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Response to the European Commission
Information Society and Media Directorate-General

Subject: **Electronic Communications Policy**
Questionnaire for the Public Consultation no the Open Internet and Net Neutrality in Europe

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Summary

The debates surrounding network neutrality and the open Internet begin with debates on network architecture and network management, but their implications are far-reaching. The Internet is not a direct private link between two end-points but a common pool resource created from the interconnection of tens of thousands of autonomous networks. The value of the Internet, to those who build it, use it, and build on top of it, is not created by any one network or operator, but depends on access to all endpoints being available on a neutral basis to all. If not carefully restrained, the traffic management practices of each individual network can influence, fragment, or foreclose the opportunities the Internet provides for innovation, democracy, and free expression,

The question at hand is how the Internet, this immensely valuable resource, is affected by the actions of an individual operator of one of these autonomous networks. Their unilateral decision to manage or manipulate or block specific traffic on their own networks can have far-reaching effects on the whole and on societal benefits from this resource. The open, competitive markets created by the Internet, from a small restaurant offering their menu online to a major content provider, depend on the open architectures, standard protocols and neutral treatment of traffic as implemented on the underlying networks. However, network management techniques are now increasingly used to create and control an alleged scarcity of bandwidth, in the name of network business models that may distort the Internet's uses. Discrimination against traffic subjects applications, services, and content to the changing and unpredictable interests of network operators, and the governments who regulate them; a future that risks subjecting citizens to ever-more invasive control technologies and interferes with the open, innovative and competitive market on the Internet.

The recommendations proposed in these comments focus on maximizing the economic and social value of the Internet throughout Europe. Ensuring that Internet service providers (ISPs), fixed and mobile, are not in a position to unilaterally discriminate between types of traffic or to exploit artificially created scarcity is essential to maintaining an open Internet. Good network management may require choices on how to deal with congestion but the end-user should be able to decide individually what choices are suited to his or hers particular needs, not the ISP. Transparency and competition of networks, while they both have roles in protecting consumers, are insufficient compared with a clear European standard preserving neutral and open networks.

I. Introduction

In its public consultation on the open Internet and network neutrality in Europe (Questionnaire),[1] the European Commission (Commission) seeks comment on current bottlenecks in Internet networks, problems that can arise related to net neutrality, the applicability to wireless and different regularity approaches to the management of data packets in communications networks including the relationship of network competition and transparency. The Commission seeks to understand the implications of network management, considering that one network operator's "management" can affect the broader Internet.

The Internet can be best described as a "network of many different networks,"[2] connecting diverse users, services, applications, and content. In fact, the Internet consists of over 26,000 autonomous networks (privately and publicly owned) across the world, cooperating in over 70,000 peering agreements to transport data in a universal address space to and from computers used by private subscribers, enterprises, institutions and government.[3]

These networks are built upon a layered and neutral, open, architecture. From a technical standpoint, as the Questionnaire notes: "[t]he end-to-end principle is one of the central design principles of the [I]nternet."[4] Packets of data transmitted between users across and between networks are transmitted equally on a first-in, first-out, best efforts framework. In this model, traffic is not prioritized or differentiated between and content, applications, and services on the Internet are all treated equally. A neutral network neither promotes nor hinders any particular applications or content, users are able to create, share, and access online content of their choice. Through the Internet created over-the-top of these interconnected and neutral networks producers of content, applications and devices for online use have been able to experiment and innovate with new technologies, given the relatively low barriers to entry to a market for their services.

The challenge at hand is balancing potentially scarce resources, such as the current bandwidth capacity of networks, while maintaining the competitive and innovative Internet space.[5] Within this context we recognize that the value of the Internet ecosystem is created not by summing the value of each individual network and Internet connection, but through the global interconnection networking to all endpoints that creates the immensely valuable "over-the-top" marketplace of the Internet, value not "owned" by any individual part of the infrastructure.

Moreover, the Internet is characterized by -- and benefits from -- spillover effects.[6] When the providers of infrastructure cannot charge for all of the value users derive from it, the surplus

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1 European Commission, *Questionnaire for the Public Consultation on the Open Internet and Net Neutrality in Europe* ,(June, 2010) (*Questionnaire*).

2 *Ibid*, 5.

3 *Information and Communications Technologies OECD Communications Outlook 2009*

4 *Questionnaire*, 4.

5 We stress that bandwidth capacity can be increased through network investments.

6 *See* Brett Frischmann & Mark Lemley, "Spillovers", 107 Colum.L.Rev. 257 (2007).

attracts users who build new value on top of it. Like toll-free roads that open a remote community to new business activity, Internet connectivity can fuel innovation at many levels, including user-to-user collaborations, faster intra-enterprise communication, and new forms of cooperative development.[7]

A. Open Network Architecture

The networks that make up the Internet consist of hierarchically-structured layers. Heuristics to describe these layers include the seven-layer Open Systems Interconnections (OSI) stack and focus on the different components of the network,[8] or a simplified four-layer model consisting of networked elements, networks, a layer of platforms, contents and applications, and a consumption layer.[9] The fundamental relationships of the layers are the same in both models. The bottom layers refer to physical components, such as wires, routers, switches, or radios for wireless communication. The networked equipment communicates in another layer, through protocols like Internet Protocol (IP) and Transmission Control Protocol (TCP). Higher levels still are applications and services, such as Skype, Bit Torrent, the World Wide Web, and websites. These comments will focus on the relationship between the network layer, consisting of networks and protocols, and the Internet layer, the resulting cloud of content, applications, and services built by the interconnections of networks and users.

As a platform, the network architecture of the Internet creates low barriers to entry for new ideas and innovations. Interconnected through the Internet Protocol (IP) standard, the networking layers transmit data without bias, creating an open Internet layer. The Questionnaire notes that the Internet "empowers citizens and brings a better quality of life through, for example, better health care, safer transport and easier access to public goods. It is no longer just a communication tool. It is an engine for creating more growth and jobs. It is a platform for the delivery of public and private services."[10] The ability recognized by the Commission that "[s]o far, '[I]nternet access has been more or less unrestricted with access to everything the [I]nternet has to offer (content, applications -- some of them only available for a fee) -- as opposed to a selection of content/applications pre-approved by the ISP" is a direct result of neutral networks supporting the Internet as an open market over-the-top of these interconnected autonomous networks. As will be discussed later, discrimination to traffic at networking layers impact the layers higher up the stack, such as which current and future applications can be used on the network.

B. Billion-sided Market

The Questionnaire describes the Internet as a "two-sided market (or multi-sided market)." Notably, while the "Internet" describes the series of networks and can enable connectivity

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[7] *See* Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale University Press, 2006).

[8] *See* Wikipedia.*org*, "OSI Model," http://en.wikipedia.org/wiki/OSI_model (accessed April 15, 2010).

[9] *See* Martin Fransman *The New ICT Ecosystem: Implications for Europe* (Edinburgh: Kokoro, 2007); Jonathan Zittrain *The Future of the Internet and How to Stop It* (New Haven: Yale University Press, 2008) (*Zittrain 2008)*.

[10] *Questionnaire*.

between two endpoints, such as an end-user and Amazon.com, an Internet Service Provider does not provide a continuous circuit between the two, but access to the Internet cloud of tens of thousands of networks. Packets of data are often transferred across networks for "perhaps ten, twenty, or even thirty hops between points."[11] Further, packets do not always take the same route, with traffic routed around congestion throughout the network path.

Existing as a layer above the networks, this market could more aptly be described as a billion-sided market.[12] The Open Internet Coalition, a group of technology companies and public interest organizations, suggests that because there are a billion routers and nodes, the Internet is actually a billion-sided market.[13] Further, nearly every business has a website, and is thus an "Internet company." This market does not represent a cleanly delineated relationship between "users" and "developers" or "online service providers." Rather than viewing creation and consumption as uni-directional flow, we see a complex network in which the same nodes are sometimes creators, sometimes consumers -- where neutral *communications* are critical to link them. In a world where personal information is valuable commodity, such as personal information and photos offered on Facebook or data collected from using Google services, the actions of individual Internet users contributes heavily to the Internet economy. Our focus should thus be on enabling these end-users to create and exchange, more than on helping the service providers to build "platforms" to intermediate their interactions and transactions.

C. Implications of Non-Neutral Networks for Competition on the Internet

With the implementation of the best-efforts Internet, the network and Internet layers currently exist as different markets. Neutral networks preserve the current competitive, downstream market of the Internet wherein Internet-based content and applications compete horizontally. As Riley and Topolski explain, the "performance of an application or service online as compared to its competitors is determined by the design and engineering of the application or service,"[14] not by preferential treatment of the traffic of the application or service. Network providers also compete horizontally in a separate Internet access market, where the primary commodities are bandwidth and throughput, and offering these products at through a variety of pricing models.

When these networks are neutral, competition of applications and services is insulated from market incentives of the network layer.[15] One user's decision to use an application or service

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[11] *Zittrain 2008,* 33.

[12] Nicholas Economides, "Why Imposing New Tolls on Third-Party Content and Applications Threatens Innovation and Will Not Improve Broadband Providers' Investment," NET Institute Working Papers #10-01, NYU Law and Economics Research Paper No.10-32, January 2010.

[13] *Comments of the Open Internet Coalition*, In the Matter of Preserving the Open Internet Broadband Industry Practices, GN Docket No. 09-191, WC Docket No. 07-52.

[14] M. Chris Riley and Robb Topolski, "The Hidden Harms of Application Bias," Free Press/New America Foundation Policy Brief, November 2009, 6, available at: http://www.newamerica.net/publications/policy/the_hidden_harms_of_application_bias.

[15] *See* Frischmann and Lemley, *supra* note 6; Lawrence Lessig *The Future of Ideas: The Fate of the Commons in a Connected World* (Vintage, 2002,) 46-47.

does not inherently impact the availability of the same application to another user -- application use is non-rival. While uses require different amounts of bandwidth, such as watching a high-definition movie versus sending a text-based email, the ISP does not have direct influence on which applications a user may use with their purchased Internet access.

Bandwidth, however, is finite based on existing network capacity, and in practice is typically shared among users on a local neighborhood/aggregation node or backhaul link, or in the interconnection between autonomous networks. This link can be shared among 50 or more residential subscribers, and while each subscriber may have a connection with a theoretical "up-to" speed, their actual throughput speed can be much lower. As a result, common Internet use can result in last-mile congestion when the cumulative bandwidth consumption of all users on the access link exceeds the capacity of the shared link. The resulting congestion can degrade the service experience of users on the link. Unfortunately if bandwidth is rationed through the prioritization of specific types of traffic, ISPs begin vertically integrating their network layer with the Internet layer. "Prioritization forwards higher priority packets ahead of other traffic, and lower priority packets are negatively affected until there are no higher priority packets to send," Riley and Topolski explain,[16] increasing the quality of service for some applications but limiting the functionality of others. By allocating bandwidth disproportionally to one application or service versus another, ISPs are imposing their judgment of value between the Internet layer and the user. Further, Lennett notes that with prioritization "networks operators are creating inefficiencies that fail to maximize the utility of these networks for their users."[17]

Riley and Topolski note that prioritization does not affect an uncongested network, and "all packets are forwarded as they arrive, without delays or drops."[18] Allowing prioritization can incentivize ISPs to create congestion, make bandwidth a rival good and manage scarcity of bandwidth to capture more value generated by the whole Internet. No longer selling Internet access but also packaged content, ISPs will be in the position of power to implement vertical foreclosure on Internet based applications and services and disrupting the current competitive Internet landscape. In light of the Commission's continued emphasis on competition, this will be a step backwards by raising barriers to entry and undermining the horizontal competition at the Internet layer.[19] Ongoing vertical integration of content and access providers (as shown by Virgin Media and Virgin Internet in the UK efforts to bundle a music subscription service

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16 *See* Riley and Topolski *supra* note 14, at 6.

17 *See* Benjamin Lennett, "Dis-Empowering Users vs. Maintaining Internet Freedom: Network Management and Quality of Service (QoS)," *CommLaw Conspectus*, 18:1 (2009), 144, available at http://commlaw.cua.edu/res/docs/articles/v18/18-1/06-lennett-final.pdf.

18 *See* Riley and Topolski *supra* note 14.

19 Three criterion of competition: 1. "presence of high and non-transitory barriers to entry;" 2. "markets whose structure does not tend towards effective competition within the relevant time horizon;" and, 3."the application of competition law alone would not adequately address the market failure(s) concerned." European Commission, 2007/879/EC, *Commission Recommendation of 17 December, 2007: Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services*, Official Journal of the European Union.

for example)[20] brings a new problem in this environment. Non-neutral access provided by Virgin Internet – which is already experimenting with deep packet inspection – will serve to reduce competition still further in the very shaky and exceptionally uncreative online cultural content market.[21] Discriminatory networks can also harm Internet businesses and Commission goals, such as increasing legal music downloads.[22] For example, prioritization of traffic by PlusNet in the UK reduces implicates legal music services and downloads for PlusNet users.[23]

D. Net Neutrality Affects More Than Networks

The debates that begin with Net Neutrality and the Open Internet affect far more than technical details. As Barbara van Schewick explains, an open architecture is modular, its swappable parts allow for distributed improvement and experimentation. By contrast, "[i]n an integrated architecture, it is usually not possible to make changes to a component that do not trigger changes in the rest of the system."[24] If network operators are permitted to cross the layers, integrating control of network, applications, and content, that integration reduces the flexibility of the Internet marketplace for would-be innovators at all layers.

Finally and perhaps most critically, the openness of the Internet is essential to freedom of expression for its end-users. The Internet supports methods of communication or organizing such as email and social-networks as well as the ability to easily share media and ideas through video or photo sharing websites and blogs. Supported by the end-to-end principle, end-users are able to define what information they want to access or share, rather than be steered towards specific content sites through agreements with content providers and networks, find certain websites or content subjected to lower tiers, or find content outright blocked.[25] The Internet's ability to support political discourse and cultural activity creates spillover benefits even for those not actively posting.[26]

E. Recommended Approach

We believe these recommendations support existing EU legislation or clarify its implementation. Additionally, the Internet ecosystem, with innovation driven by Internet running over the top of neutral networks, rather than defined by discriminatory network

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[20] Jacqui Cheng, *ISP, UMG agree on unlimited music plan, graduated respons,* Ars Technica*,* 15 June, 2009*,* http://arstechnica.com/media/news/2009/06/isp-umg-agree-on-unlimited-music-plan-graduated-response.ars.

[21] *EU to assess piracy detection software,* BBC News, 26 January, 2010, http://news.bbc.co.uk/2/hi/technology/8480699.stm.

[22] The European Commission has expressed concerns with the low rate of music downloads in the EU as compared to the US, citing "the lack of legal offers." *See* European Commission Communication *from the Commission to the European Parliament, the Council, and the European Economic and Social Committee and the Committee of the Regions: A Digital Agenda for Europe* Commission (2010) 245 final/2, 5.

[23] PlusNet has slowed the legal music service Spotify, and regularly slows downloads from content services including those used by iTunes. *See* http://community.plus.net/forum/index.php/topic,75288.0.html; http://www.plus.net/support/broadband/speed_guide/download_servers.shtml, accessed 22 September, 2010.

[24] Barbara van Schewick *Internet Architecture and Innovation*, (Cambridge: MIT Press, 2010,) 125.

[25] *See* Comments of Public Interest Commenters, FCC GN Docket No. 09-191, WC Docket No. 07-52 (filed Jan. 14, 2010).

[26] See Brett M. Frischman *An Economic Theory of Infrastructure and Commons Management, Minnesota Law Review, Vol. 89, pp. 917-1030, April 2005.*

practices, is better adapted to achieving the goals of the Commission than fragmented individual communications networks.[27] As the Questionnaire states: "[t]he open character of the [I]nternet has enabled end users in general to access and distribute or run applications of their choice."[28] We stress that the value of the Internet to Europe is greater than the sum of the autonomous networks -- individual networks merely aggregated do not match the innovative potential created by the open interconnection of these networks. Our recommendations support the distributed architecture and interconnected whole of the Internet.

Furthermore, the Commission has issued rules in this area in the past, supporting end-user defined access, but also suggesting that network operators may impose on this goal.[29] This current consultation create the opportunity to clarify past rules, and create a unified ex ante regulatory framework for networks in the EU,[30] and provide the necessary foundation for a unified Internet market. We support the continuation of end-user freedom of access and innovation and the Commission's recognition that "End-users should be able to decide what content they want to send and receive, and which services, applications, hardware and software they want to use for such purposes, without prejudice to the need to preserve the integrity and security of networks and services."[31]

In replying to these questions we will establish how significant changes to the end-to-end principle, by introduction of prioritization or discriminatory network management, disrupt the application- and user-levels of the Internet value chain. Technological developments combined with profit incentives will lead to networks that restrict ability for users to "access everything the Internet has to offer,"[32] or lead to "walled gardens" and fragmented networks.

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27 *Europe's Digital Competitiveness Report Main achievements of the i2010 strategy 2005-2009*

- "Objective 1: A Single European Information Space offering affordable and secure high bandwidth communications, rich and diverse content and digital services."#
- "The Commission has actively sought to open up competition in e-communications, remove regulatory barriers, enhance regulatory consistency and create a level playing field for Europe's operators, industry and consumers."#
- "Objective 3: An Information Society that is inclusive, provides high quality public services and promotes quality of life."

28 *Questionnaire,* 2.

29 *See* Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (*2009/136/EC)*.

30 For example, Norway has voluntary rules and the UK is just recently closed a public consultation period. *See* Norwegian Post and Telecommunications Authority *Network Neutrality: Guidelines for Internet Neutrality* 24 February, 2009, available at: http://www.npt.no/ikbViewer/Content/109604/Guidelines%20for%20network%20neutrality.pdf; and Ofcom: *Traffic Management and 'net neutrality' - A Discussion Document*, 24 June, 2010, available at: http://consumers.ofcom.org.uk/2010/06/ofcom-opens-debate-on-net-neutrality/

31 *See 2009/136/EC*, Recital 28.

32 *Questionnaire,* 5.

F. Recommendations

- *The European Union should make a clear commitment to the protection of an Internet built on end-to-end architecture where access to services, applications, and content, and how they interact with the network is decided by the end-user.*
- *"Internet access" should be clearly defined to as access to any and all applications, services or content available on the public Internet at the discretion of the end-user.*
- *The Commission should issue ex ante principles as clear guidance underpinning the protection of the open Internet in the revised Electronic Communications Framework, including what constitutes reasonable traffic management to create a unified Community-wide framework.*
- *The Commission should require that network operators treat all content, applications and service in a non-discriminatory manner.*
- *If a network operator seeks to implement network management practices that violates this non-discriminatory rule, the operator must have a legitimate and specific purpose to ensure the proper functioning of the network, and the practice must be narrowly focused to that specific purpose.*[33]
- *Managed services must not include content, applications, or services that compete with or resemble those that operate on the public "best efforts" Internet.*
- *Managed services should be approved on a case-by-case basis by the Commission or a National Regulatory Agency.*
- *The Commission should not permit carriers to engage in paid prioritization practices with content providers. Such practices encourage discriminatory, harmful network management.*
- *The Commission should require Internet service providers to disclose the amount of bandwidth they allocate for managed services and for the public "best efforts" Internet.*
- *Network neutrality rules should be applied equally to fixed and mobile networks.*
- *All network operators should provide a standard Truth-in-Labeling disclosure with network capabilities, including minimum guarantees, limitations, and restrictions.*
- *The network operator should disclose all practices used to manage congestion as well as contention ratios and total available bandwidth.*
- *National Regulatory Agencies should implement tools for measurement, data collection, and analysis of network traffic and performance of fixed and mobile networks.*
- *Data collected should be openly available to the public and independently verifiable by independent measurements.*

[33] Canadian Radio-television and Telecommunications Commission, *Review of the Internet Traffic Management Practices of Internet Service Providers*, Telecom Regulatory Policy CRTC 2009-657, 21 October, 2009), *available at*: http://www.crtc.gc.ca/eng/archive/2009/2009-657.htm.

II. Network Management in Europe

Perhaps the most infamous violation of a neutral network occurred in the United States when, in 2007, Robb Topolski noticed file transfers using the peer-to-peer software BitTorrent were not transferring properly, none of his files would upload. Topolski discovered that his Internet Service Provider was intercepting packets sent from his computer and inserting RST packets that caused his connections to reset.[34] Becoming a worldwide exemplar of restrictive networks, these RST packets terminated Topolski's BitTorrent connection and demonstrated how a traffic management practice at a specific network layer, in this case change the function of TCP, can influence or block application functionality for a user.

However, as inquired by Question of the Questionnaire, there is indeed a growing problem with net neutrality and the openness of the Internet in Europe in both fixed and mobile connectivity, creating conflicting experiences as to it means to have "Internet access."

A. Network Management on Fixed Networks

PlusNet, an ISP in the UK, is transparent and documents their network management practices on their website. Using Deep Packet Inspection (DPI) to identify traffic,[35] applications such as VoIP, gaming, and web browsing and place communications into six different priority levels.[36] Additionally, traffic speeds are predefined. For example, peer-to-peer traffic (including any other traffic that is miscategorized) is slowed on a service advertising up to 20 Mbps speeds to as slow as 50 Kbps).[37] In 2009, PlusNet users found that Spotify, a legal music streaming application, was experiencing slow speeds and PlusNet admitted their network management was interfering with the ability of end-users to use the service.[38]

However, PlusNet is not an isolated example of discriminatory networks in Europe. Earlier this year Free, a network operator in France, announced a new policy limiting the use of peer-to-peer, IP telephony, and video streaming during evening hours.[39] In 2009, customers of BT in the UK found that access to the website the Pirate Bay was blocked.[40] Additionally, in April, 2010, Telecom Italia, an ISP in Italy began experimenting with limiting the bandwidth

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[34] Peter Eckersley, Fred von Lohmann and Seth Schoen, *Packet Forgery By ISPs: A Report On The Comcast Affair*, Novemberov. 2007,) *available at: www.eff.org/files/eff_comcast_report2.pdf.*

[35] Carol Wilson, *The consumer-friendly version of DPI,* Connected Planet Online, 29 July, 2008, http://connectedplanetonline.com/access/news/dpi-consumer-friendly-0729/.

[36] *See* http://www.plus.net/support/broadband/speed_guide/traffic_prioritisation.shtml, *accessed on* 22 September 2010.

[37] *See* http://www.plus.net/support/broadband/speed_guide/download_speeds.shtml *accessed on* 22 September 2010.

[38] *See* http://community.plus.net/forum/index.php/topic,75288.0.html *accessed on* 22 September, 2010.

[39] Guillaume Champeau, *Free briderait les protocoles SSH, VoIP ou P2P en zone non dégroupée,* Numera, 9 April 2010, *available at*: http://www.numerama.com/magazine/15461-free-briderait-les-protocoles-ssh-voip-ou-p2p-en-zone-non-degroupee.html.

[40] Barry Collins, *BT Blocks off Pirate Bay*, PC Pro, 21 April 2009, *available at:* http://www.pcpro.co.uk/news/251609/bt-blocks-off-pirate-bay.

of peer-to-peer software in 40 cities.[41] O2 in the UK slows the speed of streaming video and peer-to-peer protocols on their aDSL service.[42] In September 2010, BT and TalkTalk in the UK announced the intention to prioritize some service.[43] Telefonica CEO Julio Linares announced in August 2010 plans to implement new service based on network use in Spain,[44] and prioritize service by type of traffic.[45]

B. Network Management on Mobile Networks

Network neutrality violations appear much more prominent on mobile networks.[46] Mobile networks also restrict not only traffic, but also what types of applications are allowed. A common example is how Voice of IP (VoIP), also called IP telephony, applications are either outright blocked, or only available as an add-on service. As demonstrated in the table below VoIP service is blocked on the iPad when offered through SFR in France, devices using the O2 network in the UK, or only available on the more expensive plans offered by Telia Sonera and Telenor in Sweden. Some carriers offer VoIP for a fee, T-mobile in Germany, where VoIP services costs an additional 9,95 a month on top of a data plan, or Orange in France where the VoIP costs an additional 15 € a month.

VoIP restrictions represent a striking example because the service offered through the application is a direct competitor to telephony service offered by mobile carriers. VoIP is relatively low-bandwidth but is latency sensitive. According to information available on Skype's website, their VoIP service requires between 3 kilobytes (KB) and 16 KB per second, roughly .5 megabytes (MB) and 2.9 MB for a three minute call.[47] Because VoIP allows calls over a data connection, rather than using voice minutes, the service can be attractive to consumers with access to the open Internet. However, many providers block competition from VoIP providers by blocking or limiting the availability of the services in order to protect voice service revenues.

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41 *Accuse di neutralità violata*, @iip, 29 April 2010, *available at:* http://www.aiip.it/page.php?id=952&aiip=4f21c777739f159beb86d9d49d9e9200.

42 *Las nuevas tarifas ADSL de Telefónica O2 limitan expresamente la velocidad de YouTube y las descargas P2P*, Bandaancha, *available at:* http://bandaancha.eu/articulo/7475/nuevas-tarifas-adsl-telefonica-o2-limitan-expresamente-velocidad-youtube-descargas-p2p?awesm=fbshare.me_ASsZq.

43 Barry Collins, *TalkTalk, BT: we'd put iPlayer in the slow lane*, PC Pro, 28 September, 2010, *available at:* http://www.pcpro.co.uk/news/broadband/361501/talktalk-bt-wed-put-iplayer-in-the-slow-lane.

44 Pablo López, *Telefónica quiere eliminar la tarifa plana de Internet: "Que pague más quien más descargue,"* Periodista Digital, 31 August, 2010, *available at: http://www.periodistadigital.com/tecnologia/internet/2010/08/31/telefonica-quiera-eliminar-la-tarifa-plana-de-internet-que-pague-mas-quien-mas-descargue.shtml.*

45 *Telefónica dice que el modelo de negocio del sector no es sostenible,* Periodista Digital, 30 August, 2010, *available at:* http://www.periodistadigital.com/tecnologia/telefonia/2010/08/30/telefonica-dice-que-el-modelo-de-negocio-del-sector-no-es-sostenible.shtml.

46 A major challenge to fully documenting restrictions on network access in a lack of transparency - many carriers do not list network management practices or restrictions on applications. Mobile carriers, however, often list if VoIP, peer-to-peer, or other applications are restricted or blocked.

47 *See:* https://support.skype.com/faq/FA151/How-much-bandwidth-does-Skype-use-while-I-m-in-a-call;jsessionid=E984C1F42E514DE62A7081B760946985;jsessionid=03648AD242135CC26931C6E3476EA9C6?frompage=search&q=skaype+banwidth&fromSearchFirstPage=false, *accessed 24 September, 2010.*

Mobile carriers had additional restrictions. In addition to blocking VoIP on iPad data plans, SFR in France also blocked peer-to-peer protocols, access to newsgroups, and SMS services. On Vodafone in Italy, peer-to-peer protocols are throttled to 64 kilobits per seconds. File sharing is blocked on most data plans offered by Telia Sonera in Sweden. Vodafone in Spain has also offered prioritization for higher paying customers, guaranteeing their calls will have higher quality than other users on the same cell site.

VoIP and Other Restrictions on Mobile Networks				
Country	**Carrier**	**VoIP**	**Special Charges for VoIP**	**Other Restrictions**
France	SFR[48]	Blocked on iPad		Peer-to-peer, newsgroups, and SMS blocked as well.
	Orange[49]		15 € per month	
Germany	Vodafone[50]		10 € per month	
	T-Mobile[51]		9,95 € per month	
Italy	Vodafone[52]			Peer-to-peer slowed to 64 kbps
UK	O2[53]	Blocked		Continuous streaming of any audio / video content, enable P2P or file sharing
Spain	Vodafone[54]			Prioritization of calls based on service rate
Sweden	Telia Sonera[55]	Blocked on most offers	Only available on most expensive data plan	File sharing is also blocked on most offers
	Telenor[56]	IP-telephony not available on some offers	Only available on most expensive data plan	

C. Recommendation

[48] *See* http://img.telecomix.org/EU/src/127728743242.png.

[49] Marc Reese, *Orange autorise la VoIP en 3G, l'Internet illimité enfin moins limité,* PC INpact, 14 April 2010, *available at*: http://www.pcinpact.com/actu/news/56368-iphone-orange-voip-3g-illimite.htm.

[50] Cian, *Deutsche Telekom lifts mobile VoIP ban – but charges users extra,* GoMo News, 3 June 2009, *available at*: http://www.gomonews.com/deutsche-telekom-lifts-mobile-voip-ban-but-charges-users-extra/.

[51] Ibid.

[52] *See* http://www.areaaziende.vodafone.it/190/trilogy/jsp/programView.do?tk=9610,c&channelId=-8671&contentKey=48195&programId=12545&ty_key=az_uso_equo_servizio_internet_mobilita&pageTypeId=9610&ty_skip_md=true, *accessed on* 27 September 2010.

[53] *See* http://shop.o2.co.uk/services/o2mobilebroadbandterms, *accessed* 27 September 2010.

[54] Olivier Chicheportiche,*Vodafone va proposer un accès "privilégié" à ses réseaux 3G+*, 18 November 2009, *available at: http://www.businessmobile.fr/actualites/vodafone-va-proposer-un-acces-privilegie-a-ses-reseaux-3g-39710864.htm.*

[55] *See* http://www.telia.se/privat/produkter_tjanster/mobilt/surfaimobilen/, *accessed* 27 September 2010

[56] *See* http://www.telenor.se/privat/abonnemang/tillaggstjanster/alla-mobiltjanster.html#C45-2100-P45-5468, *accessed* 27 September 2010

- *"Internet access" should be clearly defined to as access to any and all application, service or content available on the public Internet at the discretion of the end-user.*

III. Implications of Discriminatory Networks

The commission seeks comments on the extent traffic management is necessary from an operators point of view (Question 4) and how problems could arise in the future (Question 2). While traffic management (such as blocking spam) and some specific traffic prioritization (such as network details like DNS routing or user defined services like Diffserv) can provide some benefits, care must be taken to protect consumers and account for the entire value chain. Central to the network neutrality principle is that discriminatory, or non-neutral networks, harm the free and open nature of the Internet. Any discrimination that is driven by technical network management motivations should be under control of the end-users: the trade-offs should be theirs to decide.

Traffic management, or Quality of Service practices (QoS), can be used by ISPs to respond to network congestion. The Questionnaire notes: "the volume of traffic passing over communications networks has increased."[57] Congestion occurs on network bottlenecks when the packet queues at network routers and switches increase and the number of delayed or dropped packets exceed the number that is normal and needed for optimal TCP/IP capacity and congestion management. Commonly, congestion occurs when the overall bandwidth consumption of all users, which can be 50 or more, on a shared node of a local access network exceeds the capacity. The resulting increase in a) latency and b) reduction in capacity can degrade or even interrupt Internet communications for all users of that congested node. Internet access networks are shared networks - for example with multiple residences sharing a local node of with a capacity considerably less than the maximum bandwidth available to each customer, a measurement expressed as a contention ratio. But congestion is not limited to access networks. Congestion can also arise at an interconnection point to other networks. As overall network traffic increases, such as during times of heavy use, congestion can severely increase the latency (delays, which is very detrimental to time-sensitive applications as VoIP) and reduce the overall speed, or throughput, of each individual on the link. Congestion can be decreased or eliminated by network upgrades that can increase overall bandwidth or reduce contention ratio.

Managing congestion through various traffic management methods can reduce the detrimental effects somewhat, and only for certain users or applications. It cannot remove the effects of congestion, it redistributes the effects. Various congestion mitigation strategies (other than capacity increases) are known that have different effects on the user experience. For example the prioritization of streaming media, in particular small VoIP packets, reduces the detrimental effects of congestion on voice communication at the expense of other protocols or applications.

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[57] *Questionnaire*, 5.

Traffic management on a network therefore inherently affects users.[58] Some traffic management can have temporary net positive effects, such as blocking port 25 to reduce spam at the cost of limiting the ability of users to send legitimate emails through an email client.[59] Other traffic management practices, such as discriminatory prioritization, can have severe impacts on the Internet as a platform for innovation, and competition online, locking the Internet into 2010 usage patterns and potentially fragmenting what is currently a worldwide, interconnected communications network. Harmful traffic management has a similarly mitigating effect on ability of individuals to practice free expression and access a diversity of information online, which may cause tangible harm to, among others, disadvantaged communities who use the Internet to correct media misrepresentations and share their untold stories. Traffic management can pose competitive issues and anti-trust worries, enabling networks to implement vertical foreclosure on Internet based applications and services and disrupting the current competitive Internet landscape.

A. Protocol-Agnostic

Network management techniques used to reduce congestion can generally be categorized as proctor-agnostic or protocol-specific.[60] Protocol-agnostic focuses on the overall bandwidth consumption of an individual user, such as de-prioritizing or otherwise slow down general network traffic during times of heavy bandwidth use to improve overall quality of service to all users. As such, this practice mitigates congestion without discriminating against specific applications or content while

A users' traffic could also be slowed after exceeding a specified bandwidth cap, either a hard threshold or relative compared to bandwidth use of other users. Telenet in Belgium, for example, has defined a "fair use" thresh-hold as twice the average downloads of overall users.[61] A user might also be charged more for exceeding the cap, as is the case with PlusNet in the UK.[62] While bandwidth caps are intended to incentivize decreased bandwidth consumption by users and can lower overall network use, they are not necessarily linked to the actual congestion created by the usage of the network by these users. Further, traffic can also be throttled for the remainder of the billing period, continuing to reduce a users' throughput even at times when the network is uncongested.

B. Protocol-Specific

Protocol-specific network management, also referred to as application specific, prioritizes one type of application over another, such as video versus voice services, but can also

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58 *See* Shewick, *supra* note at 24, at 115-163.

59 It should be noted that any individual with the expertise to create spam software could also adjust their software to use other unblocked ports. This arms race should not leave customers unable to use ports while those with malicious intent have adapted to continue cause harm.

60 *See* Lennett, *supra* note 17.

61 *Herman, Belgian "hogs" or stupid fair use metering?* dada motive, 4 September 2010, *available at: http://www.dadamotive.com/2010/09/belgian-hogs-or-stupid-fair-use-metering.html.*

62 For their "Value" service, PlusNet charges an additional 5 £ for 5 gigabytes after exceeding the allotted 10gb. *See* http://www.plus.net/residential/10gig.html?height=260&width=600, *accessed on* 28 September 2010.

prioritize one VoIP client over another. As Lennett explains "ISPs add traffic shaping mechanisms at the router and identify what kind of packet it is (i.e. streaming media, P2P, website text, etc.) and decide whether to move it up or down in the queue depending on its perceived priority.[63] Protocol-specific practices are particularly troubling when the ISP defines the levels of prioritization.

Researchers Chris Riley and Robb Topolski have described three negative consequences that can result from protocol-specific QoS practices that harm the free expression of users and cause economic disadvantage to smaller content and application providers.[64]

First, when an ISP decides which applications should be granted priority, such an action, by definition, reduces consumer choice and flexibility. For example, if an ISP designates a peer-to-peer ("P2P") protocol as lower priority than a VoIP protocol, the user cannot make its own choice to re-upgrade P2P to a higher priority. The user has no alternative but to continue to use subpar services and applications, or switch to another carrier, provided that one is available and provided that the new carrier does not also discriminate against the consumers' preferred service. This is unacceptably unfair market behavior by the broadband provider, imposing their value judgment before the customers, and fragments the Internet layer as users access a different "Internet" defined by different network operators.

Second, ISP traffic management limits innovation at the edges of the Internet. In a neutral framework, Internet services and applications compete based on price, design, and engineering. If an ISP favors one type of service or application over another, that service or application will be prioritized based on today's Internet usage patterns. Riley and Topolski use a hypothetical scenario of RealPlayer and YouTube to illustrate the potential consumer harm:

> "Imagine if RealVideo, the video format used in RealPlayer, was classified as a priority application upon its original release in 1997. Upon its introduction in 2005, YouTube might not have received the same level of priority, because it uses a fundamentally different protocol and business model--YouTube hosts video itself, whereas RealVideo is hosted on individual websites. After eight years of prioritized use, the video quality of RealVideo would have held a substantial advantage over the new entrant, YouTube, which would be effectively degraded by the imposition of priority for RealPlayer. YouTube would have faced an uphill battle to adoption, being required to compete as a video service without priority; it might well have failed, while on a level playing field, it flourished."[65]

Riley and Topolski warn: "no engineer or policy maker can predict the future of innovation online, or even typical usage in 2014." YouTube, Twitter, and BitTorrent have each had a

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63 *See* Lennett, *supra* note 17, at 123.

64 *See* Riley and Topolski, *supra* note 14.

65 *Ibid.*

transformational impact on web usage over the past several years; assuming which websites or services will dominate the Internet in the coming years is a fools errand.

Third, traffic management practices can actually decrease overall network performance. Two elements of network management -- Deep Packet Inspection ("DPI") and traffic prioritization -- contribute to increased congestion or delays. DPI requires routing equipment to inspect a packet's body rather than just its head, increasing time the packet spends on the network. Prioritization interrupts the neutral framework of the Internet, reducing delay for specified packets while increasing delay for, or ultimately dropping, de-prioritized packets. Yet as Riley and Topolski explain, "increasing standard deviation for the same average latency will result in more transmissions, causing more packets to traverse network routes multiple times, creating additional packet load and therefore additional congestion in the network."[66] In other words, the act of prioritization for one type of application leads by definition to greater congestion for other applications.

The end-to-end principle should therefore also apply to traffic management practices: the decision what trade-off to make (if needed) should be left to the end-points of the network (the computers managed by the users of the Internet) on an individual basis. For example, a user could be enabled to control the prioritization of traffic through existing standards such as DiffServ.[67]

C. Fragmented Networks Implicate E-Commerce

How a network is managed can influence the types of applications that can run "over-the-top." While a neutral network enables an open Internet, discriminatory networks can influence the downstream Internet layer. In fact, one company marketing QoS equipment has offered that their technology allows ISPs to "insert them-selves into the over-the-top value chain . . ."[68] As Barbara van Schewick explains, architecture can "induce behavior,"[69]

One recent case exemplifies not only these risks, but also how they run counter to the interests of the European Commission. PlusNet, an ISP in the UK, uses deep packet inspection to categorize and prioritize traffic.[70] These protocol-specific network management practices allowed PlusNet to determine what quality of service to apply to different applications, removing the freedom to choose from the end-user. For example, in 2009 PlusNet categorized Spotify, a legal music streaming service, as a peer-to-peer file sharing

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66 *Ibid.*

67 "Marking is performed by traffic conditioners at network boundaries, including the edges of the network (first-hop router or source host) and administrative boundaries." -RFC2474 1 and "The authors of the RFC intended for a standard to be adopted and utilized by all networks allowing for ubiquitous end-to-end user-defined prioritization across multiple networks." *See* Letter to FCC Secretary Marlene H. Dortch, available at: http://oti.newamerica.net/publications/resources/2010/letter_to_fcc_secretary_marlene_h_dortch_secretary_re_preserving_the_ope.

68 *See* Lennett, *supra* note 17, at 134.

69 *See* Schewick *supra* note 24, at 30.

70 *See* Wilson, *supra* note 35.

technology.[71] Under one service offering, this would relegate Spotify to dial-up like speeds during peak periods, despite the service being capable of "up-to" 20 megabits per second, 400 times faster than the speeds realized.[72] PlusNet also slows traffic from download services, including those used by iTunes.[73] The European Commission has expressed concerns with the low rate of music downloads in the EU as compared to the US, citing "the lack of legal offers."[74] In this case, the legal music download market is clearly implicated by discriminatory network management.

Discriminatory networks also pose risks to cross-border digital markets. E-Commerce was estimated to be 106 billion Euros in 2006, but the gap between domestic and cross border e-commerce widened from 2006 to 2008,[75] and the Commission noted in a 2009 report: "it is still relatively uncommon for consumers to use the Internet to purchase goods or services in another Member State."[76] The Commission has expressed concerns with digital market fragmentation, offering objectives to increase cross-border traffic, such as copyright and licensing, as well as the Single Europe Payment System.[77]

This past May, a Commission report noted that "Telecommunications services and infrastructures in the EU are currently still highly fragmented along national borders."[78] The Commission directives support a common regulatory framework, interoperability, and the "harmonisation of the use of spectrum across the Community and between the Member States and other members of the ITU, "[79] noting that the "[f]ragmentation of the management of access to spectrum rights limits investment and innovation."[80] Allowing continued investment in technology to discriminate among network traffic would be a step backwards from these goals.

The Internet is a "bucket-brigade partnership in which networks neighbors pass along each other's packets for perhaps ten, twenty, or even thirty hops between points."[81] This interconnection is made possible by the standardization of the Internet Protocol. As described

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71 *See supra* note 38.

72 *See* http://www.plus.net/support/broadband/speed_guide/download_speeds.shtml#valueSpeeds, *accessed on* 28 September 2010.

73 *See supra* note 37.

74 *See* European Commission *supra* note 22, at 5.

75 *E-commerce in the EU*, MEMO/09/95, 5 March 2009.

76 Commission of the European Communities, *Report on cross-border e-commerce in the EU February 2009*, Brussels, 5.3.2009 SEC(2009) 283 final.

77 *See* European Commission Communication *supra* note 22.

78 Mario Monti *A New Strategy for the Single Market: at the service of Europe's economy and society,* May 2010*,* 44.

79 Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services (*2009/140/EC)*.

80 Ibid.

81 *See* Zittrain, *supra* note 9, at 33.

by Jonathan Zittrain, the Internet combines a large variety of ways to physically connect (such as by wires or radio waves) with a wide variety of uses (such as the World Wide Web or email) through a narrow middle: Internet Protocol.[82]

The Questionnaire notes that prioritization "can only work if all the interconnected networks that link the provider to the consumer of content/services agree on the methodologies and tools to implement such prioritization."[83] However, as Steve Deering, an engineer who worked on IP standardization, has illustrated that tying IP to additional protocols, such as Quality of Service mechanisms used for network management, complicates the network by requiring "more functionality from underlying networks."[84] Lennett further warns that "DPI-enabled prioritization departs from non-standard network management practices and potentially leads to a "balkanization" of the Internet, where every ISP routes traffic according to their own QoS standards."[85]

PlusNet and Spotify exemplify how discriminatory network management creates vertical enclosure of the Internet marketplace. While PlusNet offered a potential solution in their traffic identification system concerning Spotify,[86] the applications and services of tomorrow will face additional barriers to enter the Internet market if face not only discriminatory networks, but must account for different prioritization schemes to enter different markets within nations and throughout Europe.

D. Recommendations:

- *The Commission should require that network operators treat all content, applications and service in a non-discriminatory manner.*
- *If a network operator seeks to implement network management practices that violates this non-discriminatory rule, the operator must have a legitimate and specific purpose to ensure the proper functioning of the network, and the practice must be narrowly focused to that specific purpose.*[87]

IV. Managed Services

The term "managed services" commonly refers to services that are transmitted over the same network infrastructure used by the public Internet to connect to an end-user, but are permitted to be managed to a greater extent by the network operator than are services transmitted on the public Internet itself. It is difficult to define the specific applications or services that qualify for such treatment due to the inability to predict the development of future technologies. Purportedly, services that would qualify are those that are particularly latency-sensitive and require dedicated bandwidth for emergency, public service, or similar objectives. Question 5

82 *See* Zittrain, *supra* note 9, at 67-69.
83 *Questionnaire*, 5.
84 Steve Deering, *Watching the Waist of the Protocol Hourglass*
85 *See* Lennett, *supra* note 17, at 133.
86 *See supra* note 38.
87 *See* Canadian Radio-television and Telecommunications Commission, *supra* note 33.

of the Questionnaire inquires whether transparency of managed services will alleviate net neutrality concerns, and Questions 8 and 9 ask for clarification on the regulation of managed services.

Because carriers might choose to practice greater network management for the operation of managed services relative to that of the public Internet, they can effectively create "two Internets" comprised of fast and slow lanes. In this system, the incentive is strong for carriers to create artificial scarcity and to request payment from content or application providers in exchange for access to faster transmission on the "managed services" network. Indeed, this implies that industry code of conduct is not only not sufficient to ensure fair network management, but that carriers may even be more likely to practice discriminatory network management in favor of content providers with greater financial resources. Therefore, while the definition of manager services" is unclear, certain regulatory principles must be applied to govern how managed services may operate without harming performance, competition, and low barriers to market entry for content offered on the public Internet.

While it may be acceptable to transmit certain content faster via a managed-services regime, the definition of "managed service" must not include a service or application that competes with or replicates those offered on the public Internet. If content that competes with or replicates those offered on the public Internet are permitted to receive priority treatment over a private network, users predictably might choose to migrate to that content, leaving behind those that operate on the public Internet. Further, priority treatment of certain applications or content might also be used to serve as an alternative to performing timely network infrastructure upgrades on the public Internet.

Such prioritized treatment might force content or application providers operating on the public Internet to choose between being starved out of the market or finding a way, if they can, to migrate to the managed service platform. Priority treatment would also discourage future innovation on the public Internet. By extension, the operation of managed services that compete with or resemble those that are offered on the public Internet would freeze the public Internet in its 2010 framework, decreasing consumer choice and limiting avenues for free expression.

In addition, the Commission should request as part of its transparency requirements that carriers report the amount of bandwidth they allocate for the operation of managed services and for the public "best efforts" Internet. The operation of managed services should not degrade quality of service on the public Internet.

A. Recommendations

- *Managed services must not include content, applications, or services that compete with or resemble those that operate on the public "best efforts" Internet.*
- *Managed services should be approved on a case-by-case basis by the Commission or a National Regulatory Agency.*

- *The Commission should not permit carriers to engage in paid prioritization practices with content providers. Such practices encourage discriminatory, harmful network management.*
- *The Commission should require Internet service providers to disclose the amount of bandwidth they allocate for managed services and for the public "best efforts" Internet.*

V. All Networks Must be Neutral

Mobile Internet is becoming increasingly commonplace and posed as an alternative to wireline access. From the ability to check email on a handheld device or use a wireless modem on a laptop, technology has made the Internet portable. However, the extent to which the Internet is available on mobile devices has been limited not by technological capabilities, but often carrier restrictions. For example, German mobile companies like Vodafone has expressed intention to block VoIP on mobile devices while T-mobile charges 9,95 € for VoIP services,[88] discriminating against an Internet based application to protect their own services. Concerning Question 6 in the Questionnaire, the principles governing traffic management must be the same for fixed and mobile networks.

Mobile operators regularly make price distinctions based on applications and services, rather than on the amount of data these applications and services transfer. Current mobile phone plans, with differential pricing for text messages, telephony, and data access highlight how consumers can be subject to greatly inflated prices for even low bandwidth uses. Text messages, for example, are limited to 160 characters yet can cost 1,000 times the price per megabit of mobile telephone call,[89] a fee for service that does not reflect the cost of providing the service.[90] Protecting these vertically integrated pricing schemes by blocking out Internet based applications and services does is not a reason to create different governing principles for mobile networks.

A. Technical Similarities Between Fixed and Mobile Networks

On a technical level, mobile and fixed networks do have some differences, but these should not exclude mobile carriers from protections that will prevent anti-competitive practices or user freedom. The differences in necessary network management for mobile versus fixed Internet delivery exist largely at or below the network layers and are largely "protocols that respond to wireless signal variation, that limit interference, that limit active real-time users,

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88 *See* http://www.zdnet.co.uk/news/mobile-working/2005/07/27/vodafone-to-keep-voip-out-of-the-3g-network-39210642/ and http://www.telekom.com/dtag/cms/content/dt/de/595698;jsessionid=E3CD927532B9A0BF69BFABFEC86B8F3C?archivArticleID=673552, *accessed on* 14 September 2010.

89 While the numbers Odylzko uses are generalizations, they demonstrate the large difference in prices between different types of data. *See* Andrew Odlyzko, "The Delusions of Net Neutrality," University of Minnesota, August 2008, available at www.dtc.umn.edu/~odlyzko/doc/net.neutrality.delusions.pdf.

90 *Ibid.*

that schedule transmissions, and that reserve or prioritize resources."[91] These protocols do not exclude the ability for mobile Internet to offer an open platform for competing applications.

Indeed, mobile networks are moving towards an architectural model that is closer to an Internet-based architecture. Next generation LTE 4G cellular technology, currently being rolled out,[92] adopts a flat, Internet Protocol based architecture all the way from the network layer to the user's device[93]. Policies around network management of mobile networks must address the fact that an approach that treats wireless networks as a fundamentally different class of entity will inherently lag behind the direction the technology is moving.

B. Future Risks of Non-Neutral Wireless Networks

Despite the ability for next-generation mobile networks to operate as an Internet-based architecture, developments in next generation mobile can further limit end-user freedom unless policy makers intervene. IP Multimedia Subsystem (IMS), a still-evolving feature that can greatly implicate mobile Internet access. Rather than operating on a packet-switched network as Internet access is defined today, IMS creates virtual circuits where data flows are each given an earmarked end-to-end channel for communicating.[94] As John Waclowski writes: "With IMS, you will never know if you are getting the advertised broadband capacity you think you are paying for. The actual bit rate will be a function of what IMS thinks you are doing."[95]

C. Implications of Non-Neutral Wireless Networks for Universalization

Allowing discriminatory network management practices on mobile networks will pose challenges to users served by the Universal Services Directive. As amended on 25 November, 2009, Directive 2009/136/EC explains that in regards to the provision of universal services: "There should be no constraints on the technical means by this is provided, allowing for wired or wireless technologies."[96]

Mobile Internet access is becoming increasing crucial for underserved and rural regions. For example, Ireland is using wireless in their National Broadband Scheme to reach "[a]pproximately 234,000 residential, commercial and business premises.[97] If mobile and fixed Internet access is to operate under different principles governing traffic management,

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91 Jordan Scott, *The Application of Net Neutrality to Wireless Networks Based on Network Architecture*," Policy & Internet: Vol. 2: Iss.2, Article 6. (2010).

92 MetroPCS has rolled out the first LTE network in North America (http://news.cnet.com/8301-30686_3-20017102-266.html), and European carriers are already moving forward with their own deployments (http://www.mobileeurope.co.uk/news/news-anaylsis/8132-lte-ready-for-launch-in-austria-after-39-million-auction-concludes).

93 An in-depth test and overview of Cisco's next generation LTE networking technology: http://www.lightreading.com/document.asp?doc_id=196105

94 John G. Waclawsky, *IMS: A Critique of the Grand Plan*, BUS. COMM REV. 54, 55 (Oct. 2005)

95 *Ibid.*

96 *See supra* note 29.

97 *See* http://www.three.ie/nbs/faqs.htm, *accessed on* 14 September 2010, *accessed on* 14 September 2010.

users on these two networks will continue have different and unequal Internet connections. As particularly rural regions are served by mobile connections, if these connections only have access to the restricted 'Internet' provided by certain mobile providers, the European Commission will institutionalize a the digital divide.

Further, the current regulatory framework is technology neutral. In updating the framework to define network management practice, this consistency should continue. Such practices are not unprecedented the Canadian Radio-television and Telecommunications Commission has recently issued a ruling to apply Internet traffic management ruling to mobile networks.[98]

D. Unlicensed Spectrum Can Alleviate Congestion

Allowing for more spectrum, including unlicensed spectrum and opportunistic spectrum access, can help alleviate congestion on mobile networks. While data-capable mobile devices require more bandwidth, unlicensed spectrum access can reduce strain on mobile networks. For example, in the United States mobile advertising firm AdMob found that the percentage of requests from WiFi capable devices "increased from 19% in November, 2008 to 55% in November, 2009." In fact, 36% of iPhone traffic in the US was over WiFi.[99] Dynamic and secondary access can also increase spectrum efficiency. Opportunistic spectrum access can address false scarcities in spectrum availability by allowing communications over frequencies that may be licensed, but currently unused.[100]

E. Recommendation:

- *Network neutrality rules should be applied equally to fixed and mobile networks.*

VI. Beyond the Network Layer

Question 7 asks what other types of prioritization is taking place, and how other players in the value chain are affected. Although these are separate issues than network neutrality, it can be value for the Commission to explore these relationships. For example, when devices or software is closed or "locked down," it can implicate dependent technologies. The Apple iPhone, as the commission is well aware,[101] only allows applications that meet the iPhone Developer License Agreement, which until recently, specifically locked out software languages and tools used by competing companies.[102]

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98 *See* http://www.crtc.gc.ca/eng/archive/2010/2010-445.htm, *accessed on* 14 September 2010.

99 *See Admob Metrics November 2009 Report*, available at: http://metrics.admob.com/wp-content/uploads/2009/12/AdMob-Mobile-Metrics-Nov-09.pdf=.

100 *See* Sascha Meinrath and Victor Pickard, "Revitalizing the Public Airwaves: Opportunistic Unlicensed Reuse of Government Spectrum," New America Foundation, June 2009.

101 Jacqui Cheng, *Change in iPhone policies prompts EU to drop investigations*, Ars Technica, 27 September 2010, http://arstechnica.com/apple/news/2010/09/change-in-iphone-policies-prompts-eu-to-drop-investigations.ars.

102 "Applications that link to Documented APIs through an intermediary translation or compatibility layer or tool are prohibited." *iPhone Developer Program License.* Quoted in *Brian* X. Chen, *Adobe Apps: Easier to Pass Through the 'i' of a Needle?* Wired, 8 April 2010, http://www.wired.com/gadgetlab/2010/04/iphone-developer-policy/.

Some content and application providers also create private networks to place content closer to the edge of the networks. These Content Delivery Networks (CDNs) improves the quality of experience by reducing the distance to the end-users, which reduces the chance of congesting intermediate nodes of networks when this service is used. These relationships should not be involved in network neutrality rules, but could be explored by the Commission for cases in which market power affects competition among other members of the value chain.

VII. Network Competition vs. Neutrality

Question 10 of the Questionnaire requests input on whether the commercial arrangements that currently govern the provision of access to the Internet are in order to ensure that the Internet remains open and that infrastructure investment is maintained. We stress, however, that local loop competition is not sufficient to prevent vertical enclosure at the Internet layer by network operators or prevent fragmentation of network practices. Further, commercial arrangements will not preserve an open Internet as bandwidth use increases if network operators are allowed to manage the scarcity of bandwidth.

A. Investing in Networks or Management

The largest portion of investment, over 50%, averaged per subscriber, in the fixed networks that gives access the Internet are in the local loop. While international backbones between Internet Exchanges (IX's), and the backhaul networks connecting local concentration points to these IX's, are sizable investments, averaged out per subscriber the investment is less than half of the total network investment. When building networks, investment in the existing local loops (copper, coax) have been supported by voice telephony, and cable TV services. This existing infrastructure has since been used for IP based networking enabling Internet access. Fortunately the required investments in access networks were very low and demand driven. The deployment of always-on broadband from DSL and cable providers accelerated the growth of the Internet and gave birth to an enormous economic sector.

The investments needed in access networks to support always-on were limited, again most of it is demand driven. The cash flow generated by these fully depreciated assets (local loops) has been very attractive to the shareholders of these companies and has been used in part by incumbents for investments in mobile networks. The copper and coax cables have finite capacity. DSL is nearing its theoretical limit, though cable networks can support up to our 152 MBPS via four channels bonded under DOCSIS 3.0, and eight channels can support 304 Mbps.[103] As bandwidth demand increases, network capacity must either be increased or managed among users.

This creates a dilemma for network operators faced with the option of investing in infrastructure or network management equipment or both. An investment in a fixed local loop must be done for all potential customers in a given region at the same time to be cost-efficient, and is substantial investment that requires future expected returns. As a result, the network operators have incentives to provide services that make it difficult for users to

[103] *See* Lennett, *supra* note 17, at 107.

switch, from trying to prevent any competitor from using the new investments, unique content deals (TV), prevent cheap VOIP solutions to be used instead of the offered one etc,) and to develop new cash flows (priority traffic deals with content providers, or tier services to push subscribers to higher priced tiers, etc.).

As a result, without network neutrality rules the incentive for network operators innovate in ways to retain customers, not always by quality of service, and to ration bandwidth. The 2nd Edition Consumer Scorecard - 2009 noted that only 22% of customers switch Internet service providers,[104] indicating that there may be switching costs between providers limiting competition.

Further, as explained in these comments, the risk of network fragmentation within countries, or between countries in the E.U. will arise if network operators begin competing on network management practices. Currently, network operators compete by offering access to the Internet cloud, where the primary commodities are bandwidth and throughput, and offering these products at through a variety of pricing models. Faced with increased bandwidth consumption and without strict rules against discriminatory network management, network providers will be incentivized to control the scarcity of bandwidth through prioritization schemes and offer bundled services and content.[105] It is illogical to think that allowing practices through which a network provider can dilute the amount of bandwidth available to customers provides incentive for network providers to increase capacity.

VIII. Transparency is Not Enough To Protect the Open Internet

The commission seeks comment on what transparency for consumers should consist of and quality of service requirements should be determined.[106] The 2nd Edition Consumer Scorecard - 2009 found that 67% of users finding it easy to compare Internet services,[107] but the data comparable is often only theoretical up-to speeds and price, and does not provide an accurate expectation about the service.

Transparency requirements should create an abundance of information for consumers and developers, including details on network capabilities and any network management in use, but we stress that transparency does not alleviate incentives for network operators to foreclose on Internet innovation. For example, PlusNet in the UK has a very transparent guide to their prioritization rankings,[108] as well as what speeds traffic for types of application will receive throughout the day.[109] As discussed in previous sections, these prioritization

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104 *See* European Commission, *2nd Edition Consumer Scorecard – 2009,* Communication from the Commission – Monitoring consumer outcomes in the Single Market: the Consumer Markets Scoreboard – COM (2009)25 final of 28/1/2009, 51-52.

105 Such as agreements between Virgin Media and Universal to create a music subscription service. *See* Cheng, *supra* note 19.

106 *Questionnaire*, 5.

107 *See* European Commission, *supra* note 99.

108 *See supra* note 36.

109 *See supra* note 37.

schemes directly implicate Internet markets, such as legal music services, as well as create barriers to entry for new applications and services. The intention to provide clear and accessible information to end-users is a commendable, but do not protect the open Internet.

We recommend that information be not only clearly communicated to consumers, but also communicated in a concise and standardized way to facilitate comparisons between services. As the commission notes in amendments to the Universal Service Directive: [the] availability of transparent, up-to-date and comparable information on offers and services is a key element for consumers in competitive markets where several providers offer services."[110] The commission continues to reinforce the ability to "compare the prices of various services offered on the market based on information published on an easily accessible form."[111]

A. Truth-in-Labeling Disclosure Can Benefit Consumers

We have a proposed form (**see Appendix**)[112] that would allow end-users and consumers to be adequately informed of the price and the type of services offered before they purchase a service,"[113] as recommended by the Commission. These Broadband Truth-in-labeling disclosure standards clarify and add meaning to terms and conditions of services, as well as clearly state the capabilities of the service. Broadband speeds are often advertised on theoretical maximums, while actual though put can be much less. In Hungary, T-mobile and H1 Telekom both list minimum speeds,[114] but consumers can benefit from a greater amount of information.

The attached sample from the New America Foundation's Open Technology Initiative provides a standardized label ISPs can use to "inform their customers broadband services they are subscribing, including Internet speed, service guarantee, prices, service limits, and other related elements."[115] Typical elements of broadband service quality should be included such as minimum expected speed and latency to the ISP's border router and service up-time.

As described in the proposal, additional information should include any service limits such as bandwidth caps, traffic management, contract terms, and a link for additional terms and conditions. Providing this information to consumers before the sale of a service will provide a clearer indication of the capabilities of the service.

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110 *See* 2009/136/EC.

111 *Ibid.*

112 Benjamin Lennett, Chiehyu Li, Dan Meredith, James Losey, Robb Topolski, and Sascha Meinrath, *Broadband Truth-in-Labeling,* New America Foundation 23 September 2009. Also available online at http://www.newamerica.net/publications/policy/broadband_truth_in_labeling.

113 *See* 2009/136/EC.

114 *See* http://www.t-home.hu/english/internet/residential, and http://www.h1telekom.hu/index.php/szolgaltatasok/h1adsl-internet-szolgaltatas, *accessed on* 26 September 2010.

115 *See supra* note 108.

B. Recommendations

- *All network operators should provide a standard Truth-in-Labeling disclosure with network capabilities, including minimum guarantees, limitations, and restrictions.*
- *The network operator should disclose all practices used to manage congestion as well as contention ratios and total available bandwidth.*

IX. Role of National Regulatory Agencies

The regulatory framework, as addressed in Question 3, is not currently capable of dealing with the issues identified in this reply, nor is it capable of monitoring, assessment, and subsequent enforcement. Although the regulatory frame work contains ex ante and ex post rules, these are not sufficient for ensuring an Open Internet nor achieving Commission goals in other areas such as e-commerce or closing the digital divide through universalization goals. In regards to the Open Internet and network management, ex ante regulation is fragmented at the outset across the EU. However, relying ex post regulation can create incentives for network operators to invest in technology that results in network fragmentation between carriers, hampering efforts to promote unified e-commerce and innovation.

A. Ex Ante Regulatory Framework is Fragmented in Regards to Network Management

The Commission has made effort to promote openness at the national level, such as Article 10 of the Access Directive granting national regulators the power to implement non-discrimination obligations on interconnection and/or access,[116] but the framework is hindered by fragmentation along national borders, challenges to confirming when violations undertaken, and fragmented enforcement between nations. As described earlier, fragmented regulations can lead to continued fragmentation of the Internet marketplace throughout Europe.

This proceeding is an opportunity for the Commission to clarify previous provisions addressing the open Internet and "net freedoms," and ensure they are defined Community wide. For example, the new regulatory framework adds another responsibility for national regulators to promote the interest of citizens in the European Union, adding: "promoting the ability of end-users to access and distribute information or run applications and services of their choice" to paragraph 4 of Article 8.[117]

The updates to the Universal Service Directive provides potentially conflicting goals, first stating that "End-users should be able to decide what content they want to send and receive, and which services, applications, hardware and software they want to use for such purposes, without prejudice to the need to preserve the integrity and security of networks and services,"

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[116] Directive 2002/19/EC, access to, and interconnection of, electronic communications networks and associated facilities (Access Directive) dated 7 March 2002.

[117] *See* 2009/140/EC.

before continuing with "users should in any case be fully informed of any limiting conditions imposed on the use of electronics communications service."[118]

The Directive recognizes the need for some traffic management stating in Recital 34: "In order to meet quality of service requirements, operators may use procedures to measure and shape traffic on a network link so as to avoid filling the link to capacity or overfilling the link, which would result in network congestion and poor performance."[119] This recital continues: "National regulatory authorities should be empowered to take action to address degradation of service, including the hindering or slowing down of traffic, to the detriment of consumers." The Directive also empowers NRAs to set minimum quality of service requirements.[120]

B. Ex Post Regulation Will Not Preserve A Unified Open Internet

Competition rules are difficult to apply to address anti competitive actions on the part of network operators. Articles 101 and 102 of the Treaty for the Functioning of the European Union address limiting or controlling production, applying dissimilar conditions to equivalent transactions, and abuse resulting from a dominant position in the market. However, these are difficult to apply to a variety of network neutrality violations. The blocking or restriction of content and applications would be difficult to present as anti-competitive in the broadband market (though it clearly is an action with implications on the downstream market) because the content or application may be accessible through an alternative network.[121] Manaidaki has theorized that the application of the standard used to address Microsoft may provide some relief for more extreme activities,[122] but the existing ex post regulation has not addressed foreclosures in wire-line and mobile markets. Further, allowing differing degrees of network management to continue to develop fragmented networks throughout Europe by providing "ISPs with an incentive to build-in network management and QoS mechanisms that are difficult to turn- off or remove in an effort to resist ex post regulations."[123]

C. Need for a Common Regulatory Framework For the Open Internet

As an over-the-top market, the Internet depends on standardized protocols to realize its full potential. Similar to the hourglass architecture discussed earlier, where the Internet is maximized through the interconnection by a standardized protocol, common regulations must be applied throughout Europe in order to ensure a consistent and open Internet for innovators and users alike

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118 *See* 2009/136/EC, recital 28.

119 *See* 2009/136/EC, recital 34.

120 *See* 2009/136/EC. Article 22, Paragraph 3.

121 See Katerinaa Maniadakie *Network Neutrality in the EU: Is there Scope for the Application of Competition Rules? (Draft), available at*:
http://www.tprcweb.com/images/stories/2010%20papers/katerinamaniadaki_2010%201.pdf.

122 *Ibid.*

123 *See* Lennett, *supra* note 17, at 140.

Under direction of President José Manuel Barroso, Mario Monti wrote the report *A New Strategy for the Single Market*: At the Service of Europe's Economy and Society and explaining "[telecommunications] services and infrastructure in the EU are currently still highly fragmented along national borders."[124] Even a surface look at regulations around Europe clearly shows how this is the case as different nations approach regulations with different timetables and intentions. For example, Norway has implemented clear and voluntary non-discriminatory principles,[125] while the UK just recently had a public consultation period.[126] Additionally, Hungary has implemented transparency rules requiring disclosure of minimum speeds,[127] though efforts have not developed throughout Europe. Already, these fragmented regulations and lack of protections from discriminatory networks can impact markets. Further, problems are developing that ex post regulation is ill equipped to confront. As explained before, different treatments of Spotify helped make it a popular service in many markets, but hindered access by PlusNet customers in the UK. As Monti explains, "[the] existing regulatory framework at the EU level has been instrumental in market opening but has not yet created a single regulatory space for electronics communications."[128]

Recital 34 of the Directive 2009/136/EC states: "since inconsistent remedies can impair the functioning of the internal market, the Commission should asses any requirements intended to be set up by national regulatory authorities for possible regulatory intervention across the Community."[129] The Commission has the opportunity to define the commons regulatory space throughout Europe by applying provisions on network neutrality at the community level.

D. Minimum Service Quality

The amendment to the Universal Service Directive the states: "it may be necessary to ensure that public communications networks attain minimum quality levels so as to prevent degradation of services, the blocking of access and the slowing of traffic over networks."[130] The Commission seeks clarity on this issue in Question 11: "What instances could trigger intervention by national regulatory authorities in setting minimum quality of service requirements on an undertaking or undertakings providing public communications services?"

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124 Mario Monti *A New Strategy for the Single Market: at the service of Europe's economy and society (May, 2010* (p. 44)

125 http://www.npt.no/ikbViewer/Content/109604/Guidelines%20for%20network%20neutrality.pdf

126 http://consumers.ofcom.org.uk/2010/06/ofcom-opens-debate-on-net-neutrality/

127 http://www.nhh.hu/index.php?id=hir&cid=5631, http://www.ofe.hu/inet/ofe/hu/menu/jogszabaly/jogszab/hirkozles/object/229_08_kormanyrendelet.pdf

128 Mario Monti *A New Strategy for the Single Market: at the service of Europe's economy and society (May, 2010* (p. 44)

129 Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 (L 337/15) (recital 34)

130 Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009. (L 337/15)

Any solution requires transparency in service offerings, as well an understanding what level of service is needed to access content and applications on the Internet, as well as a definition as what is defined by "broadband" and "Internet" service. In regulating any minimum service level, the fast moving Internet landscape, and the continued need for speeds to serve new applications must be realized. This reality is apparent in directive 2009/136/EC which states that "[data] connections to the public communications network at a fixed location should be capable of supporting data communications at rates sufficient for access to the online services such as those provided via the public internet [sic]."[131]

As addressed previously in section ***VIII*****,** network operates must be mandated to disclose the minimum speed of their service, as well as details such as latency. Providing details such as minimum speeds, or average speed during peak congestion, creates definitive points over which a user can choose a service such as guaranteed speeds rather than uses ambiguous "up-to" speeds.

Question 13 adds: "In the case where NRAs find it necessary to intervene to impose minimum quality of service requirements, what form should they take, and to what extent should there be co-operation between NRAs to arrive at a common approach?"

At the heart of a mandate to impose minimum quality of service requirements is the premise that Internet service must access the open Internet. This principle provides the opportunity to summarize the recommendations in this proposal and support the ability for end-users to purchase an Internet connection sufficient to join the digital Europe community. The service provided to users must be open, and ensure that applications and content is not discriminated against, leaving the end-user in control of the experience and protecting the open Internet market.

Further, as presented in Directive 2009/136/EC, Internet connections must progress towards achieving a "Single European Information Space and an inclusive information society."[132] The Digital Agenda for Europe presents the goal to "guarantee universal broadband coverage (combining fixed and wireless) with internet [sic] speeds gradually increasing up to 30 Mbps and above."[133] Different nations have proposed varying speeds as universalization goals. For example, Sweden and Denmark have set a universalization goal of 2 Mbps by 2010, while the UK has set the same goal for 2012. Finland, however, has a 99% universalization speed goal of 100 Mbps by 2015.[134]

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131 Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009. (L 337/12) (Recital 5)

132 Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009. (L 337/11) (Recital 3)

133 A Digital Agenda for Europe COM(201) 245 final/2 (p.19)

134 *See* James Losey, Chiehyu LI, and Sascha Meinrath *Broadband Speeds In Perspective: A Comparison of National Broadband Goals from Around The Globe http://newamerica.net/publications/policy/broadband_speeds_in_perspective*

While the universalization goals of different countries varies, while increasing Community-wide to 30 Mbps, the Directive 2009/136/EC provides insight that in working towards these goals the speeds experienced by users should be "sufficient for access to the online services such as those provided via the public internet [sic]."[135] Mandating minimum speeds for service can result in outdated network connections in the future if the speeds do not update to accurately reflect the needs of Internet users.

A minimum quality of service requirement should not be implemented in conjunction with allowances for discriminatory network management or wide allowances for managed services. Otherwise, the Commission will disincentivize upgrades to network services providing access to the public Internet, slowing increases in capacity.

E. Measurement of Broadband

To provide clarification in actual Internet access speeds consumers and regulators need to be empowered with the tools to test speeds and confirm or contest network operator claims. Measurement Lab (M-Lab) is one example of broadband measurement. An open, distributed server platform that allows researchers to deploy measurement tools, M-lab provides the public with useful information about their Internet connection; tools can confirm if traffic management in use by a network provider or the capabilities of the connection. For example, NDT tests upload and download speeds as well as over a hundred variables and determines if there are limiting speeds. Glasnost can determine if BitTorrent traffic is being manipulated. As an open platform, researcher can add additional tools for a variety of network tests and all data is publicly available, informing consumers, researchers and policy makers.[136]

F. Recommendations:

- *The European Union should make a clear commitment to the protection of an Internet built on end-to-end architecture where access to services, applications, and content, and how they interact with the network is decided by the end-user.*
- *The Commission should issue ex ante principles EC should issue clear guidance underpinning the protection of the open Internet in the revised Electronic Communications Framework, including what constitutes reasonable traffic management to create a unified Community-wide framework.*
- *National regulatory agencies should implement tools for measurement, collection, and analysis of network traffic and performance of fixed and mobile networks.*
- *Data collected should be independently verifiable and openly available to the public.*

X. Conclusion

In the recent past, we have seen mobile operators delay, through a whole variety of sometimes compelling and detailed arguments, the adoption of binding legislation to prevent

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135 Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009. (L 337/12) (Recital 5)

136 *See* Calling all researchers - M-Lab data now available on Amazon EC2, http://www.measurementlab.net/news/2009/dec/10/calling-all-researchers-m-lab-data-now-available-amazon-ec2

market abuses. Such delays have caused significant financial damage to European citizens and European businesses. A perfect example of this was mobile roaming, where citizens and businesses were paying unjustifiable costs for years. With a very motivated Commissioner determined to redress the balance, the process from the launch of the investigation by the European Commission until the approval of the Regulation 717/2007 being slightly more than two and a half years, during which time the abuse continued virtually unabated.

The history of local loop unbundling demonstrates the need for quick action by the Commission to address network neutrality. In March 2000, the Council approved local loop unbundling in principle, but the problems persisted. The next month, the Commission produced a Recommendation and in the following June produced a draft Regulation. Even in France, the country in Europe which was the most motivated to implement the Regulation as quickly and fully as possible, with an exceptionally impressive team in the NRA working full time on the dossier, it took until the end of March 2001 before a fully acceptable reference offer could be negotiated with France Télécom. Effective implementation took much longer in other countries and never happened in others.

To quote former Commission official Pierre-André Buiges:

> "[Incumbents] have many ways to make life difficult for new entrants challenging their traditional monopolistic situation on the local loop. This is the famous 3D strategy: Deny, Defer, Deter. Once pure denial is clearly made impossible by the virtue of competition law or regulation, quite a series of means remain available for incumbents to dissuade entry on the market. They relate to the conditions of unbundling, and show that the devil is in the detail."[137]

The openness, innovation and freedoms of the Internet in Europe simply will not be able to survive a similar delay.

The Commission has spoken in support of openness of the Internet, in announcing the passage of Telecom reform that while traffic management can improve some service, it can also be used to degrade other services.[138] At the heart of this issue is the testament to the run-away success of the Internet. Rising bandwidth use is indicative of the ability for the Internet to provide a market for commerce, a platform for freedom of expression, and a commons for experimentation and innovation. In summarizing network management Lennett explains: "

> "[Network management] does not create capacity -- it only rations existing capacity among competing network users or uses. At best, it serves as a short-term means to defer capacity upgrades, and at worst, a way for ISPs to increasingly control the flow of bits over their networks."[139]

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137 http://ec.europa.eu/competition/speeches/text/sp2001_043_en.pdf

138 http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/219

139 *See* Lennett, *supra* note 17, at146.

Without a firm and comprehensive "regulatory backstop" that can quickly resolve any net neutrality problems as soon as they arise, it will become impossible to regulate net neutrality at all. There is a gap between "the network providers' private interests and public's interests,"[140] and short of explicit restrictions on discriminatory network management and enclosures of the Internet commons, network operators will develop ways to slice up and resell existing bandwidth to consumers in new ways, increasing their profits at the expense of the free and open Internet.[141] ISPs that are vertically integrated with content providers, the entire media industry, governments and transnational organisations will all demand – and non-neutral access providers will have the capacity to deliver - an intrusive policing role that, once in place, will be entirely impossible to remove. If ISPs are in the position of managing content, service, and applications, the gatekeeper role could also include responsibility for the traffic over their networks, raising new concerns of censorship and privacy.

If the Internet's value for society is to be preserved, policy makers will have to intervene.[142] Such a policing role is being demanded in a whole variety of forums, from the European Parliament ("…internet service providers, must join in the dialogue with stakeholders in order to find appropriate solutions [to the infringement of intellectual property])"[143] and the Organisation for Economic Cooperation and Development in its dialogue on the "role of Internet intermediaries in advancing public policy objectives".[144]

We respectfully urge the Commission to take advantage of this opportunity to define a common regulatory framework for the Community, and implement these measures to protect the Internet as an over-the-top platform for innovation and freedom of expression defined by end-user control.

Respectfully submitted,

Electronic Frontier Finland
Global Partners & Associates
Hispalinux
New America Foundation
Open Rights Group
Open Spectrum Alliance

140 *See* Schewick, *supra* note 24, 388.

141 *See* Lennett, *supra* note 17, at140.

142 *See* Schewick, *supra* note 24, at 388.

143 *See* European Parliament resolution of 22 September 2010 on enforcement of intellectual property rights in the internal market (2009/2178(INI)).

144 *See* http://www.technewsreview.com.au/article.php?article=10917.

By*

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* Thanks to Joe McNamee from European Digital Rights provided additional guidance on the framing the historical context in this debate.

Appendix

NEW AMERICA FOUNDATION

Open Technology Initiative

Broadband Truth-in-Labeling

By Robb Topolski, New America Foundation
September 24, 2009

The Open Technology Initiative of the New America Foundation is calling for Truth-in-Labeling by our nation's broadband operators. Drawn from similar useful disclosure requirements by lenders, these Broadband Truth-in-Labeling disclosure standards will give the marketplace a much-needed tool that clarifies and adds meaning to the terms and conditions of the service being offered.

Broadband subscribers are often frustrated that the actual performance of their Internet access service regularly falls far below the advertised speeds. Consumers set their expectations based on phrases like "up to 16 Mbps," and are disappointed to learn that these quotes are worthless as assurances. Currently, there is no lawful requirement for ISPs to reveal the contents of the broadband services they are providing; customers might be harmed by the invalid or ambiguous languages.

Internet Access Providers should disclose the important facts and details of the broadband offering before subscribers sign up. The disclosure should be meaningful, and failing to meet minimum standards should be treated as an important service outage (resulting in a refund or service credit to the consumer). Where there are choices between different products or providers, the disclosure should be made in a way that allows consumers to compare them. Providing clear, meaningful, comparable disclosures ultimately spurs competition between ISPs which encourages the future development of broadband technology.

Open Technology Initiative has created a sample Broadband Truth-in-Labeling disclosure below. ISPs use a standardized label to notice their customers what broadband services they are subscribing, including Internet speed, service guarantee, prices, service limits, and other related elements. The label aims at educating customers the contents of broadband services and making the broadband services more transparent to spur broadband competition, innovation and consumer welfare.

To make sure the broadband service is clearly expressed, the Broadband Truth-in-Labeling disclosure should be standardized to comprise several typical elements as indicators of broadband service quality, such as minimum expected speed and latency to the ISP's border router (where the ISP connects to the rest of the Internet) and service uptime. These minimum assurances will be supported by the ISP as guarantees in the delivery of broadband services, backed by technical support and service charge refunds or credits. In addition to the description of minimums being guaranteed of the service, the disclosure should include all applicable fees, a common description of the technology used to provide the services, any service limits such as a bandwidth cap or the application of any traffic management techniques, the length of the contract terms, and a link to all additional terms and conditions. Requirements should be established for disclosing any highly objectionable or surprising terms such as arbitration restrictions or information or data selling.

This Broadband Truth-in-Labeling disclosure must be shown to the consumer as part of the sign-up process and must be assertively presented again any time the ISP decide to alter the terms in such a way that alters the facts on the original Broadband Truth-in-Labeling disclosure.

ExampleCom Ultra 15 Mbps Broadband Truth-in-Labeling	
Advertised Speed	15 Mbps downstream/2 Mbps upstream
Service Guarantees **Services are measured from and to the border router.**	
Minimum Speed at Border Router	8Mbps downstream /384Kbps upstream
Minimum Reliability/Uptime	96%
Maximum Round-trip Latency (Delay) to Border Router	50ms
Service Guarantee Terms	Daily service credit upon request for any outages or extended periods of under-delivery of service
Prices	$44.99 monthly service $19.99 monthly for the first six months on promotion
Service Limits (List all traffic management techniques)	• Exceeding 100GB calendar week considered excessive use, subject to disconnect penalties, see http://www.examplecom.invalid/excessive • Traffic by heavy users in congested areas is artificially slowed, see http://www.examplecom.invalid/shaping
Other Fees (ISPs cannot charge if not listed)	$3 monthly modem rental fee $59.99 installation fee $19 outlet installation $150 early termination during promotion period $2 account change fee $35 service call fee unless $3 monthly inside wiring maintenance plan is in force Sales taxes and franchise fees, vary by location
Contract Term	At will, customer may cancel at anytime after first six months. During the first six months, a cancellation results in a $150 fee.
Service Technology	DOCSIS 1.1 / 2.0 HFC
Legal and Privacy Policies	http://www.examplecom.invalid/legal