Ofcom's approach to net neutrality

Publication date: 24 November 2011

Contents

Section		Page
1	Executive summary	3
2	Introduction	9
3	Competition and consumer choice	13
4	The internet as a source of innovation – citizens and consumers	19
5	The international context	29

Annex		Page
1	Summary of responses to our discussion document	32

Section 1

Executive summary

Growth in the use of the internet delivers substantial benefits, but may also require new approaches to traffic management

1.1 The unprecedented degree of connectivity provided by the internet has delivered substantial benefits:

- consumers are able to access a range of online products and services that would have previously been unimaginable;
- citizens are able to access news and opinion from many more sources than was possible with traditional media, improving the quality of public debate; and
- service providers and owners of content are able to develop innovative new applications, exploiting the large addressable market and low barriers to entry intrinsic to the internet.

1.2 The resulting growth in the use of the internet does however create a challenge for network operators, who must consider how best to meet demand. They are likely to do so partially by investing in new capacity, and partially by rationing existing capacity. Traffic management tools play an important role, increasing the efficiency with which operators can manage existing network capacity.

1.3 The appropriateness of different approaches to traffic management is at the heart of the Net Neutrality debate. Given the controversial nature of this debate, it is important to bear in mind that traffic management is often beneficial. It is commonly used for example to protect safety-critical traffic such as calls to the emergency services. The question is not whether traffic management is acceptable in principle, but whether particular approaches to traffic management cause concern.

1.4 It is possible to identify two broad forms of internet traffic management:

- 'Best-efforts' internet access, under which network operators attempt to convey all traffic on more or less equal terms. This results in an ‘open internet‘ with no specific services being hindered or blocked, although some may need to be managed during times of congestion.
- Managed Services, under which network operators prioritise certain traffic according to the value they ascribe to it. An example may be the prioritisation of a high quality IPTV service over other traffic. This amounts to a form of discrimination, but one that is normally efficiency enhancing.

1.5 Our approach to traffic management recognises the benefits associated with both types of service, and seeks for them to co-exist. Our overall aim is to ensure that consumers and citizens continue to benefit from both innovation in services and investment in networks.

1.6 The tools available to achieve this have recently changed, due to revisions in the EU framework and corresponding UK law. These changes enable regulators to enhance consumer protection, by requiring greater transparency as to the use of traffic

management by network operators, and to protect the quality of 'best-efforts' internet access by setting a minimum quality of service. This document sets out the approach we would currently expect to adopt if we were to consider using these powers.

Understandable information is necessary for all consumers

1.7 To date, the market has generally been an effective mechanism for delivering the benefits described above. Our approach to traffic management will therefore continue to rely primarily on there being effective competition amongst Internet Service Providers (ISPs). Effective competition requires that:

- sufficient information is available to enable consumers to make the right purchasing decisions; and
- consumers are able to act on this information by switching providers where appropriate.

1.8 The complexity of traffic management practices does, however, create a particular challenge for the provision of consumer information that is easy to understand. We recognise this challenge, and suggest that the information provided to consumers should include at least the following elements:

- Average speed information that indicates the level of service consumers can expect to receive.
- Information about the impact of any traffic management that is used on specific types of services, such as reduced download speeds during peak times for P2P software.
- Information on any specific services that are blocked, resulting in consumers being unable to run the services and applications of their choice.

1.9 Furthermore, any marketing terms used to describe services should be simple to understand, and comparable between ISPs.

1.10 In particular, if ISPs offer a service to consumers which they describe as ‘internet access’, we believe this creates an expectation that this service will be unrestricted, enabling the consumer to access any service lawfully available on the internet. As a result, if a service does not provide full access to the internet, we would not expect it to be marketed as internet access.

1.11 It is possible that providers may seek to market a restricted service as 'internet access' by caveating this with a description of the restrictions they have put in place. Consideration needs to be given as to whether this practice is acceptable. We believe this will depend, at least in part, on whether consumers would be able to make sufficiently informed decisions based on such a formulation or whether, in practice, the risk of consumers being misled about the service they are buying remains unacceptably high

1.12 Where consumers are entering into a long-term contract, and it is not possible to provide an appropriate level of information on traffic management policies at the point of sale, we encourage ISPs to provide a cooling-off period offering consumers the ability to terminate the contract or to change to a package that better suits their needs without having to pay additional costs. Many ISPs have already introduced a 30-day

period that enables the consumer to cancel their broadband if they are not happy with the service.

1.13 If there are material changes in traffic management policies once a consumer has purchased a service, ISPs should provide an update as quickly as reasonably possible. If these have a significant impact on the service being purchased, we also encourage the ISPs to provide the consumer with the option of switching to another package or another service provider, and provide information to consumers as to how they can exercise this choice.

1.14 We do not describe what more detailed information might be provided, over and above the desired outcomes set out above. We note, however, that the self-regulatory model recently proposed by major ISPs provides a good foundation. Under this model each ISP commits to:

- provide more information to consumers about what traffic management takes place, why and with what impact;
- provide customers with clear, easy-to-understand information on traffic management so that they can better compare broadband packages, and
- publish a common Key Facts Indicator (KFI) table, summarising the traffic management policy for each package on offer. These tables have been available on signatories' websites since July 2011.

1.15 We welcome this initiative. If properly implemented, and complied with by all providers, the KFI has the potential to provide appropriate, comparable and current information on traffic management policies. This will be of direct benefit to some consumers, but perhaps more importantly, can also underpin the provision of further information by intermediaries, such as reviewers and price comparison websites.

1.16 However, the technical nature of the KFI means that it will not by itself provide information which is accessible and understandable for all consumers. For the current self-regulatory approach to be effective, ISPs need to consider how best to provide such information. We would like to see ISPs approach this challenge creatively, drawing on their own experience, and also on the lessons that can be learned from the sale of other complex products.

1.17 We will monitor progress, and keep under review the possibility of intervening more formally in order to ensure that there is sufficient transparency as to the use of traffic management by network operators.

'Best-efforts' access to the open internet as an engine of innovation

1.18 It has been argued that the success of the open internet in fostering innovation is because it has enabled 'innovation without permission'. Anyone with an idea can, at least in principle, use the open internet as a vehicle for testing their idea in the market.

1.19 The result has been an unprecedented explosion in the availability of new content and services to citizens and consumers. These have transformed a wide range of economic and social activity, including the way we buy and sell goods, consume content (whether music, books or video), play games, search for information, participate in social networks, and so on.

1.20 These services deliver significant benefits to UK citizens. The internet is the first truly global network, allowing us to access news, views and information from anywhere in the world. The result is increased public scrutiny, transparency and accountability.

1.21 Access to the open internet is also increasingly important as a means for citizens to participate in the process of public debate and democracy, and as a means for accessing a range of public services over the internet.

1.22 From the perspective of protecting the citizens' interest alone it will be important to be vigilant in relation to the core connectivity of the 'best-efforts' open internet and the access to information and services which it provides. It is important to note however that we see no concerns in this regard in the UK at present.

1.23 From a consumer perspective, the widespread availability of 'best-efforts' access to the open internet gives rise to the following key economic characteristics:

- low barriers to entry, allowing innovators to create and distribute new services; e.g. anyone who wants to can develop an application or create a website;
- low transaction costs that enable a wider range of transactions; e.g. consumers selling goods on eBay;
- large addressable markets that allow new business models to develop; e.g. for the provision of niche content, by giving suppliers access to a wider audience; and
- near-instant access to content and services; e.g. downloading music, films or books.

1.24 These characteristics have created a virtuous circle, in which all consumers are able to access a wide range of products and services, whilst any service provider can exploit the large addressable market and low barriers to entry intrinsic to the internet to develop innovative new services and to test demand.

1.25 Markets work at their best by enabling a process of experimentation and discovery, under which many ideas are tried, with the successful ones taken forward and the unsuccessful discarded. It is notable that the internet economy has been characterised by the creation of an environment in which a vast number of different individuals and companies have been able to create ideas and test them through a global network that offers a massive potential addressable market. This has been associated with a period of intense and highly productive innovation.

1.26 Our approach to traffic management recognises the benefits associated with both 'best-efforts' internet access, and the provision of managed services, and seeks for them to co-exist.

1.27 There is, however, a risk that network operators prioritise managed services in a manner that leaves insufficient network capacity for 'best-efforts' access to the open internet. If the quality of service provided by 'best-efforts' internet access were to fall to too low a level, then it may place at risk the levels of innovation that have brought such substantial benefits during the internet's relatively short life so far. This would clearly be a significant concern.

1.28 If there was sufficient reason for concern in relation to this issue then we would need to consider intervening in order to ensure that consumers and citizens continue to

benefit from the widespread innovation that has delivered such significant benefits since the internet's creation. We might do so by using the powers which allow us to safeguard 'best-efforts' access to the open internet, in particular by imposing a minimum quality of service on all communications providers.

1.29 Any use of a minimum quality of service would need to be considered carefully, balancing the benefits of such an intervention against the associated risks. We are not, at present, aware of any actual concerns which would merit carrying out such an assessment. However, given the importance of 'best-efforts' access to the open internet for innovation, we will keep this issue under review.

1.30 We will do so as part of the process for reporting on the state of the UK's communications infrastructure[1]. This process requires us to gather data on the coverage, capacity and resilience of the main public networks and services available in the UK, and as part of this process we will also gather data on the approaches to traffic management adopted by different network operators. We will use this to keep under review whether there is a case for intervention.

1.31 There is also a concern that service innovation would be hindered if providers of internet access blocked services, or applied traffic management in a manner that discriminated against competing providers. As well as being a general concern, there is also a specific current concern that some mobile operators already block services provided by some competing providers.

1.32 We do not have a general objection to models of competition where vertically integrated operators do not provide open access to their networks, provided that there is genuine competition and rivalry among the firms. In such circumstances, we do not necessarily regard the blocking of services provided by competing providers, or discrimination against competing services, as being anti-competitive. We do however have a specific concern in the context of the discussion in this document that restricted access to the internet could have a stifling effect on innovation.

1.33 Our stance as a regulator is therefore that any blocking of alternative services by providers of internet access is highly undesirable. Similarly, whilst we recognise that some forms of traffic management may be necessary in order to manage congestion on networks, we expect such traffic management practices to be applied in a manner which is consistent within broad categories of traffic. Where providers of internet access apply traffic management in a manner that discriminates against specific alternative services, our view is that this could have a similar impact to outright blocking.

1.34 We recognise that any regulatory intervention in this area must be based on careful consideration of the risks of unintended consequences, and we recognise that the market is dynamic. Our current view is that we should be able to rely on the operation of market forces to address the issues of blocking and discrimination. There are several examples in recent history of internet service providers providing access to a restricted set of services within a 'walled garden', but business models of this kind have not proven to be sustainable in the face of competition from more open forms of internet access.

1.35 We emphasise however that our ability to rely on market forces to address this issue does depend on effective consumer transparency being provided by internet service

[1] See http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf

providers as to the nature of the services they offer. As discussed above, we encourage service providers to provide information on any services which are blocked or discriminated against, and to avoid marketing services as 'internet access' in circumstances where that use of language might result in poorly informed purchasing decisions, or be misleading.

1.36 We would in any case be concerned if the current blocking of services by mobile operators remained both widespread and persistent, in which case we would need to consider whether the benefits of intervening outweighed the risks. We do not believe such consideration is appropriate at this stage of the development of the market, but this is an issue which we will monitor closely.

1.37 In summary:

- We recognise the benefits associated with 'best-efforts' internet access and the provision of managed services, and seek for them to co-exist.

- We would be concerned if network operators were to prioritise managed services in a manner that leaves insufficient network capacity for 'best-efforts' access to the open internet. In such circumstances we would consider using the powers which allow us to safeguard 'best-efforts' access to the open internet by imposing a minimum quality of service on all communications providers.

- We regard any blocking of alternative services by providers of internet access as highly undesirable. Where providers of internet access apply traffic management in a discriminatory manner, our view is that this could have a similar impact to outright blocking. Our current view is that we should be able to rely on the operation of market forces to address the issues of blocking and discrimination, but we will keep this position under review.

- Effective competition requires that sufficient information is available to enable consumers to make good purchasing decisions. This document sets out our current view as to what we believe to be necessary, both in terms of technical information on traffic management practices, and transparency as to services which are blocked or discriminated against.

Next Steps

1.38 We will monitor progress, and keep under review the possibility of intervening more formally in relation to the issues we have identified in this document. We will do so as part of our ongoing work, within the context of our infrastructure reporting duty, to monitor traffic management practices. We expect to publish our next update on this work in summer 2012.

1.39 As this is a rapidly developing area we will continue to engage with industry, consumer bodies and consumers on any new concerns that may emerge. We will also be working through Body of European Regulators of Electronic Communications (BEREC) to assess market developments at a UK and EU level.

Section 2

Introduction

Growth in internet use delivers substantial benefits, but may also require new approaches to traffic management

2.1 The unprecedented degree of connectivity provided by the internet has delivered substantial benefits:

- consumers are able to access a range of online products and services that would have previously been unimaginable;
- citizens are able to access news and opinion from many more sources than was possible with traditional media, improving the quality of public debate; and
- service providers and owners of content are able to develop innovative new applications, exploiting the large addressable market and low barriers to entry intrinsic to the internet.

2.2 The resulting growth in the use of the internet does, however, create a challenge for network operators, all of whom have finite capacity. Network operators can respond to growth in demand by investing in new network capacity, and/or by rationing existing capacity. The balance adopted between these two strategies will depend on a commercial judgement as to the profitability of investing in additional capacity.

2.3 Rationing network capacity is neither new nor unusual. The only way to avoid rationing is to provide sufficient network capacity for all possible eventualities, but this is likely to be highly inefficient, and would result in consumers paying increased prices for communications services. This is why, for example, traditional voice networks have always been dimensioned based on assumptions about the likely level of calls, accepting that when these levels are exceeded there will be an increased level of failed calls.

2.4 Rationing can either be implicit, due to different services contending for the available capacity, or it can be explicit and associated with some form of 'traffic management'. Explicit rationing via traffic management will often result in significant efficiency gains. It is commonly used, for example, to protect safety-critical traffic such as calls to the emergency services, or to prioritise delay-sensitive traffic.

2.5 The appropriateness of different approaches to traffic management is at the heart of the Net Neutrality debate. It is possible to identify two broad forms of internet traffic management:

- 'Best-efforts' internet access, under which network operators attempt to convey all traffic on more or less equal terms. This results in an ‘open internet’ with no specific services being hindered or blocked, although some may need to be managed during times of congestion.
- Managed Services, under which network operators prioritise certain traffic according to the value they ascribe to it. An example may be the prioritisation of a high quality IPTV service over other traffic. This amounts to a form of discrimination, but one that is normally efficiency enhancing.

2.6 Our approach to traffic management recognises the benefits associated with both types of service, and seeks for them to co-exist. Our overall aim is to ensure that consumers and citizens continue to benefit from both innovation in services and investment in networks.

2.7 To date, the market has generally been an effective mechanism for delivering these benefits. Our approach to traffic management will therefore continue to rely primarily on there being effective competition amongst Internet Service Providers (ISPs). Effective competition requires that:

- sufficient information is available to enable consumers to make the right purchasing decisions; and
- consumers are able to act on this information by switching providers where appropriate.

2.8 The complexity of traffic management practices does, however, create a particular challenge for the provision of useful and understandable consumer information. We discuss this challenge in Section 3 of this document.

2.9 We recognise the importance of barriers to switching, and have a variety of work underway to address them. For example, our Strategic Review of Consumer Switching seeks to improve the consumer experience of switching, across a variety of fixed network services. These barriers are not, however, significantly affected by traffic management, and we do not therefore discuss them in this document.

2.10 We note that there might be circumstances, even in a competitive market, where the quality of 'best-efforts' access to the open internet might be degraded below the level necessary to support continuing service innovation. This would be a major concern, given the level of innovation historically associated with the internet. We discuss how we might respond to such a concern in Section 4 of this document.

2.11 Finally, we note that the provision of managed services inevitably involves a degree of discrimination. Such discrimination is likely to be acceptable as long as its purpose and effect is to enhance efficiency, rather than to restrict competition. We do not discuss discrimination in the provision of managed services in this document, as we would expect to address any competition concerns such discrimination might entail using either our *ex post* powers under the Competition Act or our *ex ante* powers under the Revised Framework in relation to access and interconnection.

Net Neutrality as a new policy objective under the Revised Framework

2.12 The reason why it is particularly appropriate for Ofcom to set out its approach to Net Neutrality now is that the revised EU framework, which has recently been transposed into UK law, contains a new policy objective to promote Net Neutrality.

2.13 In particular, Article 8(4)(g) of the Framework Directive now includes an objective for regulators to promote the interests of citizens of the EU by:

"promoting the ability of end-users to access and distribute information or run applications and services of their choice"

2.14 The revised framework also provides associated powers for regulators to achieve that objective. In particular, Article 20 of the Universal Service Directive plays an

important role, by strengthening the minimum contractual protections for consumers across the EU in order to improve the quality of information provided to them. In the UK, we have already modified General Condition 9[2] to reflect those protections under UK law. That Condition now includes a requirement that new consumer contracts must specify in a clear, comprehensive and easily accessible form:

"information on any procedures put in place by the undertaking to measure and shape traffic so as to avoid filling or overfilling a network link, and information on how those procedures could impact on service quality"

2.15 Article 21 of the Universal Service Directive sets out further minimum requirements related to consumer transparency and publication of information. These enable regulators to set new obligations on communications providers. Article 21 also notes that regulators may, if deemed appropriate, promote self or co-regulatory measures prior to imposing any obligations.

2.16 Article 22(3) sets out a new provision which enables regulators to impose minimum quality of service obligations on providers. This was implemented by a modification to Section 51 of the Communications Act, which allows Ofcom to set general conditions which:

"in order to prevent the degradation of service and the hindering or slowing down of traffic over networks, impose minimum requirements in relation to the quality of public electronic communications networks"

2.17 The harmonisation measures brought on by the Revised Framework have generated a debate on Net Neutrality throughout the EU. A similar debate has taken place globally with different NRAs exploring alternative approaches to ensure consumer transparency and a well-functioning market. We have highlighted the American, French and Dutch approaches below as they have formalised their approaches to net neutrality[3]:

- ARCEP, the French regulator, has published a set of non-binding recommendations providing general direction and principles. These state that as a general rule, there should be no differentiated traffic management in access to the internet[4]. Where there might be exceptions to this principle, they must still comply with general principles of relevance, proportionality, efficiency, non-discrimination between parties and transparency.

- The FCC in the US has proposed three net neutrality regulations which are not yet law. These introduce new rules on transparency and clarify the types of blocking permitted for fixed and mobile broadband[5]. Fixed providers are not permitted to block lawful content, services, non-harmful devices or applications, including those competing with their own voice/video telephony services. Mobile broadband providers are prevented from blocking lawful websites and VoIP/video telephony services only when they compete with their own services.

- The Netherlands has recently passed legislation to ban its mobile telephone operators from blocking or charging consumers extra for using internet-based communications services such as Skype. The measure was adopted with a broad

[2] For more information see http://stakeholders.ofcom.org.uk/consultations/gc-usc/?a=0
[3] We present more detail on the international context in Section 6
[4] http://www.arcep.fr/uploads/tx_gspublication/net-neutralite-orientations-sept2010-eng.pdf
[5] http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db1223/FCC-10-201A1.pdf

majority in the lower house of the Dutch Parliament. The bill must now pass through the Dutch Senate before becoming law.

Previous Ofcom publications

2.18 In June 2010 we published a discussion document on 'Traffic Management and Net Neutrality'.[6] We sought views from stakeholders on a range of questions, and said that we would take these views into account when we input into the European Commission's Consultation on Net Neutrality. A summary of responses is provided at Annex 1 to this document, and the approach to Net Neutrality which we set out in this document takes those responses into consideration.

[6] http://stakeholders.ofcom.org.uk/consultations/net-neutrality/

Section 3

Competition and consumer choice

3.1 Competition amongst Internet Service Providers (ISPs) is only likely to be effective if:

- sufficient information is available to enable consumers to make the right purchasing decisions; and
- consumers are able to act on this information by switching providers where appropriate.

3.2 The complexity of traffic management practices creates a particular challenge for the provision of consumer information that is easy to understand. In this Section we discuss what we believe must be achieved.

3.3 We recognise the importance of barriers to switching, and have a variety of work underway to address them. For example, our Strategic Review of Consumer Switching seeks to improve the consumer experience of switching, across a variety of fixed network services. These barriers are not, however, significantly affected by traffic management, and we do not therefore discuss them in this document.

Basic principles for the provision of clear consumer information on traffic management

3.4 A number of responses to our discussion document highlighted the importance of ISPs providing information on traffic management policies which is of use to consumers. More generally, our work on broadband speeds[7] illustrates the importance of such information.

3.5 Providing clear information on such a complex subject is challenging. We have identified six principles that can help suppliers provide good traffic management information for consumers. They are based on a number of our past projects including the 2006 *Consumer Policy Statement* which outlined the role we need to take in consumer information and the need for consumers to have access to comparative information[8].

3.6 These principles suggest that consumer information should be:

- **Appropriate** – ISPs should disclose all information, and only such information, that a consumer needs to make an informed decision.
- **Accessible** – Basic information should be available at the point of purchase, and more detailed technical information should be readily accessible online or on request.
- **Understandable** – Information should be simple enough for consumers to be able to understand the practical impact of traffic management policies on the way they may use the internet service.

[7] http://stakeholders.ofcom.org.uk/binaries/telecoms/cop/bb/Mystery_shopping_report.pdf
[8] Other information can be found in the accreditation scheme and consumers' rights to an alternative disputes resolution (ADR) scheme on the back of customer's bills.

- **Verifiable** – Consumers or third parties (e.g. intermediaries such as price comparison websites) should be able to verify any information provided.

- **Comparable** – Consumers should be able to compare information provided by different providers.

- **Current**– The information available to consumers should be up-to-date, both at the point of sale and subsequently.

3.7 These principles require a trade-off between simplicity and completeness. This is a difficult balance, and there is unlikely to be a single right approach. For example, third party intermediaries may be able to make use of information which is complete but complex, whereas many consumers are likely to require a simple summary of those traffic management policies which have most impact on the services they wish to use.

3.8 There is also an important trade-off between the completeness of consumer information provided at the point of sale, and the ease with which consumers can subsequently switch. Where consumers are entering into a long-term contract, for example, it is particularly important that comprehensive information on traffic management policies is available at the point of sale.

3.9 Where it is not possible to provide such information, we encourage ISPs to provide a cooling-off period offering consumers the ability to terminate the contract or to change to a package that better suits their needs without having to pay additional costs. Many ISPs (fixed and mobile) have already introduced a 30-day period that enables the consumer to cancel their broadband if they are not happy with the service.

3.10 Whilst we recognise these complexities, our view is that any information provided should include at least the following elements:

- Average speed information that indicates the level of service consumers can expect to receive.

- Information about the impact of any traffic management that is used on specific types of services, such as reduced download speeds during peak times for P2P software.

- Information on any specific services that are blocked, resulting in consumers being unable to run the services and applications of their choice.

3.11 If there are material changes in this information once a consumer has purchased a service, ISPs should provide an update as quickly as reasonably possible, probably via electronic means (e-mail or SMS). If these have a significant impact on the service being purchased, we also encourage the ISPs to provide the consumer with the option of switching to another package or another service provider, and provide information to consumers as to how they can exercise this choice.

3.12 Finally, any marketing terms used to describe services must be simple to understand, and comparable between ISPs.

3.13 In particular, if ISPs offer a service to consumers which they describe as ‘internet access’, we believe this creates an expectation that this service will be unrestricted, enabling the consumer to access any service lawfully available on the internet. As a

result, if a service does not provide full access to the internet, we would not expect it to be marketed as internet access. .

3.14 It is possible that providers may seek to market a restricted service as 'internet access' by caveating this with a description of the restrictions they have put in place. Consideration needs to be given as to whether this practice is acceptable. We believe this will depend, at least in part, on whether consumers would be able to make sufficiently informed decisions based on such a formulation or whether, in practice, the risk of consumers being misled about the service they are buying remains unacceptably high

We do not describe what more detailed information might be provided, but note that the self-regulatory model proposed by major ISPs is a good foundation

3.15 Voluntary approaches such as the Broadband Speeds Code[9] can be an important means by which ISPs provide information to consumers. However, for such approaches to be effective the information provided must be properly specified, and all ISPs must participate in the scheme.

3.16 A number of ISPs[10] have recognised the need to provide clearer information to consumers on traffic management, and this has led to the development of a traffic management transparency code[11]. This was launched in March 2011 and ISPs who have signed up to the Code of Practice have committed to:

- provide more information to consumers about what traffic management takes place, why and with what impact;
- provide customers with clear, easy-to-understand information on traffic management so that they can better compare broadband packages, and
- publish a common Key Facts Indicator (KFI) table, summarising the traffic management policy for each package on offer. These tables have been available on signatories' websites since July 2011.

3.17 The KFI is a significant part of this code of conduct as it provides a common template for comparable information. It is being piloted to gather feedback from consumers, consumer bodies and other interested parties in order to refine the template in the future. It is set out in a general form below.

Figure 1: The KFI developed by industry and the Broadband Stakeholder Group

Section 1: Traffic management in relation to your broadband product (not including during busy times and places to manage network congestion see Section 2)
Name of broadband product

9 http://stakeholders.ofcom.org.uk/binaries/telecoms/cop/bb/cop.pdf

10 Signatories in March 2011 at the launch of the code were BSkyB, BT, Everything Everywhere, O2, TalkTalk, Three, Virgin Media and Vodafone.

11 http://www.broadbanduk.org/content/view/479/7
The KFI is a voluntary commitment by the major fixed and mobile UK ISPs to provide better and more easily comparable information in relation traffic management policies which has been led by the Broadband Stakeholder Group. The information will be provided in the form of a table outlining what services might be prioritised or slowed down at peak times, download caps and limits as well as a breakdown of traffic management used on different traffic types.

Use and availability of services, content, application and protocols on this product		
Are any services, content, applications or protocols always blocked on this product?		Y/N
If so what?	*List*	
Are any services, content, applications or protocols always prioritised?		Y/N
If so what?	*List*	
Are any managed services delivered on this product?		Y/N
If so what? What impact?	*This would highlight prioritisation of specific content or service and explanation of impact on any other traffic*	
Data caps and downloads		
What are the download/upload limits or data usage caps on this product?		Insert
Is traffic management used to manage compliance with data caps and download limits?		Y/N
Under what circumstances?		
Level of speed reduction?		
Duration of speed reduction?		
Is traffic management used in relation to heavy users?		Y/N
Under what circumstances?		
Level of speed reduction?		
Duration of speed reduction?		

Section 2: Traffic management to optimise network utilisation (what happens during busy times and places in addition to traffic management as described in section 1)		
Is traffic management used during peak hours?	Y/N	
When are typical peak hours?	Weekdays:	Weekends:
What type of traffic is managed during these periods?		

Traffic type	*Blocked*	*Slowed down*	*Prioritised*
Peer to Peer (P2P)			
Newsgroups			
Browsing/email			
VOIP (Voice over IP)			
Gaming			
Audio streaming			
Video streaming			
Music downloads			
Video downloads			
Instant messaging			
Software updates			

3.18 We welcome the KFI initiative. If properly implemented, and complied with by all providers, it has the potential to provide appropriate, comparable and current information. We understand that the KFI is currently being piloted and we will monitor progress.

3.19 One of the challenges associated with the KFI is whether the information provided by ISPs is verifiable. Some information (e.g. blocked sites) is straightforward to verify, but this is more difficult for other information (e.g. whether certain traffic is being slowed down). Our view is that third party intermediaries as well as more technically literate consumers may play a role here, as is currently the case for line-speed measurements.

3.20 We recognise however that there may be certain types of information which can only be independently verified by Ofcom. Where this is the case, we will gather and review this information as part of the process for reporting on the state of the UKs communications infrastructure[12]. This process requires us to gather data on the coverage, capacity and resilience of the main public networks and services available in the UK, and as part of this process we will also gather data on the approaches to traffic management adopted by different network operators.

More needs to be done to provide information which is accessible and understandable for all consumers

3.21 The technical nature of the KFI means that it will not by itself provide information which is accessible and understandable for all consumers. It may however underpin the provision of information by a variety of intermediaries, such as price comparison websites, online reviews, computer magazines and so on.

3.22 Content and service providers can also play a valuable role in providing more detailed information to consumers; services such as Skype's quality of service indicator, and the BBC's proposed iPlayer experience updates, can provide important information about a service at the point of use. We welcome initiatives such as these in providing clear, real-time information to consumers.

3.23 It may be possible to learn some lessons from other markets in which consumers purchase technically complex products. For example, purchasing a car does not necessarily require expert knowledge of how cars work. Instead information is provided through multiple routes to consumers:

- Standard metrics cover headline indicators of performance, such as fuel consumption and acceleration. These offer consumers a simple and familiar reference point from which to assess a car's performance base.
- Detailed specifications are also provided. These may be used by more technical consumers, as well as third parties such as car review magazines.
- Consumers can arrange a test drive to see for themselves how the technical specification translates into a consumer experience.

3.24 We have researched[13] how traffic management information can be presented to consumers. The accompanying report can be found at Annex 2. The key findings were:

- Providing information in numerical terms helps consumers to make, on average, better choices than using colour-coding as it allows them to assess more clearly the differences between packages.

[12] See http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf

[13] We commissioned London Economics to undertake a behavioural experiment to assess the ability of consumers to purchase the right broadband package when presented with different types of comparable information. Subjects of the experiment were assigned a usage profile and asked to choose between two broadband internet packages. The information was comparable and the key aspect tested was the relative performance of subjects when they faced different types of information and/or information presented in different ways.

- Some consumers benefit from colour coding: this demonstrates the value of colour coding in environments where consumers are uncertain about which information they need to make a good choice.

- In cases where consumers are confused about what might suit their needs, they often rely on price as a guide, instead of more relevant information. This leads them to select more expensive packages when a cheaper package may be as good, or better, given their requirements.

- Consumers benefit from relevant and clearly-presented information, cutting out superfluous facts, as this enables them to focus on the key elements of the service.

- The quality of choices improves over time as consumers learn from their mistakes.

3.25 This research confirms that the appropriate presentation of information can improve consumers' ability to select the best broadband package, and that tailoring information to the consumer supports better decision making. It also shows that presenting information effectively is a significant challenge. In particular, it illustrates how presenting information on technical features (e.g. speed, usage caps, etc) and then letting consumers draw their own conclusions on what this means in terms of the quality of the services they will receive, causes them to make sub-optimal choices in a large proportion of cases.

3.26 For the current self-regulatory approach to be effective, ISPs need to consider how best to provide information which is accessible and understandable. We would like to see ISPs approach this challenge creatively, drawing on their experience providing broadband internet access to consumers, and also on the lessons that can be learned from the sale of other complex products.

3.27 We acknowledge the complexity of this challenge. We will monitor progress, and keep under review the possibility of intervening more formally in order to ensure that there is sufficient transparency as to the use of traffic management by network operators

Section 4

The internet as a source of innovation – citizens and consumers

4.1 This Section sets out our proposed framework for assessing whether the market is delivering good outcomes for citizens and consumers in relation to the use of traffic management. We consider the argument that the open internet is a source of innovation and that under certain circumstances it may be necessary to intervene to protect this.

4.2 We focus in this Section on our powers to impose a minimum quality of service, in order to protect the quality of 'best-efforts' access to the open internet. We set out our current view of the analytical framework that we would apply if we were to consider using these powers.

4.3 As noted, we expect 'best-efforts' internet access to co-exist with the provision of managed services. The provision of managed services inevitably involves a degree of discrimination, as the service provider will normally prioritise traffic which has higher value. Such discrimination is likely to be acceptable as long as its purpose and effect is to enhance efficiency, rather than restrict competition. We do not discuss discrimination in the provision of managed services in any detail in this document. To the extent it does create competition concerns, we would expect to address these using the standard competition framework (either our *ex post* powers under the Competition Act or our *ex ante* powers under the Revised Framework in relation to access and interconnection).

The importance of innovation over the open internet; citizens and consumers

4.4 It has been argued that the success of the open internet in fostering innovation is because it has enabled ‘innovation without permission’. Anyone with an idea can, at least in principle, use the open internet as a vehicle for testing their idea in the market.

4.5 The result has been an unprecedented explosion in the availability of new content and services to consumers. These have transformed a wide range of economic and social activity, including the way we buy and sell goods, consume content (whether music, books or video), play games, search for information, participate in social networks, and so on.

4.6 Many of these services are beneficial from a citizen as well as from a consumer perspective. The internet is the first truly global network, allowing us to access news, views and information from anywhere in the world at any time of the day or night. It allows individuals to become citizen journalists, bloggers and commentators. It has led to the opening up of a huge number of new sources for journalism, providing commentary, images and video. The result is increased public scrutiny, transparency and accountability. Whilst there are areas of controversy (for example, the rights and wrongs of Wikileaks) this phenomenon is in our view overwhelmingly a force for good.

4.7 Access to the open internet is also increasingly important as a means for citizens to participate in a public debate and democracy, and as a mean for accessing public services over the internet. In March this year the Government published its ICT Strategy[14], which focuses on the creation of a common ICT infrastructure to deliver better public services. This is complemented by an open approach to government data, intended to enable the provision by the private sector of innovative new public services to citizens.

4.8 For these reasons alone it will be important to be vigilant in relation to the core connectivity of the 'best-efforts' open internet and the access to information and services which it provides. It is important to note however that we see no concerns in this regard in the UK at present.

4.9 More broadly, the widespread availability of 'best-efforts' access to the open internet gives rise to the following key economic characteristics:

- low barriers to entry, allowing innovators to create and distribute new services; e.g. anyone who wants to can develop an app or create a website;
- low transaction costs that enable a wider range of transactions; e.g. consumers selling goods on eBay;
- large addressable markets that allow new business models to develop; e.g. for the provision of niche content, by giving suppliers access to a wider audience; and
- near-instant access to content and services; e.g. downloading music, films or books.

4.10 These characteristics create a virtuous circle, in which all consumers and citizens are able to access a wide range of services, whilst any service provider can exploit the large addressable market and low barriers to entry intrinsic to the internet to develop innovative new applications, and to test demand.

4.11 Markets work at their best by enabling a process of experimentation and discovery under which many ideas are tried with the successful ones taken forward and the unsuccessful discarded. It is notable that the internet economy has been characterised by the creation of an environment in which a vast number of different individuals and companies have been able to create ideas and test them through a global network that offers a massive potential addressable market. This has been associated with a period of intense and highly productive innovation.

4.12 Ofcom's general approach to economic regulation is to start with the framework of competition analysis in considering the case for intervening in a market. Regulators are able to protect consumers from harm but will only do so where the advantages of intervention would be likely to outweigh the disadvantages.

4.13 This framework could be used as a method for balancing the advantages and disadvantages of intervening to protect access to the open internet. Such protection could be achieved by, for example, requiring that ISPs provide access to all online applications and services. This could lead to a conclusion that intervention is justifiable only in cases where there is an identifiable risk of market failure – demonstrated, for example, by an absence of effective competition.

[14] http://www.cabinetoffice.gov.uk/resource-library/uk-government-ict-strategy-resources

4.14 In principle, this competition framework extends to include the promotion of innovation. While normally it is used to identify direct forms of harm such as high prices or low quality of service, it can go beyond price and quality and be extended to include detriment caused by the lack of availability of services over a network. In theory, if there is effective competition, an ISP will not impose detrimental conditions upon either consumers or service providers, for fear of losing consumers and service providers to rivals.

4.15 Therefore, under ideal competitive conditions, firms have an incentive to adopt new ideas that offer consumer benefits in order to attract and retain customers. Any individual innovator who wants to offer a new service should have competing offers from firms offering a route to market, each wishing to gain an advantage over rival platforms. This would be true even where the market was characterised by vertical integration between network operators and service providers, or if no firms provided 'best-efforts' access to all services. Provided there were sufficient firms acting under sufficient degrees of rivalry to make the market truly competitive, a large number of opportunities to offer innovative services would be taken, and innovations which had the potential to create benefits could flourish.

4.16 This implies that only where there is evidence of market failure would Ofcom intervene to impose an arrangement in which ISPs are required to provide open access, for example via the 'best-efforts' internet, between consumers and online service providers.

4.17 However, market power is a continuous rather than a discrete variable, which is of particular relevance in communications markets which are often oligopolistic. Custom and practice has established that intervention by a regulator or competition agency is normally appropriate only where firms have dominance or 'significant market power'. This is an estimate of a level of market power at which a firm has the capability to impose significant detriment upon its customers, usually represented by the ability to impose profitably a notional 5-10% increase in price (i.e. the SSNIP[15]test).

4.18 In general, the use of this threshold works well as a means of identifying situations where consumers' interests may be jeopardised. However, a mechanistic application of this framework may not always be appropriate. In particular, it is possible that an oligopolistic market provides sufficient competition to ensure that prices are not significantly above the competitive level, but constrains innovation by providing only a limited number of judges of good ideas.

4.19 In such circumstances, an innovator trying to get his or her idea for a service adopted would need to convince one of a small number of network operators that his or her idea has a good chance of success. Where innovation is of particular importance, as here, a departure from the standard competition-based approach may therefore be justified. In order to ensure continuing 'innovation without permission', it might be appropriate to introduce a minimum quality of service to be provided by all network operators, in a manner that is not dependent on a finding of significant market power.

4.20 Any intervention to introduce a minimum quality of service would need to be carefully considered, as there is the possibility of unintended consequences. These might include:

- the likely negative effects on the incentive to build a network and maintain its capacity in the first place, if open access is to be required; and

[15] Small but Significant Non-transitory Increase in Price

- the possibility of regulatory failure.

4.21 It is therefore important to consider in more detail the specific forms of market failure that might lead to us considering such an intervention.

Potential market failures associated with direct and indirect network effects

4.22 The value of many networks depends on the number of members connected to them, because each additional member creates additional potential value for the existing members by offering the opportunity for more interaction. Thus, the greater the number of connections within a network, the more useful and valuable the network becomes.

4.23 This is particularly relevant for internet access, as the internet is a network of networks. Potential market failures associated with direct network effects include:

- A new member joining confers benefits on existing members, and these benefits are not typically taken into account by the potential joiner. This can lead to sub-optimally low membership. For example social networks become more valuable the more people they include within the network. If an ISP were to block a social network, this would lead to a loss of value not only to that ISP's customers, but also to other members of the social network being blocked. This is a direct network effect or externality, which could be internalised by market participants, but might not be[16].

- If competing networks are established, there is a potential gain from their being connected with each other. There are incentives on network operators to do this, but they may be offset by other factors so that interconnection does not take place.

- Consumers may choose networks on the basis of a price/quality trade off which does not include considering the effects of that choice on other users. This could be an issue, for example, in the delivery of video calling, which requires a higher level of service than text or voice. If a person on a higher-quality network wanted to make a video call to a person on a lower-quality network, the call would take place at the lower level of quality, and there is a risk that this lower level of quality would render the call impossible, or reduce the value of the call to both parties.

4.24 These types of concerns are not new, and have historically arisen in relation to telephony. In the case of telephony they are addressed by end-to-end connectivity obligations and quality of service agreements, which ensure that services are available and able to be delivered.

4.25 In addition to these direct network effects, there is a potentially more important concern related to indirect network effects. These indirect network effects arise because each side of the internet access market feeds off the other - consumers benefit from access to services, and service providers benefit from access to consumers.

[16] In practice, if the effect is large, because the existing group of customers on the social network is large, there is likely to be a significant amount of countervailing power on the part of the social network. For example, an ISP attempting to block Facebook would probably find that it was a difficult position to maintain.

4.26 In many markets where there are indirect network effects of this kind there is no need for intervention, because participants have the incentive to take these effects into account. However, in some cases, a kick-start to one side of the market is needed to encourage development. A reasonable-quality 'best-efforts' open internet has the potential to provide the necessary kick-start by supplying a large addressable customer base. However, if a service does not work with users on low-quality networks, then a poor quality 'best-efforts' internet may inhibit the development of new services.

4.27 This could be particularly relevant for high bandwidth delay-sensitive applications such as live video calling or multi-player online gaming, as both benefit from good quality access to a large number of potential participants. If such applications were unable to launch due to poor quality networks hindering their business case, there may be no incentive to upgrade networks as the services that require improved quality would not exist. A situation of unexploited opportunities for innovation could be the outcome if market developments favoured the provision of services for which prioritisation was paid for over the provision of a good quality 'best-efforts' service. In that case, there might be a need to intervene, perhaps using the power to impose a minimum quality of service.

4.28 The potential gains from innovation, and the role of connectivity in promoting it, also underlines the importance of addressing the concerns dealt with in Section 3, concerning the extent to which consumers are well informed about traffic management and are able to switch supplier easily. An outcome of a lack of effective connectivity should not arise as a result of the market failing to reflect properly consumers' preferences. Such a failure in any market is destructive of welfare, and therefore undesirable, but in internet access markets the destructive effect may be many times greater because of the effect on the opportunities for innovation.

Specific concerns raised by stakeholders

4.29 Stakeholders have expressed concern that:

- Content and application services might be excluded, for example by being blocked by ISPs that operate similar services, or by the discriminatory application of traffic management practices. This was raised by stakeholders as a general concern, and as a specific example where mobile network operators prohibit access to services, e.g. VoIP.

- The market may develop in a way in which ISPs could become a 'competitive bottleneck' and use their position as gatekeepers between consumers and service providers to charge service providers for access, in addition to charging consumers for their broadband connection. This could lead to new barriers for innovators who might need to pay an access fee to reach consumers, or risk being blocked.

- The 'best-efforts' internet might be hindered if ISPs offered paid-for priority services that receive favourable transmission at the expense of services using 'best-efforts' capacity.

Exclusion and blocking of services and traffic management restrictions on fixed broadband

4.30 Fixed broadband providers often manage congestion by using traffic management tools targeted at individual consumers. This is typically achieved by imposing usage

caps on consumers, and sometimes by throttling the traffic of particularly heavy users.

4.31 Fixed broadband providers also manage congestion by giving priority to specific services. For example, it is common for providers to manage network loading at peak times by slowing traffic based on peer-to-peer protocols, which are typically used for file-sharing. Some providers also prioritise delay-sensitive applications, for example BT Vision content is prioritised for BT customers.

4.32 Transparency in the application of such policies is vital if consumers are to be in a position to exercise choice. As discussed above, there is certainly scope to improve the quality of consumer information in this area. But we also note there is currently little evidence that these traffic management policies are resulting in specific consumer harm that outweighs the benefits of congestion management, and so we do not currently propose to intervene in order to provide specific protections for quality of service. However, the market is developing rapidly and new commercial models may emerge which could require us to re-assess this position.

Blocking of services and traffic management restrictions on mobile broadband

4.33 Mobile networks operate a range of traffic management policies that are similar to those used by fixed networks, but which also reflect these additional capacity constraints associated with mobile networks. Like fixed networks, they can enforce usage caps, throttle access for particularly heavy users, enforce usage caps, and prioritise particular services. Our position on these practices is the same as for providers of fixed broadband, and emphasises the importance of consumer transparency.

4.34 In addition, and in contrast to the position adopted by fixed networks, some mobile networks also block specific services. In particular, Skype argued to us that three of the five mobile network operators "*impose wide-ranging restrictions*"[17]on online services, and that this is leading to consumer harm by limiting consumer choice and innovation:

"*Consumer and citizen harm through unconstrained traffic management is both in evidence and widespread in the UK market for mobile access to the internet…Unconstrained traffic management is already having a negative impact on innovation, both in the ICT sector and the wider economy*."[18]

4.35 We have reviewed the restrictions set out by the mobile network operators, for residential pay monthly contracts and data packages. We note that:

- T-Mobile[19] and Orange state[20] that they prohibit access to VoIP, messenger services and streamed content not provided by T-Mobile and Orange.
- Vodafone prohibits VoIP access on some packages; typically lower-value ones under £40/month[21]. For these lower-value packages VoIP may be added but requires an additional £15/month charge.

[17] Page 5 of Skype's response available at http://stakeholders.ofcom.org.uk/binaries/consultations/net-neutrality/responses/Skype.pdf
[18] Pages 5 and 6, Skype's Response available here - http://stakeholders.ofcom.org.uk/binaries/consultations/net-neutrality/responses/Skype.pdf
19 http://www.t-mobile.co.uk/shop/terms-and-conditions/pay-monthly-deals/
20 http://www1.orange.co.uk/mobileterms/pdfs/PAYM-Animal-Packages-Terms-20110414.pdf

- O2[22]does not prohibit access to any service. We note however that, in common with other operators, it does manage peer-to-peer traffic, and that this can have an impact on services such as Skype which use peer-to-peer protocols.

- Three does not prohibit access to any service. In addition to permitting consumers to use services such as Skype within its standard data allowance, Three has developed a customised offering which provides a limited range of Skype services outside the standard data allowance. It therefore appears that Three has sought to differentiate its service based on Skype's availability and quality on its network.

4.36 The blocking of services by mobile network operators is a potential area of concern, since it may restrict choice and stifle innovation. We do not have a general objection to models of competition where vertically integrated operators do not provide open access to their networks, provided that there is genuine competition and rivalry among the firms. In such circumstances, we do not necessarily regard the blocking of services provided by competing providers, or discrimination against competing services, as being anti-competitive. We do however have a specific concern in the context of the issues discussed in this document that restricted access to the internet could have a stifling effect on innovation.

4.37 Our concern is only partly mitigated by the fact that blocking is only implemented by some operators. Blocking by a significant subset of network operators does have the potential to hinder innovation, by limiting the addressable market available to service providers.

4.38 However, we also recognise that the provision of VoIP over mobile networks is a relatively recent development, and one which is rapidly evolving. As a result, there is now a greater degree of consumer choice than when we last considered VoIP access via mobile networks.[23] We note in particular that:

- Three has offered Skype through specialised handsets since 2007, and VoIP applications for smart-phones were first made available on the Apple app-store in 2008.

- Since then smart-phone take-up has grown, but they are not yet used by all consumers. In Q1 2011 smart-phones were used by 27% of adult UK consumers and by 47% of UK teenagers[24].

- In 2010 O2 altered its policy to allow VoIP access.

4.39 We also note that historically some fixed networks have also blocked services, with ISPs such as AOL or Compuserve providing access only to a 'walled garden'. However, as the market for fixed internet access evolved, this proved to be an unsustainable competitive strategy.

---

21 http://help.vodafone.co.uk/system/selfservice.controller?CMD=VIEW_ARTICLE&PARTITION_ID=1&CONFIGURATION=1000&ARTICLE_ID=2331&CURRENT_CMD=BROWSE_TOPIC&SIDE_LINK_TOPIC_ID=56742&SIDE_LINK_SUB_TOPIC_ID=56747&SIDE_LINK_TOPIC_INDEX=null&SIDE_LINK_SUB_TOPIC_INDEX=null

22 http://www.o2.co.uk/termsandconditions/broadband

23 In Ofcom, "Mobile Evolution", December 2009, http://stakeholders.ofcom.org.uk/binaries/consultations/msa/statement/MSA_statement.pdf

24 http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/telecoms-networks/

4.40 Our stance as a regulator is that any blocking of alternative services by providers of internet access is highly undesirable, because of the potential effect on innovation. Similarly, whilst we recognise that some forms of traffic management may be necessary in order to manage congestion on networks, we expect such traffic management practices to be applied in a manner which is consistent within broad categories of traffic. Where providers of internet access apply traffic management in a manner that discriminates against specific alternative services, our view is that this could have a similar impact to outright blocking.

4.41 We recognise that any regulatory intervention in this area must be based on careful consideration of the risks of unintended consequences and, as discussed above, we recognise that the market is dynamic. Our current view is that we should be able to rely on the operation of market forces to address the issue of blocking.

1.40 We emphasise however that this does rely on effective consumer transparency being provided by ISPs. As set out in Section 3, we encourage service providers to provide information on any services which are blocked or discriminated against, and to avoid marketing services as 'internet access' in circumstances where that use of language might result in poorly informed purchasing decisions, or be misleading.

4.42 We would be concerned if the blocking of services by mobile operators remained both widespread and persistent, in which case we would need to consider whether the benefits of intervening outweighed the risks. We do not believe such consideration is appropriate at this stage of the development of the market, but this is an issue which we will monitor closely.

Internet access as a two-sided market, and the effect of ISPs charging for the provision of managed services

4.43 ISPs participate in a two-sided market. On one side of the market, consumers want to access the internet. On the other side of the market, service providers want to reach consumers. In principle therefore ISPs can recover the costs associated with the provision of internet access from both sides of the market.

4.44 At present, costs are recovered primarily from consumers through their broadband access fees. However, where ISPs provide a managed service with some form of quality of service guarantee, it may be appropriate for the ISP to charge the service provider. For example, a service provider wishing to provide a high quality IPTV service might be willing to pay for the quality of service guarantee required to deliver such a service, and be able to recover this cost from the revenues generated.

4.45 Charging for the provision of a managed service seems to us to be reasonable as a general principle, but the question of how far such charges should extend is controversial. A number of service providers have expressed concern about the possibility that they might only be able to reach consumers if they make a payment to the consumer's ISP.

4.46 This creates several different risks:

- There is the risk of a new competitive bottleneck emerging, where ISPs seek to extract fees from content and application providers by setting prices above the level that would occur in a competitive market.

- There is the risk that ISPs will set prices which discriminate between different services, restricting the ability of new entrants to launch services. This is a

particular risk when the ISP is vertically integrated and is in direct competition with those new entrants, e.g. if both provided an IPTV service.

- Even where prices are at a competitive level, they are likely to increase transaction costs for online services, by making it necessary for new online service providers to conduct access negotiations with multiple ISPs.

4.47 When considering these risks from a competition perspective our initial position is that pricing and access arrangements are a commercial matter between parties and that two-sided markets operate well for consumers in a number of other areas. Therefore, where there is no market power there is no *prima facie* reason to prevent two-sided markets developing, and ISPs and content and application providers should be free to explore new business models that can result in more efficient investment in networks and services.

4.48 Furthermore, in circumstances where there is a finding of significant market power, or dominance, and the approach to pricing adopted by ISPs creates competition concerns, we would expect to address these using the standard competition framework (either our *ex post* powers under the Competition Act or our *ex ante* powers under the Revised Framework in relation to access and interconnection).

4.49 However, once more we believe special attention needs to be paid to the potential effects on innovation. If charges from ISPs to service providers were to become the norm for a wide range of services, the resulting increases in transaction costs could have a significant effect on innovation in internet-based services. This would be a particular concern given the likelihood that for many internet-based transactions the transaction costs could represent a significant fraction of the transaction value. For example, the value of a single click-through from an advertisement on a social network web site is small, especially at the point in time when the social network is a new entrant to the market, so a modest level of transaction costs could have a substantial impact on market entry.

4.50 Our view is that the best way to address this concern is to not hold back the development of managed services. Instead we should ensure that managed servicers continue to co-exist with ‘best-efforts’ access to the open internet, and that this ‘best-efforts’ access is of sufficient quality to support those internet-based services which are particularly dependent on low transaction costs and a large addressable market. We discuss below the circumstances under which we might intervene to ensure such co-existence.

4.51 One potential special case which is worthy of note is where the content provider is providing public service content. As noted earlier in the document, we attach particular importance to citizens being able to access news, views and information over the internet, and public service content is important in this context, in particular because of the level of trust placed in news provided by public service broadcasters. Public service broadcasters are currently able to ensure delivery of their content over traditional TV platforms, by means of ‘must carry’ obligations placed on those platforms. There is a question as to whether similar obligations should apply to public service content delivered online, and if so, what commercial arrangements should apply. We regard this as a matter of public policy, to be decided by government.

Degradation of 'best-efforts' internet access due to prioritisation of managed services

4.52 As noted above, our approach to traffic management recognises the benefits associated with both 'best-efforts' internet access, and the provision of managed services, and seeks for them to co-exist.

4.53 There is, however, a risk that network operators prioritise managed services in a manner that leaves insufficient network capacity for 'best-efforts' access to the open internet. If the quality of service provided by 'best-efforts' internet access were to fall to too low a level, then it would no longer be an effective means of driving service innovation, and this would be a concern.

4.54 If this concern was realised in practice, then we would need to consider intervening in order to ensure continued innovation in internet-based services. Under such circumstances, we might use our powers under the Revised Framework to safeguard 'best-efforts' access to the open internet by imposing a minimum quality of service.

4.55 Setting a minimum quality of service raises the practical question as to what that minimum quality of service should be, and how it should be enforced. It is likely that it could need to be sufficient to enable the delivery of video content over the open internet, given the importance of video content for many new services and applications and its use by consumers.

4.56 However, while this might suggest aligning it with the Universal Service Commitment of 2Mbps, enabling the delivery of broadcast quality video, this would not currently be appropriate. Substantial investment in both access and backhaul networks would be required to guarantee delivery of this quality of service in all geographies and at all times. We do not believe it to be appropriate to use a minimum quality of service to force such a level of potentially inefficient investment.

4.57 We also note that any imposition of a minimum quality of service may have unintended consequences for the provision of managed services. Setting the minimum too high could reduce the ability of network operators to negotiate for prioritised services, possibly hindering new business models that might lead to greater network investment.

4.58 Therefore, any intervention to impose a minimum quality of service would require very careful consideration. We do not regard the case for such an intervention exists at present, but given the importance of innovation in internet-based services will keep this under review.

4.59 We will do so as part of the process for reporting on the state of the UK's communications infrastructure[25]. As noted above, this process requires us to gather data on the coverage, capacity and resilience of the main public networks and services available in the UK, and as part of this process we will also gather data on the approaches to traffic management adopted by different network operators. We will use this to keep under review whether there is a case for intervention to address the potential issues set out in this document.

[25] See http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf

Section 5

The international context

5.1 The debate over net neutrality and traffic management has an important international dimension. In our June 2010 discussion document we provided an overview of activities at the European level as well as in several countries. It is worth reviewing how these have developed.

5.2 In April 2011, the European Commission published a Communication on *The Open Internet and Net Neutrality in Europe*[26], following its 2010 consultation[27]. The Commission concluded that the rules on transparency, switching and quality of service within the Revised Framework, currently being transposed by Member States, should contribute to producing competitive outcomes. Intervention at this point, before seeing how new rules will operate in practice, would therefore be premature. In parallel, the Commission has asked BEREC to look into a number of issues that surfaced in the course of its consultation, in particular barriers to switching and practices of blocking and throttling.

5.3 In early 2012, the Commission will consider the BEREC findings and the implementation of the new telecom framework provisions before deciding whether it needs to issue additional guidance on net neutrality. If significant and persistent problems are substantiated, and the system as a whole is not ensuring that consumers are easily able to access and distribute content, services and applications of their choice via a single internet subscription, the Commission will assess the need for more stringent measures to achieve competition and the choice consumers deserve.

5.4 BEREC responded to the Commission's consultation in September 2010[28], and noted that net neutrality incidents so far remain few and for the most part have been solved without the need for regulatory intervention; as such, BEREC suggested that it would be premature to consider intervention at the EU level. Nevertheless, BEREC recognises that problems may arise in the future, and has said that it is important that the conditions of net neutrality and the openness of the internet be monitored over time.

5.5 BEREC therefore made net neutrality a priority in its 2011 work programme[29], and this work will continue into 2012. In October 2011, BEREC consulted on draft guidelines on net neutrality and transparency[30], setting out best practices and recommended approaches for ensuring transparency as a necessary condition for end-users to have freedom of choice. BEREC will also produce reports on quality of service in relation to net neutrality, and on the effects of discrimination on the level of competition and the interests of end-users.

---

[26] http://ec.europa.eu/information_society/policy/ecomm/doc/library/communications_reports/netneutrality/comm-19042011.pdf
[27] http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/net_neutrality/nn_questionnaire.pdf
[28] http://www.erg.eu.int/doc/berec/bor_10_42.pdf
[29] See section 4.2: http://www.erg.eu.int/doc/berec/bor_10_43_1.pdf
[30] http://erg.ec.europa.eu/doc/berec/consultation_draft_guidelines.pdf

5.6 In addition, the European Parliament commissioned and published an analytical study: *Network Neutrality: Challenges and Responses in the EU and in the U.S.*[31]. In its recommendations, it advised against introducing any further net neutrality obligations until there is sufficient experience of the impact of the obligations introduced into the revised EU Framework, which was to be transposed by Member States by May 2011. It also recommended further technical and policy research, particularly looking at the areas of charges imposed by mobile operators on VoIP providers and impairment of peer-to-peer traffic. The Council of Ministers is also expected to adopt *Conclusions* on net neutrality in December 2011, which will provide the Member States' views on the Commission's approach.

5.7 Within Europe, the Dutch parliament approved a change to its telecoms laws in June 2011, prohibiting differentiation of internet data traffic and preventing operators from charging consumers separately for the use of certain services and applications while using an internet access service. The revised laws now set out the limited circumstances in which traffic management may be used, including for managing congestion, and dealing with spam and viruses. The measure was adopted with a broad majority in the lower house of the Dutch parliament, but must still pass through the Senate before becoming law.

5.8 In France, the regulator, ARCEP, published a set of Recommendations in September 2010[32], providing general direction and principles, which followed public hearings and a consultation. ARCEP recognised that, at present, the concern is "with practices that could develop, rather than current malfunctions in the marketplace", but believes that the "consequences of such developments could nonetheless be significant, and require specific measures to be taken". The Recommendations state that, as a general rule, there should be no differentiated traffic management for offers of access to the internet and, where there are exceptions to this principle, they must comply with the general principles of relevance, proportionality, efficiency, non-discrimination between parties and transparency. ARCEP also called on ISPs to work together with consumer representatives to define common systems for the transparent provision of consumer information and to identify and qualify the different types of traffic management policies.

5.9 In the meantime, ARCEP will monitor the evolution of the market and will conduct further work jointly with industry and consumer groups to define QoS parameters and indicators. In addition, ARCEP plans to initiate the collection of periodic information on the data interconnection market with a view to assess whether further intervention is necessary. In parallel, the French Parliament has also looked at these issues and in April 2011 published a report. Its proposals are similar to those of ARCEP, with the main difference being that the Parliament prefers to give the proposals a legal basis, as opposed to the soft law approach of the regulator.

5.10 In Norway, the Norwegian Post and Telecommunications Authority (NPT) introduced non-binding guidelines[33] on net neutrality in 2009, to be updated as needed. Created in collaboration with a range of stakeholders, the guidelines set out three main principles which have the effect of entitling users to an internet connection:

- with a predefined capacity and quality;

---

31 http://www.europarl.europa.eu/document/activities/cont/201105/20110523ATT20073/20110523ATT20073EN.pdf

32 http://www.arcep.fr/uploads/tx_gspublication/net-neutralite-orientations-sept2010-eng.pdf

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

- that enables them to use the content, services and applications of their choice; and

- that is free of discrimination with regard to type of application, service or content.

5.11 The guidelines also contain detailed explanations of how to interpret these principles, including acceptable exceptions to the general rules and what constitutes 'reasonable' traffic management.

5.12 Looking beyond Europe, there have been significant recent developments in the United States. The Federal Communications Commission (FCC) has regularly declared its commitment to preserving the openness of the internet and, in 2005, adopted four key principles allowing internet consumers to use the content, applications, services and devices of their choice, and promoting competition among network, service and content providers.

5.13 In December 2010, the FCC adopted three enforceable net neutrality regulations which introduced new rules on transparency as well as clarifying the types of blocking permitted for fixed and mobile broadband[34]. The restrictions on fixed broadband providers are more detailed than for mobile broadband. Fixed providers are not permitted to block lawful content, services, non-harmful devices or applications, including those competing with their own voice or video telephony services, whereas mobile broadband providers are prevented from blocking lawful websites and VoIP or video-telephony applications that compete with their own voice or video telephony services.

5.14 The FCC took a next step to implement its net neutrality regulations with its announcement in April 2011 the establishment of an Open Internet Advisory Committee "to track and evaluate the effects of the ... Open Internet net neutrality rules and to provide any recommendations the Committee deems appropriate to the FCC regarding policies and practices related to preserving the open internet"[35]. The regulations were formally approved in September 2011, clearing the way for full implementation by the end of 2011.

5.15 However, the regulations will continue to face significant opposition from Republican lawmakers as well as lawsuits on behalf of ISPs calling for the rules to be overturned, which will play out in 2012.

5.16 In Canada, the Canada Radio-television and Telecommunications Commission (CRTC) adopted in October 2009 a framework on net neutrality that requires internet providers to increase transparency requirements and allows them to employ traffic management techniques only as a last resort. The review did not cover wireless data services, but the framework was extended to cover these services in June 2010. The CRTC determination emphasised the need for strong consumer transparency requirements on operators about their internet traffic management policies that should be neither discriminatory nor unduly preferential, and it introduced additional scrutiny for wholesale services.

5.17 Ofcom will continue to engage closely with other regulators, the European Commission, and continue to contribute to ongoing work by BEREC as we continue to develop our thinking.

---

[34] http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db1223/FCC-10-201A1.pdf
[35] http://www.federalregister.gov/articles/2011/04/21/2011-9723/federal-advisory-committee-act-open-internet-advisory-committee#h-5

Annex 1

Summary of responses to our discussion document

Introduction

A1.1 Our discussion document drew significant and extensive comments from industry, consumer bodies and individual stakeholders. In total we received 99 written submissions. The period for responses to our discussion document on net neutrality and traffic management closed on 9 September 2010.

A1.2 This Annex summarises the main issues raised in response to our discussion document. Throughout this process we have engaged with other regulators, a number of stakeholders and organised – or participated in – a series of consultation events and public engagements. Any ongoing conversations we have had with stakeholders since the deadline for responses have been captured in the main document.

Approach and structure

A1.3 We asked 11 questions that covered a wide range of issues associated with Net neutrality and traffic management. We have organised the responses according to three distinct themes:

- consumer transparency;
- discrimination; and
- quality of service (QoS).

A1.4 We have not attributed comments to specific stakeholders. However, a full list of all non-confidential responses can be found on our website[36].

Major themes from responses

The evolution of consumer transparency

A1.5 There was general agreement that improved transparency is necessary to improve consumer awareness of traffic management and will help to ensure that consumers are able to make better purchasing decisions.

A1.6 The responses we received raised the need for improved rather than increased transparency. This was particularly highlighted by the individual respondents. ISPs also suggested that a greater volume of information wouldn't necessarily be beneficial, as information overload could easily occur. Instead, improving the style, context, structure and nature of the information provided was proposed as the key

[36] The respondents to our discussion document were a mix of ISPs, content and service providers, consumer groups, trade associations, network equipment/infrastructure providers, academics, individuals and other interested parties http://stakeholders.ofcom.org.uk/consultations/net-neutrality/?showResponses=true

to conveying consistent and understandable information. One ISP alluded to the fact that some ISPs currently use traffic management to differentiate themselves from other providers in the market as proof that consumers are able to digest this information.

A1.7 ISPs were keen to emphasise their discussions on how to standardise information. Specifically, the Broadband Stakeholder Group is co-ordinating industry efforts on how to provide greater transparency for consumers around traffic management practices.

A1.8 Even though there was broad agreement that improved information about traffic management is needed, one ISP stated that Ofcom should refrain from setting parameters which ISPs must disclose against, and/or the nature of the disclosure. They felt that this should be left to the market to deliver.

A1.9 A number of fixed-line ISPs argued that the need for greater transparency included all ISPs, and mobile providers should not be exempt from this.

A1.10 Another ISP highlighted the need for information to be presented clearly and precisely, with account taken of the intended recipient. It suggested that different types of consumers will have different information requirements. Similarly, a network services provider said that consumers should be entitled to accurate and relevant information in plain language about the characteristics and capabilities of their offerings, their broadband network management, and other practices necessary for them to make informed choices.

A1.11 There were more mixed responses as to whether improved transparency would prove sufficient to avoid negative outcomes for consumers. A VoIP provider stated that improved transparency was desirable but insufficient.

A1.12 Some individuals felt that increasing transparency alone would not resolve the problems, as they felt that the majority of consumers have no concept of what constitutes net neutrality or traffic management.

A1.13 Several responses stated that the importance of this information in ensuring that consumers understand how their internet connection is managed requires Ofcom to conduct further research into how consumers understand and use information about traffic management. This is specifically in the context of other information currently given about broadband services.

Discrimination against certain types of traffic

A1.14 Discrimination is a contentious topic within the ongoing net neutrality debate. Some respondents (mainly individuals and content providers) view discrimination of any kind as being against the principle of a free and open internet, while the majority of ISPs view some levels of traffic management as vital to managing traffic and ensuring a high quality internet service for users. However, concerns were raised by individuals and content providers about the risk of ‘unfair discrimination’ where an ISP may deliberately downgrade the level of service for a competitor’s content or may even block competitors’ services outright.

A1.15 A number of responses suggested that the competitive nature of the UK market prevents harmful discrimination from occurring:

- A network services provider stated that the current competitive nature of the UK broadband market at both wholesale and retail level ensured that consumers' interests were protected and worked as a disincentive for unfair discrimination.

- Some ISPs suggested that provided there is effective competition within the market, along with consumer transparency and the ability for consumers to switch, they do not foresee any incentives for them to engage in unfair or harmful discrimination.

A1.16 But other respondents suggested that the potential for discrimination is increasing:

- A consumer body highlighted the current trend of convergence, with network providers supplying television, radio and telephony services, arguing that this would incentivise a network provider to favour traffic to their own service over another. A trade association highlighted that some forms of traffic management could enable ISPs to gain a competitive advantage by giving priority to their own services, or by excluding services that may have a negative impact on their businesses. They believe that there are financial incentives for ISPs to obstruct or degrade a VoIP service that runs on their networks where the VoIP service might jeopardise existing voice telephony revenues.

- An online service provider raised concerns about the development of a two-sided market in which service providers are blocked unless they pay a data termination charge to reach an ISP's consumers. They noted that the nature of services that ISPs can provide varies depending on the parts of the network that they can control. So while there may be some ISPs who can offer services that provide additional value for content providers or consumers, such as guaranteeing end-to-end quality, other ISPs may not be able to. In that case the online service providers suggests that charging would be purely for access and not for a service, and so charging might be a disincentive for future innovation in content and services.

- A VoIP provider noted that it perceives that discriminatory behaviour within Europe can be classified under two broad categories, both of which relate to commercial considerations for operators. The first category is applications that are deemed legally sensitive or potentially bandwidth-hungry. Examples include video streaming and peer-to-peer services. They believe that generalisation of types of traffic such as peer-to-peer may be a cause for concern as only a small minority are bandwidth-intensive and few are related to illegal activities. The second category is applications and services targeted for commercial reasons, e.g. where they might directly affect voice revenues. Examples include VoIP applications and services which are regularly targeted by mobile operators.

A1.17 Several respondents chose not to respond to the discrimination questions, arguing that Ofcom had failed to sufficiently clarify 'unfair discrimination'.

Minimum quality of service

A1.18 The discussions of a minimum QoS focused largely on the potential of a two-tiered internet developing in which the 'best-efforts' element of the service is slowed to allow high-quality managed services to be delivered. Some respondents also drew connections between a minimum quality of service and a minimum universal service commitment for broadband. All the responses highlighted the need for Ofcom to have a consistent approach in this area and to give clear guidance on when it might seek to impose a minimum QoS and what this will cover.

A1.19 The majority of responses were against the introduction of a minimum QoS, with the view that a competitive market meets the needs of consumers.

- A number of ISPs suggested that a minimum QoS could act as a disincentive to ISPs to improve the quality of their networks. This kind of disincentive could then impact on the long-term quality of internet access provision, as consumers would not see investment in delivering high quality networks. As a result they would not get the same speeds or quality of service that they might under the current QoS-free 'best-efforts' approach.

- An ISP stated that it couldn't imagine any circumstance in which the imposition of a minimum quality of service would be appropriate or beneficial to consumers.

- An association of mobile providers thought that the introduction of a minimum level of QoS should only occur if it was proved that the 'best-efforts' internet was becoming degraded and that the market was unable to reverse this.

A1.20 Some respondents supported the introduction of a minimum quality of service (QoS):

- Some content providers proposed that internet access should be unimpeded and that any user should be guaranteed access to all legal content, services and applications in a transparent and non-discriminatory fashion. They also stated that discriminating traffic by content provider or origin could distort competition within the market and deviate from the end-to-end principle which they viewed as the core of the open and neutral character of the internet. They disagreed with the view that QoS would be detrimental to a 'best-efforts' internet and suggested that Ofcom examine the use of QoS regulation to thwart a decline in internet access quality to unacceptably low levels.

- Individuals who supported an introduction of QoS range from users with specific needs such as gamers who wanted a guaranteed minimum level of quality, to general users who were not happy with the current 'best-efforts' approach. These respondents often had problems with perceived speeds seeming to be slower than those advertised, or with being throttled during peak times.

A1.21 Again, several respondents chose not to answer this question because Ofcom did not supply a definition of what it perceived 'quality of service' to mean.

Other issues highlighted by the responses

A1.22 We received comments on a number of other issues, in particular around the wider citizen issues that might arise from traffic management and the broader impact on innovation in the UK.

A1.23 **Long term citizen issues** were raised by some respondents, including:

- A consumer group wanted Ofcom to explore the likely negative impact on consumers in rural areas, mentioning the possible reduction in investment as a result of a two-tier internet.

- The same consumer group was also keen to focus Ofcom's attention on the consequences of traffic management on the poorer members of society, who may suffer as a result of being restricted in their access to higher-bandwidth public services.

- Several other respondents were concerned with the status of public body websites and feared that they would lose prominence in a market which favoured paid-for access to content.

A1.24 **Innovation** – there were a number of responses regarding the impact of traffic management and net neutrality on innovation:

- Some responses, mainly ISPs, highlighted that traffic management encourages innovation as it allowed for new services to be developed that require a particular quality of service, which could then be purchased.

- Others observed that traffic management already exists and has not prevented the development of services such as Facebook, Twitter and YouTube.

- Other respondents, primarily individuals or content or service providers, strongly disagreed and highlighted concerns about the way the BBC iPlayer has been throttled in the past, as well as the implications net neutrality and traffic management could have on small businesses or innovative new start-up services which might not be able to purchase high-quality services from ISPs.

- An education and research network pointed out that innovative uses of the network are, by their very definition, more likely to fall outside the normal usage pattern, and therefore are more likely to trigger whatever traffic management action has been configured by an ISP. This could have a detrimental impact on innovation unless ISPs are effectively able to detect and respond to any mis-classification.

A1.25 We have taken all the responses into consideration and they have informed our overall position on the net neutrality debate as well as on outcomes the market should deliver.

List of non-confidential respondents

This list includes individuals who responded to the consultation

3	Alcatel-Lucent
Alissa Cooper	Amdocs Management Limited
Arqiva	Arts & Labs
AT&T	BBC
Brazen Computing Ltd	Brilliant Digital Entertainment
Broadband Stakeholder Group	BT plc
Cable & Wireless Worldwide	Capt Manin The Street
CBI	Cinly Ooi
CISCO	Colt
Communications Consumer Panel	Consumer Focus
David Hall Systems Ltd	Detica
Disruptive Analysis	Dr Gernot Pehnelt
Dr Glen Moody	Ericsson Ltd
European Privacy Association	European University Institute
Everything Everywhere	GSMA
Intellect	Internet Innovation Alliance
Internet Telephony Services Providers' Association	Internet Watch Foundation
ITV plc	Janet(UK)
KCOM	Mobile Broadband Group
Mobile Future	Motion Picture Association
Mr Andrew Taylor	Mr Barrie Etherington
Mr Christopher Marsden	Mr J Cluny
Mr Matt Sharpe	Mr Michael JD Brown
Mr Ray Corrigan	Mr Richard Jarrott
Mr Russell Heiling	Mr Trevor Ellis
National Union of Journalists	NetTek Ltd

Open Rights Group

Open Spectrum Alliance

Perini

ProInnovate

Qualcomm

Sandvine Incorporated

Scottish and Southern Energy plc

Sky

Skype

TalkTalk Group

Telco 2.0

Telefonica

The Blue Walrus

The Federation of Small Businesses

The Institution of Engineering and Technology

The Internet Services Providers' Association

The Voice on the Net Coalition Europe

UK Music

Verizon

Vodafone

Which?

www-stephentemple-co-uk

Yahoo