
Broadcast



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Subject

Response of the Nederlandse Publieke Omroep (NPO; Netherlands Public Broadcasting) to the EC Questionnaire for the public consultation on the open internet and net neutrality in Europe; publication date: 30 June 2010

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Introduction

Public service broadcasting, as a service of general interest, is a key element in the European model of society. The broadcast media play a central role in the functioning of modern democratic societies, in particular in the development and transmission of social values. Therefore, the broadcasting sector has, since its inception, been subject to specific regulation in the general interest. This regulation has been based on common values, such as freedom of expression and the right of reply, pluralism, protection of copyright, promotion of cultural and linguistic diversity, protection of minors and of human dignity, consumer protection. The Protocol on the system of public broadcasting in the Member States, which was annexed to the Treaty of Amsterdam, recognises the role and the importance of public service broadcasting. The Commission considers that the digital revolution does not call into question the need for audio-visual policy to identify relevant general interests and, where necessary, to protect them through the regulatory process.

Open Internet becomes more and more important in the exercising of the function of public service broadcasting, because the public increasingly uses the content of public broadcasters via this medium. It is therefore of paramount importance that the Internet remains open and transparent and can further grow in its capabilities in order to let public service broadcasting fulfil its tasks and mission.

Question 1: Is there currently a problem of net neutrality and the openness of the internet in Europe? If so, illustrate with concrete examples. Where are the bottlenecks, if any? Is the problem such that it cannot be solved by the existing degree of competition in fixed and mobile access markets?

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NPO considers the way Internet traffic for mass scale streaming, such as video streaming to large audiences is handled by ISPs in the Netherlands, as problematic. Structural prioritization (active prioritization) with regard to source or destination is not acceptable to NPO. But it does occur, as far as we know, in fixed networks during events when NPO streams video to large audiences (with data amounts of more than 80 Gbps).

NPO meticulously monitors how its content and services find their way to the end user. Systems are used to monitor the performance and throughput on the various networks. In distributing content we do experience problems, which indicate a structural difference in treatment of Internet traffic. However, we should note that other, more subtle forms of obstruction may not be noticed by the NPO.

As far as we can ascertain ISPs do not use the possibility to add 'false' RST-messages to hinder specific kinds of traffic (eg P2P). It is important to note that this method is not the only way to restrict P2P traffic; certain ISPs restrict P2P at certain times by using need-based prioritisation, e.g. UPC, by its own admission.

In recent years incidents did occur at NPO. The most notorious one was that of "NOS Sports Summer 2008". In the summer of 2008 NPO distributed live streams of about 800kbps each of the *Tour de France*, the *European Football Championship* and the Olympic Games. Tens of thousands of streams (with a peak of 100.000 concurrent streams) were simultaneously viewed and a capacity of approximately 80 Gbps had been setup by NPO. The NPO has signed settlement-free peering agreements with almost all Dutch ISPs (peering at the AMSIX and NLIX) and has private peers with a number of parties at the Mediagateway in Hilversum and the AMSIX.

While most ISPs relayed the generated traffic without any problem, two ISPs stated that the amount of transmitted data was so large that their network could not deliver it without compromising the quality of Internet connectivity for other uses and users. NPO consequently entered into discussions with

these ISPs. The ISPs indicated that the required amount of traffic could not be handled without additional investments in their network, despite their announced peering capacity which was sufficient for the generated traffic. They claimed a fee was required for this extra investment. Otherwise the ISPs would decide to end the existing peering agreement and block traffic coming from our servers. NPO did not agree. For one ISP the amount of traffic remained within acceptable boundaries (as stated by the ISP) but for the other ISP we experienced a cap of some tens of thousands concurrent streams. The ISP stated they did not use any prioritisation schemes or other limiting actions. However, for several hours we counted more concurrent requests than they accepted. We had both server and bandwidth capacity spare at our facilities and the AMSIX peering too were able to serve the extra requests, but the streams never reached the end users.

NPO holds the view that, given its public function, it will meet user requests to the maximum available capacity, without discrimination. While doing so we will stay within existing peering agreements. It is not acceptable to NPO that ISPs restrict user requests. If their users request information from NPO we will cater for those requests by installing enough server capacity to a reasonable maximum.

In our opinion the aforementioned bottlenecks cannot be solved alone by the existing degree of competition in fixed and mobile access markets. The huge growth investments in traditional infrastructure, such as routers, switches and glass fibre, which are needed to safeguard the open internet will prove to be economically inefficient, or even physically impossible. Additional, adequate legislation and regulation will be needed.

Modern facilities in open Internet infrastructure, such as Content Delivery Network technology, could come to help and offer cost-effective solutions. However, it is very doubtful whether ISPs will be willing to invest sufficiently in such facilities. Tier-1 providers to some extent will have to do this, and to some extent have done this already, but in order to reach the end user on a local level also Tier-2 and local ISP's will have to implement this. Trying to convince these parties to invest or allow content providers to install (joint) CDNs has not yet been successful so far.

ISP's setting up CDNs with bandwidth-usage based fees, would create a two-sided market in the open internet, in which both content providers and end users would have to pay for content requested by the end user. Content

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providers of public information, such as public broadcasters, find this an undesirable situation since it leads to discrimination of content providers in their access to the open internet. In a two-sided market public service broadcasters would not be on a level playing field with commercial content providers in competing to get access to the open internet.

If content providers, such as broadcasters, are enabled to install Content Delivery Networks in the networks of ISPs, based on co-location or site sharing, greater independence of investment by ISPs in their networks will be the result. Moreover broadcasters themselves will obtain a strong decrease of the network load and with it the risk of congestion. Finally a much greater autonomy for broadcasters is created in transferring their content over the open Internet.

Question 2: How might problems arise in future? Could these emerge in other parts of the internet value chain? What would the causes be?

NPO recognizes several possible developments¹ that might worsen the aforementioned problems:

1. Under-dimensioning of fixed, open Internet networks

Under-dimensioning of specific fixed Internet networks can lead to scarcity of bandwidth in these networks. A network in which little is invested will have a lower capacity. Under-dimensioning of fixed networks can occur if the market is very price sensitive. A development might occur where a substantial part of the market simply wants the cheapest Internet subscription. An ISP which is under-dimensioning its network does have lower costs and can serve its customers in a economically more attractive way. The users of such networks will find that the network slows down during peak hours. Data requests, especially audio and video streams, will fill up these networks quickly, thereby creating problems like packet loss and large jitter, resulting in bad quality streams and bad user experience.

This scenario possibly leads to a high degree of differentiation and specialization in the market. From a macroeconomic point of view, this kind of diversification in the supplies leads to optimization of the market. The trade-off between reductions in speed and/or quality against lower costs will be a

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¹ Dialogic Report: Netwerkneutraliteit: stand van zaken in Nederland, 10 juni 2009

deliberate choice by the end users. Specific groups of users, which would otherwise not have obtained access to the Internet, do get access and at low cost.

However, in this specific example concerning the Internet, the high degree of dependence between ISPs will cause complications. An ISP which is under-dimensioning can cause traffic problems for other ISPs, especially in transit arrangements or when users from one ISP access servers in an under-dimensioned network from the other ISP. In the most radical case, high-end ISPs will separate their services from the public Internet since its quality can no longer be guaranteed.

It is possible that ISPs implement new technologies in the “last mile” to attract customers, but at the same time neglect investments in the backbone. From a marketing perspective it is more attractive for an ISP to advertise VDSL or FttH to its (potential) customers than to publish improvements in its backbone.

2. Mobile Internet Growth

The use of mobile Internet is growing rapidly and many providers of mobile Internet choose to obstruct data-intensive traffic. More and more end users will experience the limitations of a non-neutral network. Many mobile internet subscriptions impose restrictions on the type of traffic, that the user can send and receive. For example, quite often the use of VoIP or P2P or streaming audio and video is not possible.

Compared to fixed networks, the cost of sending data packets on a mobile network are (still) relatively high. This is partly due to frequency licenses, expensive infrastructure with a shorter depreciation period and physical limitations in bandwidth of the mobile radio-channel. By manipulating traffic it is possible to satisfy a large(r) number of users at limited costs. However, this behaviour can also be motivated by the wish to consolidate revenues from traditional services, such as traditional telephony, e.g. by hindering VoIP traffic. Moreover mobile operators in The Netherlands have indicated they will shift away from fair use policies and move to a model based on a data cap per month.

3. Emergence of services which undermine business model of ISPs

An ISP which sees its business model in jeopardy by the emergence of new

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services, has an incentive to hinder these services. It can use its control over the network to accomplish this. This problem is only relevant for ISPs which generate revenues from traditional services. Examples include cable operators (television images), mobile operators (sms and phone calls) and providers of fixed telephony.

In recent years, more and more services have come to the market that - at least potentially – undermine the current business models of ISPs. Examples include VoIP, SMS through websites and through messenger applications, Internet TV (OTT, over-the-top TV) and the downloading of movies and television series. The quality of these services over the internet is gradually augmenting. They are increasingly becoming genuine alternatives to the more expensive traditional services.

The conflict in the business model is caused by the fact that the cost per transmitted bit is different for each of the various services. Providers make their business case, based upon expectations of the use of various services. When customers use the cheap services at a large scale to avoid expensive services, a conflict arises. It should be noted that not all services are substitutes for each other.

In order to protect its revenues an ISP will often try to keep end users as high up in the value chain as possible. To realize this they may use the control they have over end-user devices, such as mobile phones. It is for example sometimes impossible to make a telephone call through a mobile data-subscription. Obviously, this process can also be shaped in a more subtle way by giving certain types of traffic priority over others, or by discouraging cheaper alternatives (e.g. the 'poisoning' of P2P traffic with TCP resets).

4. Emergence of high-traffic services for which service providers or end users will pay extra premium

A growing demand for ever higher quality services, such as IPTV, may lead to a situation where end-users (and thus indirectly service providers) will want to spend money on a premium channel. This reserved channel has a higher quality and better service as compared to the others. ISPs will be paid to set up such channels. As a result, a certain type of traffic gets priority over other traffic. And as a consequence traffic is no longer treated equally.

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In recent years, more and more services are introduced, that have very high demands on the quality of the connection. Think of (video) telephony, online gaming and television services. Issues around speed and/or quality of traffic are immediately noticeable by the end-user and its consequences are experienced as very negative. Buffer under runs lead to loss of video and audio and make them unusable. All these developments will probably lead to an increase in the different treatment of Internet traffic.

Some service providers in The Netherlands are willing to pay for such additional high quality services. They expect to much better serve their customers this way. NPO does not agree with this approach since NPO rejects the principle of a two-sided market for the open Internet since it will lead to differentiated access by content providers to the open Internet.

Question 3: Is the regulatory framework capable of dealing with the issues identified, including in relation to monitoring/assessment and subsequent enforcement?

According to NPO in particular the following aspects from the new guidelines 2009/136/EG and 2009/140/EG by the European Parliament and the Council form a good basis:

Directive 2009/136/EG

- The principle that a competitive market guarantees quality of service, but -in addition- that governments can enforce minimum quality levels of public communications
- The need for regulators to investigate network management and where appropriate to address discriminatory conduct.
- The ability of regulators to impose minimum requirements for quality of service upon providers of public communications.
- The right of end-users to information on any restrictions in services and applications.
- The possibility that "Must Carry" rules may in certain cases be imposed upon operators of electronic communication networks (including IP networks) networks for some radio and television channels

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Directive 2009/140/EG

- The recognition that the Internet is essential for education and the practical exercising of the right to freedom of expression and the access to information.
- Any restriction of fundamental rights must comply with the European Convention for the Protection of Human Rights and Fundamental Freedoms.
- The need for the Commission to start a broad public debate on these matters.
- Easy access by all end-users to affordable, quality services.
- The possibility to take measures to protect a special service that has clear objectives of general interest, such as public broadcasting.
- The possibility to impose co-location and site sharing.

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In spite of these positive developments NPO sees some bottlenecks in the following points:

Consumer protection

One of the main features of the new European regulatory framework is that consumers will be better protected. End-users should get more choice and certainty and consumers can make better choices through greater transparency of tariffs and quality of services.

In the vision of NPO the European Commission will need to ensure that in this regard the implementation in national legislation will be adequate. It is not sufficiently certain that at national level adequate consultation mechanisms will be implemented. These mechanisms ensure that in the process of decision-making on issues related to all the rights of end-users appropriate account is taken of the interests of consumers in electronic communication.

Internet access and net neutrality

The principle of network neutrality means that traffic in the open Internet should not be discriminated by source, destination or content. If ISPs interfere with Internet traffic, this may lead to a restriction of fundamental rights to freedom of communication, freedom of news and information. In addition, ISPs can only discriminate Internet content if they scrutinize Internet traffic. This can only be done by inspecting IP packets ("deep packet inspection"). Network neutrality protects both the fundamental right to freedom of

communication, intelligence and freedom of expression as a fundamental right to privacy of every Internet user.

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The continued existence of a freely accessible internet has rightly received much attention in the Council and European Parliament. Both in the Council and in Parliament, the openness of the Internet is considered of the highest importance. The new European Framework does not give an answer however to the question whether an ISP has the right to limit access to specific services and to prioritize specific services over others which have a similar nature.

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The new third paragraph of Article 21 of the Universal Service Directive does however request Member States to ensure that operators inform their subscribers about restrictions on access to services, specially in the case when overloading of the network occurs. Furthermore, the new third paragraph of article 22 offers the possibility to set levels for minimum quality of service, to prevent degradation of service or a hindrance or delay in traffic over the Internet.

NPO doubts if the opportunity, offered by the EU Directives for regulatory measures, will be implemented adequately on a national level at the Member States.

The prescription of transparency only will certainly not suffice. It will in our opinion be insufficient to prevent violations of network neutrality. And the cost of switching from one provider to another can be too high and the process too cumbersome for end users to actually do this. It is also possible that all providers will ultimately use the same policy towards end-users so that it will be pointless for them to switch. The role of NRAs will therefore necessarily become more important.

According to NPO the possible decline of the open internet can not be prevented only by consultation with the market. NPO bases this view on previous negative experiences with ISPs in terms of traffic shaping, other than on grounds of scarcity of capacity (capping of traffic; see answer to Question1) and the unwillingness to discuss the setup and use of Content Delivery Networks.

The increasing importance of an open Internet for the information society and the economic engine which it offers by its rapid innovation, now justifies

further action. The increase in the number of interventions on Internet traffic by ISPs, for reasons other than congestion, at this stage justifies legislation to safeguard minimum quality levels of the service.

Question 4: To what extent is traffic management necessary from an operators' point of view? How is it carried out in practice? What technologies are used to carry out such traffic management?

NPO holds the opinion that the selective treatment of different kinds of Internet traffic based on technical grounds (eg congestion) is acceptable, provided there is no question of deliberate under-investment in the capacity of a network or the different treatment of certain content types or traffic from certain services or origin or destination. Under-investment is a problem in some cases in The Netherlands. In some ADSL networks over-subscription factors changed from 1:25 to 1:125.

Blocking of traffic from law-offending sites (after being told so by the right agency and/or judge) is acceptable to NPO.

Also acceptable to NPO is traffic management in the case of deliberate cyber attacks (e.g. DDOS or hacking attacks) on request of the owner of the site under attack.

Question 5: To what extent will net neutrality concerns be allayed by the provision of transparent information to end users, which distinguishes between managed services on the one hand and services offering access to the public internet on a 'best efforts' basis, on the other?

The provision of transparent information to end-users will, in our opinion, be a vital starting point. Effective transparency will result in consumer awareness if their legitimate traffic is throttled. And will also lead to calls from within the public for improvement.

Question 6: Should the principles governing traffic management be the same for fixed and mobile networks?

NPO supports principles of net neutrality for both fixed and mobile networks. As stipulated in the Questionnaire the end-to-end principle is one of the central design principles of the internet. In practice, this means that network operators treat packets equally,

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regardless of origin, content type or destination. It has resulted in 'intelligence' being located at the ends of the network, i.e. in the devices and applications that are connected to the network, rather than centralised in the network's core, as is the case for many traditional telecommunications networks. This architectural feature is considered by many to have been a key driver of the growth of the internet to date, and to have facilitated an open environment conducive to the spectacular levels of innovation seen in online applications, content and services.

At a time when more and more Internet services are accessed from mobile devices, preserving an open Internet that is accessible to innovators — regardless of their size or wealth — will promote a vibrant and competitive marketplace where consumers have ultimate control over the content and services delivered through their Internet connections.

Concerning capacity, mobile networks are where fixed networks were several years ago, when there was no issue with net neutrality. By better using the existing techniques in mobile networks (like multicast and LTE broadcast mode) and new innovative network technologies and new bandwidth saving technologies (e.g. in video encoding), the capacity of mobile networks will grow to where broadband fixed networks are today. Principles governing traffic management therefore should be the same for all electronic communication networks.

Question 7: What other forms of prioritisation are taking place? Do content and application providers also try to prioritise their services? If so, how – and how does this prioritisation affect other players in the value chain?

Prioritisation comes in the following forms:²

1. Need-based prioritisation

Only in case of actual congestion are packets delayed/dropped. Could be done on:

- FIFO
- Sender
- Recipient
- (apparent) content or application (deep packet inspection)

² Dialogic Report: Netwerkneutraliteit: stand van zaken in Nederland, 10 juni 2009

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Criteria can be user-friendly (e.g. VoIP gets priority over browsing) or could be commercially driven and have a negative effect on the user.

2. Active prioritisation

This a form of 'non-minimal traffic shaping'. Traffic is divided into 'tiers' and system capacity is assigned to the tiers. The result is that low priority traffic can get affected even if there is no actual system congestion

3. Straight blocking

In this case some traffic is blocked unconditionally

4. User device restrictions

Certain traffic, services or applications are excluded for certain user devices

- by contract
- by identification in network
- by technical blocking in device / by closing the software platform (necessary application not available)

Need-based prioritisation, active prioritisation and straight blocking may be used to reduce competition in services. ISPs may be vertically integrated and perceive application providers (IAPs) and content providers (ICPs) as competitors. These measures may block their traffic or force them to get engaged in exclusive agreements.

The NPO is strongly against using need-based prioritisation, active prioritisation and straight blocking for such aims. The NPO itself, as one of the largest content providers in the Netherlands, does not prioritise its services in any way nor has plans to do so in the foreseeable future.

Question 8: In the case of managed services, should the same quality of service conditions and parameters be available to all content/application/online service providers which are in the same situation? May exclusive agreements between network operators and content/application/online service providers create problems for achieving that objective?

NPO considers managed services to be public communications networks.

Therefore they should all be subject to fair, reasonable and non-discriminatory terms.

In trying to achieve this objective, exclusive agreements between network operators and content/application/online service providers will certainly create

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problems. Investments would be diverted from the open internet to managed services and this would lead to a degradation of the quality of the open internet.

Question 9: If the objective referred to in Question 8 is retained, are additional measures needed to achieve it? If so, should such measures have a voluntary nature (such as, for example, an industry code of conduct) or a regulatory one?

Yes, fair, reasonable and non-discriminatory terms need to be encouraged by the EC through additional mandatory, legislative and regulatory measures. Measures with a voluntary nature will most likely not be sufficient.

Question 10: Are the commercial arrangements that currently govern the provision of access to the internet adequate, in order to ensure that the internet remains open and that infrastructure investment is maintained? If not, how should they change?

No, peering agreements between Tier 1 and other ISPs are subject to a degree of discrimination. Regulation is needed for this intransparent area, which has not been effectively examined since the failed merger between MCI WorldCom and Sprint in 2001.

The plan was to combine MCI WorldCom's long distance business with Sprint's operation. Regulators in the U.S. and Europe prevented this and the deal was cancelled.

NPO recognizes that future investments to safeguard the open character of the internet will have to be formidable and sees technological innovation, for instance in the form of the installation of Content Delivery Networks, as a prerequisite.

To this end adequate regulation of co-location and site sharing of facilities becomes crucial.

Article 12 of Directive 2009/140/EG deals with co-location and sharing of network elements and associated facilities for providers of electronic communication networks. The Article focuses on the sharing of facilities or property, including buildings, access to buildings, wiring of buildings, masts, antennas, towers and other support buildings, ducts, conduits, manholes, cabinets. It is primarily intended to facilitate the coordination of public works

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in order to protect the environment, public health and safety or to meet municipal and country planning objectives. Governments can enforce the shared use of facilities or property (including physical co-location) where this is justified because of the fact that duplication of such infrastructure would be or physically impracticable or economically inefficient.

When conceiving the Article the legislature was thinking primarily in broadcasting systems or transmitting systems for wireless telecommunications facilities.

Broadcasters, such as NPO, call for this Article to also cover services for open Internet and suggests that the Telecommunications Act be modified at this point. The arguments to this purpose are as follows:

The occurrence of congestion in the open Internet is one of the main reasons ISPs are intervening in network traffic. Streaming video is a known, major source of congestion. The sum of all forms of video (TV, video on demand, Internet and P2P) will take up more than 91 percent of all global consumer traffic in the year 2013. Video on the Internet alone will amount to more than 60% of all consumer traffic in the open Internet in 2013 (source: Cisco White Paper "Hyperconnectivity and the Approaching Zettabyte Era"; 9 June, 2009). To accommodate this, growth investments in traditional infrastructure, such as routers, switches and glass fibre, will prove to be economically inefficient, or even physically impossible.

Modern facilities in open Internet infrastructure, such as Content Delivery Network technology, could offer a cost-effective solution. See the answer to Question 1.

Question 11: What instances could trigger intervention by national regulatory authorities in setting minimum quality of service requirements on an undertaking or undertakings providing public communications services?

NRAs should - in the generic sense – be pro-active in keeping track of the growth of demand, by following the various surveys and other news sources in that area. Even more important is to keep track of the opinion of end-users through communication with consumer organisations but also via blogs and expert websites, on how end-users experience different treatment of traffic.

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Question 12: How should quality of service requirements be determined, and how could they be monitored?

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In the past various services were offered to the market which enabled end-users to measure and analyse their connection to the internet and thus to check the behaviour of their ISP on violations of principles of net neutrality. Recently, a number of applications entered the market (particularly the M-Lab made by Google) that allow to disclose the behaviour of ISPs to a broad audience. ISPs which are not open or honest in their policies regarding network neutrality and traffic management may suffer negative effects. And as a result transparency in the market will increase. This allows customers to make more well-informed decisions. Only in markets where (too) little competition exists, this effect is likely to be absent.

The emergence of accessible measuring instruments, which can be used by a wide audience, represents a significant strengthening of the direct transparency. In fact end-users can act as the "eyes and ears" of the government. That government can use "The Wisdom of the Crowds". Many citizens worry about net neutrality and they want to express their opinions. On many forums they list when and if they experience problems with net neutrality. It is therefore important for governments to regularly monitor for signs of problems. The possible lack of reliability of individual measurements will be compensated by the great mass of the auditors and the great number of measuring points and instances. Monitoring costs of governments can be reduced significantly.

Regulation should see to it that ISPs allow aforementioned tools in their networks and are not allowed to mask or hide their capacity choices.

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

Minimum quality of service requirements could best be based on minimum guaranteed bandwidths and throughput and maximum values for lag and jitter. NRAs of countries where similar broadband connections are available to the audience (whether fixed or mobile) should cooperate to impose the same

set of requirements in order to allow for free flow of internet traffic through the networks in and between these countries.

Question 14: What should transparency for consumers consist of? Should the standards currently applied be further improved?

NPO holds the opinion that the different treatment of Internet traffic based on technical grounds (eg congestion) should be allowed, provided there is no question of deliberate under-investment in the capacity of a network. See the answer to Questions 4 and 12. Any measure taken by the ISP should be made known to those end-users that are affected by it. Preferably before the measure is taken. It should be done in language understandable by the end user and related to the extent in which its service is hindered, disrupted or otherwise limited, e.g. in a lower throughput for several hours or the inability to reach certain sites (parts of the network) or use certain services.

Question 15: Besides the traffic management issues discussed above, are there any other concerns affecting freedom of expression, media pluralism and cultural diversity on the internet? If so, what further measures would be needed to safeguard those values?

See the Introduction. Open Internet becomes more and more important in the exercising of the function of public service broadcasting, because the public increasingly uses the content of public broadcasters via this medium. It is therefore of paramount importance that the Internet remains open and transparent and can further grow in its capabilities in order to let public service broadcasting fulfil its tasks and mission.

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Netherlands Public Broadcasting

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With kind regards,

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