BEREC's Approach to Net Neutrality

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Abstract: The net neutrality debate has continued to develop at European level, particularly regarding the significance and use of the provisions in the "telecom package". This paper concentrates on the important activity of BEREC in this area. Four pieces of related work were included in its 2011 Work Programme, following its response to the Commission's 2010 Open Internet consultation, and in addition to an upcoming investigation designed to provide market evidence by early 2012. BEREC experts have been looking at Quality of Service (relating to the new discretionary power under the Framework to set minimum requirements); the IP interconnection market situation; Competition and discrimination issues (assessing the impact of differentiated traffic management on competition, innovation and consumer welfare). Furthermore, the first public consultation was recently launched on draft Guidelines on Net neutrality and Transparency, which aim at ensuring that users benefit from effective transparency.

Key words: Net neutrality, Europe, regulation, Internet

■ European background

The European debate on net neutrality has taken into account a diverse range of policy concerns, including:

- the advantages of preserving the open and neutral character of the Internet, as recognised in the Commission's declaration on net neutrality [1];
- the good functioning of networks; in other words a satisfactory level of network performance;
- the development of sustainable and efficient business models for networks, services, applications and content;
- the benefit of enabling end users to access and distribute information or run applications and services of their choice;
- wider policy considerations, such as freedom of expression and citizens' rights, although these latest matters often refer to specific

[1] Commission declaration on net neutrality, 2009/C 308/02, 18.12.2009.

legislative initiatives, such as the fight against online copyright infringement.

The 2009 revised telecom regulatory framework of the European Union (EU) addresses these issues through a number of pragmatic provisions. Brought together, these provisions of the "telecom package" provide a multi-pronged approach, which recognises the fundamental role of competition in achieving net neutrality, and focuses on the elements that are necessary to make this competition effective and beneficial to end users. Alongside tools to address market failures, the telecom package also explicitly emphasizes the need for national regulatory authorities (NRAs) to promote "the ability of end-users to access and distribute information or run applications and services of their choice". All these aspects will be described in more detail in this article.

In addition, as an annex to the telecom package, the Commission issued its Declaration on Net Neutrality, which states that:

> "The Commission attaches high importance to preserving the open and neutral character of the Internet, taking full account of the will of the co-legislators now to enshrine net neutrality as a policy objective and regulatory principle to be promoted by national regulatory authorities, alongside the strengthening of related transparency requirements and the creation of safeguard powers for national regulatory authorities to prevent the degradation of services and the hindering or slowing down of traffic over public networks." (in *Commission declaration on net neutrality*).

■ The Commission's initiatives

Bound by this declaration to further report on the topic, the Commission issued the following year a public consultation on net neutrality and the open Internet, and a joint summit was organized with the Parliament on November 11, 2010. A concise overview of the responses to the public consultation (over 300 from a wide range of stakeholders) was included in the Communication issued by the Commission, on April 19, 2011. It stated at the outset that "the importance of maintaining the open internet, underlined in the Commission Declaration, received large endorsement in the public consultation and joint Commission-Parliament summit".

The Communication underlines the need to ensure the framework's effective implementation [2], recognizes that a number of issues have been brought forward, in particular: the potential impact on innovation of blocking or equivalent charging structures; the lack of appropriate information on quality of service (QoS) (e.g. the discrepancy between advertised and actually delivered speed); and the need to allow for reasonable and transparent traffic management. The Commission concludes, however, that there is insufficient evidence at this stage to conclude that these concerns justify more stringent measures. Nevertheless, the Commission considers close monitoring necessary. In this respect, the current work undertaken by BEREC [3] is underlined, and the Commission insists that this body's investigations should from form the basis to provide "evidence" of market problems requiring additional guidance.

■ Overview of the BEREC approach to Net Neutrality

The BEREC 2011 work program includes a strong focus on net neutrality, in line with its response [4] to the public consultation of the Commission. Although few incidents have been reported so far (and most of them solved without the need for regulatory intervention), this did not mean that problems could not arise in the future, with potentially high impacts. BEREC concluded therefore that NRAs should monitor closely "the conditions of net neutrality" - based in particular on "appropriate technical tools to evaluate the deployment of traffic management and the quality of the Internet service". In this scope, a number of priority topics for analysis were identified, which could be the basis for working solutions or guidance aimed at achieving the objective contained in the new Article 8(4)(g) of the revised Framework Directive: the ability of end-users to access and use all content/applications/services. BEREC indeed sees this ability as an important driver for economic and social wealth.

To achieve this objective, two questions require further assessment:

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2 The transposition period ended on May 25, 2011, the directives formally coming into force on that date.

3 Body of European regulators of electronic communications.

4 "BEREC Response to the European Commission’s consultation on the open Internet and net neutrality in Europe", 30 September 2010.

How to ensure that competition in the relevant markets is effective?

BEREC believes that remedies to promote effective competition are fundamental in the net neutrality context. First, BEREC recognizes that operators/ISPs (Internet service providers) may have an incentive to discriminate against competitors' equivalent services. Second, encouraging multiple offers enhances the possibility that users will find the services they want on the Internet.

Here, the main concern for NRAs is to understand in what contexts some behaviour by ISPs could lead to discrimination. Practices potentially within this scope include traffic management, but also degradation of quality, barriers to enter the network (e.g. through restrictive peering/transit policies), or specific charging structures. "Discrimination" is used by BEREC as meaning a "differentiation that has an anti-competitive purpose and/or causes harm to the market and/or to consumers". BEREC believes that a differentiated treatment per se is not necessarily problematic. If such (improper) discrimination occurs, appropriate regulatory approaches to deal with discrimination also need to be analysed. This includes questions related to the evolution of article 5 of the Access Directive (interoperability) and the scope of the NRAs' dispute resolution power (Article 20 of the Framework Directive).

In the BEREC work program, projects regarding "discrimination and competition issues" and the "status of the IP interconnection market" address those questions.

How to ensure that end-users are able fully to exercise their choice?

Transparency is a key pre-condition for users' freedom of choice. Transparency will enable customers to compare offers, in particular regarding QoS, all forms of limitations (including via traffic management) - or any pricing conditions (e.g. concerning the access to particular content). In the case where the services themselves were improperly degraded, the framework foresees the possibility that minimum requirements of QoS are imposed. In the BEREC work program, projects regarding "transparency" and "QoS" aim at covering those questions.

BEREC also decided to include in its analysis how to preserve the fundamental characteristics of the Internet, including the universal connectivity that it enables, and the separation of the transport and service layers. These features are key preconditions to the long-term impact of the

Internet economy (as underlined in the recent High-Level communication of OECD members [5]), as well as to the effective exercise of fundamental rights and freedoms, such as freedom of information and expression or protection of privacy.

Concerns expressed in this scope include the risk that operators and ISPs may in the future allocate capacity to "managed services" in a way that may negatively impact the "best efforts Internet" transport service. This could seriously hinder innovation in new content, applications and services, which currently benefits from the best effort Internet's low barriers to entry. Such concern is related to two broader questions, which are also of paramount importance to the net neutrality debate:

- What should a service of "access to the Internet" include / consist of?
- Should such a service be guaranteed to all (including on mobile devices)?

In addition to the work streams initiated in 2011, BEREC received in the beginning of the year a request from the Commission to prepare an overview of the European markets' status regarding traffic management practices. A dedicated task force, with members from BEREC and the Commission, was mandated to prepare a questionnaire, to be sent by NRAs to operators and open to all stakeholders.

■ BEREC's work on transparency

BEREC looked at providing guidance on the best measures to put in place for effective transparency to be ensured, in particular based on the new provisions of the regulatory framework (especially articles 20 and 21 of the Universal Service Directive). The draft guidelines have been submitted to public consultation from the 4th of October to the 2nd of November 2011 [6]. They underline the responsibility of NRAs in this area, and set out:

- the type of information that should be provided - the scope of the service (e.g. typical speeds), general limitations (e.g. usage caps), and specific limitations (e.g. traffic management practices);

[5] OECD high-level meeting on Internet Economy – official declaration.

[6] Public consultation by BEREC on "draft Guidelines on Net Neutrality and Transparency": http://berec.europa.eu/

- which bodies should provide information - as well as the Framework requirements on ISPs, various third parties provide an important complementary source of information, whereas users should be early involved early.

Beyond, regulators recognize the utmost importance of comparability, and agree that:

- Transparency is necessary for users to select the offers that best suit their needs, but transparency is not sufficient for a number of reasons. For instance, transparency will not produce its effects if there is a lack of competition on the retail market. Also, transparency alone might not be sufficient for achieving net neutrality because of the difficulty of switching between different providers. The various barriers to switching that exist in the electronic communications sector were analyzed by BEREC in its 2010 report on "Best practices to facilitate switching" [7]. Lastly, even in the absence of competition problems, there still remains a possibility that the QoS levels offered by the market are considered insufficient with regard to the broader demands of end users and the wider society.

- Simply stating that "information should be available" is not sufficient. For transparency to be effective, a certain number of conditions must be fulfilled regarding the way the information is presented, and its level of detail. For instance the user should be able to easily find the place where information is displayed, understand it, compare the various offers, etc.

To help build an effective transparency policy, regulators have discussed the following ideas:

- Transparency actions may consist either in "direct" transmission of information from the ISP to the end-user, or in "indirect" provision of the information through third parties (institutional or private organizations, experts…), who process available data to present it in a specific manner to their audience. Considering the complexity of the net neutrality context (variety of technologies, usages, etc.), BEREC finds it useful to pursue both approaches, keeping the proportionality principle in mind.

- It is interesting not to present information all in the same place, but rather to display the most essential elements first, with details easily accessible through navigation (but never more than two clicks away). This is referred to as a tiered approach. NRAs are also reviewing tools that enable

[7] BoR (10) 23 rev1.

customers to test some parameters related for example to the functioning of their connection. This provides them with real-time information on their actual service.

- Descriptions of services for (potential) customers are frequently based on a certain number of concepts, e.g. terms such as "unlimited" or notions such as "maximum available bandwidth", which are generally used without precise definitions. These terms are generally considered useful, given the complexity of Internet access offers. However, their "common understanding" is often not clear, so various stakeholders and NRAs believe that promoting public references could be helpful for users to better know what they can expect.

In general, most policymakers are eager to continue analyzing what are the best ways to inform users of service characteristics. Some regulators have launched inquiries to understand the information needs of consumers (e.g. OFCOM (the British regulator)), whereas some have implemented websites for ISPs to fill up comparative data (e.g. PTS (the Swedish regulator)). An example of stakeholders' initiative is provided in the UK, where operators decided to publish indicators ("KPIs") of the traffic management measures used on their networks [8]. At the European level, the Commission has initiated a large study that will allow the measurement of real speeds across the various member states. The methodology chosen is based on hardware test equipment (probes).

■ BEREC's work on Quality of Service

BEREC intends to assess how regulators could implement the new power of imposing minimum quality requirements (article 22 of the USD). Guidelines in this respect will be developed for publication mid-2012, after a public consultation.

In general, there is a large consensus among regulators that this power is to be considered as a remedy of last resort. The modified directives describe a multilayered progression of the means to secure QoS objectives, first allowing NRAs to require from providers quality related information and measurements (para.1 of article 22 USD). Then, NRAs may specify and

[8] "Voluntary industry code of practice on traffic management transparency for broadband services".

provide parameters to operators (para.2 of article 22 USD). In order to prevent degradation of QoS, NRAs may eventually set minimum quality of service requirements. But in doing so, they are obliged to provide information on the envisaged requirements and to take into utmost account the Commission's comments or recommendations.

An important obstacle to the implementation of the minimum QoS remedy relates to the various possible interpretations of the concept "quality of service", depending on the context in which it is used. There is a difference between, on the one hand, what appears to be the meaning in the provisions of the telecoms package, and on the other hand, what could be considered as a strict technical definition of QoS. In the Universal Service Directive, the concept refers to a more general quality perception related to the user's subjective experience when running applications over the network, whereas the technical specification of QoS consists instead of well-defined performance characteristics of applications. In connection with this, one issue of importance is to distinguish between the various elements that intervene when an end user accesses any content or application, typically the terminal equipment, the network itself, but also the conditions under which content is made available on the Internet by "content and application providers" (CAPs). Even though it is the end users' perception of the application that must ultimately be taken care of, it is only the network part that is under the operators' control. Because of this, the end users' perception is an important source of indicators of quality problems, but it will only be the performance of the network itself for which NRAs may set minimum requirements.

The "best effort" operation of the Internet also makes it challenging both to measure and to guarantee network performance because multiple networks are involved. In reality, the QoS analysis may need to rely on notions such as the relative "openness/closeness" of services, in order to distinguish for instance the "specialized services". This may clarify the area of application of "preserving the open and neutral character of the Internet" [9].

Determining minimum quality requirements will not be straightforward either, depending in particular on whether individual applications are considered, or rather the performance of the overall electronic communications service provided by the network. Lastly, there is a question

[9] Commission declaration annexed to the revised telecom framework (cf. here above).

about how to interpret what consists in "degradation of service and the hindering or slowing down of traffic", which is the wording used in article 22.3 USD. Having in mind these complexities, there are several steps which are available to regulators, such as: evaluating quality; detecting symptoms of problems or triggers for intervention; defining the properties that minimum requirements should fulfill. In particular, different approaches can be used for monitoring developments in the marketplace, from proactive measurement of communications services to a more reactive response, based on incidents reported to the NRAs.

Some regulators have already taken steps in the first direction, by promoting or setting themselves a number of processes to monitor quality parameters on their countries' networks. This is the case for instance in Greece and in Latvia (where measurements imposed by SPRK include average speed, jitter, latency, packet loss ratio…). In other countries, discussions with stakeholders tend to identify appropriate tools to monitor the quality of access to Internet services. This is intended first as an information mean for the end user (before or after subscription). It can also enhance the regulator's capacity to assess whether quality remains "sufficient" (primarily on the segment of the network which is under the ISP's control), based on the measurement of technical and objective parameters and supplemented, as far as possible, by some indicators closer to the user experience.

Many QoS initiatives can arise outside the scope or NRAs' direct responsibility. It is worth mentioning for instance the development of publicly available measurement tools, such as Neubot (initiated by Italian academics) or M-Lab (lead by a research community and largely funded by Google). The results of the discussions (particularly on normalisation normalization and interoperability) held by operators and manufacturers in the scope of the "CEO roundtable" initiated by Commissioner Neelie Kroes may also yield interesting "cross-networks" QoS initiatives.

To conclude on the subject of QoS, most stakeholders in Europe are of the opinion that imposing minimum quality requirements should be used only in case of serious problems, and where other existing regulatory tools would not be sufficient. However, an increasing number of private or public parties are working in order to better define and monitor the various parameters contributing to the quality experienced by users. This is seen as particularly important, given the many uncertainties related to the development of intelligent networks, specialized/managed services, etc. and their potential impact on "basic" access to Internet.

■ BEREC's work on IP Interconnection

The BEREC project on the evolution of the IP interconnection market aims, first of all, at improving knowledge by NRAs of relationships between parties, and later at assessing whether specific actions would be required.

Traditionally, there were two main forms of IP interconnection, which is a fundamental underlying backbone of the Internet: either peering (an exchange of traffic addressed to each party - a "local access", that generally used to be free of charge), or transit (the provision of connectivity to the whole world - a "global access", that had to be paid for). Now the situation has grown more complex, as a variety of economic models have developed, such as "paid peering" (which provides local access against some specific fee) and "partial transit" (which consists in access to a subpart of the global network, and is less expensive than "full" transit). Furthermore, the traditional relationships between stakeholders (Tier 1/Tier 2 operators etc.) are not as clear as they used to be. For example, some content providers own very large networks and are able to "peer" with major operators. The development of alternative models for the distribution of traffic (e.g. the deployment of content delivery networks - CDNs) also contributes to changing the patterns of interconnection markets.

IP interconnection arrangements have flourished for many years without regulatory intervention (although the obligation to accept interconnection negotiations also applies to the IP environment). This was enabled in particular by the competitiveness of the transit market on IP backbones, which has so far prevented the emergence of any interconnection bottlenecks. Problems may arise, however, in the termination segment, where some large ISPs could exert control over the access to a very large number of end users. One important trend in this regard is the claim by many operators that local networks are facing a growing asymmetry regarding the ratios of incoming/outgoing traffic. This may have an impact on operators' policy regarding the various streams of content, and/or on the flow of payments in peering and transit relations.

In general, there is no direct net neutrality issue arising from interconnection arrangements between networks, at least when all traffic flows and access/interconnection requests are treated equally. In case this condition is not satisfied, regulators may need to determine whether any discrimination, detrimental to competition and the market, is taking place. Given the importance of IP interconnection for the functioning of Internet, it

was suggested that the BEREC should specifically study the trends in these markets (including some recent signs of tensions).

Some regulators, but also for instance a new OECD study [10], have started to monitor commercial developments more closely. This may help to identify the impact on net neutrality of the different types of IP traffic exchange agreements, and to determine the need for regulatory (or other) interventions. This monitoring may provide, at first, more information on how IP interconnection is organized: location of interconnection points, distribution of the different types of agreements (peering, transit, …), their evolution, the positions of major stakeholders, … It may also provide some indications on prices (e.g. average monthly rates for Mbit/s) or volumes (e.g. upstream and downstream capacities). Beyond this useful empirical basis, future analysis in this area will need to focus on allowing the long term financing of the networks, monitoring the balance of power for negotiations between parties of the value chain, and preserving the principle of "universal connectivity", which has been a key to the Internet's development.

■ BEREC work on traffic management and discrimination

The BEREC has initiated a project on competition problems linked to traffic management practices. BEREC's objective is to evaluate the impact of potential discrimination by operators against content/services/applications provided via their offers of access to the Internet. Regulatory tools to address such discriminations will be analysed as well. A public consultation is planned to be launched on the first half of 2012.

Although it is not possible at present (and may never be) to build an exhaustive list of traffic management practices observed on the markets, regulators can identify the most frequent types, based on the objectives pursued by ISPs:

- Avoid saturation of networks (principally mobile): limitations of the access to, or use of, P2P or Newsgroups ; slowing of traffic above a "fair use" cap; blocking of SMTP streams when they are not addressed to the operator's servers (in some mobile networks);

[10] Study currently in progress within the PIIC Committee of OECD, not published yet.

- Preserve an economic model: paying options to enable functionalities such as Voice over IP (VoIP) or modem usage;
- Protect the infrastructure or some users: mechanisms against denial-of-service attacks or spam; legal obligations to block traffic or sites in relation to property rights, child pornography, etc.; parental control or measures to limit "bill shock"…

The implementation of those practices can consist in filtering ports, analysing signatures, or the content of packets (DPI). It seems that there are currently very few measures in place performing clear discrimination between similar parties.

On this basis, discussions are on-going between experts to provide guidance on what would be acceptable (or not) in terms of traffic management. Some regulators have already established guidelines. NPT in Norway was a pioneer, and is leading discussions this year in order to review and clarify the "guidelines" agreed by the stakeholders in 2009. In its Proposals on Internet and network neutrality of September 2010, ARCEP decided not to list ex-ante appropriate traffic management measures. Instead, ARCEP proposed five criteria to assess ex-post, on a case-by-case basis, acceptable traffic management exceptions to the general rule (for Internet offers) of non-discrimination between data-streams. These criteria are: relevance, effectiveness, proportionality, non-discrimination between parties, and transparency. The most "radical" approach developed so far in the EU is the net neutrality law adopted in the Netherlands in June, where the Parliament introduced a neutrality principle. This text prohibits the ISPs [11] from: 1/ hindering or slowing services or applications on the Internet – exceptions may be justified only for the four following reasons: avoiding networks over-saturation (through non-discriminatory measures); security; protection against spamming (subject to consent of the customer); implementation of law or court decisions; 2/ implementing tariff plans that depend on the services used. This provision emerged from a heated debate, triggered by the blocking (either complete or through paying options to use the service), by KPN, of applications of VoIP (e.g. Skype) or SMS-IP (e.g. WhatsApp).

Policymakers however tend to be cautious regarding traffic management, since it is probably the topic that raises the most debate between

[11] Actually the text refers to ISPs and "Providers of public electronic communications networks over which internet services are delivered".

stakeholders. This can be observed for instance in the great variety of academic papers discussing when an operator's traffic management practices should be considered problematic. Nevertheless, there are signs of a growing consensus regarding a certain number of assessment elements. First of all, there is a common perception that a fundamental distinction must be drawn between, on the one hand, the cases where an operator decides by himself to put in place certain measures, and on the other hand, the cases where these measures are imposed because of legal requirements. External legal constraints include, for example, laws to protect intellectual property rights (e.g. the famous "Hadopi" in France), provisions against terrorism and online crime, etc. Such laws have encountered fierce criticism from defenders of liberties such as freedom of expression. But once enacted, those laws or court decisions become compulsory for operators.

Second, there is agreement that many restrictions to access content or applications can be outside the control of operators. Other stakeholders may play a significant role here, and there have been some allegations in this respect against, for instance, search engines and terminal providers. The latter have raised concern, for instance, regarding interoperability or switching barriers. This is driven, on the one hand, by the success of some smartphones and their related (closed) applications platforms, and on the other hand, by the foreseeable development of devices such as connected TVs, which have the potential to induce major disruption of existing markets.

Finally, many NRAs and stakeholders are of the view that some traffic management practices are fully justified for technical reasons. The debate may thus be simplified by making more explicit this consensus on measures that are acceptable a priori. This typically covers certain measures of protection of the network and users, at least if they are implemented in an acceptable way (this depends for example on their limitation in time or their interactivity with users).

There is also a growing consensus on practices that would likely be harmful to competition. This would be the case for instance if an ISP holding SMP (significant market power) on the broadband retail market, vertically integrated with a provider of a specific content or application, performed traffic discrimination against similar content or applications of third party providers. The incentive for such behaviour can exist according to economic theory, although this does not mean that it would always be in the interest of the SMP operator to act in such a manner. Of course, the case would be even worse if the measure was not transparent to users.

Some argue that traditional tools of analysis are not sufficient to identify the cases where operators' practices would be problematic. For instance, pure vertical integration is not so common today, whereas partnership agreements between different companies may have a similar effect. Using the concept of SMP may need further work to determine the relevant market. In the case of Internet, the analysis indeed applies to a platform which serves various kinds of commercial relations - often referred to as a "two-sided market". These are examples of complexities that must be taken into account within the traditional framework of SMP analysis.

Moreover, some experts wish to evaluate the long term economic impact (on innovation etc.) of discriminatory practices, even in the absence of dominance. Apart from the limits to competition already mentioned [12], there are some justifications for this view, which are specific to the "Internet" (whereby a multiplicity of content and applications are accessed). Considering the current complexity of telecom offers and switching processes, it will probably not be so frequent that a user will switch providers because of one particular application being restricted - the CAPs' countervailing power is often quite low. Even if a customer was sufficiently fond of "application A" to be ready to change ISPs, his new provider could well be restricting "application B". Besides, many services used over the Internet involve more than one user, so even if a customer chooses an unrestricted offer regarding an application, he will not be able to use it with all the users on restricted contracts. Those cases illustrate how, even in the absence of a dominant position, there might be an important impact on small innovative services of the Internet - the famous "long tail" that has provided for many successes of the Internet economy.

There is probably still a long way to go before properly identifying and qualifying the different types of acceptable traffic management, and even longer before the different stakeholders broadly agree on a European approach in this domain. One important challenge will be to preserve, as much as possible, the liberty for users to connect to the whole Internet and select their favourite content or application. At the same time, this shall not prevent operators from developing added value on their networks, by offering differentiated quality for some services in appropriate manners.

[12] Obstacles in the markets in terms of transparency and switching; absence of alternative providers in some geographic regions; joint behavior of all operators in a market…

In conclusion, BEREC's works on transparency, on QoS, on IP interconnection and on traffic management attempt to deal with many aspects of net neutrality issues encountered in the European market. These initiatives, together with facts research and finding, will also permit the Commission to determine if the tools contained in the 2009 telecom package are sufficient to deal with this multi-faceted problem.