect of the Draft Guidelines is accommodation of specialized services in Articles 8 and 9. The scholarly literature and industry have long recognized that some services, such as voice and video, require a level of quality that the best-efforts Internet cannot guarantee.¹⁰ Other examples include telemedicine and online gaming.¹¹

Specialized services are likely to play a critical role in the deployment of 5G. Projections for 5G forecast that unlike previous generations of wireless connectivity, consumer demand may not be sufficient by itself to support the buildout of the entire network, which means that business-to-business service will play an important role. In addition, no one business segment (often called *verticals*) will have sufficiently large demand to support 5G by itself. If so, the deployment of 5G will depend on making a network that is flexible enough to configure itself to serve the needs of one vertical (such as autonomous vehicles) at one moment and then

⁹ Tania Begazo, *COVID-19: We're tracking digital responses worldwide. Here's what we see*, WORLD BANK BLOGS (May 5, 2020), <https://blogs.worldbank.org/digital-development/covid-19-were-tracking-digital-responses-worldwide-heres-what-we-see>.

¹⁰ Christopher S. Yoo, *Common Carriage's Domain*, 35 YALE JOURNAL ON REGULATION 991, 1010 (2018), available at <https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=1531&context=yjreg>; Christopher S. Yoo, *Modularity Theory and Internet Regulation*, 2016 UNIVERSITY OF ILLINOIS LAW REVIEW 1, 50, available at <https://ssrn.com/abstract=2032221>. For the seminal statement of the importance of prioritization for voice, see J.H. Saltzer, D.P. Reed, & D.D. Clark, *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS ON COMPUTER SYSTEMS 277, 284-85 (1984).

¹¹ Christopher S. Yoo, *Network Neutrality, Consumers, and Innovation*, 2008 UNIVERSITY OF CHICAGO LEGAL FORUM 179, 229, available at <https://ssrn.com/abstract=1262845>.

reconfigure itself to serve the needs of another vertical (such as smart cities) at another moment.¹²

The most promising approach to enabling this type of functionality is known as *network slicing*. Under the current model for telecommunications networking, each provider owns or rents all of resources needed to provide service (such as base stations, spectrum, spots on microwave towers) on an exclusive basis. Network slicing deviates from this by allowing providers to obtain temporary access to network resources on a set-up and take-down basis, much like cloud computing enables multitenant access to computing power and storage in a flexible, temporary way. In addition, the components must be flexible enough to provide the services that different verticals require. And because these assets are accessed on a temporary basis, providers of network slicing components must be able to offer different services as needed and charge for them.¹³

The Draft Guidelines present two key interpretive issues that must be resolved properly in order to enable network slicing. First, the last sentence of the English translation of Article 8 reads, “The provision of specialized service by the ISP may not be translated, under no circumstances, in requiring a payment of ACSP for the course, under standard conditions, of the traffic generated by its contents, applications and/or services.” Construing this provision to prohibit any payment for access to enhanced services would in effect stymie the use of network slicing to support the deployment of 5G. The potential saving grace is the caveat, “under standard conditions.” Any conflict can be avoided if the use of enhanced capabilities on a temporary basis associated with 5G is construed to fall outside of standard conditions.

Second, the second to last sentence of Article 8 raises concerns about situations in which an ISP distributes its own content, applications, or services. This of course refers to vertical integration, a concern also raised at the IFT workshops on June 9 and June 16. Any application of Article 8 must bear in mind that market power in the primary network is a necessary condition of any model in which vertical integration can even arguably harm competition under any traditional or revisionist economic theory.¹⁴

As a result, IFT should consider applying a market power filter to any arguments based on vertical integration.¹⁵ In so doing, regulators should keep in mind that ISPs participate in two

¹² Christopher S. Yoo & Jesse Lambert, *5G and Net Neutrality*, in THE FUTURE OF THE INTERNET – INNOVATION, INTEGRATION AND SUSTAINABILITY 221, 228-29 (Guenter Knieps & Volcker Stocker eds., Nomos 2019), preprint version available at <https://ssrn.com/abstract=3429948>.

¹³ *Id.* at 229-31.

¹⁴ Christopher S. Yoo, *Vertical Integration and Media Regulation in the New Economy*, 19 YALE JOURNAL ON REGULATION 171, 201-02, 203-04 (2002), available at <https://ssrn.com/abstract=319122>.

¹⁵ The importance of a market power filter is demonstrated eloquently by the very complaint brought under the U.S. Federal Communications Commission’s 2010 Open Internet Order, which asserted that MetroPCS’s decision to zero rate access to YouTube violated net neutrality. MetroPCS was a minor player with only three percent of the national market. As such, any such practices could not possibly have harmed consumers. Christopher S. Yoo, *Network Neutrality and the Need for a Technological Turn in Internet Scholarship*, in ROUTLEDGE HANDBOOK OF MEDIA LAW 539, 551-52 (Monroe E. Price, Stefaan G. Verhulst, & Libby Morgan eds., Routledge 2012), preprint version available at <https://ssrn.com/abstract=2063994>.

different markets—one in which they contract with end users and one in which they contract with upstream networks and ACSPs—and that market definition requires both definition of both product markets and geographic markets. Each of these markets has a different geographic scope. While the market in which ISPs contract with end users is local, the market in which they contract with ACSPs is national (if not international).¹⁶ Consider the U.S. Federal Communications Commission's decision in the analogous situation in which telephone companies bargain with both consumers and handset manufacturers, another input to provide service. What matters in the bargain with handset manufacturers is the percentage of the country that the ISP reaches. The fact that it may enjoy a local monopoly over a small part of the country does not matter. What matters is national reach, not local reach.¹⁷ So too with the bargain between ISPs and the ACSPs.

Consumer Privacy

The final issue I would like to address is consumer privacy. The Draft Guidelines emphasize the importance of this issue in Articles 4, 5, and 13. Participants raised this as an issue at both IFT's June 9 workshop on traffic management and the June 30 workshop on consumer rights.

I recommend that IFT address privacy from the perspective of consumers rather than from the perspective of technologies. The reality is that Internet service depends on a large number of technologies in addition to networks, such as devices, operating systems, browsers, and ACSPs, all of which have significant visibility into personal information about consumers. In addition, the allocation of functions to any particular layer of the stack is largely arbitrary from a technological standpoint at any particular point and is undoubtedly going to change dynamically over time.¹⁸

Different actors in the system have long argued over which actor has greater access to personal information about consumers.¹⁹ Consumers no doubt find such debates to be somewhat beside the point. They are concerned about *all* actors that have access to their personal information regardless of which ones have access to more or less and are well aware that the degree of access is almost certain to change over time.

¹⁶ Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEORGETOWN LAW JOURNAL 1847, 1892-93 (2006), available at <https://ssrn.com/abstract=825669>.

¹⁷ *Bundling of Cellular Customer Premises Equipment and Cellular Service*, Report and Order, 7 FEDERAL COMMUNICATIONS COMMISSION RECORD 4028, 4029-30 ¶ 13 (1992).

¹⁸ David J. Farber & Christopher S. Yoo, *FCC Ushers in a Troublesome New World for Online Privacy*, TECHCRUNCH (November 7, 2016), <https://techcrunch.com/2016/11/07/fcc-ushers-in-a-troublesome-NEW-world-for-online-privacy/>.

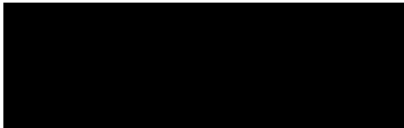
¹⁹ Compare Peter Swire, Justin Hemmings & Alana Kirkland, *Online Privacy and ISPs: ISP Access to Consumer Data is Limited and Often Less than Access by Others* (Institute for Information Security & Privacy at Georgia Tech Working Paper February 28, 2016), available at https://iisp.gatech.edu/sites/default/files/images/online_privacy_and_isps.pdf, with Nick Feamster, *What Your ISP (Probably) Knows About You*, FREEDOM TO TINKER (March 4, 2016), <https://freedom-to-tinker.com/2016/03/04/what-your-isp-probably-knows-about-you/>.

The best way to promote consumer interests would be to create a unified, technologically neutral framework that creates uniform rules that protect against misuse of their personal information by any actor. Piecemeal regulation risks creating a fragmented regime that forces all actors to confront difficult definitional questions about which set of rules applies. In addition, it also risks creating perverse incentives to allocate functions to minimize regulatory burdens rather than to maximize benefits to consumers and that may rapidly be rendered obsolete by technological change.

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I hope that these comments will aid IFT in its deliberations. I would be happy to discuss any aspect of the Draft Guidelines with you if further discussions would be helpful.

Sincerely,



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