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Editors

Net Neutrality Compendium

Human Rights, Free Competition and the Future of the Internet

Preface by
Vinton G. Cerf
Postface by
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Preface

Net neutrality is a term that has taken on many apparent meanings and has served to provoke many debates over the past several years. The issues that invoke the use of the term vary depending on geography, economic and business conditions and regulatory environment. A consequence is that the arguments for or against net neutrality may be inconsistent when compared side by side. This year's meeting of the Dynamic Coalition on Network Neutrality is an opportunity to compare notes and observations on the ongoing debate.

In the USA, there is limited competition for provision of broadband Internet access. Historically, the dial-up Internet had many providers (some reports estimated more than 8000 ISPs), but broadband technology tended to be associated with coaxial cable television networks, hybrid fibre/coax, digital subscriber loops on copper (DSL, ADSL, etc.) and fibre to the home (FTTH). The usual providers of these broadband services were traditional telephone companies and television cable companies. Residential subscribers might have a choice of two broadband providers (a telco and a cableco), or perhaps only one of them or, especially in rural areas, no broadband service choice at all.

Alternative access methods including Wireless Internet Service and satellite tended to have limits either with regard to speeds or latency or both. In all cases, the residential services tended to be asymmetric, providing higher speeds in the download direction. In the recent past, some providers, notably Google, have been offering very high capacity in the gigabit per second range in both directions.

After lengthy debates, the American Federal Communications Commission decided to reclassify Internet service as a Title II Telecommunications Service, while forbearing to apply most of the regulations found in that title to the providers of Internet service. This was a controversial decision but understandable, given that court cases disputing the FCC's jurisdiction in the space turned on the earlier decision by the FCC to declare the Internet a vertical information service. The new classification appears to give the FCC authority to respond to potential anticompetitive behaviours by Internet service providers. A risk is that the forbearance might be reverse and a more elaborate regulatory practice might be adopted. Perhaps the most

practical outcome would be a new title in an amendment to the Telecommunications Act that would be specific to Internet and suitably constrained.

In other jurisdictions, while the same term, *net neutrality,* is used, the local regulatory conditions may be different. In some countries, broadband services are provided on a wholesale basis to any party that wishes to use the infrastructure to provide residential customers with access to Internet. In the UK, Australia, the Netherlands and New Zealand, variations on this theme have been undertaken with varying results.

There are also debates about quality of service, fueled by the belief that the Internet should be sensitive to application requirements and provide low latency or high bandwidth, depending on the need. Some take the position that there is no need for special controls for quality of service if the absolute capacity of the access is high enough. Others think that users and application providers should be able to obtain the appropriate quality of service needed for specific applications. It is common, however, to argue that the broadband access providers should not be in a position to selectively extract additional rents from the application and content providers, effectively controlling which application can be used or content providers can be reached and used satisfactorily by users—essentially dictating user choice.

It seems important to preserve the notion that the Internet should support what is sometimes called "permissionless innovation"—that is, that innovators of new applications and services should *not* be forced to conclude some kind of contractual agreement *with every Internet access provider in the world* before a service can be offered. One must accept, however, that some services may work poorly or not at all if adequate capacity is not available to support them.

The conundrum in the net neutrality debate is to fashion incentives for access providers to continue to invest in and upgrade service capacity while preserving user choice and provide incentives for new applications to be brought to the Internet and made accessible to all access subscribers without inhibiting new entrants into the marketplace of Internet services by erecting barriers to their entry.

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Louis Pouzin is the inventor of the datagram and designed an early packet communications network, CYCLADES, that influenced the development of TCP/IP used by the Internet. He is considered one of the fathers of the Internet and is currently a consultant, giving seminars on Internet evolution. He is an active participant in the UN Internet Governance Forum and contributes to several non-profit organisations, EUROLINC (native languages in Internet), MAAYA (federation for cultural and linguistic diversity) and ATENA (high-level seminars). He has created a company, Savoir-Faire, for selling new top-level domains (Open Root).

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Contents

Part III
Network Neutrality in Action: Challenges and Implementations

This final part analyses the most recent challenges to the network neutrality debate as well as the implementation of net neutrality regulations in different jurisdictions. The contributions contained in this Part critically analyse the most recent regulatory approaches to net neutrality, suggesting elements that should be taken into account in order to develop solid national approaches. Emerging challenges are explored, nurturing a reflection on the implementation of net neutrality policies to zero-rating schemes, Internet access provision through drones and grassroots community networks. To conclude, a legally interoperable approach to net neutrality is proposed, identifying the core elements of net neutrality policies and distilling them in a Policy Statement to be discussed at the 10th United Nations Internet Governance Forum.

The preservation of openness, the protection of end-users rights and the maximisation of consumers' welfare may be seen as some of the core objectives of net neutrality policies. The regulatory intervention aimed at preserving network neutrality is not only motivated by the existence of market failures, but also on the need to preserve users' fundamental rights. As such, net neutrality regulations should carefully consider the impact of market practices on end-users' fundamental rights and consumers' expectations.

Arnold et al. argue that, at the European level, little effort has been made to date by policymakers to understand properly consumers' preferences, values or motivations. Notably, the authors note that, despite the European Commission's attempt to frame its 2012 Public Consultation on network neutrality around the actual needs and preferences of consumers, the results of the consultations are not always reliable, and often do not properly reflect the actual values and motivations of consumers. To emphasize this point, the authors compare the views expressed in the European Commission's public consultation with the results of a representative study on the value of network neutrality to European consumers, undertaken by the authors in 2014. Based on this empirical study, the authors show that the views expressed by citizens in the public consultation differ significantly from representative consumer's preferences and values. While consumers generally tend to favor an open and neutral Internet, their preferences towards network neutrality are in fact much more nuanced than it appears from the public consultation. As such, the authors argue that a more

widespread use of representative consumer's insights, based on objectively unbiased sampling, should be used to support policy making and regulation.

The elaboration of sound net neutrality frameworks may also require the further consideration of some elements that have not been duly considered over the past decade. In this regard, Konstantinos Stylianou argues that in most jurisdictions a sustainable net neutrality regime has not yet emerged, despite persistent regulatory efforts. According to the author, in the US, Europe and Latin America, net neutrality rules are either frequently changed or frequently challenged or impossible to adopt in the first place. Three main reasons may be found at the origin of such difficulties. First, regulators as well as involved stakeholders frequently push for black-and-white solutions, disregarding the nuances of the implicated issues, thus tending to be either overinclusive or under-inclusive. A solution to this problem may be offered by flexible framework clauses, like those used in antitrust, which may be capable of filtering out harmful practices while allowing non-harmful ones. Further integration of antitrust-like analysis and principles into telecommunications regulation would indeed offer regulatory tools that can accommodate the arguments of both sides. Second, the author criticise the insistence on traditional principles of the Internet architecture, arguing that they may not be fully applicable or beneficial today as when the Internet was first conceived and commercialised. As an instance Stylianou argues that mobile cellular networks, which are more managed and more complex than fix ones, may not benefit from the imposition of the original Internet design principles that should be reconsidered in order to allow free technological evolution. Lastly, the author suggests that regulators need to focus further on the competitive conditions in the market, which includes the identification of potential bottlenecks and the power interrelations among them. Current practice seems to pay insufficient attention to modern power interrelations and may fail to identify which players are favourably positioned in the value chain. Hence, further analysis of the relevant players their mutual interrelations may be very beneficial.

The first semester of 2015 has been characterised by the attempt to define sustainable net neutrality approaches, sparking intense debate and substantial novelties as regards net neutrality regulation. In February the U.S. Federal Communications Commission published its new net neutrality rules; on 1 July a political agreement about the European net neutrality rules was reached between the European Commission, the Parliament, and the Council; and heated discussions have emerged, as regards the compatibility of zero-rating schemes with the non-discriminatory treatment mandated by net neutrality policies and regulations. Regulators have been very active, proposing and implementing net neutrality rules around the globe. In this regard, Frode Sørensen explores the most recent European and US approaches to net neutrality through his article on "A Norwegian perspective on European regulation of net neutrality". The author highlights that the two approaches have similarities and differences. Similarities may be easily understood due to cross-Atlantic influence while the interpretation of the differences requires further reflection. Frode Sørensen discusses some key elements that have characterised net neutrality debates both in the U.S. and EU, such as application-agnosticism, reasonable traffic management, specialised services and, finally,

zero-rating. The author's analysis seems instrumental to understand current as well as future net neutrality discussions, clarifying that the goal of net neutrality is not to treat all traffic identically but rather to preserve the Internet as an open platform for communication and avoid discrimination between applications or fragmentation.

Analysing the concept of application-agnosticism, Sorensen stresses that this is not only a technical characteristic regarding traffic management practices but also reveals economic implications on charging models, leading to conclusions on zero-rating. A major criticism that has been raised regarding the political compromise on European net neutrality rules is that it hardly addresses zero-rating practices on which net neutrality discussions are increasingly concentrating. In this regard, the author explains that the goal of non-discrimination should be kept in mind when analysing charging models that, due to the commercial incentive to select specific applications, leads to favour specific traffic above other traffic. As Sørensen points out, this is exactly the type of situation that net neutrality policies should aim to avoid.

The growing trend towards the provision of sponsored data plans in mobile services seems one of the most important challenges that Network Neutrality is currently facing. In many developing countries, where broadband connection is not or hardly present on the territory, mobile phones are the main source of Internet connectivity. Yet, in order to optimise Internet traffic management, most mobile operators introduced specific data plans to cap the amount of Internet traffic that can be achieved through the telephone subscription, with the exception of the traffic stemming from affiliate partners, so-called sponsored content. In his article on Zero Rating and Mobile Net Neutrality, Chris Marsden considers whether sponsored data plans pose an actual challenge to Internet openness and the extent to which zero rating may or may not infringe the network neutrality principle. In particular, the author suggests two regulatory actions to encourage the correct use of zero rating: treating zero rating as a short-term exception to net neutrality, and ensuring that any such short-term exception is not exclusive.

Subsequently, the report investigates the potential implications of network neutrality regulations in a variety of new and innovative contexts, ranging from community mesh networks to civilian drones. Primavera De Filippi and Félix Tréguer analyse the question through the lenses of the network commons, by investigating how public policy could help promote the deployment of open and non-discriminatory community networks. The authors first provide a historical overview of the Internet access market in Europe, to subsequently focus on the rise of Wireless Community Networks (WCN) as a communitarian reaction to the growing centralization of the Internet network, combined with the advent of draconian regulations encouraging the surveillance and control of online communication. De Filippi and Tréguer highlight the new power dynamics emerging in today's telecom infrastructures, by describing the interplay that subsists between telecom operators and grassroots community networks. While WCNs potentially constitute an important counter-power that could limit the abuses that commercial operators have the capability to inflict on their user-base, the authors bring attention to the fact that current telecom regulations creates significant hurdles that might

significantly restrain the deployment of large-scale WCNs. The chapter concludes with a series of policy recommendations to support the deployment of community networks and promote the development of the network commons.

Similar reasons motivate the deployment of unmanned aircraft systems (UAS)—commonly known as drones—for novel applications such as the delivery of broadband connectivity to remote areas with no Internet or telephone coverage. As explained by Leonidas Kanellos, in some developing countries, companies such as Google and Facebook are already undertaking these activities with solar-powered drones and high-altitude balloons, while at the U.S. level they have already obtained relevant testing licenses from the FCC. Yet, to ensure coverage across wider regions, inter-drone communication needs to be established and maintained. In his article on the 'Network Neutrality Aspects of Civilian Drones', Kanellos explores emergent policy questions related to the use of civilian drones to provide Internet access to underserved areas. Specifically, the article investigates the opportunities that these aerial devices provide in terms of extended broadband connectivity, as well as the implications of traditional platforms such as Google and Facebook progressively turning into access providers. The article concludes with an illustration of the potential negative impacts of drones on the privacy and security of users, stressing the need for a coherent regulation of drones at the global level.

As a conclusion of this book, Luca Belli and Nathalia Foditsch analyse net neutrality under the lenses of legal interoperability, identifying the basic elements that a net neutrality policy statement should include. A network of networks based on a globally interoperable architecture may be considered as difficulty reconcilable with an international system based on mutually excluding legal frameworks. Indeed, while the technical Internet standards allow heterogeneous networks to communicate and cooperate, legislations and regulations are essentially based on national sovereignty, whose inherent purpose is to establish different domestic approaches. As technical interoperability aims at making networks work together, legal interoperability aims at making national rules compatible across jurisdictions, thus avoiding legal fragmentation. Luca Belli and Nathalia Foditsch analyse the importance of fostering legal interoperability, in order to allow legal systems to frame common problems in a compatible fashion, as technical standards do. Shared principles and compatible rules amongst various juridical systems have, indeed, the potential to decrease transaction costs, reduce barriers to cross-border trade, and introduce important non-monetizable benefits, by fostering individual empowerment and ensuring the protection of fundamental rights.

Net neutrality policy focuses on Internet traffic management, an issue virtually affecting every electronic network composing the Internet. To date, national legislators and regulators have been adopting different approaches for the promotion of net neutrality, although many similarities and common features can nonetheless be identified. To this extent, it seems both possible and useful to analyse existing regulatory frameworks in order to synthesise best practices within a principle statement, which may be used to foster a shared level net neutrality protection. Indeed, due to the transnational nature of the Internet, the development of legally interoperable net neutrality frameworks may prove beneficial in order to preserve the open, distributed

and general-purpose nature of the Internet, while simultaneously setting shared standards for protection of end-users' rights. Luca Belli and Nathalia Foditsch scrutinise the network neutrality concept and stress its importance for maintaining the original architecture of the Internet, by preserving technical interoperability and fostering global connectivity on a non-discriminatory basis. After having identified common features shared by existing net neutrality frameworks, the authors propose a common principle-based approach that may be used to develop legally-interoperable net neutrality regulations, fostering legal certainty without introducing excessive legal fragmentation. Such principle-based approach has been elaborated through an open and multi-stakeholder process, organised through the IGF Dynamic Coalition on Network Neutrality and presented as an outcome of the Coalition at the 10th Internet Governance Forum.

Chapter 15
All But Neutral: Citizen Responses to the European Commission's Public Consultation on Network Neutrality

René C.G. Arnold, J. Scott Marcus, Martin Waldburger, Anna Schneider, Bastian Morasch, and Frieder Schmid

Network neutrality is a complex and multi-faceted subject. Not surprisingly, consumer views toward network neutrality appear to be correspondingly complex and nuanced.

Our paper highlights the relevance of objective, representative consumer research for regulatory and policy decisions regarding the European network neutrality debate. Despite its immediate impact on consumers, little effort has been made to date by policymakers to understand consumers' preferences, values or motivations. Moreover, much of the assessment of such consumer preference data as is available tends to be simplistic and/or misleading. To emphasize this point, we compare views expressed in the public consultation on network neutrality that was conducted by the European Commission in 2012 and comprehensively reported on in a 2014 study by the authors for the European Parliament, with those from a representative study of the value of network neutrality to European consumers undertaken in 2014, also led by the authors.

We find that the views expressed in the public consultation differ significantly from representative consumer preferences and values. For instance, consumer opinions about traffic management were largely negative among citizens in the public consultation, while the unbiased survey results demonstrate that there is in fact a substantial segment of consumers who are interested in purchasing prioritized services. More generally, our results shed some doubts on the reliability of public consultations and other surveys where respondents are self-selected as a sole means to understand consumers' preferences, values and motivations. We argue for a more widespread use of representative consumer insights based on objectively unbiased sampling to support policy making and regulation.

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15.1 Introduction

Network neutrality is a complex and multi-faceted subject. Not surprisingly, consumer views toward network neutrality appear to be correspondingly complex and nuanced. We question whether the public debate about network neutrality to date has properly captured the richness and complexity of consumer views.

Potential concerns involve:

- The relative paucity of serious, objective studies of consumer attitudes and preferences toward network neutrality; and
- The risk that there might be a minority of consumers who hold strong and polarized views, and that because they are vocal they might be far more visible than large numbers of consumers whose views are more complex.

This possible risk of a distorted view of consumer preferences is the main focus of this paper. The risk is linked to the well-known statistical phenomenon of *self-selection bias*—when respondents to a survey or consultation select themselves, those who feel most strongly about the issue are disproportionately likely to respond. Those who conduct serious surveys of consumer (or voter) behavior typically invest a great deal of effort in ensuring that their samples are *representative*.

There is good reason to worry about possible self-selection bias in surveys and consultations relating to network neutrality. First, one might well wonder what fraction of citizens are, in the normal course of events, even aware of public consultations on network neutrality conducted by the European Commission, or BEREC, or Member State governments. Second, one might wonder what fraction of the public has sufficient awareness and knowledge to motivate them to take the trouble to comment.

In this paper, we aim to shed light on the degree of self-selection bias by comparing (1) the responses of self-selected citizens from the public consultation conducted by the European Commission on network neutrality in 2012 to (2) those of a representative sample used in a study on behalf of BEREC (the European Board of Regulators of Electronic Communications) on the value of network neutrality to European consumers. To this end, we draw on two studies conducted by the authors of this paper for the European Parliament[1] and BEREC[2] in 2014.

The remainder of the paper is structured as follows. First, we briefly summarize the existing literature on consumers' attitudes to and preferences for network neutrality as well as network neutrality-related product attributes for Internet Access Services (IAS). Second, the methodology used for the two studies is reported. Third, we compare the results of the public consultation and the representative consumers survey on network neutrality. The paper closes with concluding remarks.

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[1] Reference not inserted here to preserve authors' anonymity.

[2] Reference not inserted here to preserve authors' anonymity.

15.2 Literature Review

Whilst for some policy and regulatory decisions there may be ample existing insights on consumer preferences, values and motivations available, this is not the case for network neutrality. In this part of the paper, we present the few relevant published insights. First, we review qualitative insights into the issue. Second, quantitative studies focusing on consumers' willingness-to-pay for network neutrality are reviewed. The literature review culminates in a short summary and implications section.

15.2.1 Qualitative Studies on Consumers and Network Neutrality

One of the most relevant studies in this area is that of Lawford et al. (2009), who conducted six focus group discussions in various Canadian cities. The participants were heavy Internet users, yet one major finding was that their "awareness and recognition of the term 'network neutrality' was very limited". The majority of them were unfamiliar with it, and those who had heard the term before still lacked a clear idea of its meaning; suggestions ranged from a lack of online censorship to an Internet where business interests have no influence. They often blamed their lack of awareness on being complacent about their own ISP's service. All participants had previously experienced disruptions, but they did not usually blame their ISP for these and instead thought the problem lay with their own hardware and/or software, or another server. These views can also be seen in Kenny and Dennis (2013). Once participants were made aware of network neutrality, they showed great interest in it. Many were concerned about what they had learned about traffic management practices, and opposed the idea of the unnecessary throttling or prioritization of certain content. Almost all of them saw ISPs' interest in profit as an insufficient reason for traffic management.

Quail and Larabie (2010) presented similar findings from a single focus group discussion with communication studies students at a Canadian university. Their participants were also largely unaware of network neutrality, despite the fact that they studied communications. When provided with information about it, they understood the concept and engaged more in the focus group discussion than before. Generally, they also seemed concerned about the influence that business interests might have on the Internet, which they thought of as a public utility.

15.2.2 Quantitative Studies on Consumers and Network Neutrality

Another stream of literature addresses consumers' willingness-to-pay for specific product attributes as part of an Internet Access Service (IAS). These studies commonly rely on conjoint analysis to determine this willingness-to-pay. Among

the numerous studies investigating this topic, only two could be identified that included network neutrality-related product attribute in their choice experiments.

Huck and Wallace (2011) conducted a choice experiment with 156 students at the University College London, in which they focused on the influence of color as compared to numerical coding of information about broadband speed and network neutrality in fictitious ISPs' offerings. The subjects were asked to make appropriate decisions for given individual or multi-user scenarios based on usage pattern descriptions. Subjects received an incentive for correct answers.

The fictitious packages were developed around their access speed (up to 10, 20 and 50 Mbit/s). For each of these levels, there was a distribution of typically tested choice criteria such as price, and one attribute capturing traffic management. This attribute covered (1) data consistency during peak time, (2) none, (3) download slowdown at peak times, (4) download slowdown of P2P at peak times and (5) prioritization of real time services such as VoIP or video streaming.

Subjects in Huck and Wallace's study made right choices in less than half of the cases (i.e. they performed worse than had they picked offers at random which would have led to 50 % correct choices). Subjects who received the numerical information performed significantly better. They chose the right option in 50.7 % of the exercises. Personal characteristics such as intelligence quotient (IQ) did not have a statistically significant effect on subjects' performance. Due to the limitations of the specific method used, Huck and Wallace did not publish part-worth utilities for the product attributes tested. Thus, a specific willingness-to-pay for the traffic management attribute cannot be inferred.

Nam et al. (2011) address this issue. Their conjoint choice experiment conducted with 1049 consumers features four attributes: (1) Price (low 28US$, medium 34US$, high 40US$); (2) Access speed in Mbit/s (guaranteed minimum speed/ maximum advertised speed: 1/10, 5/50, 10/100); (3) Content Availability (free access to all content, access except for some content); (4) Quality of the Public (Low-Tier) Network (access speed of public network is guaranteed, access speed of public network can be reduced). Respondents considered price to be the most important attribute in their broadband choice, followed by access speed. Taken together, these two attributes add up to more than 60 % of part-worth-utilities. The relative importance of the two attributes directly linked to network neutrality were considerably lower in end-users' choices. The quality of the public network scored 19 % and content availability scored 14 %. The latter seems especially surprising given that unblocked access to all content is one of the characteristics of the Internet commonly referred to by consumers as highly desirable in the qualitative studies described in the above.

Nam et al.'s (2011) research seems somewhat limited in comparison to the other conjoint experiments reviewed in that the number of attributes tested is low. Therefore it seems likely that the relative importance of network neutrality is identified unreliably and would likely change significantly if other important attributes such as bundling with TV or the brand of the ISP had been introduced to the experimental setting.

15.2.3 Summary and Implications of the Literature Review

The reviewed studies, however, concur that consumers were concerned about these issues as soon as they have learned about network neutrality and traffic management practices. On this backdrop, it appears important that citizens' views are heard in the public consultation on network neutrality.

However, all studies also found that consumers lack awareness of the term "network neutrality" and have great difficulty grasping its meaning. An Ofcom study further supports this point. They found that only around one in ten UK consumers are aware of the term "traffic management", and even these consumers do not think that ISPs in the UK use it (Ofcom 2013). This insight clearly indicates that a simplistic open forum procedure to capture citizens' views is unlikely to result in a holistic and representative picture of the value of network neutrality to consumers. In fact, it calls for an approach that can explore in-depth the issue with a broad sample of consumers and hence verify as well as further investigate the value of network neutrality quantitatively using a representative sample. This is further supported by the fact that each of the reviewed studies covers only a small part of the issue. Although only one of the relevant studies reviewed here refers to the European context and none of them has been published after 2011, some fundamental insights may be gained from them that can critically guide the development of such a holistic and representative study.

Qualitative exploration should focus on generating insights that can critically guide the development of a quantitative research approach that can overcome the shortcomings of the two papers described in the above. For instance, doubts exist on whether the terminology applied to describe network neutrality-related product attributes and general information actually meets consumers' understanding and conceptualization of the issues. Qualitative exploration can shed light on the terminology used by consumers and their conceptualization of network neutrality. Quantitative research has to investigate the value of network neutrality to consumers in conjuncture with the full breadth of typically tested attributes. The lack of critical attributes such as product bundling with TV or mobile contracts in the two quantitative studies reviewed is likely to have adversely affected the results on network neutrality.

The following part of the paper describes how we have addressed these implications in our methodology for the representative consumer study discussed here.

15.3 Methodology

In this paper, we compare the results of two studies. We describe in some detail the methodologies employed in these two studies in the following sections.

15.3.1 Public Consultation Study

Late in 2012, the European Commission conducted a public consultation on network with an eye to a legislative initiative in 2013. For whatever reason, the Commission never published a comprehensive analysis of the results of that public consultation. In a study in 2014,[3] we went back to the Commission's public available source data and effectively completed the consultation that the Commission had begun. The source data included more than 400 multiple choice citizen responses from the public consultation that had been collected using a web-based tool.

We separately assessed the views of on a fourth of the 131 organizational stakeholders based on their detailed non-confidential text responses.

15.3.2 Representative Study on the Value of Network Neutrality to European Consumers

For the pan-European study on the value of network neutrality to consumers, we used a mixed-methods approach. The research was conducted in four carefully selected test areas: Croatia, the Czech Republic, Greece and Sweden. The qualitative part of the research consisted of 12 offline focus groups (three per country). The quantitative part comprised an online survey including a conjoint experiment. In each test area, at least 1000 usable questionnaires were obtained. Within the online survey, we performed a test as regards the impact of additional information about network neutrality in each country. Respondents were randomly assigned to the test group (with additional information) and control group (without additional information). The effect of the additional information on respondents' knowledge about network neutrality was confirmed as part of the questionnaire.

Focus group discussions were chosen for the present research as their characteristics echo our research objectives. The stimulation of ideas and concepts through interaction supported us in exploring significant cultural differences between countries and generate insights into consumers' conceptualization of and attitudes towards different aspects of network neutrality. Our search for the drivers of these attitudes has been aided by the candor, spontaneity and potential to retrieve new ideas typical for focus groups. Equally, we were able to learn more about the attributes of ISP choice in less time as compared to individual interviews, which considerably helped to keep the tight schedule of the project.

The most relevant methodological choice as regards the quantitative part of the research was to prefer ACA to CBC in the conjoint experiment. This choice was based directly on the results of the literature review indicating that network neutrality-related attributes had to be tested within a broad set of typically tested product attributes for IAS and that their impact may be relatively small. ACA is better suited than more popular CBC for exactly this kind of task. First, ACA forces

[3] Reference not inserted here to preserve authors' anonymity.

the respondent to perform choices, in conjunction with the information at prior stages of the questionnaire, this provides reliable insights on each product attributes regardless of whether it is a primary decision driver or not. ACA can test more attributes at once. Finally, this type of conjoint questionnaire is more engaging for respondents as the method "adapts" to the answers a respondent gives and forces increasingly difficult trade-offs.

Those advantages came at the cost that ACA requires more space in the questionnaire as it combines decision tasks between possible offers with additional questions regarding attractiveness and decision importance. Also, price effects are underestimated in ACAs, limiting the applicability to pricing research and predicting market shares. An analysis of respondents' willingness-to-pay was still possible in ACA nonetheless.

15.4 Findings

From a first inspection of the citizen responses in the public consultation, one can observe that they appear to reflect a high degree of concern over traffic management. Interestingly, this degree of concern is more often than not even higher than that expressed by consumer advocacy groups, and also higher than that expressed by content and application providers (who are presumably the parties who would be most directly impacted by anticompetitive forms of traffic management). This can be taken as a first indication of a strong underlying self-selection bias. This is supported further by comparing the consultation responses of self-selected individuals to the results of individuals in our balanced and representative survey on behalf of BEREC.

15.4.1 Views on Traffic Management Measures to Deliver Specialized Services

For the item referring to ensuring of a guaranteed quality of service for a specific content or application, citizens in the public consultation expressed a significant degree of concern. Two thirds of them found traffic management measures applied to deliver special services problematic. Around one fourth felt they were appropriate, while 9.2 % see them as a necessity.

The representative consumer survey shows a much more nuanced picture as regards such services. To contextualize consumers' views, we have benchmarked them against BEREC's four assessment criteria for traffic management measures.

(1) Non-discrimination between players: The practice is done on a non-discriminatory basis among all content and *application* providers.
This first criterion identified by BEREC reflects consumers' concept of fairness as regards traffic management quite well. The focus group and survey results

reflect clearly that consumers care about fairness if traffic management measures are used. For instance, around 75 % of respondents across all four test areas agreed with the statement "If prioritizing one user means that someone else gets slower access to the Internet, I find this unfair". Thus, one might even argue that consumers go beyond the idea that all content and application providers have to be treated equally by also considering the impact that their potential choice for a prioritized content/application service might have on the quality of experience for other users.

In essence, consumers subscribe to the idea that some data can or, in some cases, even should be prioritized, either for extra payment or due to reasons of urgency. On the other hand, consumers do not want prioritization to take place at the expense of anybody else's access and in particular not their own quality of Internet access. As they consider potential effects of traffic management not only on themselves but also on others, consumers exhibit a pronounced sensitivity for fairness when it comes to network neutrality. In this context, consumers also consider to some extent greater societal effects. For instance, Swedish focus group participants were concerned about potentially harmful effects of deviations from network neutrality on innovation.

(2) End-user control: It is an important indicator of reasonableness when the practice is applied on the request of users at the edge, who can control and deactivate it. The level of control is deemed higher when the user does not incur costs for removing a restriction

The role and control of the end-user are reflected clearly in our results. If consumers opt for prioritized services, they want to make the choice themselves about which particular content or applications are prioritized and are reluctant to accept any predefined selection that their ISP may offer. In fact, in the focus group discussions, many participants voiced doubts that ISPs could actually anticipate their specific needs and create bespoke products. This is also reflected in the low agreement with the item in the survey that asks if ISPs should make the choice of which content and applications are prioritized and which ones are not. Similarly, respondents showed relatively little agreement with the item referring to ISPs prioritizing their own content such as IPTV over other (third-party) content.

(3) Efficiency and proportionality: The measures should be limited to what is necessary to fulfill the objective, in order to minimize possible side effects. The intensity of the practice, such as frequency and reach, is also important when assessing its impact.

First and foremost, the focus group discussions highlighted that consumers would like to be as free and uncontrolled as possible when they are online. On the other hand, many participants also voiced their wish for a sort of anticipatory filtering of content that they deem offensive, fraudulent or dangerous. Some participants did subscribe to the idea of a "guardian angel" in the background and intended to perform this task themselves, probably severely underestimating its magnitude.

As hard as it might be (if possible at all) to achieve this consumer ideal, the only institution that most of the participants would have faith in performing it is their own government. The actual fulfillment of the task is further impeded by consumers' clear wish that their personal data remain untouched (as far as possible). While this suggests that they adhere to the principle put forward by BEREC quoted above, in fact neither ISPs nor the government or an NRA could possibly fulfill the task of filtering without analyzing user data.

(4) Application agnosticism: As long they are able to achieve a similar effect, BEREC expresses a general preference for 'application-agnostic' practices. This reflects the fact that the decoupling of the network and application layers is a characteristic feature of the open Internet, and has enabled innovation and growth.

The results of our study show that consumers by and large are unaware of the technical underpinnings of the Internet, nor of the specific role that ISPs play within it. They care mostly about their own quality of experience and have a strong preference for open, unrestricted and reliable access to the content and applications they want. In addition, ideas about the wider effects of potential prioritization of content and applications on the competition and innovation also register to some extent with consumers. Overall, we found stable and clear-cut attitudes towards network neutrality as described in detail above.

Citizens in the public consultation found application-agnostic practices the least problematic. Only 36.7 % felt that measures 'affecting all applications and content providers in the same way (application-agnostic)' were problematic. Around a quarter felt that it was necessary to treat all applications/content providers in the same way.

15.4.2 Views on Traffic Management Measures to Ensure Quality of Experience

The second set of items analyzed more closely by us from the public consultation refers to traffic management measures that are used to 'take into account the sensitivity of the service to delay or packet loss'. The majority of citizen respondents found this problematic (53.8 %). Around one third felt they were necessary while 13.4 % consider them necessary. Similarly, a significant majority of citizens opposed measures 'applied during busy times and places, when and where congestion occurs'—67.7 % found them problematic. An even more negative picture is found for measures referring to 'targeting types/classes of traffic contributing most to congestions'. In total, 82.8 % of citizen respondents found this problematic.

The representative consumer survey results underline that consumers in fact show little concern for the technical details of data transport; however, they are concerned about their quality of experience. Thus, it is not surprising that consistently more than 60 % of respondents agree with that traffic management for technical

reasons such as the ones cited above should be conducted. Greek consumers showed the lowest share of agreement (62 %), while 78 % of consumers in the Czech Republic agreed with the corresponding statement. In this context, it should be noted that consumers by and large were satisfied with the quality of their IAS at home and experienced only occasional disruptions of their service. The focus groups indicated a comparatively poor quality of experience in the Czech Republic, which may contribute to the high agreement with the idea of traffic management being used to ensure the quality of service.

15.4.3 Views on Traffic Management Measures for Blocking Specific Applications or Contents

The results referring to the use of traffic management to manage compliance with explicit contractual restrictions for instance as regards blocking of VoIP or P2P traffic concur across the two sources we compare. In the public consultation, 85.9 % found such practices problematic. Only 2.4 % felt that such practices were necessary.

The results of representative consumer study concur with this finding. In essence, they highlight that consumers care about free, unrestricted, reliable access to and high quality of content and communication. For them, that is the essence of quality of experience. The relevance of free and unrestricted access becomes obvious when one considers the role that the Internet plays in their lives today. Around 90 % of respondents use the Internet every day at home. Interestingly, the focus group discussions in particular were able to shed some light on differences in the role that the Internet plays in people's lives. For instance, in Sweden the Internet is woven into consumers' lives and they often use it almost without realizing, such as when streaming music or videos on a smart stereo system or TV. Thus, it is not surprising that we observed much higher expectations as regards the reliability of respondents' Internet connection in Sweden than in any other test area. Independent from where they are, even in rural areas, Swedes simply expect their access to the Internet to work. On the other hand, Czech consumers noted that they are very conscious of their Internet use and do not use it all of the time. They use it predominantly for organizational purposes, such as arranging to meet friends.

15.4.4 Views on Traffic Management Measures to Manage Access to and Usage of the ISPs' Own Infrastructure

The final set of items reviewed in detail for our analysis of the European public consultation refers broadly to the idea of fairness. The first item in this set looked at 'targeting heavy users whose use is excessive to the extent that it impacts on other users'. Three quarters of citizen respondents found such a practice problematic.

Around one fifth agreed that it was appropriate and 5.2 % found it necessary. Traffic management used by ISPs to limit competition for their own services was frowned upon even more strongly. In total, 96.2 % saw this practice as being problematic. Correspondingly, only a marginal share of respondents felt traffic management was appropriate or even necessary under these circumstances.

While the first item is largely covered by the strong sensitivity for fairness by consumers in the representative survey when traffic management is done by ISPs as outlined previously, the second item was covered in our survey by the item "It is fine if Internet providers prioritize applications that are offered directly by them (*e.g.* IPTV from the provider)". The responses to this item conflict somewhat with the concept of fairness. In three out of the four test areas, a majority of respondents agreed with this statement. The highest agreement was found in Croatia. Here, 60 % of respondents had no concerns with this sort of traffic management practice (CZ 52 %; ET 54 %). In Sweden, however, only 40 % agreed with the statement. This results is unsurprising as Swedes also were the ones who expressed strong concerns in the focus group discussions that commercially driven deviations from network neutrality could harm the competitive environment.

15.5 Discussion and Conclusion

In the introduction to this paper, we expressed the general concern that European policy might not be sufficiently informed regarding the views of citizens in regard to network neutrality, and the specific concern that citizens with strong views (but not necessarily typical or representative views) might be over-represented in the materials available to policymakers.

These concerns appear to be valid. The responses of self-selected citizens to the public consultation on network neutrality conducted by the European Commission in 2012 differ dramatically from those obtained based on a representative and holistic mixed-methods study on the value of network neutrality that we conducted in 2014 on BEREC's behalf. This tends to supports our expectation that a strong self-selection bias underlies the citizen responses.

The literature review for the present paper suggests that information about consumer views on network neutrality is in fact vital to the decision process; however, reliable publicly available information on consumer preferences regarding network neutrality continues to be limited. Our representative study was able to shed light at the issue from various angles of consumer perception, however, it seems to have raised at least as many questions as it was able to answer. For instance, initial tests of selected attitude questions in Germany, the UK and the US showed marked differences compared to the four test areas. Also, we could only cover the at home usage situation, while many network neutrality concerns are strongly linked to out of home i.e. mostly mobile usage of broadband connections. This indicates that significantly more work is needed in the area.

More generally, and looking beyond the network neutrality debate, our findings shed doubt on the reliability of public consultations and other surveys where respondents are self-selected as a sole means to understand consumers' preferences, values and motivations.

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Chapter 16
The Persistent Problems of Net Neutrality or Why Are We Still Lacking Stable Net Neutrality Regulation

Konstantinos Stylianou

16.1 Introduction

The debate on net neutrality has been around long enough to allow its various aspects to emerge and develop sufficiently. Indeed, after years of scholarly and policy attention we now have a deep understanding of the industrial economics behind net neutrality regulation,[1] the dynamic competition and innovation aspects to it,[2] the technical infrastructure of the networks and actors that are subject to the relevant rules,[3] and the human rights and plurality considerations surrounding the rules.[4]

And yet we are still far from reaching a resolution that garners multi-stakeholder support and offers some guarantees of stability. The volatility of net neutrality regulation is evidenced by the failure of various jurisdictions to enact stable rules, even after years of persistent efforts. The Federal Communications Commission (FCC) in the United States was recently sued again over the latest regulations it passed in February 2015, which marks the third challenge of relevant rules over the past decade.[5] In Europe, the Council and the European Parliament are sharply divided over the projected rules that are pushed as part of the Digital Agenda, and that date back to the updated telecom package of 2010.[6] And in countries where net

[1] Yoo (2005), Hahn and Wallsten (2006), Sidak (2006), Speta (2000), SCF Associates (2012), ITU (2012), and Institute for Policy Integrity (2010). See generally In the Matter of Protecting and Promoting the Open Internet, GN Docket No. 14–28 (2015) (Report and Order on Remand, Declaratory Ruling, and Order).

[2] Lee and Wu (2009) and Lemley and Lessig (2000).

[3] Crowcroft (2007) and Faratin et al.(2007).

[4] CoE Steering Committee on Media and Information Society (2013).

[5] Fung (2015).

[6] See Geere (2015) and McNamee (2014).

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neutrality only recently became a policy issue, like Latin America countries, the relevant adoption and implementation process has not gone smoothly either.[7] These recent developments and the unresolved situation they leave behind foreshadow a protracted regulatory battle.

One could reasonably inquire as to what might explain this never-ending net neutrality saga. Could it be the lack of political will to resolve the issue, because in fact net neutrality is of little importance to consumers and regulators alike, despite the academic obsession with it? Probably not, considering the intense public participation (the FCC for example collected four million comments in the latest round of public consultation),[8] the repeated presidential interventions in the US debate,[9] the numerous front-page headlines in the media, and the overall engagement of high-level stakeholders with the issue. Or maybe is it because net neutrality regulation is a highly complex issue? As just mentioned there are several stakeholders involved and various conflicting interests to reconcile (economic, technological, social). But isn't all (or most of) regulation complex and an attempt to strike a sustainable balance between opposing interests? Moreover—and this comes with a pinch of arbitrariness—no major new issues have arisen in the net neutrality debate recently, as evidenced by the largely recycled questions that regulators are still grappling with.[10] On the other hand, it could be the case that net neutrality regulations have failed because of contextual reasons. For example in the United States the highly litigious environment has made FCC's work extremely difficult, while in Europe the peculiarities of the European Union decision-making process results in complexities that are not common in non-supranational systems.

There is some truth to all of those reasons. Yes, some policy-makers consider net neutrality an unimportant topic, net neutrality does indeed present hard questions that combine law, economics and technology which do not avail themselves to easy solutions, and contextual factors do create obstacles. But, besides the fact that these reasons do not explain fully why progress has stalled, there is little that can be done about them, because fixing them would require an overhaul of the context in which net neutrality is being discussed.

On the contrary, what this paper suggests is that there are also persistent problems with the net neutrality debate that are specific to the *way* the debate is conducted, not its *context*, and therefore, hopefully, easier to fix. The identified problems are irrespective of whether one supports or opposes net neutrality; they rather focus on the factors that have precluded a stable policy outcome to arise.

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[7] See, *e.g.* for Open Society Foundations et al. (2013), Nathalia Foditsch et al. (2015).

[8] Kastranakes (2014).

[9] Obama Says Unequivocally Committed to 'Net Neutrality', New York Times, October 9, 2014; White House (2014).

[10] Compare, for example, the discussion and issues in FCC's 2010 and 2015 Open Internet Orders: In the Matter of Preserving the Open Internet, Broadband Industry Practices, GN Docket No. 09-191 (Report and Order) (2010) and the 2015 Open Internet Order, supra note 1. Even if the resolutions adopted in the two Orders are different the main themes remain the same: blocking, discrimination, paid prioritization, specialized services, neutrality in wireless, scope of the rules, legal basis for the rules.

In that direction I discuss three issues. The first has to do with the persistence of policy-makers to adopt either the full arsenal of net neutrality protections (*e.g.* U.S., Brazil, Mexico, Chile, Netherlands, Slovenia), or no rules at all. This black-and-white approach disregards the nuances of the implicated issues and tends to be over-inclusive or under-inclusive. Instead, regulators could choose a flexible framework clause, like those used in antitrust, which is capable of filtering out harmful practices while allowing the rest. The FCC came close to this solution in April 2014 but decided otherwise in the end.

The second problem concerns the fixation of stakeholders with certain historical features of the Internet, which are seen as immutable axioms that should define today's Internet the same way they did decades ago (*e.g.* end to end, neutrality, openness). This clinging is impractical because the Internet and the marketplace around it have evolved and the continuing application of historical principles without justifying their modern relevance obscures rather than illuminates the debate. To set the discussion on the proper base, it is therefore advised that the starting point for the debate is not how to ensure neutrality, openness, non-discrimination and the end to end principle, but whether those characteristics apply with the same force today as when the Internet was first conceived and commercialized. Once there is agreement as to which principles serve the Internet better, the discussion can continue on how to safeguard them.

Third, and on a related topic, to determine whether regulation is needed to safeguard the Internet's desired features (as per above), regulators need to determine the competitive conditions in the market, which includes the identification of potential bottlenecks and the power interrelations among them. Current practice seems to ignore a prevalent form of competitive pressure in telecommunications, namely vertical competition, which, if taken into account, should affect the way regulators view the necessity or type of appropriate regulation. These three issues are examined in sequence below.

16.2 The Three Plagues of the Net Neutrality Debate and How to Overcome Them

16.2.1 Polarization and the Pursuit of Categorical Regulation

One thing that is fairly obvious to anyone that has followed the net neutrality debate over the past decade is that there are two clearly defined camps to it and that regulatory choices have by and large sided with one of them. In particular, countries have either opted to not adopt rules at all, or where net neutrality rules have been adopted, they contain clear no-blocking, no-discrimination, no-paid prioritization provisions with an exception only for reasonable network management.[11] Such rules are almost

[11] Such is the case, for example, in the U.S., Brazil, Chile, Mexico, Netherlands and Slovenia. These countries represent the majority of those that have enacted net neutrality rules. For the U.S. see 2015 Open Internet Order, supra note 1; for Latin America see Ferraz et al. (2012 Content Filtering in Latin America: Reasons and Impacts on Freedom of Expression, available at http://www.palermo.edu/cele/pdf/english/Internet-Free-of-Censorship/Content-Filtering-Latin-America.pdf; on the Netherlands see Art. 7.4(a), Telecommunicatiewet—BWBR0009950; on Slovenia see Art. 203, Zakon o elektronskih komunikacijah (ZEKom-1), Stran 12069.

in complete consonance with the pro-net neutrality camp, and, conversely, they leave little to no room to accommodate the concerns of net neutrality skeptics, who don't see the need for such pervasive regulation for a variety of reasons that have been fleshed out in detail in the relevant literature.[12] This regulatory bipolarity leaves the issue unresolved, whereas greater regulatory flexibility could provide a middle road solution receptive to the priorities of both sides.

Normally, clear-cut regulation is desirable, because it creates legal certainty by specifying ex ante which behavior is allowed and which is banned. As a result, market actors can safely develop their business plans and investment strategies. For instance, when carriers know that, if they want to offer some kind of video service with assured quality, their only option is to package it as a specialized service and not through a fast lane, because regulation bans fast lanes, they can plan accordingly without wastefully investing (time, capital, human resources etc) in a business arrangement that regulators will seek to block.

But in reality, clear-cut regulation and legal certainty are only desirable if they advance good rules; otherwise one should hope for a change, and the continuing effort to get there will negate the very benefits clear-cut regulation seeks to advance (i.e. certainty). So the question is whether the rules currently in place are good and stable. I believe the answer is negative, but not because they support net neutrality (in my view, complete absence of regulation would be also wrong). Rather, because they are one-sidedly in favor of net neutrality, and the issues raised by net neutrality are such that no black and white regulation—in favor or against—can address them properly. Therefore, to the extent that stakeholders advocate for rules that uniformly allow or ban blocking, discrimination, prioritization, zero-rating and other practices that fall within the ambit of net neutrality, and to the extent that regulators adopt such rules, the problem will persist unless one side decides to give up.

The reason is simple: there are provenly valid and powerful arguments on both sides, and rules that prioritize simplicity over accuracy by picking one side will necessarily be so detached from the interests of the other side that the rules will not reflect the current state of scientific knowledge, and will be out of touch with reality.[13] It is neither practical nor essential to attempt a full discussion of the pros and cons of net neutrality here. That the communications industry, in all its peculiarities and our expectations from it, cannot be trusted to be fully unsupervised, but that at the same time absolute bans on blocking, discrimination and differentiation are not necessary are points already proven by existing literature, and it is indeed odd that regulators still fail to see that.[14]

I say this with a certain degree of confidence because it is backed by decades of scholarly work in the fields of antitrust and industrial economics, both of which, much like telecommunications regulation, are concerned with the efficient operation

[12] See Yoo (2005), Spulber and Yoo (2012).

[13] On the problem of treating dissimilar situations (*e.g.* discrimination, blocking etc.) the same, see Speta (2014), p. 491, Verizon v. Federal Communications Commission (2014).

[14] On the arguments for both sides see supra notes 1–4. On the necessity for regulation that adapts to circumstances see Weiser (2003), pp. 60–63, Yoo (2007), pp. 504–409.

and organization of the industry, and which have routinely been called into use in the telecommunications area.[15] Indeed, many of the arguments in the net neutrality debate can be traced back to economic and industrial organization theory. What this body of literature tells us is that both an absolute ban and a blank check on discriminatory practices are misplaced, and it also provides us with the tools to differentiate between good and bad instances of discriminatory practices.[16]

This makes the integration of antitrust-like analysis and principles into telecommunications regulation useful and appropriate as regulatory tools that can accommodate the arguments of both sides. By doing so, regulation can move away from fixed predefined rules that are bound to be over-inclusive or under-inclusive, and instead rely on flexible clauses that leave room for different treatment of harmful and beneficial practices. This approach could be a good way out of the current net neutrality deadlock.

In antitrust theory, net neutrality is, to a large extend, an issue of vertical exclusion, namely the practice by which a market actor blocks or discriminates against another actor upstream or downstream along the value chain, most commonly with the view to extend or maintain power to the upstream or downstream market or to raise entry barriers by making entry efficient only if it occurs in two levels at the same time.[17] Industrial economics and antitrust have sufficiently defined the circumstances under which such practices should invite scrutiny[18]: actors must have an incentive to discriminate or block.[19] Incentives cannot be taken for granted because it is well-established that conduit and content exist in a coöpetitive and not simply competitive relationship, but also because conduit providers have alternative ways to recuperate lost surplus from vertical competition than to resort to aggressive

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[15] See, *e.g.* United States v. AT&T Co. (1982), pp. 135–36; Verizon Communications, Inc. v. Law Offices of Curtis V. Trinko (2004); Verizon, 740 F.3d 623.

[16] Tirole, as early as (1988), p. 193; stated that "few topics in industrial organization are as controversial as market foreclosure." Tirole (1990).

[17] Rey and Tirole (2007), pp. 2145, 2145, 2148–50; Areeda and Hovenkamp (2006), ¶ 756b7; Viscusi et al. (2005). EU Guidelines on the Assessment of Non-horizontal Mergers Under the Council Regulation on the Control of Concentrations Between Undertakings, 2008/C 265/07, at ¶ 29–30; Sullivan and Grimes (2000), p. 638; Carlton and Waldman. The Strategic Use of Tying to Create and Preserve Market Power in Evolving Industries, 33 RAND Journal of Economics 194, 194; Tirole (1990), p. 185 (with internal references).

[18] Sullivan and Grimes (2000), pp. 415–418, 667–670; See also EU Guidelines on the Assessment of Non-horizontal Mergers, supra note 17, at ¶ 32; Horizontal Merger Guidelines, passim (2010); 2010 Open Internet Order, supra note 10, at ¶ 20–35, 80–93; Geradin and Sidak (2003), p. 519.

[19] See, *e.g.* FCC (1999) (where the Commission highlighted the need to "analyze the incentive and ability to discriminate … with respect to competitors providing advanced services, interexchange services, and local exchange services in the SBC and Ameritech regions."); Parker (1999) (where Parker commenting on the canceled vertical merger between Barnes & Noble and Ingram explained the emphasis the FTC placed on the incentives to raise rivals' cost: "As I already suggested, the question we ask is whether the newly vertically-integrated company will have an incentive (and, of course, the ability) to raise the costs of its rivals.").

strategies like discrimination or blocking.[20] Second, the discriminatory practice must have a harmful effect on the competitive conditions of the industry.[21] If the institutional structure of competition remains intact, isolated problems are self-correcting and there is no need for an over-inclusive generalized regulatory response. Third, if there is good justification or countervailing efficiencies that flow from discriminatory practices they must be weighed against the harms.[22] Evidently, some discriminatory practices can be pernicious to the industry while others not so much, or they may even be beneficial if the countervailing efficiencies offset whatever harm is caused.

Current rules are not receptive to this possibility, and instead outlaw virtually all blocking and discrimination. As a result, none of the concerns of the anti-net neutrality camp seem to have been taken into account, which perpetuates the problem. The FCC came very close to adopting the model advocated for here, namely a antitrust-like standard, in April 2014 when it released a Notice for Proposed Rulemaking (NPRM).[23] In the 2014 NPRM the FCC proposed the adoption of a flexible standard by which it would assess the effect of discriminatory practices on the market. In particular the proposed rule "would prohibit as commercially unreasonable those broadband providers' practices that, based on the totality of the circumstances, threaten to harm Internet openness and all that it protects.[24] At the same time, it could permit "broadband providers to serve customers and carry traffic on an individually negotiated basis, 'without having to hold themselves out to serve all comers indiscriminately on the same or standardized terms,' so long as such conduct is commercially reasonable."[25]

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[20] See Bengtsson and Kock (1999) (where the authors analyze the spectrum of relationships between firms in coexistence, cooperation, co-opetition, and competition); Zineldin (2004), pp. 780–781 (where the author suggests that industry cooperation is based on "a value net of involved actors—suppliers, distributors, subcontractors, "complementors", competitors–who collectively add value to one another's organisations." at 781). For the so called "one monopoly rent" theorem see, among others, Bork (1978), Viscusi et al (2005), p. 249.

[21] Areeda and Hovenkamp (2006), ¶ 335.2f (1986 Supp.) ("the foreclosure argument has grave weaknesses; only where foreclosures reach monopolistic proportions—or threaten to do so—does a vertical merger become troublesome"); Page (1980), p. 467, 495. See also, *e.g.* United States v. Brown University, 5 F.3d 658, p. 668 (1993) ("The rule of reason requires the fact-finder to weigh all of the circumstances of a case in deciding whether a restrictive practice should be prohibited as imposing an unreasonable restraint on competition. The plaintiff bears an initial burden under the rule of reason of showing that the alleged combination or agreement produced adverse, anti-competitive effects within the relevant product and geographic markets.").

[22] See Guidance on the Commission's Enforcement Priorities in Applying Art. 82, ¶ 46 et seq. See also In re IBM Peripheral EDP Devices Antitrust Litigation, 481 F. Supp. 965, 1005 (N.D. Cal. 1979) (holding that IBM did not violate section 2 by tying its computer central processing unit to its peripheral devices, because the combination resulted in an improved design), affid sub nom. Transamerica Computer Co. v. International Business Machines Corp., 698 F.2d 1377 (1983).

[23] In the Matter of Protecting and Promoting the Open Internet, GN Docket No. 14-28 (2014) (Notice of Proposed Rulemaking).

[24] Id., ¶ 128.

[25] Id., ¶ 116.

The genius of this rule is twofold: first, it is flexible in the sense that it requires the showing of particular harm and allows for a margin of appreciation. Second, while it is inspired by antitrust, it does not merely replicate the antitrust standard of "restraint of trade or commerce" but adapts it to the particular needs of the telecommunications industry, namely the threat "to harm Internet openness and all that it protects." By means of such a rule regulators are in the position to customize their treatment of dissimilar situations, and respect and uphold the special characteristics and features of the communications ecosystem (*e.g.* in the Internet ecosystem, pluralistic participatory innovation seems to play a more prominent role than in other industries). This is an important point of departure from those who claim that antitrust law alone is sufficient to safeguard the industry from anticompetitive practices.[26] An antitrust-inspired customized rule for the communications industry is more responsive to its needs and peculiarities and has greater chances of success.

Unfortunately, the NPRM was superseded by the rules the FCC passed in February 2015, which take the familiar road of a full ban on blocking, discrimination and prioritization (save the reasonable network management exception). Other jurisdictions in Europe and Latin America, whose countries are lately seen as pioneers of Internet legislation also opted for black and white rules that leave little room for the reconciliation of opposing interests.[27] It is hard to see how these choices can conclusively resolve the debate in a way that the various considerations are justly balanced against each other. The EU has recently shown some encouraging flexibility by orientating towards explicitly allowing specialized services, but this doesn't fully solve the problem, because innocuous discriminatory practices outside of the specialized services exception are still banned. Regulatory flexibility along the lines of antitrust clauses seems like the only Pareto efficient solution.

16.2.2 Clinging to Historical Principles of the Internet

Another factor that obfuscates the debate and prevents a mutually accepted solution from emerging is that stakeholders often invoke historical principles they assign to the Internet without justifying their continuing relevance to today's ecosystem. Citing a principle without explaining why one should abide by it or whether there are limitations that may be pertinent today but were not when the principle was first conceived, is not helpful because it stalls the debate.

This phenomenon is common with what are considered the foundational principles of the Internet, such as end-to-end, openness, decentralized control and innovation, and the Internet as a unified whole. These features are often used as axioms from which one is not supposed to deviate, because they account for much

[26] See, *e.g.* Huber (1997).

[27] See supra note 11.

of the indisputable success and contribution of the Internet as we know it today.[28] I don't mean to say that these features have not been crucial to the development of the Internet or that they are no longer valuable today. To the contrary, they are backed by rich theoretical and empirical literature and they are still instrumental to the Internet ecosystem.

However, at the same time, the Internet is not what it used to be when it was first conceived as a scientific project, or when it was first commercialized. It has evolved, matured, and it serves different needs and consists of different actors.[29] Market players such as content delivery networks (CDN) or IP inter-exchange providers (IPX) were not in operation or common, and business practices like secondary peering, and multihoming only recently became widespread too. These developments change the shape and nature of the network in a way that historical principles may still be relevant, but one should at least consider whether there are limitations and exceptions to them that make them less applicable or absolute than in the past.[30] We may very well discover that full adherence to the traditional nature of the Internet is the optimal solution today as well, but before we get there the various stakeholders need to engage in a discussion on its merits. Unfortunately, this discussion is largely missing making compromise impossible.

In the limited space here, I can only anecdotally attempt to explain the kind of limitations and qualifications historical principles may be subject to today as opposed to earlier phases of the Internet's evolution. Taking into account these limitations and qualifications can result in enriching the traditional values of the Internet that net neutrality seeks to safeguard with those elements that would make them more relevant and appropriate for today's Internet.

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[28] Lemley and Lessig (2000) ("allowing such bundling [:cable companies integrating to the ISP market] will compromise an important architectural principle that has governed the Internet since its inception: the principle of "end-to-end" design ("e2e"). Nothing less than the structure of the Internet itself is at stake in this debate."; Lemley and Lessig (2000), p. 925; Wu and Lee (2009). Subsidizing Creativity Through Network Design: Zero Pricing and Net Neutrality, 23.3 Journal of Economic Perspectives, 61, p. 63 ("The overall network does not, by its own design, distinguish between content providers and users. Consequently, content providers—who may also be users—are also able to reach an audience consisting of every single Internet user. These norms and expectations, which have created a de facto ban on termination fees, stands in sharp contrast to what is standard practice on other important information networks, like the telephone and cable networks. One reason for the differences between networks is rooted in history. The Internet was conceived by various visionaries, particularly the Department of Defense researchers J. C. R. Licklider and Robert W. Taylor, as a "network of networks" or an "intergalatic network" that would make it possible for users of any single computer network to reach users on any other network (Licklider and Taylor, 1968)."; The FCC also, on several occasions has reiterated its strong faith that the openness flowing from network neutrality "promotes competition … [and] enables a self-reinforcing cycle of investment and innovation in which new uses of the network lead to increased adoption of broadband, which drives investment and improvements in the network itself." 2010 Open Internet Order, supra note 10, ¶ 3.

[29] See, generally, Yoo (2012).

[30] Many engineers have explained how the original design of the Internet poses limitations and may not serve modern needs any more. See Handley (2006), p. 119; Huston (2008).

For instance, one of the most revered characteristics of the Internet is the end-to-end principle, which limits the core of the Internet to the simple function of transmitting data in order to achieve maximum interoperability, and additional functions are added in the layers above and below the slim waist of the IP layer.[31] The resulting "inherent" neutrality (since all the core does is route packets) has accounted for much of the innovation and entry that has occurred in the Internet ecosystem.

Assuming that this depiction accurately characterizes the nature of the Internet,[32] we need to acknowledge that, at the same time, the insistence on a bare-bones core has resulted in some limitations and has prevented some efficient implementations of quality of service, security, and congestion management.[33] All three issues are good candidates to be dealt with at the network level because the coordinated cooperation of network operators instead of the independent response of the edges can be a more effective way to deploy or resolve them.

Indeed, networks that perform better in terms of quality of service, security and congestion incorporate those functions in the network design rather than rely solely on the intelligence of the edges. A good example is mobile cellular networks, which are heavily managed and more complex.[34] To achieve the above-stated goals they employ (virtual) circuits, encapsulation, and elaborate architectures for QoS, user verification and mobility management, all of which rely on core functionality.

One might say that mobile cellular networks are more specialized than the public Internet and that this is why they are built on specialized architectures with additional features, but convergence is quickly eroding this argument. The Internet is supplanting uses cellular networks were traditionally associated with, and cellular networks are carrying more and more Internet traffic. Inevitably, the interaction between the two networks will result in some cross-transplantation of features. Artificially sticking to the original design of the Internet (whatever that might be) would impose a technological freeze to an evolving socioeconomic and technological environment.[35]

Consider now another feature that most policy-makers associate with the modern Internet, namely that it is universal and undivided. There seems to be long-standing agreement that the success of the Internet was partly driven by the fact that every public address (device or host) is reachable from every other public address under

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[31] Saltzer et al. (1984), p. 277. See also Clark. Interoperation, Open Interfaces and Protocol Architecture, in The Unpredictable Certainty: White Papers on Information Infrastructure Through 2000 133, pp. 133–134 (NII 2000 Steering Committee, Computer Science and Telecommunications Board, Commission on Physical Sciences, Mathematics, and Applications, National Research Council, 1998).

[32] Despite the popular belief, the Internet has never been completely egalitarian—technically or as a marketplace. See Hass (2007), p. 1565; Sasso (2014).

[33] See, *e.g.* Yoo (2004), p. 23.

[34] On the different philosophies of the telephone network and the Internet, see Wu (2007). A Tale of Two Platforms, available at http://ssrn.com/abstract=993288.

[35] David Clark, a prominent Internet engineer, has nice described how networks should be designed as a playing field where different interests and priorities compete, rather than with a specific outcome in mind. This means that as needs change the network should change with them. See Clark (2005).

the same terms and conditions, making the Internet a unified whole, and resulting in fast scaling up and powerful network effects.[36] Vint Cerf recently stated that "fragmentation is destructive of the basic functioning of the Internet. … Fragmentation would be a terrible outcome [and] destroy value."[37]

There is no denying that the universality of the Internet has added enormous value to it and drove its initial and ongoing expansion. But here is precisely the crucial point: the Internet is no longer an emerging product/market; it is a mature well-developed and highly evolved one, and the fact that it is now in a different phase in its life-cycle should inform us about its current characteristics and not only the historical ones.[38] Young markets are characterized by fluidity, uncertainty, high experimentation and fast growth.[39] In this context a platform that is not designed for any specific use and at the same time does not serve any specific purpose seems ideal. But in mature markets, demand diversifies, various preferences and sub-markets emerge and market actors try to deliver greater value to consumers by meeting their (by now crystallized) needs.[40] What this tells us is that in the current state of the Internet, "forking" part of it and assigning to it properties that go against neutrality will not only not be catastrophic but it may actually serve niche specialized demand. Therefore, re-evaluating the need for and purpose of an undivided universal Internet seems like a necessary step to be performed by regulators, which will affect their stance towards fast lanes and specialized services.

Moreover, in the years from the Internet's early age to today's maturity, we have gained valuable insight into how market fragmentation and differentiation can be welfare enhancing and desirable. Niche or incompatible sub-markets have the potential to better address specialized consumer demand, they can operate more efficiently by adopting forms and mechanisms that may be ill-suited for the entire market, they can attract entry by averting too fierce competition that results from uniformity, and they encourage innovation and experimentation because they are able to adopt novel and differentiated practices.[41]

In the Internet context, this type of fragmentation (and accompanying pros and cons) has come up in various forms, including free or subsidized access to only a subpart of the Internet, walled gardens, and blocking off parts of the Internet for a variety of reasons (*e.g.* national security, intellectual property etc). These are all practices that are in tension with net neutrality. I don't mean to say that such practices should be lightheartedly accepted, but their scientific merits as mentioned above and elaborated on in the relevant literature seem to be missing from the debate too.

The general point of criticism here, and the advice that flows for policy-makers is that the fixation on perceived traditional, established, and foundational principles of the Internet may today hinder good policy-making as the conditions have changed and with them the value, meaning and relevancy of said principles. When contested,

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[36] On the risk of Internet balkanization see Lessig (2009).

[37] Rosenbush (2015).

[38] See Yoo (2010).

[39] Porter (1980), pp. 159–161. Utterback and Abernathy (1975), p. 639, 643.

[40] Porter, id.; Kotler and Keller (2008), p. 288; Grant (2008), p. 271.

[41] See, *e.g.* Church and Gandal (2005), p. 117; Spence (1976), p. 407; Dickson and Ginter (1987), p. 1.

as they often are, those principles must be proven, much like any other position that aspires to become policy, not simply assumed.

16.2.3 Not Up-to-Date Competition Analysis

Two of the most fundamental underpinnings of net neutrality regulation is that the broadband access market is not adequately competitive, and that as a result of that but also because of their bottleneck position in the value chain broadband providers have the power to discriminate against service, application and content providers if so they wish.[42] In this context, the idea is that regulation becomes necessary to prevent such anticompetitive discrimination.

Logically, if any of the conditions mentioned above is not fulfilled the rationale for net neutrality regulation is undermined. Therefore appropriately defining the competitive interrelations between broadband access providers and service, application and content providers (or other involved actors for that matter) is key to good policy-making. This task has presented great difficulties for regulatory authorities leaving them unable to assess the true competitive conditions in the market and accordingly devise appropriate regulation.

More specifically, the assessment of competitive conditions in the market has focused too much on existing competition and not enough on entry potentials, and it has maintained a somewhat antiquated understanding of power allocation between broadband access providers, and other actors in the value chain (notable service, application and content providers), namely that broadband access providers are the defining bottleneck in the Internet value chain.[43] These two weaknesses prevent stakeholders from agreeing on what metrics they need to look at in determining competitiveness levels, market power and consequently the need for and type of regulation. The reason why I identify these two instances of competitive analysis as obsolete is that technological developments have altered how easy it is for market players to jump from one layer or role in the value chain to another (*e.g.* content/application providers becoming conduits), which is known as vertical entry and which creates additional competitive pressure, and to amass power vis-a-vis other players in the value chain, thusly building bargaining power.[44] Any competition

[42] I conventionally focus here on broadband access providers and service, application and content providers as the most representatives sides in the net neutrality debate, but as we can see from the recent expansion of the scope of the rules in some jurisdictions, including the U.S. (Open Internet Order) and Brazil (Marco Civil), other actors may be implicated, *e.g.* interconnection providers.

[43] See infra notes 45, 46 and accompanying text.

[44] Vertical entry and competition are generally not considered as factors in the mainstream competition analysis because successive steps in the value chain are seen as complements, not as competitors. See Steiner (2008). Vertical Competition, Horizontal Competition, and Market Power, 53 The Antitrust Bulletin 251; Non-Horizontal Merger Guidelines (Originally issued as part of "U.S. Department of Justice Merger Guidelines," June 14, 1984), ¶ 4.0 ("By definition, nonhorizontal mergers involve firms that do not operate in the same market."); Lianos (2009).

analysis has to take this fluidity in mind. Otherwise regulators and stakeholders are bound to rely on a non-realistic perception of the industry.

The relevant analyses performed in the US and in the EU do just that. In the 2015 Open Internet Order—much like in the 2010 Open Internet Order—the FCC based its justification for the need for regulation on the fact that broadband access providers are uniquely positioned to pressure service, application and content providers, and that the US broadband access market is an oligopoly (at best) because there is a limited number of ISPs available to most consumers.[45] In other words, it performed a horizontal competition analysis. At the EU level, while the new Connected Continent Regulation gives deference to national regulatory authorities and so there is no overarching principle, BEREC in a recent report on interconnection, which was used as input for the European rules on the Open Internet, similarly treats service, application and content providers as mere customers of broadband providers, who have the ability and incentive to exercise market power over them.[46] This, again, preconceives both the position of power of broadband access providers and their complementary rather than co-opetitive relationship with the other actors in the value chain (i.e. "customer" relationship). The result is that both jurisdictions (and others) see a need to protect service, application and content providers from potentially abusive practices of broadband providers.

The problem with this treatment is that it presents only half the picture or a version of the picture that may have been accurate in the past but not today. The technological structure of today's broadband industry is such that it makes vertical entry and substitution much easier than in the past, and it also allows value to flow from one layer to another in a way that doesn't a priori allow the conclusion that one type of actor holds more power in the value chain than another (as it is assumed, for example, for broadband access providers).

For these reasons, regulators and stakeholders need to move away from the cozy *presumption* that a certain type of actors (notably access providers, but it can be others, like interconnection providers) is favorably positioned in the value chain and instead rebuild the list of relevant actors and their inter-relations and then decide whether, where, and what type of regulation is needed.[47] It is entirely possible that regulators and stakeholders, even after responding to the call above, will conclude that broadband access providers still deserve to be regulated. This is acceptable. But in this case, first, the conclusion will have been based on a sounder assessment of the industry's state, and second, it might result in more flexible regulation in recognition of the fluid nature of the industry as described supra, as opposed to black and white regulation of the kind we have today.

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[45] 2015 Open Internet Order, supra note 1, ¶ 78–85.

[46] BEREC (2012). An assessment of IP interconnection in the context of Net Neutrality, BoR (12) 130, pp. 9–15.

[47] BEREC attempted this assessment in the interconnection report but omitted the vertical dynamics.

To go into more detail, entry is an important parameter in the analysis of competitive conditions because it tells us how easily competition can be created even in situations that it is underdeveloped.[48] In fact, entry does not necessarily have to actually occur; the threat of it can be enough to discourage market players from resorting to practices that will harm consumers, which rivals can see as an opportunity to join the market to fill in for the unsatisfied demand.

In high technology industries, like the communications industry, entry (or threat thereof) into one layer from existing players in adjacent layers is facilitated by the technological proximity between layers.[49] Technological proximity is the ability of neighboring market actors to amass the necessary know-how and assets to enter similar/adjacent markets.[50] This is because there are *no exogenous boundaries* to layers and so actors do not have to be confined to one specific role,[51] because the transferability of technical know how allows greater *absorptive capacity* which is useful for firms to expand,[52] and because the *natural boundaries* of layers change as the industry evolves thereby allowing or forcing actors to expand up and down the value chain.[53]

We see the result of this in the emergence of new sources of competition in various layers. Google, for example, started off as an application provider (search) and, aided by the technical nature of the industry, expanded gradually to operating systems (Android), devices (Nexus) and infrastructure (Google Fiber, Google Wi-Fi, Project Fi). Another example is the transformation of CDNs from providers of a service (local caching) to providers of backbone connectivity infrastructure and of service and application platforms. Moreover, traditional access providers (notably mobile carriers) are now morphing into service and application platform providers by upgrading their networks to general-purpose IP-based architectures (*e.g.* IMS), and by virtualizing the

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[48] EU Guidance on the Commission's Enforcement Priorities in Applying Art. 82, ¶ 30, where the European Commission stresses that "where there is no residual competition and no foreseeable threat of entry, the protection of rivalry and the competitive process outweighs possible efficiency gains."; U.S. Department of Justice & Federal Trade Commission, Horizontal Merger Guidelines (2010), p.¶ 5.1, 5.2 and 9 (where it is proposed that the response by competitors should be assessed inter alia based on timeliness, likelihood and sufficiency). Sullivan and Grimes (2000), pp. 603–608. See also R. J. Reynolds Tobacco Co. v. Philip Morris, 199 F. Supp. 2D 362, p. 383 ("[a] mere showing of substantial or even dominant market share alone cannot establish market power sufficient to carry out [an anticompetitive pricing] scheme. The plaintiff must show that new rivals are barred from entering the market and show that existing competitors lack the capacity to expand their output to challenge the [defendant's] high price.").

[49] See Bresnahan and Greenstein (1999), p. 1.

[50] Id. pp. 20–21.

[51] Bresnahan (1999), p. 155.

[52] Cohen and Levinthal (1990), p. 128. See also Knoben and Oerlemans (2006), pp. 71, 77–78.

[53] Baldwin and Clark (2000), p. 64. See also Boudreau (2006), pp. 2–3; Gawer and Henderson (2007), pp. 3–6.

network functions so that they can serve as generative hubs for other providers to build upon without relying exclusively on the Internet.[54]

In all these cases players assume more than one functions and occupy positions in more than one segments of the industry creating competitive pressure that has been unaccounted for and continues to be largely ignored. In the recent net neutrality proceedings this kind of "*divided technical leadership*" to use the words of Bresnahan and Greenstein,[55] that has traditionally characterized the computer and communications industry and forcefully continues to do today, seems to be absent from the analysis. Again, while even if this type of vertical competitive pressure is not enough to change the conclusion that regulation is needed, it should at least play a role in moving regulation away from absolutist black and white solutions that trap the industry in a static state of what is allowed and what not, and instead adopt a flexible framework as advocated above, that has the ability to take into account the new forms of competitive pressure mentioned here, when and to the extend they apply.

Further, as mentioned, entry/expansion doesn't necessarily have to occur; along with technological proximity, the technical interdependence between layers creates a bi-directional bond and consequently limits the independent exercise of market power of each actor in the various layers.[56] In this context, it is unclear a priori which layer/actor has more power and more value, and in fact the allocation is fluid.[57] The much-publicized case of Comcast's interconnection battle with Netflix (operating in different markets) shows that Comcast needed Netflix as much as

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[54] See, *e.g.* TATA Communications (2011). Infrastructure-as-a-Service: Fulfilling the Promise of Cloud Computing, White Paper, available at http://www.tatadocomo.com/business/download/WhitePaper-Infrastructure-as-a-Service.pdf; Interoute, What is IaaS, available at http://www.interoute.com/what-iaas; Hoffmann and Staufer (2011); Ashiq Khan et al., Network Sharing in the Next Mobile Network: TCO Reduction, Management Flexibility, and Operational Independence; 2011 IEEECommunications Magazine 134 (2011); Press Release, Fujitsu Unveils 'Network as a Service Concept,' available at http://www.fujitsu.com/global/about/resources/news/press-releases/2007/0516-02.htm; NokiaSiemens Networks, Network Virtualization Enabling Novel Business Models in a Dynamic Market, available at http://networks.nokia.com/system/files/document/nsn-noo-2012_networkvirtualization_v01.pdf; Hao et al. (2009), p. 33; Mishra (2010), pp. 206–208; Fogliata and Mussini (2008). Intelligence-Ready Network Infrastructure: An Ecosystem to Control Third-Party Intelligence Distribution Close to Nomadic Users, 13 Bell Labs Technical Journal 105, 107 (" A network operator running an 'open platform' for network-distributed computing (OPNDC) may offer several competing service providers an opportunity to deploy their software modules, loading the desired service logic directly onto network equipment or network management system nodes. Such a separation of roles allows both the network operator and the service provider to focus on its respective core mission and makes it faster and easier to deploy new network-intensive services packaged as plug-ins independent of network infrastructure upgrades. … The resulting secondary market of value-added services, provided by a constellation of smaller and dynamic partner companies through the deployment of plug-in software for the standard platform of network machines, can expand the offer of new value-added services, relying on network-based information to create a common user context across the services.").

[55] Bresnahan and Greenstein (1999), p. 3.

[56] Fransman (2010) pp. 41–42.

[57] See, *e.g.* Sabat (2002), p. 505; Peppard et al. (2006), p. 128; Ballon (2009), p. 4; Gawer and Henderson (2007), pp. 1–3.

Netflix needed Comcast, and that it took many years of Netflix straining broadband access providers' capacity until they successfully pushed back, a testament to the vertical power Netflix holds vis-a-vis broadband access providers on account of its tremendous value in the ecosystem.[58] Similarly, the power balance between mobile device manufacturers and mobile carriers is constantly changing too: in the US the major national carriers were traditionally considered the most powerful player in the value chain, but along came Apple to disturb this power allocation, while in Europe giants like Ericsson and Nokia commanded great power due to the fragmented national carrier scene, but when they lost market share to Apple and Samsung, their position vis-a-vis national operators worsened dramatically.[59]

What these examples and the underlying theories show is that the peculiarities of the technology-intensive environment of the modern communications sector does not lend itself to the kind of competition analysis that we have applied so far. Recognizing and factoring in the parameters of technological proximity, technical interdependence and the resulting vertical entry, pressures and value flow between layers will allow regulators and stakeholders to more accurately assess the competitive state of the industry and devise appropriate regulation. Even if the regulatory result is the same (which it shouldn't—at a minimum a more flexible approach as described above should emerge), it will have been based on an up-to-date analysis, hopefully one that is more future-proof than the current.

16.3 Concluding Remarks

I have attempted to briefly present in this article the three main reasons why, I think, regulators around the world are not closer to a solution that shows signs of stability. These do not depend on one's position on net neutrality. Even after taking them into account, regulators can very well choose to support or oppose net neutrality, although the factors considered here point to a middle road.

Of the three reasons, the first one concerns regulatory rigidity, the second fixations on historical principles of the Internet, and the third the reliance on a not up-to-date competition analysis. These problems may seem disparate and high-level, and it is perhaps why they haven't been collectively addressed, but in essence they all have a common underlying cause: path dependence. Net neutrality rules (perhaps unavoidably) are building upon past regulations (*e.g.* common carrier regulation, essential facilities), historical practices and state of affairs (*e.g.* the belief that the Internet is not owned or controlled by anyone), and extant scientific knowledge (*e.g.* on industrial economics and organization).

If we could restart from zero and had to identify the relevant players and markets, see how they relate to each other, determine a desirable outcome based on industrial

[58] See Bode (2014) and Raybum (2014). See also Zeidler (2010).

[59] A good illustration about this power balance can be found in the case studies on i-mode in Takeshi Natsun, The i-Mode Wireless Ecosystem pp. 1–20 (2003); Tee and Gawer (2009), p. 217.

organization analysis and other socioeconomic considerations and devise regulation that can take into account the resulting conflicting interests, we could come up a solid piece of legislation with multi-stakeholder support. Hopefully, the factors discussed here and the relevant literature will help overcome the influence of the past and devise stable regulation for the future.

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Chapter 17
A Norwegian Perspective on European Regulation of Net Neutrality

Frode Sørensen

17.1 Introduction

An agreement about European net neutrality rules was reached between the Commission, the Parliament and the Council in Brussels 30 June 2015. The FCC published the US net neutrality rules 26 February 2015, a step ahead of the European developments.

The first part of this paper presents some thoughts regarding comparison between the two approaches to net neutrality on the different sides of the Atlantic, as seen from a Norwegian perspective.

And the second part of the paper discusses the relationship between net neutrality and traffic handling, and the relationship between net neutrality and charging models, including zero-rating, from a Norwegian perspective.

First, a quick walk along the Norwegian historical milestones related to Internet, net neutrality and democracy:

- **Norway has the longest running net neutrality regime in Europe**
  In 2009 Norwegian net neutrality guidelines were adopted based on a co-regulatory approach, with clear rules against blocking and throttling of applications (not to be compared to self-regulation which typically only covers transparency, while allowing throttling and blocking).[1]
- **Norway was the first country outside US that was connected to the Internet**
  In 1973 Norway established the first non-US node on ARPANET, the predecessor of the Internet. In the beginning, the connection was primarily used for seismic data exchange, subsequently giving access to additional Norwegian research institutions.[2]
- **Norway has one of the oldest constitutions in the world which is still in use**

[1] http://eng.nkom.no/technical/internet/net-neutrality/net-neutrality.

[2] http://www.norsar.no/norsar/about-us/History/Internet/.

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> There is a strong democratic tradition in Norway. Inspired by the US Declaration of Independence 1776 and the French revolution 1789, the Norwegian Constitution from 1814 was at the time considered one of the most liberal and radically democratic in the world.[3]

This may be mere coincidence, and I will not speculate, although it is a fascinating constellation of historical facts. Anyway, Norwegians are today enjoying an open Internet!

17.2 A Comparison between European and US Attitude to Net Neutrality[4]

Europe is a large continent with varying cultures, as well as different approaches to net neutrality. And how do Europe compare with US regarding attitude to net neutrality? There are several significant differences which I would like to address.

17.2.1 Can Regulated Local Loop Unbundling Ensure Net Neutrality in Europe?

It has often been speculated whether local loop unbundling in Europe would lead to a significant difference in the need to regulate net neutrality.[5] Unbundling stimulates the establishment of competing providers of Internet access services. This increases users' possibility to choose a neutral Internet access service.

However, Internet access is not like any other service, since an Internet user is (of course) not communicating with himself. Users need to communicate with *other* users in the other end, and these users may not be switching to a neutral Internet access service.

And restrictions on Internet access services for some users fragments the Internet, the possibility for user-to-user communication becomes lower, and the size of the market for content and application providers becomes smaller. The network effect is reduced.

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[3] http://en.wikipedia.org/wiki/Constitution_of_Norway.

[4] These considerations were elaborated for the Net Neutrality panel of the SMART Workshop which was organized on 22 April 2015 in Barcelona (ref. http://internet-monitoring-study.eu/), where these two approaches were discussed between Scott Jordan (FCC) and Frode Sørensen (Nkom). The considerations were subsequently updated after the 1 July agreement to reflect latest European developments in the area.

[5] Marsden (2009).

17.2.2 Significant Level of Restrictions of Internet Access in the European Market

An investigation of the actual level of restrictions on Internet access in the European market, conducted by BEREC in 2012, showed that every fifth fixed Internet connection and every third mobile Internet connection experienced blocking or throttling of applications.[6]

It is interesting to read the analysis by van Schewick in The Atlantic in 2014: "Unlike Internet users in Europe, many of whom are on restricted Internet service plans that ban the use of specific applications on mobile networks, U.S. users have experienced the power of an open Internet—and they are not willing to give it up."

The amount of restrictions was one of the major reasons presented by the European Commission when they in September 2013 proposed a net neutrality regulation.

17.2.3 Europe, despite the European Union, Still Consists of Many Strong National States

Furthermore, different national approaches to net neutrality have developed over time. Norway has its co-regulatory approach, while the Netherlands and Slovenia have adopted net neutrality laws. Several member states were considering net neutrality rules before the European Commission proposed the regulation of net neutrality.[7]

After the European Parliament in April 2014 strengthened the proposed net neutrality regulation, the national interests within the Council of EU discussed significantly weaker proposals which were presented during the trilogue meetings between the Commission, the Parliament and the Council in Brussels. And finally, on 30 June 2015 an agreement between the three was announced.

17.2.4 The Most Successful Content and Application Providers (CAPs) Are US-Based

ISPs express worries about increasing power of CAPs, and many major successful CAPs are US-based. This may have given an impression that there is a particular need to protect European ISPs against US CAPs. However, blocking and throttling

[6] BEREC (2012).

[7] European Commission, 2014 Report on Implementation of the EU regulatory framework for electronic communications, https://ec.europa.eu/digital-agenda/en/news/2014-report-implementation-eu-regulatory-framework-electronic-communications: "*Belgium and Luxemburg were considering legislating and have opened a debate on net neutrality; however the process is pending the co-legislative process on the Connected Continent initiative. In Germany the draft decree on net neutrality of June 2013 was not further pursued. In January 2014 the Finnish Government submitted its proposal to the Parliament on the 'Information Society Code', a telecoms legislative package scheduled for 2015 that includes provisions on net neutrality*."

of content and applications would not lead to any stimulation of European CAPs! And CAPs are essential since it is the demand for content which drives the demand for bandwidth.

The ISPs have a gatekeeper role towards their subscribers. And the termination monopoly problems leading to sector specific regulation of traditional telecoms may revive in new fashions for providers of Internet access services due to the powerful deep packet inspection techniques. Therefore, net neutrality is important for innovation among European CAPs that can compete with US-based CAPs.

17.2.5 European Telecom Technology Has Shown Major Success in Mobile Communications

The European Telecommunications Standards Institute (ETSI) developed the GSM mobile telephony system, which became widespread over the world. Furthermore, its successor the 3G-system UMTS, standardized by 3GPP, has also taken over as a prevailing technology for the previous US-dominated 3GPP2 standards, while being succeeded by LTE ("4G").

US on the other hand, have a stronger tradition in IP technology, being "the cradle" of the Internet. This may have led to a better position in the communication technology development where IP has become "the winner", as well as a better understanding of how to adapt to this new paradigm which is replacing traditional telecommunications.

17.2.6 How Come US Citizens Show Such Enthusiasm in Protecting Net Neutrality?

What is the reason for the strong engagement of the US population in the public net neutrality discourse? There seems to be a more relaxed attitude to net neutrality in Europe, although there are some strong advocates on this side of the Atlantic as well.

Can this be understood in the context of the First Amendment to the US Constitution and the strong position of freedom of speech in the US society? Is the "Internet freedom" simply highly valued by US citizens as a prolongation of this well-established constitutional principle?

17.3 Fundamental Elements of Net Neutrality Regulation

How does this difference in background between Europe and US influence the proposed net neutrality regulations on the different continents? This may be difficult to prove, but the differences in the regulations are anyway interesting to investigate.

17.3.1 Application-Agnosticism

Equal treatment of traffic from different applications, so-called application-agnosticism, is the essence of net neutrality, and therefore it should be expected that this is safeguarded in such regulation. Non-blocking and non-throttling are obvious characteristics of both proposed regulations reflecting this.

The rules from FCC are even clearer and add non-prioritization to these characteristics. Regarding the European proposed rules, they announce: "Providers of internet access services shall treat all traffic equally, when providing internet access services".[8] However, the effect of this depends on the implementation of the rules for exceptions.

17.3.2 Reasonable Traffic Management

Net neutrality is of course not regulated to give obstacles to efficient operation of networks or protection of citizens, even though stakeholders sometimes present such travesty. To accommodate such measures, reasonable traffic management is allowed. A typical example is preservation of network integrity and security.

The proposed European rules have fairly well designed exceptions for reasonable traffic management. Unfortunately, the rule for handling of network congestion does not prescribe that the exception should only be granted when application-agnostic methods are not usable. Traffic overload can in many cases be fully handled by application-agnostic methods.

17.3.3 Specialised Services (Non-internet Access Services)

Specialised services, also referred to as "non-Internet access services", provide extensive exceptions from net neutrality. Therefore there must be clear rules regarding which services that can be approved as specialised services. First, the traffic from such services should be isolated from the traffic on the Internet, and second, specialised services should not be provided at the expense of Internet access services.

Regarding the former, the proposed European rules remain unclear, while the US rules say that "these services use some form of network management to isolate the capacity used by these services from that used by broadband Internet access services". Regarding the latter, the European rules say that such services may be offered "only if the network capacity is sufficient to provide them in addition to any internet access services provided". But the implementation of this rule is still pending.

[8] Council of the European Union, 2015, Roaming and open internet draft regulation, http://data.consilium.europa.eu/doc/document/ST-10409-2015-REV-1/en/pdf.

17.3.4 Zero-Rating and Price Discrimination

Recently, there has been much attention to data caps and zero-rating, in particular for mobile Internet access services. Simple data caps can be application-agnostic and would then not lead to concerns regarding net neutrality. However, in case of exempting particular applications from charging, so-called zero-rating, would obviously not be application-agnostic.

In the legislative net neutrality initiatives on both sides of the Atlantic, this question is not fully resolved yet. However, the US net neutrality rules seem to acknowledge that this will need particular regulatory attention, and such matters will be scrutinized on a case-by-case basis.

In Europe, a few national initiatives have tackled the issue. In the Netherlands and in Slovenia, the regulators have taken concrete decisions against zero-rating based on the national laws. In Norway as well, it has been clarified that zero-rating would be regarded as a breach of the national net neutrality guidelines. However, proposed European rules, has not resolved this issue explicitly. And it remains to be seen how "commercial practices which by reason of their scale, lead to situations where end-users' choice is materially reduced in practice" will be interpreted.

Net neutrality has been an important regulatory question in Nkom's work for many years, and it is interesting to see how the relevance of net neutrality has grown in Europe lately. But the public debate never reached the same temperature as in the US, while FCC has taken a clear position to strengthen net neutrality through its new rules. The question is; has Europe really taken a strong stance regarding net neutrality to achieve similar safeguards for an open Internet, or will we be lagging behind the US?

17.4 Net Neutrality and Charging Models[9]

Lately we've seen a change in the European net neutrality discussion where charging models have become more central. In this part of the paper we discuss how the relationship between net neutrality and traffic handling has implications regarding the relationship between net neutrality and charging models. The clues to this discussion are application-agnosticism and user-control. But this still allows rich possibilities for ISPs to perform traffic management and product differentiation, as described below.

In simple terms, net neutrality means that the Internet works the same for different users of the net, regardless of who you are. Norway has had guidelines on net neutrality since 2009, and these seem to be working well as a regulatory tool to preserve net neutrality for the citizens. Through the EEA Agreement, the new regulation of net neutrality in Europe will also apply to Norway when it enters into force.

[9]This paper was originally published at Nkom's web site (http://eng.nkom.no/), but has subsequently been updated to reflect latest developments.

17.4.1 Net Neutrality: Equality and Variation

Some people argue against net neutrality on the grounds that the Internet has never worked the same for all users, or for all types of usage, which is in itself true. However, the goal of net neutrality is not that all traffic should be handled identically—which would never be possible in practice. The aim is rather to preserve the Internet as an open platform for communication and avoid discrimination between applications or fragmentation of the Internet.

A commonly used analogy for Internet communication is the road network. In this analogy net neutrality means that we want the same rules for all traffic on the "road network". But, as for the road network, there are various ways of accessing the Internet. Different technologies such as telephony networks, cable TV networks, fibre networks and mobile networks all have varying qualities and provide varying access speeds. It is also common practice for a single technology to operate at different speeds for various types of subscription. However, with regard to net neutrality, the point is that it is the users of the Internet access who decides what their access is to be used for.

Following the analogy, inside the Internet too, the various "highways" have different capacities. The capacity is typically deployed by the Internet service provider, based on how much traffic there is to the various destinations. As users of Internet communications, we can observe this by running speed tests via our own Internet access. In some cases disputes arise when the interconnection between the different providers' networks need upgrading. Until such disputes are settled, this can lead to short-term reduced speed when users communicate via these interconnections. But as long as all the different applications are treated equally, this is not a direct violation of net neutrality.

17.4.2 Charging Models for Internet Access Services

Internet service providers use differentiation of Internet access services as a natural element of their business model. We all benefit from well-functioning businesses that can offer a wide range of well-functioning, affordable communication services to the population. Today it is common for providers to charge users on the basis of capacity (speed) and/or volume, depending on the technological platform.

According to economic theory, offers of different qualities at different prices can help to ensure that people with lower willingness to pay are also able to obtain a product.[10] Product differentiation can be fully compatible with net neutrality, since different speed classes mean that the different products have varying quality. Differentiation based on other quality parameters such as time delay or service availability can also be used similarly. By contrast, services that provide access to selected sets of content or applications would be typical examples of differentiation that would violate net neutrality.

[10] https://en.wikipedia.org/wiki/Price_elasticity_of_demand.

Nowadays it has also become common practice for subscriptions to be differentiated on the basis of volume limits. Again, as long as this is done independent of the traffic type, this does not provide grounds for concern in respect of net neutrality. However, in recent years providers in some countries have launched service offers where specific applications are exempted from charging.[11]

17.4.3 What About Zero-Rating?

The Norwegian guidelines on net neutrality state quite clearly that "Internet users are entitled to an Internet connection that is free of discrimination with regard to type of application, service or content or based on sender or receiver address." This means that in the Norwegian market zero-rating would constitute a violation of the guidelines. At first glance it may appear that all traffic is handled equally in this charging model, but once you have used your quota, the traffic that is exempted will usually be allowed to continue, while all other traffic will be throttled or blocked. This is clearly a case of discrimination between different types of traffic.

Also for data plans where users can upgrade their basic data cap with an additional quota, there is discrimination between different traffic types. For any given total quota bought by a user, consider a user pumping exempted traffic, such traffic would always run at full speed since it never reaches the limit of the total quota, compared with a user pumping non-exempted traffic which would eventually become blocked when it reaches the limit of the quota.

Another way to consider this would be to assess the average speed provided to the users, which would become application-specific. Again, for a given total quota bought by a user, consider a user pumping exempted traffic, such traffic would achieve a considerably higher average speed, compared with a user pumping non-exempted traffic which would eventually reach the limit of the total quota and thereby achieve a lower average speed.

Furthermore, in the heads of the users there would probably be a "traffic filter" choosing which application(s) to prefer, based on a decision taken by the Internet service provider. Thereby we can understand that also for data plans with continuous volume charging without explicit quotas, such personal "traffic filters" would still have effect due to the incentive to select specific applications to avoid high bills by the end of the month.

There are of course arguments in favour of zero-rating that make the method seem quite fair. As consumers, we may find it advantageous that we do not have to pay for a particular type of traffic. Nevertheless, zero-rating lead to selected traffic from the Internet service provider itself or affiliated providers being favoured above other traffic. And this is exactly the kind of situation net neutrality aims to avoid—allowing the Internet service provider to decide how we use the Internet. Instead, the Internet should remain an open, neutral platform for all types of communication.

[11] Digital Fuel Monitor (2014).

The Norwegian Communications Authority (Nkom) has long been working actively for net neutrality for the benefit of Norwegian consumers, organisations and businesses. The Internet is important to economy, cultural diversity, social life and democracy, and Nkom therefore works to preserve the Internet as an open platform. Internet service providers should instead use other methods than discrimination of content and/or applications to differentiate their products, *e.g.* based on access speed.

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Chapter 18
Zero Rating and Mobile Net Neutrality

Christopher T. Marsden

18.1 Introduction: Net Neutrality and Walled Gardens

Several developed countries have recently legislated for or regulated for net neutrality, the principle that Internet Service Providers (ISPs) should not discriminate between different applications, services and content accessed by their users. This came after 20 years of attempted discrimination between content streams within the walled gardens of both fixed and mobile ISPs,[1] such as AOL in the 1990s, BT Openworld (sic) around 2000[2] and Vodafone Live/360 in 2002-11, which was intended to challenge the Apple AppStore and Android/GooglePlay.[3] Alongside their walled gardens, these ISPs enforced monthly data caps preventing their customers having unlimited use of the Internet.

Fixed line walled gardens failed in view of the easy access at increasingly low cost offered by broadband access, though in the earlier dial-up analogue era, walled gardens had been assumed to predominate or at least offer the first "landing page" on the Internet. By 2003, it had become obvious that users preferred a landing page that represented their search engine of preference (and increasingly their browser of choice), in which competition Google rapidly won against Yahoo! and Microsoft. Continued attempts to maintain walled gardens throughout the past 10 years have focussed on both 'negative' and 'positive' net neutrality, as I have previously explained in depth.[4] I explain both in turn.

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[1] Lemley and Lessig (1999) and Marsden (1999, 2010b).

[2] BT Openworld (known internally as 'OpenWoe') was merged with BT's joint venture BT-Yahoo! in 2002. Timms (2003).

[3] Wray (2009).

[4] Marsden (2010a).

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Negative neutrality is the blocking and throttling of content that threatens the business model of the ISP. This can be relatively benign when it is spam email and viruses that are blocked. It can also be self-serving and anti-competitive when it is unjustified and unreasonable restrictions on user's preferred content that is affected—for instance peer-to-peer file sharing or video streaming. It is this 'negative' net neutrality which is the target of most legislation in the area, based on the generic regulatory principle of "first, do no harm", in this case eliminating the harms caused by unreasonable negative blocking, or discrimination. Cases in the US such as Madison River and Comcast were about blocking,[5] and is it this that rouses much consumer anger and political action.

'Positive' net neutrality violations involve not blocking, but treating some content better than general Internet traffic. As cable TV provides High Definition and standard video and television channels at high fees in a separate logical pathway to the general Internet traffic on its cable, some telecoms companies hope to partition its Internet traffic to replicate this business model. Several ISPs attempted this practice over lengthy periods, notably by excluding television channels from monthly data caps for users, positively discriminating in favour of their affiliated content and against other video providers (such as YouTube). In this way, 'walled gardens' reappear with much more specialized walls—restrictions that affect only certain non-affiliated types of Internet traffic, such as social networks or video.

This use of excluding preferred content from data caps is described as "zero rating" because all that downloading costs precisely zero in terms of counting towards their monthly bill.[6] Note that many fixed ISPs have virtually unlimited data use as part of their offer, made possible because maximum speeds and user profiles mean that the cumulative download burden does not over-strain the network (a dial-up network would be an excellent candidate for "unlimited" service as users would find it very hard to download very much). An infamous example was Deutsche Telekom's 2013 announcement that its video service would be excluded from data caps and that users who downloaded in excess of their monthly limit would in the rest of the month find their speeds throttled back to 256 kpbs. It was both the positive discrimination in favour of Telekom's own service and the threat to users' service that caused the pre-election political outcry that led to Telekom deciding on 2 Mbps as the (rather more generous) throttled speed.

Data caps have been controversial throughout the consumer Internet's history,[7] especially in the United States where dial-up Internet was virtually free to the end-user (simply the cost of a local telephone call). The US Open Internet Advisory Committee noted the move towards capping data especially for mobile users and worried "whether caps or thresholds that are set too low could lead to a world where the average user carefully monitors her bandwidth use" given uncertainty over data

[5] Marsden (2013).

[6] Eisenach (2015) and Maillé and Tuffin (2014), pp. 89–90.

[7] ERMERT, MONIKA (2013) Managed services – a net neutrality trap? Internet Policy Review 03 MAY 2013 at http://policyreview.info/articles/news/managed-services-%E2%80%93-net-neutrality-trap/125.

caps as a "transitory or permanent concern"[8] which appears to be the case in developing (and many developed) nations' mobile data access. While data caps apply in many nations applied by many ISPs, the user often has little or no idea that they are approaching their monthly limit until informed by the ISP, and such warnings are often inaccurate. It is at best a blunt weapon for handling congestion, though there is little argument that data caps per se infringe net neutrality, as long as the cap gradually increases over time.

Politicians and telecoms executives who now claim to be in favour of net neutrality are in fact conceding that blocking and throttling users is no longer acceptable to politicians, and therefore regulators (even if the latter protest their independence). They largely only concede 'negative' net neutrality. 'Positive' net neutrality is a much more contested topic, and where download limits apply or ill-defined specialized services carry the zero-rated content, this concept of zero rating will be heavily contested. That is more the case with mobile than fixed networks, and more the case with developing nations' mobile ISPs than developed.

18.2 Towards the Mobile Internet

In the mobile Internet, speeds were so low and costs so high initially that a dial-up analogue type experience was all that users could expect. Smartphones were initially business-enabled Nokia and then Blackberry e-mail devices. The stark choice of price collapse for networks otherwise lacking any significant data use, or limited bandwidth offers faced the developed world in 2007, but two astonishing developments occurred together: smartphones and app stores, and social networking via mobiles.[9]

Prior to 2007, few Internet users accessed the Internet via their 2G or 3G mobile devices, as bandwidth was expensive, network build-out limited and mobile data was very expensive. First, the Apple iPhone was launched, offering a full Internet experience on mobile alongside its App Store which offered low bandwidth experiences that could be downloaded and used later: particularly useful for underground Metro journeys and in 3G "not-spots". It was the invention of the iPhone, and the networks' decision to move towards unmetered or more generous pricing to encourage use of the hitherto little-used 3G mobile networks, that led to the explosion of smartphone Internet use.

The number of active 'smartphone' users rapidly increased following the iPhone launch in 2007, especially when the Google Android operating system and Android (now Google Play) Store began to compete against Apple for lower cost and lower income users—whose interest lay mainly in entry price smartphones and free apps. Prices also collapsed due to use of 3G 'dongles' (USB-linked laptop antennae for 3G) as well as the ubiquitous use of WiFi within broadband-enabled homes, offices and coffee shops. This went alongside the expectation that users would download apps

[8] Open Internet Advisory Committee (2013), p. 13.

[9] Wu (2007).

over WiFi rather than eating into their expensive data plans, with the iTunes Store only accepting 3G purchases from autumn 2009, 2 years after the iPhone launch.[10]

Note that WiFi became widely available in laptops in 2001-4 with a lag of about 5 years in public 'hotspots', the number of public access hotspots increasing from 1 million in 2010 to 70 million by 2015.[11] There were over 3 billion WiFi chipsets shipped in 2015, in smartphones, laptops, tablets and other devices, including 166 million consumer WiFi terminals (as used in the home connected to a fixed broadband Ethernet connection).[12] Because WiFi 'piggybacks' on fixed connections, its essential role in mobile Internet access over the past decade is much overlooked and under-estimated, with a recent study for the European Commission estimating as much as 80–90 % of "mobile" traffic is actually carried by WiFi connections to the fixed network—i.e. only 20 % is truly mobile traffic: "as much as 80–90 % of Android smart phone and tablet mobile traffic is already being off-loaded to private Wi-Fi".[13] The conclusion is that the more WiFi and other hand-off to the fixed network, the cheaper mobile data becomes, with the most ubiquitously WiFi-enabled nations being South Korea and the United Kingdom.

The iPhone itself was tethered or "locked" exclusively into a single network at launch in 2007, a model started in the US with AT&T and continued with O2 in the UK and T-Mobile in Germany. These networks imposed severe cost penalties on customers who tried to leave before the end of their contract, and Apple's contracts made it a warranty violation to unlock the phone for use on other networks. Customers brought a class action law suit against AT&T, which backfired spectacularly resulting in the loss of customer rights to bring law suits if contracts contain compulsory arbitration clauses.[14] The iPhone, despite high costs and the App Store's aggressive filtering of applications considered technically or ethically unsound, rapidly outsold the Nokia and Blackberry competition. Android devices began to sell in volume with the Samsung and HTC families of phones, and at no point did Apple actually outsell its competitors (first Nokia until 2011, then Samsung thereafter became top selling global competitors in smartphones). The mass adoption of smartphones depended on driving a lower price point than Apple was willing to compete at, and the wealthy technologically literate early adopters are now far outnumbered by Android mass users (by 50 % to 25 % in the UK in 2015, for instance): about 1 in 7 smartphone sales worldwide are iPhones.[15]

Social networking using Web2.0 software expanded from a very low base at the start of the smartphone era. Brown and Marsden explain that "Facebook grew from nothing in 2004 to become the second most popular destination Web site in the

[10] About.com (2009).

[11] Lemstra et al. (2010). WiFi is the brand name for the IEEE802.11 family of standards, protocol released 1997, trademark adopted 1999.

[12] ABI Research (2015).

[13] Marcus and Burns (2013).

[14] *AT&T Mobility v. Concepcion*, 563 U.S. 321 (2011).

[15] Neal (2015).

world by 2012".[16] It grew to 100 million users by autumn 2008, surpassed 1 billion monthly active users (MAUs) in 2012 and 1.5 billion in 2015, which included 210 million in the US/Canada and 112 million in its second largest market, India, in autumn 2014. Facebook was floated on the stock market in 2012, warning investors in its prospectus that "There is no guarantee that popular mobile devices will continue to feature Facebook, or that mobile device users will continue to use Facebook rather than competing products."[17] It was thus a matter of great priority for Facebook to expand its mobile network partnerships rapidly internationally in the face of a decline in youth MAUs in its home US market from 2013.

18.3 Zero Rating and Internet.Org

I now examine the developing nation zero rating controversy, before considering the extent to which zero rating may infringe or support net neutrality and Internet access. The future controversy for net neutrality is mobile in the developing world, and specialised services in the developed world. That is the stark conclusion after the United States and Canada[18] implemented net neutrality in 2015, and the European Union legislated to provide net neutrality. This paper does not examine these developments in depth, but a complete analysis will be found in Marsden (2016).

While net neutrality law is coming into effect in those 30 countries and their European Economic Area neighbours (for instance Norway has implemented net neutrality since 2009, and Switzerland recently introduced industry-led co-regulation), outside East Asia most citizens in developing countries depend on expensive mobile access to the Internet. Odlyzko notes that the zero-rating debate exists in one Asian country, but does not explore in depth,[19] while monthly caps were important before zero rating had become commonly identified.[20] Just as net neutrality dates to the 1990s so zero rating dates to the same decade even if the term of art came much later.

There are ten times more mobile (5.6 billion) than fixed line connections (572 million) in developing countries, whereas the developed world ratio is 3:1. There are five times more mobile broadband subscriptions in the developing world with 2.37 billion to only 429 million fixed subscriptions (developed world 1.09 billion mobile to 365 million fixed at a ratio of 3:1). 70 % of Internet users totalling over 2 billion people are outside the EU/US, and total Internet penetration in 2014 was only 39 % of the population.[21] With similar GDP per capita to Brazil, it is only 50 % more expensive for Bulgarian or Romanians to access mobile data than Germans, but at least 600 % more for Brazilians (only €1 per GB for prepay data in

[16] Brown and Marsden (2013), p. xii.

[17] Cited in Brown and Marsden (2013), p. 123.

[18] CRTC (2015).

[19] Odlyzko et al. (2012), p. 15.

[20] Fierce Wireless (2011), p. 18.

[21] Source: International Telecommunications Union (2015).

Romania[22] but 200 MB per day for 3.29R in Brazil[23] maximum 6 GB per month for 100R = €26 or at least €4.3 per GB). Romania and Bulgaria may be smaller countries than Brazil but they have equivalent wealth. Something is seriously wrong with the Brazilian mobile competitors' data pricing.

If these 2 billion users are to get online as quickly as in developed nations, prices need to fall exponentially—extremely unlikely given the geography of interconnection.[24] Note also that stable oligopoly conditions are prevalent in mobile,[25] and the corrupt manner in which mobile licences are awarded by many developing nation governments.[26] Absent price competition, consumers seeking low cost messaging and calling need a limited Internet offer. In the developing world, which rapidly caught up in mobile phone subscription, achieving the same conditions of neutrality as in the developed world will need to focus on mobile ISP regulation. Mobile ISPs introduced walled gardens which are so-called 'sponsored data plans' or 'zero rating' of their affiliates' content. A particular business model for this practice is that of dominant social network Facebook, which from 2009 introduced Facebook Zero with mobile ISP partners, later called Facebook Lite in 2011, and in 2015 introduced a wider walled garden called "Internet.org" (which despite its name is an Intranet for 30–40 affiliates).

18.3.1 The Internet.Org Model

Internet.org has in September 2015 strict guidelines for applicants, no third party audit of scrutiny procedures and no appeal against its veto of new applications, while "submission and/or approval by Facebook does not guarantee that your site(s) will be made available through the Internet.org."[27] Internet.org was so closed that it did not even issue specifications for those applications seeking to join: "After global criticism to the closed and allegedly net-neutrality violating nature of Internet.org, Zuckerberg opened up the platform to any developer whose website meets the technical guidelines; and the set of technical guidelines was also published. Not only did this open the platform up, but, via the technical guidelines, it gave us a glimpse into what Facebook considers to be mobile-friendly".[28] This includes "emphasis on efficiency: infrastructure and data must be efficient so that operators can sustain infrastructure. This means high-bandwidth, VOIP, video and even image-heavy sites

[22] 12.5 GB for €12, see Orange Romania (2015).

[23] See TIM Brazil (2015).

[24] Telegeography (2015).

[25] A major policy challenge for the attempts to consolidate and reduce competition in mobile telecoms came with the EC veto of TeliaSonera's attempt to buy a Danish mobile network in 2015. See Europa (2015).

[26] Sutherland (2012), pp. 4–19.

[27] See Facebook (2015).

[28] Ruadhan (2015).

won't be included… this list reads as if it was straight out of the W3C mobile web best practices (MWBP)" written in 2006!

Internet.org was set up in August 2013 to extend far beyond the initial closed Facebook Zero model which dates to Facebook's original forays into mobile in 2009-10 and which inspired Wikimedia to follow suit. Facebook Lite was a version of the website optimised for low bandwidth users, launched in 2009 and closed in 2010 in favour of lightweight Facebook applications. It has been revived in June 2015 as a 300Kb apk file.[29] But Mobiforge explains that still means Facebook is gatekeeper: "Although Facebook has bowed to pressure and 'opened' up the platform, it's still not truly open, or universal. There are technical guidelines, but Facebook is the sole arbiter in respect of approving sites…the Internet.org proposition violates decentralization too, because of its approval process and proxy setup."

As an open letter to Mark Zuckerberg posted on Facebook by 67 rights groups point out, Internet.org is "misleadingly marketed as providing access to the full Internet, when in fact it only provides access to a limited number of Internet-connected services that are approved by Facebook and local ISPs. In its present conception, Internet.org thereby violates the principles of net neutrality, threatening freedom of expression, equality of opportunity, security, privacy and innovation."[30]

Zuckerberg claimed: "Some may argue for an extreme definition of net neutrality that says that it's somehow wrong to offer any more services to support the unconnected, but a reasonable definition of net neutrality is more inclusive. Access equals opportunity. Net neutrality should not prevent access." Bode argues this is: "simply disingenuous and obnoxious. Nothing about opposing zero rating 'prevents access'." He claims that "Zuckerberg's basically cementing his company's gatekeeper authority over developing nations for generations to come under the bright banner of selfless altruism, then taking offense when told that these countries might just be better off with un-apertured, subsidized access to the real Internet."[31]

Facebook claims that Internet.Org is succeeding, with 800,000 new Indian users: "20 %… did not previously access mobile data… Only 7 % of the data used by Internet.org subscribers came through the initiative's free, zero-rated offerings; other paid services accounted for the remaining 93 %."[32] If it does work as promised, it may drive down prohibitive data plan costs, which are highest in Brazil and Mexico compared to minimum wages.

Zero rating is practised by Facebook, Internet.org with their mobile ISPs partners, but also many other content providers. Wikipedia Zero, which is the Wikimedia Foundation's response since 2011 to the desire to spread Wikipedia to new territories, audiences and languages, operates in almost 60 countries.[33] MCent also operates with far more users than Internet.Org. Digital Fuel Monitor has collected evidence of more

[29] Brinkmann (2015).

[30] Access Now (2015).

[31] Bode (2015).

[32] Smith (2015).

[33] Marsden (2015b), http://www.slideshare.net/EXCCELessex/fgv-law-marsden-gringo-net contains many graphic illustrations of zero rating strategies by Facebook and Wikimedia.

than 90 zero rating schemes operating in over 60 nations: clearly this is a practice which has grown enormously in the last 2–3 years.[34] What have regulators done about it?

18.4 Zero Rating Regulation

In this section, I focus on three developing countries that are early movers in both zero rating and the net neutrality debate: India, Brazil and Chile. The methodology used was both literature review and empirical interview based. Research into comparative net neutrality law has recently been carried out by several Non Governmental Organisations (NGOs) and is well reported in the specialist media.[35] Additionally many regulatory documents are available in Spanish, Portuguese and English on regulator websites. The consultation process for net neutrality regulation was very well publicised in both Brazil and India, while Chile's 2010 law was well noted but little researched in academia outside Latin America. India has zero rating in practice but no effective regulation in mid-2015, Brazil the same despite a law passed with great fanfare in April 2014.

The practice of zero rating has been outlawed by several developed nation regulators, notably those of Netherlands,[36] Slovenia, Norway,[37] Canada,[38] all developed nations with ubiquitous fixed Internet access as well as relatively affordable mobile data. The Norwegian regulator stated that zero rating is "exactly the kind of situation net neutrality aims to avoid – allowing the [ISP] to decide how we use the Internet". Zero rating must be discriminatory to other apps not included, and therefore was ruled illegal without a case being brought. I briefly explore the Netherlands and Slovenia before turning to potential precedents for developing countries.

18.4.1 Netherlands Zero Rating

The new Netherlands rules only affect mobile ISPs in practice: "The new neutrality rules had no effect on the fixed market." The four issues dealt with by the Netherlands regulator once its net neutrality law came into effect in 2013 have caused academic

[34] Drossos (2015).

[35] Rossini and Moore (2015). See also Marques et al. (2015).

[36] Department of Economic Affairs (2015). In summary: "Pursuant to the Act, providers of internet access services may not block or obstruct services and applications on the Internet (with limited strict exceptions). Furthermore, providers may not differentiate between tariffs for internet access services, and services and applications provided or used through these services."

[37] Sørensen (2014).

[38] Canada has had a chequered record on net neutrality until 2015, with rules proclaimed by the regulator in 2009 but not enforced until this year. In 2011, the regulator explicitly supported capacity-based billing (rate caps) in Telecom Regulatory Policy CRTC 2011-703, Billing practices for wholesale residential high-speed access services (TRP 2011-703), which led the main ISPs to stop throttling video and other high bandwidth content as they had admitted so doing since 2008. It then adopted greater enforcement practices for net neutrality in 2014. Marsden (2015a).

expert van Eijk to caution that 'hard cases make bad laws' including for zero rating: "the new net neutrality rules… led to a new subscription structure, with a substantially increased emphasis on data traffic. Data bundles are priced more specifically, and existing packages with unlimited data access have been replaced by packages with a specific size (data caps) and specific speeds."[39] He cautions that "it is too early to tell whether net neutrality has had an effect on the overall costs for mobile broadband." He explains: "In two cases, the Authority investigated the bundling of data packages with free services (i.e. a mobile subscription with 'free' access to Spotify). To deal with these cases, a new guideline has been drafted by the ministry involved."[40] This clarifies that zero rating is illegal in the Netherlands, though it may not be a ruling that is compatible with the new draft European law which may be implemented in 2015/16.

18.4.2 Slovenia Zero Rating

Due to the language, limited size and resources of the regulator, and the peripheral nature of Slovenian (population 2 million), Slovenia's very strict net neutrality law has been analysed very little by non-Slovenes. The net neutrality law is Article 203 of the wider Electronic Communications Law 2012 (ZEKOM), drafted as an innovation measure in response to hostility by the dominant ISP and trades unions towards competition in Internet supply. The regulator is the Communications Networks and Services Agency of the Republic of Slovenia (AKOS). The law's author when Minister for Communications, Professor Ziga Turk, has examined its genesis and implementation in a publication for the European Commission (I declare an interest as co-author).[41] His main conclusion was that implementing net neutrality in a nation with such a weak regulator would prove very difficult. Drossos agreed with this analysis arguing that AKOS "led by a former industry executive, has not been an advocate of net neutrality. Instead, it has taken a pro-industry stance on net neutrality and has not opposed attempts to weaken or even remove net neutrality provisions from the law."[42]

While the ZEKOM law dates to the start of 2013, its regulation by AKOS was slow to arrive, with the main 4 rulings those of 24 January and 20 February 2015 against zero rating. AKOS confounded its critics with a strong zero rating decision when forced to investigate by the Electronic Communications Council (SEK), which filed a complaint in July 2014 alleging Telekom Slovenije violated net neutrality with zero-rated products. Telekom Slovenije from 2013 provided free

[39] van Eijk (2014).

[40] The other two cases in 2013/14 concerned public Wifi and mobile ISP throttling: "The regulator in charge – the Authority for Consumers and Markets – took a first decision on applying the new rules in a case where Internet access in trains was blocked for congestion reasons. In another case, a service similar to WhatsApp was inaccessible via wireless networks" (van Eijk 2014).

[41] Turk (2015).

[42] Caf (2014).

data for HBO and UEFA Champions League football, then later the music streaming service Deezer. AKOS also found against Si.mobil (the largest mobile ISP) for zero-rating cloud storage service Hanger Mapa. TS and Si.mobil were instructed to stop zero rating. In the second pair, bans were imposed against a zero-rated mobile TV service and web portal provided by AMIS (Mobia TV) and Tušmobil (Tuškamra), respectively. That completes rulings against all major ISPs in Slovenia, all of whom had zero rated affiliated content, and were given 60 days to comply. The issue was fought for by AKOS against substantial industry lobbying and the huge asymmetry in personnel between the ISPs and the very small regulator. A remaining issue is that football and cloud storage on Telecom Slovenije remains zero rated, though it stopped the practice with video channel HBO, whereas AMIS and Si.mobil were banned from video and cloud zero rating. It is difficult to convey to non-Europeans the importance of Champions League football, and it may be that politically to deprive viewers of that stream by capping downloads would be impossible.

The results of bans have been "Telekom Slovenije and Si.mobile have both come up with special offers and packages with larger data caps or inexpensive data cap options" to expand the cap, presumably to try to include their formerly zero-rated services. Just as in the US, Slovenian operators and the regulator are highly litigious and a final judicial decision was awaited in all cases.[43]

18.4.3 Chile and Zero Rating

Chile has the earliest known net neutrality law (from 18 August 2010)[44] and an implementation of regulation permitting zero rating from 2014. Ley 20.453 includes a provision which adds Article 24(h-j) to Ley N° 18.168 'General de Telecomunicaciones'. Article 24H expressly forbids ISP practices that "arbitrarily distinguish content, applications or services based on the source or ownership thereof." This would be relied upon by those opposed to zero rating. The original law required ISPs to self-report on any violations, resulting in infringement only for failure to report. Cerda reports that there were "allegations of negligent supervision of the law by public authority" in failing to enforce consumer rights.[45]

In Chile,[46] all four mobile ISPs (Claro, Entel, Telefonica and VTR) were notified to cease zero rating in 2014.[47] The regulator's (sub-secretary of communications: Subtel) conclusion was misreported in the developed nations' media as banning all

[43] Caf (2015).

[44] The Chilean 'Law 20.453 Which enshrines the principle of net neutrality for consumers and Internet users', of 18 August 2010 at http://www.leychile.cl/Navegar?idNorma=1016570&buscar=NEUTRALIDAD+DE+RED which is implemented by Decree 368 of 15 December 2010: http://www.subtel.gob.cl/images/stories/articles/subtel/asocfile/10d_0368.pdf.

[45] Cerda (2013).

[46] Huichalaf Roa (2015), p. 20.

[47] In Chile, a total of 40 cases may sound substantial, but 25 were in the first 2 years, and fully 29 relate to those four major ISPs. Most were for infringement of transparency rules or network self-measurement. Zero rating in 2014 was considered by many observers as the first true test.

zero rating from 1 June 2014, when it applied to social networks, notably Facebook and therefore Internet.Org. Wikipedia Zero was also excepted from the ban, though the reasons why are not declared by the government.[48]

Subtel stated: "las empresas que entregan algunas redes sociales gratis, lo que hacen es privilegiar el uso de estos servicios, mediante el acceso a una Internet bloqueada, excluyendo las redes sociales privilegiadas"—social networking apps received positive discrimination ('privilegiadas') when included in the zero rated offer. In fact, Claro (subsidiary of Mexican operator America Movil, also active in Brazil, Columbia and other Latin American nations) was permitted by the Chilean regulator to continue zero rating as long as it formed part of a wider data plan that customers could choose.[49] This was because data plans were included in the new zero rating offer, removing the part of the complaint relating to "cuando los usuarios salen a través de un enlace externo, las empresas piden pagar"—that non-zero rated websites have to pay for users to exit zero rating onto the wider Internet.

18.4.4 India and Zero Rating

In India, two zero-rated options have been offered in 2015, by both Internet.Org, owned by Facebook which has 1.5 billion monthly active users (MAUs), and Bharti Airtel (the largest mobile ISP in India with 226 million customers at April 2015, and over 300 million customers including its 19 subsidiaries in other markets[50]). An Indian Parliamentary committee in July 2015 suggested that the locally based Airtel's zero-rated option should be permitted but foreign-controlled Facebook's Internet.Org prohibited. In response to concerns most vociferously raised in India but also in Brazil, the US and other nations, Facebook made the terms of Internet.Org more transparent in May 2015, effectively opening access in principle to any app developer who could meet its terms.[51] Nevertheless, Facebook's privacy policies continue to apply and it is not possible to use Internet.Org without also being a Facebook user, while Facebook accesses all your tracking behaviour while logged in to any partner sites and can share that with mobile ISPs. Facebook's privacy and IP policies have been robustly analysed and critiqued for several years and are somewhat regulated in a light touch manner in the European Union and US (Brown and Marsden 2013: xvii–xviii, 19). It is also worth noting that many mobile ISPs use IMSI and other parsing methods to track everything you do on the Internet—in developed and developing countries.[52]

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[48] See Rossini and Moore (2015) explaining the exchange of letters between Wikimedia Foundation and Subtel in 2014.

[49] The draft Direction of May 2014 apparently banned all zero rating, but the final decision of August 2014 permitted those plans offered only in addition to a data plan—i.e. where users had purchased wider access to escape the walled garden.

[50] For Airtel's collaboration with Internet.Org in Zambia, see Airtel Africa (2015).

[51] Pahwa (2015).

[52] Vallina-Rodriguez et al. (2015). The paper describes privacy violations and header enrichment practices performed by mobile operators (perma-cookies, x-forwarded-for, IMEI, IMSI,…).

Self-imposed FRAND may be the result of strong public and political pressure together with the threat of regulatory action as expressed by the Joint Secretary of the Department of Telecommunications, V. Umashankar: "if the need arises, the government and the regulator may step in to restore balance to ensure that the internet continues to remain an open and neutral platform for expression and innovation with no [ISP], or for that matter any content or application provider, having the potential or exercising the ability to determine user choice, distort consumer markets or significantly controlling preferences based on either market dominance or gatekeeping roles".[53] While the Indian government has not yet finally decided on its neutrality policy pending a final report from the regulator TRAI, its Joint Secretary explained that the Telecoms Committee report delivered in July 2015 proposed ex ante regulation: "a licensee has to file the tariff plan with TRAI prior to the launch. TRAI would examine each such tariff filing carefully to see if it conforms to the principles of net neutrality and that it is not anti-competitive by distorting consumer markets." Should zero-rating have already begun, as with Internet.org and Airtel, "penalties will be levied if there is a violation".[54]

18.4.5 Brazil and Zero Rating

Brazil has had zero rating since prior to 2014, a common practice by several mobile ISPs. Like Chile, Brazil has a bicameral constitution with a powerful directly elected executive president. Brazil had discussed net neutrality since the mid-2000s, with its formal advisory committee on Internet governance passing a resolution known as the 'Decalogue' in 2009 which in part stated: "Filtering or traffic privileges must meet ethical and technical criteria only, excluding any political, commercial, religious and cultural factors or any other form of discrimination or preferential treatment" (Resolução 2009/03 do CGI.br). This led to a period of public consultation led by the Ministry of Justice in 2009 (29 October–17 December) over a potential new legal framework. In 2011, the Chamber of Deputies (lower house of parliament) began to negotiate a law on privacy and net neutrality led by Deputy Alessandro Molon, which stalled in 2012/13. In late 2013 the political process was accelerated due to President Roussef's concerns over foreign surveillance of telecoms and Internet traffic (specifically her own communications), resulting in the Senate ratifying the Chamber of Deputies' proposed law in a single month.[55] Law No. 12/965 (the "Marco Civil da Internet") was signed by the President at the opening ceremony of the Net Mundial conference in Sao Paolo in April 2014.[56] The relevant section is Article 9 which states: "The party responsible for the transmission,

[53] Doval (2015).

[54] Quotation from Doval (2015).

[55] Wohlers et al. (2014).

[56] Law No. 12.965, April 23 2014 by the Presidency of the Republic, Civil House Legal Affairs Subsection.

switching or routing has the duty to process, on an isonomic [equality before the law] basis, any data packages, regardless of content, origin and destination, service, terminal or application." Moreover, according to Article 9(3) ISPs must "act with proportionality, transparency and isonomy" and "offer services in non-discriminatory commercial conditions and refrain from anti-competition practices". The question for regulators implementing zero rating is whether it is **proportional, transparent and non-discriminatory**.

Unsurprisingly for such a rushed final law, the consequent implementation has proved controversial, not least because it is not clear which of two consultative bodies and the Ministry of Justice should be in charge of the drafting and enforcement of the subsequent rules.[57] Article 9(1) states that it: "shall be regulated in accordance with the private attributions granted to the President…upon consultation with the Internet Steering Committee [CGI] and the National Telecommunications Agency [Anatel]". In 2015, both the regulator and the Ministry issued consultations, the latter organised together with the CGI in the period 28 January–30 April.[58] The results of the consultation are to be made public in an Executive Order expected in the latter part of 2015.

It is unclear whether zero rating or specialized services will be effectively regulated at the time of writing. At the 2015 Summit of the Americas in Panama on 10th April, President Rousseff met Mark Zuckerberg and was photographed with him,[59] he in a suit, she in a Facebook hoodie.[60] Her pronouncements in favour of Facebook's work in Brazil with poorer communities, and by inference Internet.Org, were a public scandal in view of the open consultations then ongoing. However, it is not clear what benefit such public lobbying achieved for Facebook/Internet.Org.

In practice, Anatel in 2014 chose not to regulate zero rating. TIM (the Brazilian subsidiary of Telecom Italia Mobile), in partnership with WhatsApp, released a zero rating plan that allowed subscribers to use the app in zero rating. Marcelo Bechara, counsellor of ANATEL, refused to regulate in the absence of specific prohibitions "If there is no prioritized traffic, I do not see why it breaks the Marco Civil. This is the free market. It's free business".[61]

In 2015, Claro abandoned a previous offer that offered zero rating only, and adopted its Chilean approach with free WhatsApp, Facebook and Twitter offered only to users who also subscribed to data plans (pre or post-pay).[62] Claro CEO Carlos Zenteno had said in April that zero-rating plans were no longer part of the carrier's strategy as less than 1 % of customers used only Facebook or Twitter, and in June added: "It's an evolution. We realized that it has no purpose only to offer zero-rating access to one site." Claro argues that zero-rating on top of existing data plans represents a positive discrimination that the consumer chooses. Anatel's decision on this issue will be critical to the future of Brazilian zero rating.

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[57] Cruz et al. (2015).

[58] Ministerio da Justicia (2015) and Chilvarquer (2015).

[59] http://www2.planalto.gov.br/centrais-de-conteudos/imagens/encontro-com-presidente-do-facebook.

[60] Antunes (2015).

[61] Marques et al. (2015), pp. 66–67.

[62] Prescott (2015).

18.5 Conclusion: Regulating the Fair Reasonable and Non-discriminatory (FRAND) Mobile Internet?

I suggest two regulatory actions to encourage the correct use of zero rating: treating zero rating as a short term exception to net neutrality, and ensuring any such short term exception is not exclusive, by subjecting such contracts to Fair Reasonable and Non-Discriminatory (FRAND) conditions. (I have explained these interventions in depth in a previous book, referring to the policy toolkit recommendation as representing the first footsteps into **'prosumer law'**: those looking for the definitive full explanation should refer to that work.)[63]

These conditions are not dis-similar to the principles by which the Wikimedia Foundation permits Wikipedia Zero to be offered by mobile ISPs, in that it: "allows other public interest websites to ride onto its own scheme, eschews any exclusive rights or exchange of payment between itself and mobile carriers, and forbids carriers from selling the service as part of a limited bundle".[64] It is also similar to concerns expressed to Facebook by the 67 NGOs in their letter, by Public Knowledge in their recent study, by the Centre for Internet Studies in India,[65] and others. As it summarises my perspective since the 2010 book,[66] I make some claim to prior knowledge. I consider exceptions, non-exclusivity and FRAND in turn.

Short term exceptions to net neutrality are likely given the post hoc nature of regulation: regulators lay out ground rules then respond to complaints regarding infringing practices. Difficult marginal cases can require extensive investigation. Such processes can take several months in the case of effective regulators, requiring both technical and economic analysis, a call for evidence, hearings and enforcement notices. In the case of litigious market actors, appeals against decisions can take months, years or longer to reach constitutional courts as final appeal court. There is nothing in zero rating to suggest it is anything but a straightforward case of discrimination, which should not be subject to such long appeal processes. As explained earlier, walled gardens are nothing new, represent obvious discrimination and have been outlawed by those countries with effective net neutrality regulation. Any attempt to offer a time-limited zero rated offer as an introduction to mobile data use could be flagged as such and limited by regulation to perhaps 3 or 6 months. This would be subject to FRAND conditions and regulatory enforcement.

FRAND conditions could be applied to two areas depending on national regulatory powers: to mobile ISP contracts with Internet.org and other affiliated content providers, including the ISPs' own subsidiaries, and to the conditions under which the content providers offer access to their own portals. This would need to be applied to each mobile network as the stable oligopoly in each nation examined means no

[63] Brown and Marsden (2013).

[64] De Guzman (2014); Asia Pacific Bureau (2014).

[65] Jain et al. (2015), pp. 11, 17–18.

[66] Marsden (2010a), to be revisited in full length monograph in Marsden (2016).

one network is dominant, and in any case this is in legal terms an access-utility problem, not a generic competition problem.[67] The former is relatively straightforward to implement in theory, as it is basically vertical unbundling of the mobile ISP's business unit arrangements, following examples such as those of the local access monopoly Openreach within British Telecom in the UK, or similar arrangements in Italy and Sweden. In practice, regulatory independence and strength is needed to successfully carry through such a course. One could also compare it to the regulatory treatment under EU antitrust law of competitors to Microsoft's applications interoperating with their dominant Windows operating system. However, not all regulators are capable of equal treatment of subsidiaries with competitors, especially in the resource-challenged developing world where independence and regulatory commitment are less easily maintained.

An alternative form of FRAND may therefore be to regulate de facto at a regional or global level, in establishing the ground rules for access to the zero-rated platform which mobile ISPs will offer. Regional rules (such as those in the EU) or those of a very persuasive regulator (FCC) can provide a strong policy lead to neighbour regulators. In this case, the regulated actor is the 'host' platform for those applications that will be offered. If applications to join such a platform offer—such as Internet. Org or Wikipedia Zero's offer—are established under FRAND terms that can be examined and monitored independently, then the platform which is established for one developing market may, with few modifications, prove to be that offered in many others.

Jurisdiction will be the greatest challenge to any attempt to regulate the platform rather than the mobile ISP offering zero rating. There are three obvious routes to enforcement: via the telecoms regulator's enforcement of platform neutrality on the mobile ISP and therefore into the contractual terms of its agreement with the platform; via the antitrust route as a merger condition for any platform that choses to expand into this area; or by a considered coordinated response by a network of net neutrality enforcement agencies at regional level, such as in BEREC.[68] The first has the same resource constraints as with OpenReach-type regulation except that the better resourced early mover regulators may establish ground rules that can be 'copy and pasted' by later acting, less motivated regulators. The second is the type of net neutrality regulation that was adopted in the United States from 2005 onwards as an antitrust 'default' rule against large ISPs that wished to merge. In the global view of such mergers, a net neutrality undertaking for a limited time period was considered by the merger partners to be a small price to pay. The third is similar to the first, in that the larger well-resourced regulators acting in concert with their smaller cousins can issue a decision or opinion that will help other regulators to take similar or identical action to enforce neutrality. Given the networks of regulators,

[67] See Coates (2011), Ungerer (2005), pp. 52–60, Maniadaki (2015).

[68] In practice BEREC has an increasingly effective coordinator role for its members, which may be reflected in the final version of the ConnectedContinent Regulation still pending in September 2015. See for example Sorensen (2015) cited in Marsden (2015a).

consultants, civil society actors, academics and law firms that have exported and shared "best" (sic) practice in telecom regulation since the first liberalisations in the 1980s (in Japan, US, Sweden and UK), such networks can be expected to actively engage in spreading such practices internationally.

I now further consider whether zero rating poses a serious challenge to open Internet use and suggest areas for further independent research into the effectiveness of net neutrality regulation. I can be accused of the assumption based on neo-colonial comparison, that zero rating is a short term problem whose significance can be overstated. I would argue that my belief that zero rating is a relatively minor short term problem is based on the technological development of alternative forms of hardware-supported mobile data, which drives consumer adoption of mobile Internet access. This is not technologically but price deterministic as I now explain. Too many analysts of mobile Internet access fail to fully consider the role of free or low-cost hardware and Wifi in its growth. The majority of "mobile" data traffic is actually downloaded to devices via Wifi in home, office or hotspot location. It is not the cost of mobile data plans that is the dominant price driver, but that of hardware and prevalence of Wifi. There can never be as much Wifi in developing countries as developed, but open Wifi can be accessed relatively widely in countries where Internet policy is not dominated by the copyright maximalist lobby and morality (anti-pornography) cybercrime lobby. Hardware for mobile data is much cheaper than at its introduction a decade or more ago in the developed world, whether that be smartphones, laptops or tablets. Whereas the first iPhone was priced at $599 with 8 MB memory in June 2007 (equivalent to $689 in 2015), and an equivalent WiFi-enabled laptop in 2000 cost $1000 or more (equivalent to $1386 in 2015), consumers in developing countries can buy an 8 Gigabyte Android or Linux smartphone or tablet for $50,[69] or a Raspberry Pi mini computer for $30. Each is many times more powerful than those early equivalents. Combining the huge advances in technology pricing/performance with the prevalence of Wifi hotspots in 2015, it is clear that the environment for late adopter nations in mobile Internet access is far better than for developed countries in 2007. This applies despite the extremely high prices for mobile ISP data, which only forms a small part of the adoptive environment required to access the mobile Internet (arguably, no mobile ISP access is required at all given that schools, cafes, universities and other public areas offer free Wifi). Only 57 % of Indian and 43 % of Brazilian smartphone users actually use data plans at all, and the average amongst those Indians who do was 80 MB a month in 2015 (3–5 % of developed nation average usage).[70]

It is perhaps facile to argue that net neutrality regulation may be a somewhat blunt telecom regulatory instrument for a multi-faceted problem such as mobile Internet access, which also includes such policy issues as privacy and free expression as well as universal access and many Millenium Development Goals. The

[69] Freischlad (2015) states "Even in China, which is a more mature market [than Indonesia] by most measures and smartphone penetration is higher, data usage itself remains low. This tells us either Chinese smartphone users are not interested in using their phones on the go, or they are simply being thrifty."

[70] Olsen (2015).

wider issue of how Internet users of 'free' apps such as Facebook and others are being monetized by advertisers is associated with the net neutrality and zero-rated debates, and in particular the correct policy responses. In countries such as Indonesia where monthly Average Revenue Per User (ARPU) is only $2.20 for calls, texts and data, it is unsurprising that advertising is attractive as a further revenue partnership with zero rated apps. Next to such a pervasive Internet policy problem, neutrality in itself may be a sideshow. In most developed countries, neutrality developed from privacy concerns, a dynamic which needs further empirical comparative research in the developing nation context, which should be a subject for future research.

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Chapter 19
Wireless Community Networks: Towards a Public Policy for the Network Commons?

Primavera De Filippi and Félix Tréguer

The history of communication technologies is populated with conflicts between centralization and decentralization. While many of these technologies started or have existed at some point of their development as a decentralized structure, often replacing older technological paradigms, nearly all progressively evolved into concentrated clusters of power as a result of industrialization and of the reaffirmation of state sovereignty, following a Schumpeterian process of "creative-destruction" (Wu 2010). However, when the needs of citizens turn out to be systematically overlooked in existing power dynamics, decentralized initiatives may emerge as an attempt to disrupt the dominant hegemony and allow for the democratic re-appropriation of technology—a process that the philosopher Andrew Feenberg calls "subversive rationalization" (Feenberg 1995).

In this paper, we focus on an ongoing—though too often neglected—phenomenon of decentralization in telecommunications networks. We show that current telecoms regulation significantly overlooks the contribution of community networks in fostering political and socio-economic objectives associated with broadband policy and we propose a number of policy recommendations to overcome this gap.

19.1 A Short History of the Internet Access Market in Europe

Since its early days, the Internet has followed a trend of emancipation. Already throughout the 1970s and 1980s, engineers and early hackers were experimenting with computers and exploring the potential of these new machines as communications

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devices. But it is only in the following years, as personal computing boomed and the computer networks spread, that efforts from civil society to democratize the use of these revolutionary technologies went viral. The creation of the World Wide Web in 1989 finally opened the door to widespread Internet use.

In the mid-1990s, the Internet access market boomed in Europe, partly because incumbent network operators had to open up the infrastructure rolled-out by state monopolies to small and innovative ISPs. In a context of rapid privatization, regulation promoted facility-based competition[1] and new companies began laying down their own network infrastructure. This, along with the explosion of mobile telephony and the democratization of Internet access, made liberalization look like a success story: innovation in telecom services was dynamic and fast-paced, prices were low, and the number of subscribers surged.

Today, the EU regulatory framework is still often praised when compared to the situation in the US, where local Internet access markets are generally under a duopoly. Regulatory policies have indeed ensured some level of competition in European markets. But more in more, the two markets have a similar outlook: EU telecom policy has been unable to prevent the growing concentration of power in the telecommunications sector. Ex ante merger control by the EU Commission has typically been loose (Thatcher 2014; Stoyanova 2008), leading to de facto oligopolies in national or regional markets. Meanwhile, abuses of dominant positions by incumbent network operators are fairly common.

Overall, in the EU, policy targets in terms of broadband penetration and quality of service remain a distant reality: more than a third of European households still have no broadband access (39 %) and, in a country such as Greece, broadband penetration is as low a 56 % (EU Commission 2013). A fifth of EU citizens with no Internet access say they are deterred by the sheer cost of it (EU Commission 2013): the cheapest available broadband offer can be as high as €46.20 in Cyprus, €38.70 in Spain or €31.40 in Ireland (EU Commission 2014a). Meanwhile, users are not provided with the service they paid for: on average, they only get 75 % of the broadband speed they signed up for; 63 % when they get it through ADSL rather than cable or fiber lines (SamKnows 2013). The situation is usually much worse in rural areas. Meanwhile, telecom operators also have the technical ability and economic or regulatory incentives to hinder the autonomy of Internet users, for instance by violating the principle of Net neutrality.

The trend towards centralization, combined with economic incentives and regulations encouraging surveillance and control has led to the revival of more decentralized, citizen-centric network architectures. This is illustrated, in recent years, by the deployment of Wireless Community Networks (WCN)—grassroots community networks, deployed at the local or regional level, managed *by* the community and *for* the community.

[1] Facility-based competition, or infrastructure-based competition, refers to the regulatory focus on creating competition between telecom firms that each have their own distinct network infrastructure for delivering end-user services, such as Internet access provision.

All across Europe, and beyond, there are currently a large number of grassroots community networks seeking to provide a decentralized alternative and more commons-based approach to the current Internet infrastructure. Rather than being driven by profits like most of the large, highly capitalized Internet Service Providers (ISPs), WCN focus on the actual needs of its participants. While most of them are very limited in scope—and are therefore not widely heard of—, the most popular ones enjoy more than dozens of thousands of users.[2]

19.2 Community Networks and New Power Dynamics in Telecom Infrastructures

Given the considerable investments required to set up an independent network infrastructure, and given the costs of purchasing wholesale access to last-mile landline networks from commercial operators, many grassroots community networks have decided to operate via wireless technologies, setting up network of peers sharing radio signals. Most of their network infrastructure consists of wireless radio equipment: Wi-Fi routers and antennas strategically distributed at different locations so as to maximize coverage. As a result, they can often provide a service of better quality than that which is generally available from commercial alternatives.

At the operational level, almost every grassroots community network tries to promote users' autonomy and fundamental rights to communication and privacy. As opposed to commercial ISPs blocking certain ports and censoring websites or content, community networks ardently protects Net neutrality. In several countries, small community networks are usually not bound by censorship orders issued by courts against illegal online content. In this regard, user autonomy and self-reliance is maximal when WCN are apprehended not just as part of the wider Internet but as autonomous local networks (or Intranets), allowing users to share information with other users connected to the same community network. Local networks also enable users to escape from the ubiquitous and pervasive surveillance that is occurring on the global Internet, as a result of privacy-intrusive practices undertaken by traditional online operators. In particular, given the lack of a central authority regulating access to the network, it is in theory more difficult for anyone to assess the real identity of users connected to these networks.

Accordingly, WCN constitute, essentially, a political choice: by establishing a mix of social and relational ties between participants involved in the provision of the network infrastructure, they promote a more democratic and cooperative political system, with a more symmetrical and participatory governance structure

[2] For the purpose of this paper, we focused on a handful of groups, and in particular FreiFunk (Germany), Wlan Slovenija (Slovenia), Guifi.net (Spain) and Tetaneutral.net in Toulouse (France)—the latter is also a member of the FFDN, a federation of French grassroots networks initially spearheaded by the landline community network FDN. Other European WCN include Ninux (Italy), Funfeuer (Austria), the Athens Wireless Metropolitan Network (Greece), Djurslands.net (Denmark) and Czfree.net (Czech Republic).

(Bauwens 2005). Besides, most of these grassroots community networks experiment with novel models of distributed governance relying on cooperation and sharing among a community of peers (from a dozen to tens of thousands participants), and that are reminiscent of commons-based peer production schemes (Benkler 2006).

From a political standpoint, WCN can be regarded as a counter-power to currently established power structures or incumbents. Following the typology of social movements drawn by Stefania Milan in her analysis of "emancipatory communication practices", we can infer three ways by which community networks could counteract existing power dynamics in the telecom sector.

One way is to address the issue from within the political system, as *insiders*, formally interacting with the power holders in order to make them support the deployment of community networks. Another solution is to fight the problem as *outsiders*, pressuring both regulators and incumbents from outside the political system, by means of protests, demonstrations and other campaigning tactics aimed at voicing dissent against the practices of commercial ISPs and against the lack of appropriate regulation for community networks.

Yet, most community networks do not properly qualify as what social movement scholars define as "insiders" (although they sometimes do interact with policy-makers), and much less as outsiders. Mostly, they fall within the third category—what Milan identifies as "*beyonders*". They acknowledge that law and regulation will always be late compared to practice and private ordering, and purport to influence the networked ecosystem by remaining beyond the political system. This objective is achieved by building self-organized, decentralized and citizen-owned communications networks and setting up alternative socio-political and technical arrangements as a substitute for the traditional top-down power dynamics typical of traditional institutions.

WCN can also be regarded as a potential source of competition to mainstream commercial ISPs. As we have seen, not only can WCN provide better services than commercial alternatives, they also adhere to specific ethical commitments and governance structures. As opposed to commercial providers, which often go counter to the interests of consumers by engaging in anti-competitive behaviors, WCN promote open and democratic values, such as Net neutrality and consumer protection. While they do not directly wage competition against traditional ISP, these nonprofit, community networks serve to increase diversity in the market for Internet access—thereby opening up the range of options available to citizens. In this sense, WCN constitute a form of grassroots, bottom-up regulation of established players that simply emerges from there being a viable (and more attractive) alternative to the dominant, commercial system.[3]

At this point in time, however, WCN cannot totally emancipate from traditional incumbents. Although they can be completely autonomous when they operate as closed local networks, most community networks eventually need to connect with

[3] In Berlin, for instance, Freifunk's popularity actually brought incumbent telecom operators to update their service agreements enabling subscribers to share their DSL connection to contribute bandwidth to the network.

the global Internet network. Uplink Internet access is achieved by linking the local network to one or several "Internet gateways" in charge of routing the traffic from and to global backbones.[4] Here, potential bottlenecks resurface.

To obtain such an uplink to the Internet, community networks currently choose from a number of strategies. The first is to use upstream through traditional mainstream last-mile ISPs. Some WCN, like Freifunk in Berlin, prefers not to build any formal relationship with third party ISPs, and simply rely on the goodwill of community members (who are also subscribers of commercial ISPs) to share their commercial Internet connection so as to provide bandwidth and connectivity to the rest of the network.

When relying exclusively on the uplink connections of mainstream ISPs to provide a gateway to the Internet is not possible, or perhaps simply not reliable enough, WCN must establish a commercial relationship with transit ISPs. The transit market is generally much more competitive than the mainstream last-mile Internet access markets. Lesser concentration creates a more diverse ecosystem where multinational firms, such as Cogent or Level 3, compete with smaller, local companies. Diversity drives both competition and cooperation, and allows grassroots community networks to escape the risk of abusive behaviors on the part of incumbent operators. For instance, in New York, the RedHook initiative is getting support from both medium-sized ISPs (such as Brooklyn Fiber) and a number of even smaller ones established in the area.

That being said, one cannot rule out the possibility of a transit operator exerting control over, and even disconnecting, a community network. To the extent that in some markets (in both urban and rural areas) a few large telecom operators retain the ability to filter, censor, monitor, discriminate online communications, or simply refuse to interconnect, the need for uplink leads to the emergence of new bottlenecks that replicate the problems that community networks aimed to address in the first place.

To meet that challenge, some activists have begun to organize: the goal is for community networks to collectively acquire more independence and more bargaining power in the various markets in which they operate, and promote their philosophy in the face of the conflicting value systems of commercial telecom operators who might engage in predatory practices. A first experiment of this kind was carried on in 2012, when community networks FunkFeuer from Austria, NEDWireless from Croatia, and Wlan Slovenija established a wireless backbone spanning across geographical borders to create a direct link between them. As the number of mesh networks deployed over the world grow, the potential for establishing a global and independent network infrastructure that abides to the founding principles of the Internet network will also increase.

[4] An Internet gateway is all that is required to connect a particular network to an existing Internet connection. The gateway router will share bandwidth with other devices on the network from that connection. Multiple gateways can be deployed on the same network to provide additional bandwidth, as does for instance Tetaneutral.net.

19.3 Regulatory Framework Favoring Commercial Players at the Expense of WCN

Despite their potential in fostering public interest goals in telecom policy, regulators have so far failed to support the efforts of community networks. More often than not, public policy actually puts important hurdles on their way.

The most striking example of such hurdles relates is that several community networks have been precluded from using public broadband networks funded with taxpayers' money. In France for instance, many local governments invested in rolling-out fiber networks in both urban and rural areas. These networks are built and managed by a private company contracted by the public authority, which leases access to traditional access providers that sell Internet access offers to subscribers. Yet, the fee charged to access the network is designed for big commercial ISPs, and is often prohibitive for nonprofit grassroots community networks.

Another other major problem of current telecom policies for WCN is the issue of spectrum management. Again, regulatory capture by commercial interests leads to regulatory choices that systematically overlook the potential of more flexible and citizen-centric policies. The recent allocations so-called "digital dividend" (i.e. the frequencies left vacant by the switch from analog to digital television) is a textbook case. In France, for instance, it was proposed to use part of the spectrum dividend to create new digital TV channels and develop mobile television as well as digital radio (neither of these two technologies has taken off thus far). The remaining half of these frequencies for the lower UHF bands (sought-after because of their long-range propagation) was then auctioned off to telecom operators for their 4G mobile Internet access.

In the process, one option has, however, never been considered: extending "unlicensed" access to some of these frequencies, effectively turning them into a commons open for all to use. Long thought to be unreasonable because of the risk of radio interferences, opening up the spectrum to multiple, non-coordinated radio users has actually been experimented on a worldwide basis more than a decade ago for the Wi-Fi frequencies. Needless to say, it has proved to be a very wise policy choice.

Against the backdrop of traditional economic theory, open spectrum policies suggest that commons-based approach to many-to-many communication infrastructure can actually work in practice. Through packet switching, best-effort delivery, as well as innovative radio transmission and bandwidth management's techniques, Wi-Fi has successfully verified Ostrom's claim that users themselves and ad hoc technical standards can create and enforce rules that mitigate the over-exploitation of the commons (Ostrom 1990). In many regards, though property-based allocations of spectrum and exclusive licensing still have the upper hand, they have often come short of fostering public interest goals, for instance by causing a

very significant underutilization of this public resource.[5] Moreover, not only does the regulatory focus on exclusive licensing create an enormous opportunity cost by favoring established players over innovative new-entrants (such as community networks), it has even been argued by human rights NGOs that it may actually breach the international law on freedom of expression (Article 19 2005).

Meanwhile, despite the successes of Wi-Fi, unlicensed access to spectrum remains marginal and regulators have a tendency to ignore WCN's spectrum needs. Guifi.net and Freifunk, for instance, report having a hard time maintaining the quality of their network because of the saturation of the 5 GHz frequency bands.[6] Another issue for WCN is linked to the topography of their environment: Wi-Fi bands have some important technical limitations, in particular in terms of propagation, and signals are easily blocked by buildings or trees. WCN are thus faced with the choice of either renouncing to create a new radio link in a given location, or push the emission power levels beyond the legal limits to overcome these obstacles.

19.4 Towards a New Public Policy for the Network Commons

Much can be done at the regulatory level not only to lift the technical, legal and policy hurdles that community networks run into, but also to actively support them. Several elements presented in the course of this paper—from regulatory capture to the impressive results achieved by these small nonprofit citizen groups—show that this is both an urgent and sound policy move.

First, there is a range of regulations that make WCN's very existence significantly and often unnecessarily difficult. In a country such as Belgium for instance, the registration fee that telecom operators must pay to the NRA is relatively high,

[5] First, exclusive licensing have led to anti-competitive behaviors by spectrum owners, or favored certain technologies over potentially more promising ones. For example, several countries grant exclusive licenses to established commercial players providing Internet access through WiMAX or satellite, and even subsidize them. Second, such schemes have proved to encourage underutilization of the resource in the name of avoiding congestion, thus creating artificial scarcity of frequency bands. Many spectrum owners, be they the military or commercial operators (again, satellite or WiMAX come to mind) own important portions of spectrum but do not actually make full use of it, thus crowding out other technologies and potential uses of social value. TV and radio broadcasters also leave significant gaps between their respective channels (these so-called "white spaces") acting as buffers to avoid interference—thereby leaving many frequencies unused in the valuable UHF bands. Combined together, these phenomena bring underutilization to stunning levels: a recent study conducted for the EU Commission finds that, in Paris, the average spectrum use is as low as 7.7 % of the 400 MHz–3 GHz bands, while the average spectrum utilization rate in Europe is under 10 %.

[6] WCN theoretically could be allowed to use the other portion of spectrum by NRAs. Yet, they also refrain from doing so. Except for the 2.4 and 5 GHz license-exempt bands were high demand has driven prices down, radio networking remains a niche market for manufacturers of radio transmitters, and the gear necessary to deploy wireless networks in other bands is costly. Community networks generally cannot afford the price.

whereas in France, Spain or Germany, it is free—which may explain why the movement is much more dynamic in these countries. It is, therefore, all the more important that registration processes be harmonized at the EU level, and, in particular, that they remain free for nonprofit networks.

Second, several laws seek to prevent the sharing of Internet connections amongst several users by making people responsible (and potentially liable) for all communications made through their Wi-Fi connection. This is the case in France, for instance, where the 2009 three-strikes copyright law against peer-to-peer file-sharing also introduced a tort for improperly securing one's Internet connection against unlawful activity on the part of a third party. As a result, many community networks willing to establish open Wi-Fi networks in public spaces, such as parks and streets, refrain from doing so out of legal insecurity. It is our view that, even though connection sharing might sometimes make law enforcement more difficult by allowing many unrelated users to share the same IP address, this drawback is more than compensated by the benefits brought about by the deployment of open wireless networks.

Third, it is not just Internet wireless access points that can be shared, but also the intangible infrastructure on which radio signals travel. As we have seen, unlicensed spectrum is a key asset for community networks to set up affordable and flexible last-mile infrastructure, but it is currently very limited. In the US, the FCC has initiated promising policies in that field.[7] But for the moment, the EU has shied away from similar moves. In 2012, the EU adopted its first Radio Spectrum Policy Programme (RSPP). During the legislative process, the EU Parliament voted in favor of ambitious amendments aimed at opening more spectrum to unlicensed uses.[8] Even if some of these amendments were later scrapped by national governments, the final text still calls for member states and the European Commission to "assess" the "need for and feasibility of extending the allocations of unlicensed spectrum" in the Wi-Fi bands, while also voicing tepid support for mesh networks by stressing their potential to foster access to the global Internet. As EU lawmakers were working on the RSPP, a study commissioned by the EU Commission also called for a new 100 MHz of license-exempt bands as well as for higher power output limits in rural areas to reduce the cost of broadband Internet access deployment.[9]

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[7] For the past years, through several regulatory moves, the FCC has been opening UHF "white spaces" to unlicensed uses. It has also started expanding the so-called "Unlicensed National Information Infrastructure" by adding 195 MHz of spectrum in the 5 GHz band and increase the permissible power for radio transmitters in these bands. See Farivar (2014).

[8] La Quadrature du Net (2011).

[9] For giving unlicensed access to another 100 MHz of spectrum bands, the report suggested that half of these should be in the 1 GHz bands and the other one at 1.4 GHz. To avoid underutilization, the report also calls on policy-makers to suspend exclusive use of specific channels whenever the use of that spectrum is consistently below a level justifying any form of exclusivity. In France, where WiMAX roll-out has been so slow that the NRA eventually notified the corresponding licensees that they were in breach of their obligations, such a measure could lead to many more channels being opened up for shared or even unlicensed use, for instance to community networks.

Since then, however, EU work on unlicensed spectrum and on flexible authorization schemes that would be more accessible to community networks has stalled. In a communication released in September 2012, the EU Commission failed to announce any concrete action to expand unlicensed use of the spectrum (European Commission 2012). At the national level too, there is unfortunately no policy change in sight.

Fourth, networks built with taxpayers' money could also be treated as a commons, and as such should remain free from corporate capture. Regulators should ensure that nonprofit community networks can access publicly-funded and subsidized physical infrastructures without unnecessary financial or administrative hurdles. Accordingly, they should review existing policies and current practices in this field, providing transparent information to map publicly funded networks, and mandate rules to allow community networks to use these on a preferential basis.[10]

Of course, countless other policy initiatives can help support grassroots networks, such as small grants and subsidies to help these groups buy servers and radio equipment, communicate around their initiative, but also support their research on radio transmission, routing methods, software or encryption (Shaffer 2013).

Yet, all these proposed policies point to an overarching issue, namely the need to democratize telecom policy and establish procedures that can institutionalize existing and potential grassroots community networks. In many countries, such as Spain or Italy, even though city councils may occasionally actively support these organizations to the extent that they provide better Internet access to their citizens, regional governments and national regulators have so far largely neglected them.

Given the revival of community networks in the past years, it is not enough for regulatory authorities to treat citizens as mere consumers by occasionally inviting consumer organizations at the table. Regulators and policy-makers need to recognize that the Internet architecture is a contested site, and that citizen groups across Europe and beyond are showing that for the provision of Internet access, commons-based forms of governance are not only possible but that they also represent effective and viable alternatives to the most powerful telecom operators. Their participants have both the expertise and legitimacy to take an integral part in technical and legal debates over broadband policy in which traditional, commercial ISPs are overrepresented. They can bring informed and dissenting views to these debates, and eventually help alleviate regulatory capture.

But democratizing telecom policy is not the sole responsibility of institutional actors. If regulators are not ready to listen, community networks must organize politically and pressure them to do so. Indeed, many community networks are working to form a more cohesive and powerful group to discuss legislative issues and advocate regulatory reforms. Of course, a potential problem for sustaining political engagement is the fact that community networks are often run by volunteers whose

[10] On very-fast broadband roll-out, our interviewees also pointed to the need to reorient both public and private investments in fiber-optic last-mile networks where they are most needed, that is in rural communities where decent broadband is crucially lacking, rather than in already well-connected urban areas where there is usually less demand for higher speeds. They also called on regulators to better coordinate so that any public work being carried to roll-out fiber-optic cables that can then be used to expand and improve Internet access.

lack of time and resources may sometimes make it difficult form them to participate as actively as the full-time and well-resourced lobbyists of incumbent actors. But overtime, as the movement grows, it may be able sustain its engagement with public authorities, especially if the latter adapts and establish ad hoc contact channels and remote participation mechanisms. Going back to the typology of political action, direct engagement with policy-makers constitutes a more "insider" strategy that might well be worth pursuing.

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Chapter 20
Safety, Privacy and Net Neutrality Aspects of Civilian Drones

Leonidas Kanellos

Unmanned aircraft systems (UAS) have a tremendous number of potential applications, particularly for industry and enterprises, such as delivery of broadband connectivity, speedy delivery of goods, parcels, geo-mapping, filming, as well as for government operations including surveillance, public safety, coastal security and disaster recovery.

Today drones monitor illegal fishing off Libya, Japan and the Galapagos Islands, count sea lions in Alaska and patrol oil and gas pipelines in Angola, Nigeria, Kuwait and Saudi Arabia. Archeologists in Russia are using small unmanned systems with infrared cameras to construct a 3-D model of ancient burial mounds. Researchers in Costa Rica fly small aircrafts through volcanic clouds to try to predict major eruptions. In Brazil, drones are being used by farmers to spot crop blights and apply pesticides with more accuracy. Conservationists in Nepal plan to use UAVs to help save endangered tigers and rhinos from poachers.

Civilian drones shall also be used by companies such as Google or Facebook)[1] to provide drone-enabled Internet access to remote areas that need capacity. On this purpose, Google aims at using solar-powered drones (Project Titan) combined with high-altitude balloons (Project Loon).[2] Said company is reported to have already obtained relevant testing licenses from the FCC.[3] Facebook plans to launch a lightweight drone with a wingspan similar to a Boeing 767 using solar power to deliver internet access via laser to people 60,000–90,000 feet below (Project

[1] http://www.techtimes.com/articles/36674/20150302/publish-mwc2015-google-titan-drones-loon-balloons-bringing-wireless-everywhere.htm.

[2] Google announce at the Mobile World Congress 2015 in Barcelona is available at https://www.youtube.com/watch?v=lKHDJs-zc1g.

[3] http://www.computerworld.com/article/2896581/googles-solar-drone-internet-tests-about-to-go-airborne.html.

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Aquila).[4] To ensure coverage across wider areas communications between drones need to be established and maintained.

The benefits of a supportive regulatory framework for the creation of an all-wireless network in the sky are clear. Such networks would be far less expensive, far less disruptive and take far less time to build than implementing a wired land-based infrastructure over very large swaths of the earth where no communications infrastructure currently exists. However, the commercial operation of such airborne networks worldwide still faces important technical constraints (reliability of the connection, weather conditions, capacity, etc.)[5] and legal uncertainties.[6]

20.1 The International Drones' Industry

From an industry perspective, a recent report,[7] submitted or vote to the European Parliament in July 2015, notes that the US is considered as the leading market for the use of RPAS, albeit for military operations while Europe is the leader in the civilian sector with 2500 operators compared to 2342 operators in the rest of the world (with 50 countries including Japan Australia, Brazil, China, Japan and South Africa currently developing RPAS).

The drone industry is estimated by ABI research[8] to climb to $8.4 billion by 2019. An IDATE industry forecast[9] covering 2014–2020 for commercial and consumer drones predicts that once a suitable regulatory framework is introduced and no significant disruption takes place, nearly 170,000 commercial drones will be operating across the globe by the end of 2020, alongside about 12 million hobby drones.

According to US industry analysts,[10] the economic impact of the integration of UAS into the US National Aviation System will total more than $13.6 billion in the

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[4] A description of the Facebook Project Aquila is available at https://www.youtube.com/watch?v=PdxRa-nBtV4.

[5] Will internet access via drones ever fly? article published at http://www.wired.com/insights/2014/11/internet-access-drones/

[6] Kanellos (2015).

[7] The Draft Report (Rapporteur: Jacqueline Foster) on the safe use of remotely piloted aircraft systems (RPAS), commonly known as unmanned aerial vehicles (UAVs), in the field of civil aviation (2014/2243(INI)) Committee on Transport and Tourism can be accessed at http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE-554.997+01+DOC+PDF+V0//EN.

[8] See Cadie Thomson's article entitled " Here is where the real money is in drones" at http://www.cnbc.com/2015/05/13/heres-where-the-real-money-is-in-drones.html.

[9] This report is on sale at http://www.idate.org/en/Research-store/Collection/Market-report_23/Commercial-and-consumer-drones_1005.html.

[10] The AUVSI Report on "The economic impact of unmanned aircraft systems integration in the United States" can be downloaded at https://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New_Economic%20Report%202013%20Full.pdf.

first 3 years of integration and will grow sustainably for the foreseeable future, cumulating to more than $82.1 billion between 2015 and 2025. Moreover, the Integration into the NAS will create more than 34,000 manufacturing jobs and more than 70,000 new jobs in the first 3 years.

20.2 The Applicable Rules in Europe and the US

Despite notable divergences among various industry forecasts, they all agree that a suitable regulatory framework is critical for the take off of the drone industry worldwide.

In Europe, so far there is no legislation on civil drone use. In 2014, the European Commission requested a draft regulation from the European Aviation Safety Agency (EASA). EC Regulation No 216/2008[11] mandates the Agency to regulate Unmanned Aircraft Systems (UAS) and in particular Remotely Piloted Aircraft Systems (RPAS), when used for civil applications and with an operating mass of 150 kg or more. Experimental or amateur build RPAS, military and non-military governmental RPAS flights, civil RPAS below 150 kg as well as model aircraft are regulated by individual Member States of the European Union.[12] EASA is supported by two other agencies, EUROCONTROL, which coordinates the air traffic management services across Europe and the European Organisation for Civil Aviation Equipment (EUROCAE) which drafts the airworthiness and operational standards for aircraft.

In this direction, on 31 July 2015, the EASA launched a consultation process on a new regulatory framework for drones.[13] According to this approach, flight safety requirements are in relation to the risk an activity poses to the operator and to third parties such as the general public. On 24 August 2015, EASA made available a summary of its Proposals a for the Introduction of a Regulatory Framework for the Operation of Drones.[14]

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[11] Regulation (EC) No 216/2008 of the European Parliament and the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC was published at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:079:0001:0049:EN:PDF.

[12] A summary of national laws on drones in Europe can be found at http://epthinktank.eu/2015/03/12/civil-drones-in-the-eu/.

[13] The EASA Concept of Operations for Drones A risk based approach to regulation of unmanned aircraft can be accessed at http://www.easa.europa.eu/system/files/dfu/204696_EASA_concept_drone_brochure_web.pdf.

[14] Press release on the EASA proposals can be accessed at http://www.easa.europa.eu/newsroom-and-events/news/short-summary-easa%E2%80%99s-proposals-new-rules-drones.

Following the Riga Conference (March 2015) on remotely piloted aircraft systems entitled "the future of flying" a Declaration was issued on remotely piloted aircrafts.[15]

This policy document sets out five essential principles for future EU focus: (a) RPAS need to be treated as new types of aircraft with proportionate rules based on the risk of each operation; (b) EU rules for the safe provision of RPAS services need to be developed to enable the industry to invest; (c) technology and standards need to be developed to enable full integration of RPAS into the European airspace; (d) public acceptance is key to the growth of RPAS services; (e) the operator of an RPAS shall be responsible for its use. In July 2015, a Report outlining legislation plans on AUS was introduced in Parliament's Transport and Tourism Committee.[16] Such legislation is expected to be voted by the end of December 2015.

In the US, the 2012 US Drone Act (FAA Modernization and Reform Act) [17] contains provisions requiring the Federal Aviation Administration (FAA) to integrate fully unmanned aircraft into the National Airspace System by September 2015. Additionally, the Drone Act allows law enforcement agencies, including local police forces, to buy and use unmanned aircraft for evidence gathering and surveillance.

Recently, the FAA has released a Notice of proposed Rulemaking (NPRM) for small, unmanned aircraft,[18] which opened the door for public comments and the beginning of the rulemaking process. The main goal of this process is to allow routine use of certain small unmanned aircraft systems (UAS) in today's aviation system while maintaining flexibility to accommodate future technological innovations.

The FAA proposal offers safety rules for small UAS (under 55 lb) conducting non-recreational operations. The rule would limit flights to daylight and visual-line-of-sight operations. It also addresses height restrictions, operator certification, optional use of a visual observer, aircraft registration and marking, as well as and operational limits. Such rulemaking initiative is supported by an industry-led educational ("know before you fly") campaign.

Moreover, the public dialogue in the US focuses on matter such as regarding privacy, data protection, law enforcement and access to sensitive information collected by commercial drones, such as location data, safety regulations, licensing, airworthiness process and technical standardization. A Presidential Memorandum was issued on 15 February 2015 with the title "Promoting Economic Competitiveness

[15] The Riga Declaration on remotely piloted aircraft (drones) "Framing the future of aviation", of 6 March 2015 is available at http://ec.europa.eu/transport/modes/air/news/doc/2015-03-06-drones/2015-03-06-riga-declaration-drones.pdf.

[16] The Draft Report (Rapporteur: Jacqueline Foster) on safe use of remotely piloted aircraft systems (RPAS), commonly known as unmanned aerial vehicles (UAVs), in the field of civil aviation (2014/2243(INI)) Committee on Transport and Tourism can be accessed at http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE-554.997+01+DOC+PDF+V0//EN.

[17] The Drone Act is accessible at https://www.congress.gov/bill/112th-congress/house-bill/658.

[18] The FAA Notice can be retrieved at http://www.gpo.gov/fdsys/pkg/FR-2015-02-23/pdf/2015-03544.pdf.

While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems".[19]

20.3 Towards a Comprehensive Legal Framework for UAS

Except for flight safety rules, the commercial and private use of UAS also raises concerns over privacy, transparency, insurance for third party liability and accountability. Following many years of public consultation,[20] the European Commission has developed a strategy to support the progressive development of the RPAS market in Europe, while also addressing concerns about safety, security, privacy, liability and public acceptance.

The European Commission strategy was presented in a Communication, adopted in April 2014 and entitled "**A new era for aviation:** Opening the aviation market to the civil use of RPAS in a safe and sustainable manner".[21]

The European strategy focuses on Remotely Piloted Aircraft Systems (RPAS), a sub-set of Unmanned Aircraft Systems (UAS), which excludes fully autonomous systems. It aims to ensure the **safe and secure integration of RPAS into the European aviation system**, from 2016 onwards, through the development of: (a) A **common safety regulatory framework**, proportionate to risks for drones of all classes in order to promote the creation of a single European market for civil drones applications; (b) the **necessary enabling technologies** ('sense and avoid', 'comment and control communication link' etc.); (c) measures to ensure the protection of citizens (privacy, insurance, etc.); (d) measures to support market development and European industries.

20.4 Privacy Aspects of Drones

The progressive integration of drones into the European civil airspace combined with a large-scale deployment of drone and sensor technology creates privacy risks arise for the individuals' privacy and civil and political liberties. Drones process personal data such as images, sound and geolocation relating to an identified or identifiable natural person under non-transparent conditions as to for what purposes

[19] The Presidential Memorandum is published on the White House website https://www.whitehouse.gov/the-press-office/2015/02/15/presidential-memorandum-promoting-economic-competitiveness-while-safegua.

[20] See the UK Government's Response to the House of Lords European Union Committee's Seventh Report of Session 2014/15: Civilian Use of Drones in the EU http://www.publications.parliament.uk/pa/ld201415/ldselect/ldeucom/122/122.pdf.

[21] COM/2014/027 **"A new era for aviation Opening the aviation market to the civil use of remotely piloted aircraft systems in a safe and sustainable manner"** http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52014DC0207.

personal data are being collected (bulk data collection) and by whom (law enforcement, private data collectors for possible unlawful multipurpose uses). Furthermore, the dexterity of drones and the possibility to interconnect multiple drones further facilitates their ability to avoid obstacles or not to be constrained by barriers, walls or fences, so to easily enable the collection of a wide variety of information even without the need for a direct line of sight, for long periods of time and across large area without intermission.

To tackle privacy concerns under the European data protection principles (transparency, proportionality, anonymisation etc. under Directive 95/46/EC and the forthcoming data Protection Regulation the European Data Protection supervisor published), on 26 November 2014 his opinion on the above RPAS communication.[22] On 16 June 2015, the Article 29 Data Protection Working Party adopted an opinion[23] on privacy and data protection issues relating to the utilisation of drones. On 20 May 2014, the European Group of Ethics in Science and New Technologies issued an opinion[24] which addresses the use of drones for surveillance missions.

20.5 Net Neutrality Aspects of Drones

One other important aspect of a coherent regulatory framework is the relation between the provision of Internet access via drones and net neutrality. In 2013, Facebook founded Internet.org, a partnership between the company and seven mobile companies[25] to bring Internet access to users in developing countries by subsidizing their data plans. Such initiative appears like a win-win situation for both Internet.org partners and mobile users in developing nations. As pointed out in a white paper for Internet.org[26] approximately 80–90 % of the world's population lives today in areas already covered by 2G or 3G networks. In the remaining non-connected areas, connectivity may be reached by combining all available technologies such as drones, satellites, mesh networks, radios and free space optics.

However, this initiative has been strongly criticized to constitute a violation of net neutrality rules. In India, telecom companies fought against Internet.org, claiming the service gave web-based apps like Facebook's WhatsApp and Microsoft's Skype an unfair edge over their own phone-based apps, which consume paid data.

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[22] The European Data Protection supervisor's opinion is published at https://secure.edps.europa.eu/EDPSWEB/webdav/site/mySite/shared/Documents/Consultation/Opinions/2014/14-11-26_Opinion_RPAS_EN.pdf.

[23] The Article 29 Data Protection Working Party opinion is available at http://ec.europa.eu/DocsRoom/documents/11481.

[24] The European Group of Ethics in Science and New Technologies opinion is published at http://ec.europa.eu/DocsRoom/documents/11493.

[25] Samsung, Ericsson, MediaTek, Opera Software and Qualcomm.

[26] The White paper "Connecting the World form the Sky" can be retrieved at https://fbcdn-dragon-a.akamaihd.net/hphotos-ak-ash3/t39.2365-6/851574_611544752265540_1262758947_n.pdf.

That pressure led travel site Cleartrip, one of Internet.org partners in India to withdraw from the alliance. In response to those net neutrality concerns Facebook opened the Internet.org platform to all developers meeting its criteria.[27]

It remains to be seen how attractive this offer will be compared to alternative platforms. In this respect, it has to be noted that the Internet.org technical guidelines exclude the use of various protocols such as HTTP. In order for a website to display properly within the Internet.org platform and be accessible to people on all types of phones and data plans, the mobile websites must meet certain technical conditions created by the Internet.org proxy.[28] If websites are found to contain any of the above post-implementation, they are blocked until the content has been removed.

20.6 Minimizing the Risk of New Gatekeepers

From an infrastructure viewpoint, it is true that using drones as an internet platform in remote areas, without network competition, could incentivize access providers to prioritize their own services to the detriment of others. Access providers might also allow access to selected services and not all internet content by violating the principle of net neutrality. Such trend could progressively lead to an increasing data monopoly through the commercial presence of certain companies in the unconnected regions of the planet.

For instance, in some parts of the world covered by the Internet.org initiative Facebook users and specific applications promoted by the access provider are reported to be a significant part of the open internet users. For instance, Facebook hit 100 million active users in Africa last September, and it had registered 112 million active users in India at the end of 2014. Those figures represent nearly half of all Internet users in both regions. A recent Geopoll survey revealed that 11 % of Indonesians and 9 % of Nigerians used Facebook, but yet had no idea they were connected to the Internet.[29] Those findings support the argument that Facebook's Internet.org is an attempt to establish a solid commercial presence by redefining the Internet under its own banner in emerging markets.

In the same vein, Google's Project Loon using high-altitude balloons placed in the stratosphere to create an aerial wireless network with up to 3G-like speeds could also raise similar net neutrality concerns. This is obvious to the extent infrastructure cost recovery for Google as an access provider will rely on profit maximization for the company as a service provider through the granting of higher speed access to its associated sites like youtube compared to other sites.

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[27] "Facebook Opens Internet.Org To All Developers In Response To Net Neutrality Concerns". *TechCrunch*. May 4, 2015. Retrieved on 10 September 2015.

[28] Specifically, mobile websites should work in the absence of, JavaScript, SVG images and WOFF font types, HTTPS support, iframes, video and large images, flash and Java applets.

[29] Mirani. "Millions of facebook users have no idea they are using the Internet". Retrieved on 10 September 2015 at http://qz.com/333313/milliions-of-facebook-users-have-no-idea-theyre-using-the-internet/.

20.7 Open Questions

In this context, two sets of questions arise: on the one hand, are those allegations founded or do they neglect the positive effect of a big, innovative and costly effort to connect more users to the internet? Do those critics constitute an overreaction to the extent internet.org (and potentially similar activities by other manufacturers) neither blocks or throttles any other services nor creates fast lanes by remaining open to all developers and web publishers?

On the other hand, can Internet.org or in the near future Google Loon be considered as a "gatekeeper" for delivering select apps to poorer users? Can such drone-enabled access providers progressively turn into significant technical and content—monitoring bottlenecks for the unconnected?

It is obvious that companies powering such initiatives gain commercial advantages from tethering and locking users in developing markets to their ecosystems. The user lock-in effect emerges in terms of guaranteed user growth and more eyeballs for their display ads together with more search—and browsing activities by their subsidized clients. Under those conditions, can the subsidization of the user data plans be considered as a purely charitable act or as a smooth new market entry strategy?

20.8 How Drone-Enabled Data Traffic Be Regulated?

Furthermore, from a regulatory perspective, should drone-enabled data traffic be regulated differently from regular Internet access? For instance, in the U.S., should it be regulated under the common carriage rules of Title II of the Communications Act? How can European net neutrality rules[30] which, upon their adoption, will guarantee that "users will be free to access the content of their choice, they will not be unfairly blocked or slowed down any more, and paid prioritisation will not be allowed" be compatible with drone-enabled connectivity?

On which grounds and for how long could sponsored data activities and paid prioritization through drone-enabled internet access be treated differently in comparison to other communications platforms? More generally, should quality of service and equal access obligations be extended to cover "subsidized access" to basic services via UAS?

In conclusion, policy makers and regulators around the world considering how best to incorporate drones into existing airspace also including their role as internet access infrastructures will need to balance the many positive contributions they can make, as well as the obvious negative externalities they can inflict. Drones should be integrated into the existing aviation system and the communications infrastructures across the globe in a safe, proportionate and non-discriminatory manner. This integration should foster an innovative and competitive drone industry, creating jobs

[30] Commission welcomes agreement to end roaming charges and to guarantee an open Internet, Brussels 30 June 2015, Press release http://europa.eu/rapid/press-release_IP-15-5265_en.htm.

and growth but without compromising user privacy, data protection and secrecy of communications. From a policy viewpoint, it is also important to avoid over-regulation that could kill the global drones industry. Parliaments should recognize the significant financial, technical, legal and other constraints of infrastructure deployment in remote areas. Political support for the industry is a key factor to fulfill the vision of making available RPAS networks for underserved segments of the earth's population.

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Chapter 21
Network Neutrality: An Empirical Approach to Legal Interoperability

Luca Belli and Nathalia Foditsch

21.1 Introduction

The Internet is grounded in an open and interoperable architecture, giving rise to a quintessentially transnational environment. This global network of networks is, however, in natural tension with an international legal system based on mutually excluding legal frameworks. Differently from electronic networks, which are based on shared technical standards whose main objective is to make different systems compatible, national juridical system are based on essentially domestic rules, whose application to the online environment has the potential to fragment the Internet. The implementation of divergent domestic laws and regulation has indeed the potential to balkanise the global Internet creating separated national intranets and potentially conflicting cyberspaces. It seems important, therefore, to encourage the development of harmonious rules across jurisdictions, thus fostering the compatibility of the legal systems penetrated by the Internet. Promoting a "legally interoperable" environment may be considered as an instrumental step to achieving a better-functioning Internet ecosystem, in which new technologies can spur, and the free flow of information is not hindered by diverging national laws.

Although the promotion of legal interoperability should be seen an important policy objective, it must be recognised that advancing legal interoperability of issues of systemic importance is not an easy task. A promising approach in this regard consists in analysing existing regulatory frameworks in order to identify best practices and synthesise them within a policy model. As open standards, policy

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models should be freely accessible and usable by any interested stakeholder, so that policymakers, regulators or market actors could use them in order to shape legally interoperable frameworks.

One particular topic that lends itself well to be analysed from a legal interoperability perspective is net neutrality. Net neutrality policy focus on Internet traffic management, which is an issue virtually affecting every electronic network composing the Internet and, for this reason, it has already been addressed by several jurisdictions through different approaches.[1] Furthermore, the definition of legally interoperable net neutrality rules and principles may be particularly beneficial to address a shared problem that, over the past years, has gained great political momentum at the global level. In the U.S., the FCC consultation on net neutrality rules triggered nearly 4 million comments (White House 2015), in India, Internet users sent more than 150 thousand emails over one weekend to the telecom regulator asking to protect network neutrality in the country, as part of one of the biggest online protests in Indian history (Jayadevan 2015), while the European Union is putting forward new net neutrality rules (Ansip 2015) and national efforts have being undertaken in order to guarantee constitutional status to the net neutrality principle (Senato 2014).

At the same time, a Model Framework on Network Neutrality (Belli et al. 2015), aimed at fostering legal interoperability on this matter, has already been elaborated by the IGF Dynamic Coalition on Network neutrality (DCNN)[2] and has inspired more than one organisation, such as the European Parliament[3] and the Council of Europe.[4] In this paper we elucidate the importance of addressing net neutrality from a legally interoperable perspective in order to foster shared rules safeguarding the originally open and distributed nature of the Internet. Whereas it might be seen as a domestic matter, exclusively impinging upon how Internet traffic is managed by network operators at the national level, the protection of network neutrality determines immediate consequences on the Internet users' capability to freely seek, impart and receive information regardless of frontier. For this reason, legally interoperable tools fostering shared principles or providing compatible regulatory indications should be welcome in order to foster universal connectivity on a non-discriminatory basis.

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[1] See Belli and De Filippi (2014).

[2] Dynamic coalitions are structural components of the UN-convened Internet Governance Forum (IGF). These multistakeholder groups are aimed at analysing and fostering debate with regard to specific topics and can be used as working groups in order to produce concrete outcomes. See http://www.intgovforum.org/cms/dynamiccoalitions.

[3] Compare the network neutrality principle's definition and the provisions regarding traffic management of the Model Framework on Network neutrality, available at http://www.networkneutrality.info/sources.html and of the European Parliament legislative resolution of 3 April 2014 on the proposal for a regulation of the European Parliament and of the Council laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent.

[4] Compare Belli and van Bergan (2013); CDMSI (2015).

After providing a brief analyses of the concept of interoperability and its potential transposition from the technical to the regulatory level (Sect. 21.2), this paper examines the relevance of network neutrality in order to maintain the original end-user-empowering architecture of the Internet (Sect. 21.3). Lastly, after having identified common elements within the existing net neutrality frameworks, we suggest a common principle basis that may be used to develop future legally-interoperable approaches, avoiding fragmentation and fostering legal certainty while diminishing transaction costs for businesses (Sect. 21.4).

21.2 The Techno-Legal Nature of Interoperability

Interoperability is usually described as "the ability to transfer and render useful data and other information across systems, applications, or components" (ITU 2015). This concept is increasingly important as interconnected technologies, continuously receiving and transmitting data, are becoming the norm. Communication among interconnected devices, cars, engines, phones is only possible if they are interoperable and therefore, interoperability plays an instrumental role in furthering the sustainable evolution of the Internet, as a global ecosystem. In the sections below, we concisely analyse the concept of interoperability and its potential application to legal and regulatory systems rather than being merely confined to the technical domain.

21.2.1 What Is Interoperability and How to Foster It

Interoperability plays a key role in facilitating the free flow of information. Indeed, the purpose of interoperability is to fostering the ability to transfer and use data across heterogeneous technologies and systems. Conspicuously, this means having the possibility to create new applications and services and being able to use them to exchange information across technically different but compatible networks. This is indeed the quintessential purpose of the Internet, whose original Catenet model for internetworking aimed at establishing "a model and a set of rules which will allow data networks of widely varying internal operation to be interconnected, permitting users to access remote resources and to permit intercomputer communication across the connected networks" (Cerf 1987). From a technical perspective, such "models and sets of rules" are defined by the technical standards and protocols that allow all Internet users to exchange information and to utilise services in a cross-border fashion on a daily basis. Hence, technical interoperability plays an instrumental role in fostering openness, innovation and competition, while providing the user with wider choice amongst a greater diversity of content and services (Gasser and Palfrey 2007).

Interoperability is also one of the main purposes of the ITU's International Telecommunication Regulations, which "are established with a view to facilitating

global interconnection and interoperability of telecommunication facilities and to promoting the harmonious development and efficient operation of technical facilities, as well as the efficiency, usefulness and availability to the public of international telecommunication services."[5] Such goals can be fostered through the actions of private as well as public actors, which can operate on a unilateral basis or via joint multistakeholder efforts. Hence, it is important to note that there is a spectrum of possibilities for public–private collaboration aimed at developing tools that may advance interoperability.

On the one hand, private actors unilaterally choose the design of products and services and can grant licenses to others, thus establishing rights and limitations to the use of technologies in a top-down fashion. Private actors can also foster interoperability trough technical collaboration. Technical collaboration has a broader level of cooperation that goes beyond the mere granting of IP licenses. Palfrey and Gasser (2012) cite mobile payments as an example to illustrate such broader level of cooperation, as they rely on licensing schemes but also require technical cooperation between retailers, manufacturers, payment processors and banks. Standards are the third way through which private actors collaborate towards higher levels of interoperability. Although standards have a great potential for achieving high degrees of interoperability their effectiveness might be limited (Palfrey and Gasser 2012). At the same time, both the elaboration and adoption of open standards is based on voluntary efforts which might suffer from the over-representation of those players having the financial capability necessary to continuously participate in voluntary but still resource-consuming efforts.

On the other hand, regulatory decisions influencing interoperability might also range from more unilateral actions to more collaborative actions. Regulators might mandate the adoption of interoperable standards, which might be an effective approach. However, governments might have difficulties to adapt rules to new realities once the standards become exceeded. Moreover, governments might lack sufficient expertise to choose the most efficient standards. Lastly, interoperability might be fostered through competition law, an ex-post type of intervention. Nonetheless, the limitations of such intervention are easy to infer, particularly due to its ex-post nature and procedural delays.

The concept of interoperability has been considered as beneficial for competition and innovation, increasing efficiency in the provision of services by Governments. Interoperability is also associated with reductions in the cost of technologies, as it promotes scalability (Palfrey and Gasser 2012). The benefits of technical interoperability tend to outweigh the possible challenges related to it and, for this reason, it seems important to enquire whether similar benefits may be achieved through the promotion of interoperability from a regulatory perspective rather than from an exclusively technical one. Particularly, shared principles and compatible rules amongst various juridical systems have the potential to reduce transaction costs, deflating barriers to cross-border trade and significantly lowering costs related to adaptation to different regulatory frameworks, but can also foster important

[5] See art. 1.3, ITR.

non-monetisable benefits, such as individual empowerment and the protection of fundamental rights. In the following section, we analyse the concept of legal interoperability in order to subsequently apply it to the concrete example of net neutrality regulation.

21.2.2 Can Juridical Systems Be Interoperable?

Legal systems can be considered as interoperable when the cost of regulatory fragmentation is low enough for people, goods and services subject to regulation to easily move between them (Tréguer 2012). Legal interoperability fosters compatibility of rules concerning the same topic within different jurisdictions or different administrative levels within a state, thus reducing regulatory fragmentation (Weber 2014). Like technical interoperability, legal interoperability stimulates the exchange of information within different systems. As such, interoperability of both technical and legal systems allows individuals—and, particularly, Internet users—to access and provide services in a cross-border fashion and to enjoy equal right-protection within different systems thanks to compatible (or, preferably, common) rules, principles, and procedures.

Models and sets of rules aimed at facilitating legal interoperability may be elaborated by players on an equal footing, in the context of harmonisation efforts; may be unilaterally imposed, in a top-down fashion, by a player enjoying an asymmetric power relationship with the other players; or may be fostered through transnational diffusion (Jörgens 2003; Belli 2015). Harmonisation relies on the cooperative effort of a group of—usually governmental—actors to elaborate a suitable solution to a shared and frequently transnational problem. To this end, public actors may define common regulatory tools aimed at fostering the free flow of information or, more generally, the free movement of people, goods, services and capital. Harmonisation usually backs legal interoperability via intergovernmental processes taking place within bilateral, plurilateral or multilateral fora. Harmonisation relies on the formulation of multilateral agreements, such as conventions, and subsequent implementation of policies consistent with such agreements by the entities that participated in the formulation process.

Legal interoperability through imposition occurs when a single actor—be it private or (inter)governmental—has the capacity to define unilaterally and enact policies that will affect other actors. For instance "business enterprises"[6] can unilaterally define the standard contractual agreements—or licenses—according to which they will provide a service and, subsequently, implement the contractual provision via

[6]The expression "business enterprise" should be considered as including "any business entity, regardless of the international or domestic nature of its activities, including a transnational corporation, contractor, subcontractor, supplier, licensee or distributor; the corporate, partnership, or other legal form used to establish the business entity; and the nature of the ownership of the entity." See: Sub-Commission on the Promotion and Protection of Human Rights 2003, § 21.

technical means (Schultz 2005; Belli 2015). One example in this regard is the use of Digital Rights Management techniques, allowing private actors to control both access and use of digital material (Palfrey and Gasser 2012).

Transnational diffusion, differently from the two former cases, is grounded on a process of voluntary adoption and reproduction of rules and procedures, by reason of their efficiency and reliability. Hence, contrary to harmonisation and imposition, transnational diffusion may occur in the absence of any institutional agreements. To this extent, international fora and NGOs may be the vehicle of transnational diffusion, facilitating policy development and offering breeding ground for policy cross-fertilisation (Béland and Orenstein 2009).

When considering the autonomous networks composing the Internet, it is spontaneous to remark that their technical interoperability is guaranteed by the use of shared standards that are voluntarily adopted by operators and service providers by reason of their proven efficiency. Indeed, the day-to-day operation of the Internet is based on the "voluntary adherence to open protocols and procedures defined by Internet Standard" (Bradner 1996) that enable end-to-end communication taking place via "a loosely-organized international collaboration of autonomous, interconnected networks" (Bradner 1996). Likewise, policy models framing shared regulatory problems may be a useful source of inspiration for national regulators and legislators—or even for self-regulatory efforts by market player—thus fostering legal interoperability through the adoption of compatible rules and procedures. Policy models may not only inspire legislative efforts but also be used as basis on which develop co-regulatory frameworks by national regulators in partnership with national stakeholders or even by private-sector actors themselves that may find it more convenient to craft their self-regulatory codes of conduct on the basis of existing policy models.

Globally shared regulatory issues such as net neutrality, data privacy or copyright regulation lend themselves very well to be the object of policy models that may subsequently be used by various stakeholders to transnationally diffuse legally interoperable rules. As we will discuss in the next sections, the net neutrality principle aims at guaranteeing a non-discriminatory treatment of Internet traffic in order maintain the Internet's open, interoperable and general-purpose nature. Such non-discriminatory treatment can be promoted by national policies but, given the global nature of the Internet, a more suitable approach may be to experiment the development of open policy-standards or open model-frameworks aimed at fostering the protection of net neutrality in a legally interoperable fashion. In light of the fact that open technical standards facilitate the development of interoperable technology, it seems reasonable to posit that open policy standards may be instrumental to the development of legally interoperable policies and regulations. The next section will emphasize the endogenously neutral character of the Internet architecture and will identify some elements that should be considered in order to define legally-interoperable net neutrality approaches.

21.3 From Endogenous Neutrality to Exogenous Net Neutrality

Network neutrality is the principle according to which Internet traffic shall be treated without discrimination, restriction or interference regardless of its sender, recipient, type or content so that Internet users' freedom is not restricted. The concept of network neutrality prescribes a non-discriminatory management of Internet traffic in order to guarantee that all Internet users enjoy universal access to all online resources, thus maintaining their power to decide autonomously how to use the network rather than being subject to the usage decisions imposed by network operators. To this extent it is important to bear in mind that the Internet has been conceived as a general purpose internetwork whose end-to-end architecture and layered structure were precisely aimed at decentralising the intelligence of the network in its applications (run by end-users), rather than keeping it within the control of the networks' operators (Saltzer et al. 1984).

This decentralised approach is mirrored in the TCP/IP protocol suite, the "technical constitution of the Internet" (Belli 2015) that structures the network in different layers to which distinct functions are delegated (Saltzer et al. 1984; Solum and Chung 2004). This decentralised architecture has allowed the Internet to maintain a high level of openness to new technologies, applications and devices. However, the increasing vertical integration between network operators and Content and Applications Providers (CAPs) may undermine such an open and decentralised structure, due to the substantive incentive that network operators may have to discriminate in favour of their commercial partners and against competitors (BEREC 2012; FCC 2015). Indeed, Internet traffic management has the potential to negatively impact end-users' capability to freely exchange information online, possibly jeopardising the full exercise of their fundamental rights as well as their possibility to "innovate without permission" (Belli and van Bergen 2013; Daigle 2014).

In the following sections we will provide a brief overview of the fundamental features of the Internet architecture, subsequently highlighting that the general aim of any net neutrality frameworks should be to preserve such features.

21.3.1 An Inherently Neutral Architecture

The original Internet structure was purposely designed to avoid centralisation, having an end-to-end design for efficiency and resilience purposes (Saltzer et al. 1984; Carpenter 1996). Such distributed architecture *de facto* delegated to end-users the possibility to decide how to use the network while keeping it interoperable, thus fostering the openness of the system and deflating barriers that may hinder user participation, communication and innovation. The basic assumption was that a network of heterogeneous networks, "however carefully designed, will be subject to failures of transmission at some statistically determined rate [and the] best way to

cope with this is to accept it and give responsibility for the integrity of communication to the end system" (Carpenter 1996). To this end, information was fragmented into data packets to be transmitted independently of each other and independently from their content or application. The intelligence of the network was delegated to the application run by the end-users, responsible for reassembling data packets for various purposes. Indeed, specialised treatment of packets may have risked hindering interoperability of applications run by end-users in different networks while, on the contrary, non-discriminatory transmission of data packets represented a guarantee for interoperability. Particularly, the layered and end-to-end structure, determined a separation between transport functions, which were delegated to network operators, and application functions delegated to the end-points.

Therefore, the original configuration of the Internet was "organically neutral" (Weinberger 2014) because data packet transportation was grounded on a best-effort delivery that did not apply special treatment based on the content of the data packets or the type of application. Besides this organic feature of the original end-to-end network design, it is important to stress that, until the early 2000s, traffic management practices were not granular enough to allow application-or-content-specific discrimination while the small size and great number of local networks composing the Internet made discriminatory traffic management ineffective. Network operators were simply transporting data packets in a non-discriminatory fashion, therefore acting—and being legally defined—as "mere conduits".[7] Since its creation, openness and neutrality have been endogenous features of the Internet architecture: open Internet standards facilitate the development of new technologies and the provision of new services, while the non-discriminatory best-effort delivery of data-packets strengthens the free-flow of information and lowers barriers to entering the market of innovation. Conspicuously, such open and non-discriminatory structure empowers end-users allowing them to access and share innovation without interference, being able to freely "seek, receive and impart information and ideas of all kinds, regardless of frontiers" (ICCPR, art 19). It is therefore this endogenously neutral structure that enables end-users to be active participants to the Internet, capable of independently deciding how to use the network, by choosing—or even creating—any kind of applications, services and content, and by connecting any kind of device (Belli and van Bergen 2013).

However, as computer scientists know, technical change is continuous in the information technology industry and the principle of "constant change" is probably the only principle of the Internet able to survive indefinitely (Carpenter 1996). Indeed, over the past 20 years, the Internet ecosystem has been visibly changing. On the one hand, traditional media and communications systems have been converging onto the Internet environment and, simultaneously, the end-to-end nature of the Internet has been exploited for various malicious uses, such as the diffusion of

[7] See Digital Millennium Copyright Act ("DMCA") 1998, section 512; Directive on Certain Legal Aspects of Information Society Services, in particular Electronic Commerce, in the Internal Market (2000/31) also known as "the E-Commerce Directive", art. 12.

spam, vira, malware or DDoS attacks. What was a quintessentially open and decentralised environment has been gradually centralising due to the emergence of an increasing number of intermediaries, as well as the vertical integration of network operators with service providers. The Internet has been smoothly evolving from an end-to-end structure to a trust-to-trust one, where average users delegate to intermediaries the task of exercising the intelligence of the network, in order to provide a trustworthy and reliable Internet environment (Clark and Blumenthal 2011). As a result, the end-to-end structure has been complemented with trust-to-trust mechanisms, where network operators and other intermediaries act as trusted agents providing network integrity and security.

The evolution towards centralisation has been characterised by massive investments—by network operators—in the development and standardisation of technologies allowing controlling and efficiently managing Internet traffic conveyed through their networks. Although efficient traffic management can be considered as a meritorious goal, it must be noted that the vertical integration of network operators with CAPs offers a relevant incentive to shape Internet traffic discriminating against applications, services and content that are provided by competitors (BEREC 2012; FCC 2015). To this latter extent, the net neutrality debate has been focusing on discriminatory Internet traffic management practices that may be implemented by network operators in order to favour vertically integrated service providers or disfavour competing ones (Wu 2003; Clark 2007; Marsden 2010). In this regard, it must be noted that the need for net neutrality policies is due to the very evolution of the Internet environment where vertical integration can motivate abusive behaviours while technical advancements make them possible. Indeed, the originally open Internet environment was able to foster innovation by providing end-users with a general-purpose decentralised network in which data flows were treated on a non-discriminatory basis by default. In such an environment, net neutrality policies were obviously not needed because Internet players did not have the possibility to discriminate against each other's, thus self-regulating themselves in healthy fashion. On the contrary, the abovementioned evolution of the Internet ecosystem allows network operators to put in place discriminatory traffic management practices and may offer concrete incentives to limit openness (FCC 2015), thus putting end-users rights and capability to innovate in jeopardy. As Sir Tim Berners Lee famously pointed out, "[t]here have been suggestions that we don't need legislation because we haven't had it. These are nonsense because in fact we have had net neutrality in the past it is only recently that real explicit threats have occurred" (Berners Lee 2006).

This is the basic line of argument that has motivated the development of net neutrality frameworks around the world over the past 10 years. As we will argue in the next section, national approaches vary and involve a more or less ample spectrum of stakeholders in their definition and implementation, thus providing for different levels of flexibility as regards their concrete application. However, these different frameworks share many common elements that might be considered as best-practices and consolidated within an open policy-blueprint.

21.3.2 Towards Exogenous Neutrality

As we have previously argued the original Internet structure has been designed to be open and foster a non-discriminatory transmission of Internet traffic. Such endogenous non-discriminatory structure has been instrumental to unleash the creativity of Internet users, allowing them to shape the very evolution of the Internet. This design choice has been considered as beneficial both from an economics perspective (Economides and Tag 2012) and from a human rights perspective (Belli and De Filippi 2013; Belli and van Bergen 2013).

Particularly from an economics perspective, net neutrality aims at avoiding that network operators impose two-sided pricing on the Internet, charging—or exempting from—a fee specific content, applications or services. Such practice may indeed distort the market and potentially preclude access to those content and applications lacking a contractual relation with the operator (Economides and Tag 2012). Indeed, although traffic discrimination for commercial reasons might be lucrative for operators, it would determine a shift from a decentralised general-purpose communication system to a centralised system where the provision and fruition of applications, services and content is influenced—and potentially subject to—by the existence of a contractual relationship between the CAP and the network operator. From a human rights perspective, the aforementioned reasoning is echoed by prominent jurisprudence, according to which discriminatory traffic management can be seen as an interference with freedom of expression, which "applies not only to the content of information but also to the means of dissemination since any restriction imposed to the [means] necessarily interfere with the right to receive and impart information" (ECtHR 1990, 2012).

Hence, net neutrality policies should be seen as an exogenous effort to re-equilibrate a system that risks losing its general-purpose, due to some market players' temptation to redefine its architecture as a "controlled distribution medium like TV and radio" (Banisar et al. 2003). To this extent, net neutrality supporters argue that the net neutrality policies and regulations are instrumental to maintain an open Internet architecture and reduce incentives to discriminate Internet traffic based on commercial reasons, thus preserving the economic, social, cultural, and political potential of the Internet (Wu 2006; van Schewick 2010). However, it must be noted that, as freedom of expression, net neutrality should not be considered as an absolute principle and, accordingly, several approaches have been emerging over the past decade in order to appropriately frame net neutrality and define exceptions. In this regard, different national approaches have been experimented, based on market-driven self-regulation, multistakeholder co-regulation, or hard-law in the form of both legislation and administrative regulation.[8]

[8] For an overview of the existing regulatory approaches to net neutrality, see https://www.thisisnet-neutrality.org/beta/#map_wrap.

Since the elaboration of the first net neutrality approach, promoted by the FCC in 2005 through a Policy Statement, the core elements of net neutrality have been crystallising and further elements have been emerging as a consequence of the traffic management evolutions and the potential risks that such evolutions present. As originally argued by the FCC, net neutrality is grounded on the premise that Internet users are entitled to access any lawful content of their choice; run legal applications and use legal services of their choice; connect their choice of legal devices that do not harm the network; and enjoy competition (FCC 2005). The subsequent evolution of the net neutrality debate has been the recognition of the need for a transparent definition of the characteristics of the Internet connection contracted by the user. Notably, the 2009 Norwegian Guidelines for Internet Neutrality (Nkom 2009) considered this latter element as one of the fundamental pillars of its co-regulatory framework and transparency obligations were also enshrined within the EU Telecom Package reform of 2009.[9]

It should be noted that the Norwegian approach has shown to be particularly efficient, not only by reason of its flexibility, based on the co-operation of market players and consumers associations with the telecommunications regulator, but also for being particularly clear and forward-looking. Indeed, the Norwegian approach has for the first time recognised the essence of net neutrality as non-discriminatory treatment of Internet traffic while pioneering the issue of specialised services. Particularly, since 2009 the Norwegian Guidelines recognised the importance of providing clear information regarding the provision of "other services on the same physical connection" of Internet access. Such information is indeed essential for regulators and consumers associations in order to verify that the provision of innovative IP-based services with enhanced features, such as guaranteed quality of service or security (the "other services" also referred to as specialised services or managed services), does not impair the provision of Internet access for which the user has paid.

Moreover, transparency requirements have also been considered as essential by the FCC, since its 2010 Open Internet Order and have been subsequently confirmed by the 2015 FCC regulation, according to which operators "shall publicly disclose accurate information regarding the network management practices, performance, and commercial terms of […] broadband Internet access services sufficient for consumers to make informed choices" (FCC 2010, 2015). Importantly, the 2015 FCC framework specifies the non-discriminatory nature of the traffic management, explicitly banning blocking and throttling practices as well as paid prioritisation, thus building strong safeguards against broadband providers' temptation to favour or disfavour specific Internet traffic for commercial reasons (FCC 2015).

Since 2010, the non-discriminatory treatment of Internet traffic has also been explicitly endorsed by several national laws, in countries such as Chile,[10] the

[9] See Directive 2009/136/EC, recital 23.

[10] See Ley N° 20.453 Consagra el principio de neutralidad en la red para los consumidores y usuarios de Internet http://www.leychile.cl/Navegar?idNorma=1016570.

Netherlands,[11] Slovenia[12] and Brazil,[13] which converge in the definition of exceptions to the general rule of non-discriminatory treatment. Indeed, discriminatory traffic management is usually allowed in order to enforce court orders or legal provisions; to guarantee the integrity and security of the networks, for instance to prevent or limit DDoS attacks; and to manage congestion at peak times. Moreover, the provision of specialised services—such as IPTV and e-health—is are also considered as an exception to the general non-discriminatory treatment although few regulators have clearly defined the characteristics of such services so far. In many jurisdictions, legislators have simply not addressed the issue yet, but despite rumours that specialized services are a threat to net neutrality, it has been mostly seen as a valid exception to the neutrality rule, as long as clear guarantees against their potential negative impact on Internet access are defined, such as in the Norwegian case.

Lastly, due to the extensive use of Deep Packet Inspection in order to manage Internet traffic, typically for blocking or throttling purposes (BEREC 2012), concerns have been growing with regard to the interference of such technique with regard to the privacy of end-users' communications. In this regard the European Data protection Supervisor has been particularly vocal, affirming that "risks to privacy, data protection and communication confidentiality are very high due to the high intrusive feature of DPI, which scans the whole content of the IP packets to find out specific patterns against pre-defined criteria established in inspection policies."[14]

Due to the widespread nature of the net neutrality debate and the shared need for effective policy solutions, it seems desirable to develop a common principle basis that would allow elaborating practicable and coherent national approaches. In the next section we provide some concrete net neutrality policy, which may be exploited for the development of legally interoperable net neutrality frameworks.

21.4 Conclusion: How to Make Net Neutrality Legally Interoperable

It is important to note that different juridical systems, as well as diverse markets, may require different solutions in order to establish efficient and sustainable net-neutrality frameworks. However, as it has been stressed above, national frameworks converge towards the protection of some basic elements deemed as

[11] See art.7.4a, Dutch Telecommunications Act https://www.bof.nl/2011/06/27/translations-of-key-dutch-internet-freedom-provisions/#nnexp.

[12] See art. 203, Slovenian Electronic Communications Act http://www.uradni-list.si/_pdf/2012/Ur/u2012109.pdf#!/u2012109-pdf.

[13] See art. 9, Lei N° 12.965, de 23 de abril de 2014, also known as Marco Civil da Internet no Brasil. http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2014/lei/l12965.htm.

[14] See EDPS (2012), p. 3. See also EDPS (2011, 2013).

essential in order to guarantee the full enjoyment of end-users' rights while preserving the original openness and non-discriminatory nature of the Internet. To this end, it seems possible to distil some essential elements from the existing net neutrality frameworks, in order to define a common principle base on which interested policymakers or market actors can develop compatible net neutrality frameworks. Indeed, while the Internet is usually seen as an interconnection of electronic networks, it is important to stress that the online environment also determines an interconnection of juridical systems that may benefit from shared policies.

As highlighted above, existing approaches to net neutrality converge as regards some core elements. First, the necessity to foster a non-discriminatory Internet traffic management, specifically banning blocking, throttling and paid prioritisation. To this extent, it should also be noted that exceptions to the general non-discriminatory treatment are shared amongst existing frameworks as well as the necessity to transparently state how traffic will be managed. Secondly, increasing concerns due to the abuse of intrusive filtering techniques have led policymakers and regulators to foster the compatibility of traffic management techniques to privacy norms and regulations. Lastly, due to the users' near-impossibility to identify the negative effects of traffic management policies' the existing national approaches converge in allowing regulators to monitor the compliance of all stakeholders to the agreed (self-/co-)regulatory framework.

It is important to highlight that international efforts aimed at making net neutrality protection legally interoperable already exist. Since 2010, the 47 Council of Europe (CoE) members have prominently declared their "commitment to the principle of network neutrality" arguing that net neutrality should be "explored further within a Council of Europe framework with a view to providing guidance to member states and/or to facilitating the elaboration of guidelines with and for private sector actors in order to define more precisely acceptable management measures and minimum quality-of-service requirements."[15] Since then, the CoE Internet Governance Strategy has foreseen the development of "human rights policy principles on network neutrality",[16] while the participant to the CoE Multi-Stakeholder Dialogue on Network Neutrality and Human Rights stressed the need for the elaboration of CoE guidelines on net neutrality that could be recommended to CoE members (CDMSI 2013). The elements necessary for the elaboration of such guidelines have been provided to the CoE by the Model Framework on Network Neutrality, elaborated by the IGF Dynamic Coalition on Network Neutrality and offered to the CoE to be used as a working document for the elaboration of a recommendation on network neutrality (Belli and van Bergen 2013; CDMSI 2015).

[15] See CoE 2010, para 9.

[16] See CoE 2012 para I.8.e.

The elaboration process of the Model Framework by the DCNN has been based on the participatory process utilised by the working groups of the Internet Engineering Task Force (IETF), pioneering the transposition of such process within the Internet Governance Forum. Rather than elaborating an open technical standard to be voluntarily adopted by market players, as the IETF working groups do (Bradner 1996; Hoffman 2012), the DCNN aimed at the elaboration of an open net neutrality regulatory-standard (Belli and van Bergen 2013; Belli et al. 2015). The Model Framework has become a global reference for net neutrality protection, openly supported by a variety of civil society organisations.[17] However, it must be noted that, at the IETF level, once the working groups elaborate their "draft standards", the IETF process requires the organisation of a final consultation period, defined "Last Call", during which the entire IETF community has the possibility to present final remarks on the draft before its validation. Such last-call process does not exist at the IGF level, where the DCNN and other dynamic coalitions operate, and for this reason the 2014 IGF Chair's Summary explicitly stressed the "need to develop a process that allowed the entire IGF community to weigh in and validate the findings of the [DCNN]."[18] Such process has been initiated via a Request for Comments on a Net Neutrality Policy Statement, divulgated on the DCNN mailing-list as well as on several other specialised mailing-lists, and aimed at producing a draft policy statement that could be "validated by the entire IGF community." The initial draft—based on the Model Framework—has been refined via four consultation periods, open to all interested stakeholders, whose comments have been consolidated in a text, subsequently published on the IGF official website for a further comment period involving the entire IGF community.[19]

Importantly, the Statement contains policy indications that might be exploited in order to develop any kind of net neutrality framework, be it regulatory, co-regulatory or self-regulatory. The protection of net neutrality through such frameworks should be considered as an exogenous effort to restore and preserve the endogenous openness and non-discriminatory nature of the original Internet architecture, thanks to which the Internet has generated incredible economic, social, cultural, and political changes. As such, the use of an open policy standard may be instrumental to foster compatibility of national rules. As technical standards aim at offering the most efficient solution to solve a common problem in an interoperable fashion, the statement aims at offering a useful principle-based approach that can clarify the net neutrality debate and be exploited to develop legally interoperable frameworks, on a voluntary basis.

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[17] See the website of the Global Coalition on Net Neutrality, a worldwide group of civil society activist, using the Model Framework as a "model rules" for the protection of net neutrality https://www.thisisnetneutrality.org/.

[18] See IGF (2014), p. 10.

[19] All information regarding the development process of the Net Neutrality Policy Statement can be found at http://www.networkneutrality.info/events.html.

21.5 Annex: Policy Statement on Network Neutrality[20]

21.5.1 Preamble

a) The Internet should be open, secure and accessible to all people.
b) Network Neutrality plays an instrumental role in preserving Internet openness; fostering the enjoyment of Internet users' human rights; promoting competition and equality of opportunity; safeguarding the generative peer-to-peer nature of the Internet; and spreading the benefits of the Internet to all people.
c) Managing Internet traffic in a transparent and non-discriminatory manner compatible with the Network Neutrality Principle serves the interests of the public by preserving a level playing field with minimal barriers to entry and by providing equal opportunity for the invention and development of new applications, services and business models.
d) Competition among broadband networks, technologies and all players of the Internet ecosystem is essential to ensure the openness of the Internet.
e) All individuals and stakeholders should have the possibility to participate in the elaboration of any Network Neutrality regulatory instrument.

Network Neutrality regulatory instruments should, at a minimum, provide the following safeguards.

21.5.1.1 Network Neutrality Principle

Network Neutrality is the principle according to which Internet traffic is treated without unreasonable discrimination, restriction or interference regardless of its sender, recipient, type or content.

21.5.1.2 Reasonable Traffic Management

Internet service providers should act in accordance with the Network Neutrality Principle. Any deviation from this principle may be considered as reasonable traffic management as long as it is necessary and proportionate to:

a) preserve network security and integrity;
b) mitigate the effects of temporary and exceptional congestion, primarily by means of protocol-agnostic measures or, when these measures do not prove practicable, by means of protocol-specific measures;
c) prioritise emergency services in the case of unforeseeable circumstances or force majeure.

[20] This Policy Statement is part of an Input Document on Network Neutrality, to be presented at the IGF 2015 Main Session on Dynamic Coalitions' Outcomes. The elaboration of this draft has been coordinated by Luca Belli and Michał Andrzej Woźniak, consolidating the comments received through several rounds of public consultation, organised by the IGF Dynamic Coalition on Network Neutrality from April to the end of September 2015.

21.5.1.3 Law Enforcement

None of the foregoing should prevent Internet service providers from giving force to a court order or a legal provision in accordance with human rights norms and international law.

21.5.1.4 Transparent Traffic Management

Internet service providers should publish meaningful and transparent information on characteristics and conditions of the Internet access services they offer, the connection speeds that are to be provided, and their traffic management practices, notably with regard to how Internet access services may be affected by simultaneous usage of other services provided by the Internet service provider.

21.5.1.5 Privacy

All players in the Internet value chain, including governments, shall provide robust and meaningful privacy protections for individuals' data in accordance with human rights norms and international law. In particular, any techniques to inspect or analyse Internet traffic shall be in accordance with privacy and data protection obligations and subject to clear legal protections.

21.5.1.6 Implementation

The competent national authorities should promote independent testing of Internet traffic management practices, ensure the availability of Internet access and evaluate the compatibility of Internet access policies with the Network Neutrality Principle as well as with the respect of human rights norms and international law. National authorities should publicly report their findings. Complaint procedures to address network neutrality violations should be available and violations should attract appropriate fines. All individuals and stakeholders should have the possibility to contribute to the detection, reporting and correction of violations of the Network Neutrality Principle.

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