

# BT Response to Ofcom Consultation on Traffic Management

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## **BT Response to Ofcom Consultation on Net Neutrality and Traffic Management**

This response is positioned in the context of broadband communications rather than the “Internet”. Typically a broadband connection will be used for a range of services and applications – some of which will be handled by the Internet while others will be additional services commissioned or operated by the broadband service provider and distributed from servers, caches, or content delivery networks located or terminating close to the end user. Any discussion of net neutrality or potential traffic management rules should be focussed on the public Internet service and not on additional broadband services or on business VPNs. Moreover if there is to be any regulation, it should be technology and market neutral, applying to wired and wireless networks and to undertakings of all sizes.

A precondition for any discussion of net neutrality policy in a specific country context is a general appraisal of market conditions at retail and wholesale level in that country. Where there is effective wholesale access there is likely to be competitive retail supply (this is the case in the UK, and the EU Framework provides the basis for competition elsewhere in Europe too). Coupled with appropriate transparency around traffic management and with reasonably straightforward migration between competing broadband service providers this should allow the market to develop freely in response to changes on the demand and supply sides without any need for traffic management rules.

Traffic management is necessary at various points in the network; to guarantee an appropriate experience for customers, to offer a range of tariffs based on different levels and types of expected usage, to control overall costs and to ensure compliance with contractual terms and conditions. In a competitive retail market broadband service providers should be free to select additional services to offer to their customers, with or without traffic management, as long as the basic Internet service remains fit for purpose given the access network capability and service tier subscribed to by the customer. The fiercely competitive market we have today will ensure that this is the case in the UK.

The technologies and applications for broadband connectivity are evolving so rapidly that it would be inappropriate to attempt to specify acceptable limits for discrimination or traffic management, beyond the general requirements of competition law.

As a contribution to the debate, we are proposing a set of principles or commitments for ISPs to end users which is attached as Annex 1. We have disseminated this document widely in recent weeks to gauge industry appetite for making such commitments jointly. We would support continuation of this activity within a suitable forum such as the Broadband Stakeholders Group.

*1. How enduring do you think congestion problems are likely to be on different networks and for different players?*

The phenomenal growth of the Internet in terms of users, volume of activity and traffic over the past twenty years represents a remarkable demonstration of the scalability properties of the Internet architecture. The Transport Control Protocol (TCP) is responsible for managing the majority of end-to-end connections across the Internet. This protocol dating from the late 1980s relies on the signalling of delay and congestion to ensure that applications can work across a variety of heterogeneous networks. TCP provides the mechanism to control the balance between supply and demand. Other protocols also exist and may be less able to cope with congestion.

The fact that congestion occurs in a network is not an evidence of a problem but is a direct result of the fact that resources are shared across multiple applications. We recognize that a public discussion around congestion is critical for the health of the Internet but given the relentless growth in the quantity and diversity of traffic we also believe that it would be unrealistic to conclude that congestion will be absent in the Internet in future.

Internet bandwidth has a significant cost associated with it at all points in the network and thus commercial service providers will endeavour to match supply with demand reasonably closely. It is possible that during off-peak periods, and over the life of infrastructure investment cycles, there may be times when the network is over-provisioned relative to offered demand. However, since demand fluctuates significantly over the short and long term, both at random and in response to specific events it is also inevitable that there will be periods when congestion will arise. Network providers are unlikely to be able to provide a competitive affordable service if they always provision to meet the maximum conceivable demand. This is the main reason why, over the last few years, network operators have sought to limit the variability of bandwidth demand by implementing traffic management solutions to control the performance of their networks during peak times or whenever demand exceeds supply.

Without going into the detail of how broadband access providers invest in capacity or control that capacity with traffic management solutions, it is important to note that simply over provisioning the link will not provide a guarantee against congestion. Broadband connection speeds could soon offer rates in excess of 100Mbps but TCP is an opportunistic protocol and will attempt to use all the available bandwidth. The result is that congestion will sooner or later reappear; perhaps not in the network itself but in the systems at the edges. For applications such as VoIP that generate data at a limited rate congestion may not be a problem but for bulk transfers of movies or large files then sudden congestion will always be a possibility.

An important consideration is the access bandwidth to the user, which, depending on the technology, may be the main bottleneck for the foreseeable future. If, for example, the user needs 2Mbit/s for an IPTV service and only has a 3Mbit/s link then two thirds of this capacity will need to be reserved exclusively for the IPTV stream, for as long as it is being viewed, in order to ensure there are no interruptions triggered by other traffic on the link. This could create temporarily higher congestion for other traffic on that link.

The most important way to reduce congestion on different networks and for different players is to provide adequate capacity. The critical question to answer is what is adequate? It is a balance of user needs, architecture constraint and investment cycles. From the point of view of an end user it is the ability to receive a popular service at peak time (e.g. BBC iPlayer) within a given broadband package. From the point of view of an ISP it is the capacity level which allows users to be satisfied with the performance of key applications with the use of network management techniques. There may be as many answers as to what is adequate as the number of users and providers. There may also be different answers by the same user/provider depending on when they are asked the question. In the end, network capacity investment is better stimulated by a vibrant market at service provider level rather than a tightly constrained or regulated one.

*2. What do you think are possible incentives for potentially unfair discrimination?*

We are not convinced that there is a separate category of “unfair discrimination” different from abuse of dominance – for which there are already significant penalties. If the retail market is competitive, if new ISPs can enter the market thanks to a competitive or regulated wholesale market, and if consumers are well informed and able to switch between suppliers in response to significantly detrimental changes to network management policies, then it is difficult to see how discrimination can be deemed to be unfair. A retail broadband service provider in a competitive market should always be free to choose to discriminate positively in favour of certain services, including ones that are exclusively available to its own customers, and/or for which its customers may be paying a premium, as long as the basic Internet service, if this is part of the offer, remains acceptable.

*3. Can you provide any evidence of economic and or consumer value generated by traffic management?*

Given that there are bandwidth limits in various parts of the network which may be reached at peak times We believe that the ability to throttle traffic/protocols associated with non time-critical applications and/or to prioritise other traffic/protocols has helped to ensure that time-critical applications can flourish despite potential or occasional congestion. These time-critical applications are often highly valued by the consumer. Consumers may also value the ability to subscribe to lower cost services based on peak or total throughput limits – and these are only feasible where traffic management is enabled.

The final link to the customer may be the most severe bottleneck if the achievable line speed is low. Traffic management over that link may be essential to ensure that time-critical applications are prioritised.

From a network operator’s perspective, traffic management allows customer requirements to be satisfied with significantly less bandwidth than would be required without it.

4. *Conversely, do you think that unconstrained traffic management has the potential for (or is already causing) consumer/citizen harm? Please include any relevant evidence.*

No. Unconstrained traffic management would only have the potential for consumer harm if the consumer were unaware of what was happening, or were aware but unable to switch to a satisfactory alternative service provider in a reasonable timescale. In the competitive UK marketplace where consumers have the right to switch if any significantly detrimental changes are made to their contractual conditions this is not an issue.

5. *Can you provide any evidence that allowing traffic management has a negative impact on innovation?*

Traffic management does not have a negative impact on innovation. In fact, by allowing different traffic streams to receive the priority needed for the application data they are carrying, traffic management allows innovative applications that might not thrive in a single quality environment. Current examples include BT Vision, the planned multilateral "Project Canvas" and various interactive gaming applications.

Traffic management approaches have been developed by the global Internet Engineering Task Force and it is likely that engineers and developers will increasingly expect these standardised approaches to be available and will base their innovations around them. The IETF Integrated Services Working Group commented in the early '90s<sup>1</sup> "Recent experiments demonstrate the capability of packet switching protocols to support Integrated Services --- the transport of audio, video, real-time, and classical data traffic within a single network infrastructure. These experiments suggest that expanding the Internet service model would better meet the needs of these diverse applications." Thus the IETF recognised that the original "all packets are equal" approach developed when Internet services were limited to file transfer and email was unsuited to the developing mix of new applications and would in fact limit innovation.

6. *Ofcom's preliminary view is that there is currently insufficient evidence to justify ex ante regulation to prohibit certain forms of traffic management. Are you aware of evidence that supports or contradicts this view?*

We strongly agree with Ofcom's preliminary view. We are not aware of any evidence to justify ex-ante regulation prohibiting certain forms of traffic management. The Internet is still evolving rapidly and any significant restriction of traffic management risks serious unintended and unpredictable consequences.

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<sup>1</sup> <http://datatracker.ietf.org/wg/intserv/charter/>

*7. Ofcom's preliminary view is that more should be done to increase consumer transparency around traffic management. Do you think doing so would sufficiently address any potential concerns and why?*

Increased transparency will provide consumers with a more informed view of which ISP they want to be with and will result in traffic management policies becoming a point of competitive differentiation. Consumers who have a strong preference in respect of traffic management practices, will select the most appropriate supplier from a range of price/quality options.

BT shares Ofcom's concern that indiscriminate provision of high levels of detail may only serve to confuse most consumers. It is important to make traffic management policies clearer but this can be a challenge as different customers will benefit from different levels of detail. We address this in more detail in our response to Question 9.

Ideally there should be consensus on what level of detail is appropriate and what framework will provide the most effective way of presenting and explaining traffic management information. Further research is needed in this area and we understand Ofcom is itself embarking on this.

The objective should be to establish a set of guidelines which ISPs are encouraged to adhere to in order to ensure clarity and consistency for customers across different service providers. The guidelines should ensure that traffic management is defined by all ISPs in a standard way and looser terms such as "peak", "unlimited" and "restriction" have a consistent definition. It may be appropriate to treat the "peak period", during which time tighter traffic management policies may be applied, as a standard comparator.

It is equally important that the best practice industry standard should not be so prescriptive as to stifle the development of innovative approaches to the nature and presentation of the information. In other words, there should be sufficient scope within a standard to enable transparency to become itself a source of competitive advantage, while not losing the ability of end-users to make appropriate basic comparisons.

In short, we believe that increased transparency can sufficiently address potential concerns.

*8. Are you aware of any evidence that sheds light on peoples' ability to understand and act upon information they are given regarding traffic management?*

We agree with Ofcom that further research is required but there are a few indications available:

- Service providers are using traffic management as a commercial differentiator which suggests that some customers are able to understand and act on the information.<sup>2</sup>
- Activity on Internet forums suggests that people are aware of traffic management issues and willing to switch providers if necessary.

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<sup>2</sup> For example Plusnet Pro for downloads, gaming, music and more.... "All traffic prioritised at all times".

9. *How can information on traffic management be presented so that it is accessible and meaningful to consumers, both in understanding any restrictions on their existing offering, and in choosing between rival offerings? Can you give examples of useful approaches to informing consumers about complex issues, including from other sectors?*

A layered model would be appropriate here so that sufficient detail is widely available for the typical customer but allowing any subsets of the customer base who are interested in actively monitoring their service set-up and performance to access the necessary information separately.

Good examples are any industries such as banking and insurance with extensive product specifications. Independent publications or internet information sites are frequently expert at rearranging information into a straightforward and easy to interpret format. A degree of governance is required which makes sure independent performance benchmarking organisations with a vetted methodology are awarded the necessary accreditation to show customers they are valid and to prevent a multitude of varying points of view from unsubstantiated sources causing confusion for customers. We would support the extension of an Ofcom accreditation scheme for independent sites and would have concerns about the impartiality of sites operating outside any such scheme.

Information should be structured to show the following:

- What categories of network management process are being used?
- Which precise management processes?
- Why are they used?
- How do they affect customer experience?
- How are they likely to affect me?
- How do they compare with other ISPs?

All traffic management aspects should be categorised and quantified in terms of impact. The information should always bring it back to performance and customer experience.

Service providers could offer an online tutorial to improve understanding.

Broadband service providers could potentially offer additional information on their service for example:

- Product performance. Information telling the customer the level of performance they can expect against an objective industry standard (e.g. bandwidth, contention levels, time of day performance)
- Traffic specific controls. Information explaining how ISPs manage the traffic on the network for everyone (e.g. peer to peer restrictions, QoS traffic protocols).
- Customer specific controls. Restrictions that affect the speed \ performance of the line (BRAS profiles and potential speed)

Finally, it may also be helpful for customers to have access to a portal showing various levels of information about their service. The basic level could include connection speed and total data downloaded/uploaded (as percentage of allowance that month – with indication of chance of exceeding allowed limit). Advanced levels could include, by time of day, dropped packets, jitter and latency, as well as currently operative traffic management

policies, whether interleaving is on or off, etc. In the future, some broadband service providers may also allow their customers, within limits, to set the QoS management parameters for their upstream and downstream traffic.

There will of course always be a problem disentangling effects of throughput problems before traffic arrives in a broadband service providers network (e.g. slow servers, congestion at peering points etc) and after it leaves it (e.g. in a domestic LAN).

*10. How can compliance with transparency obligations best be verified?*

Market participants are likely to have a reasonable awareness of whether stated network management practices are being followed and both consumer and professional magazines/websites are likely to report this. There are also various tools that can be used to explore network performance and are likely to be deployed by principals and intermediaries in a competitive marketplace.

*11. Under what circumstances do you think the imposition of a minimum quality of service would be appropriate and why?*

We are unable to envisage any circumstances at present where the imposition of a minimum quality of service would be appropriate. In a competitive marketplace consumers will switch suppliers if the basic QoS is inappropriate for their needs. There may be significant demand for a cheap low QoS service from people with basic needs and it is unclear why they should be denied the opportunity to buy this. Imposition of a minimum quality could damage competition using service as a differentiator. Customers should be able to decide if the service level provided by a broadband service provider is sufficient for their needs. Furthermore, focussing on a minimum QoS could divert attention from the need for ongoing general improvements in network performance.

If there is a most important metric of interest in characterizing the "quality" of broadband service it is speed. It is likely that any imposition of a minimum QoS would be made on a predefined level of speed. However, as we have seen in the recent Ofcom report, speed measurements from the same service can vary significantly. These differences are not only due to differences in test conditions and methodologies. For any possible measurement it is technical challenging to understand where congestion is present in the network. While the access network can be the bottleneck, significant bottlenecks arise in home networks, end users' computers, and Internet side systems and networks.

Consequently, the definition and measurement of a minimum quality of service would have to be monitored with careful attention to the testing methodologies employed. Not only do we believe that many speed-testing methodologies are inappropriate for the purpose of assessing minimum QoS but we also believe that this could add additional costs without clear long-term end-user benefits.

- Different device settings and applications can play a significant role in determining the speed that is measured. User initiated speed tests tend to

be biased as users run these tests most frequently when they are experiencing service or network issues.

- Special test infrastructure and tools such as the ones deployed by SamKnows and EpiTiro can provide accurate views. The deployment of measurement servers and attention to broadband isolation in the access connection is a significant step forward in network measurement. While control and accuracy are increased there are still limitations. Due to the special arrangements required this approach can only cover a limited proportion of the population.
- Measurements averaged across the entire country also have limited value. They can be used for benchmarking against between ISP or access technology but do not provide a view on specific issues or regional requirements. More accurate measurements may often be required at regional or local levels.

As broadband speeds are increasing, new and more sophisticated services will appear such as 3D TV, HD Streaming, Gaming and HD conferencing and we expect the debate to shift away from just speed. The quality of an entire broadband package will have to be measured on different metrics than just speed or other technical parameters such as latency, jitter and packet loss. Metrics such as service reliability and opinion score performance of services and applications at peak times will become more important in the way services get advertised and sold.

To conclude we believe that the imposition of minimum quality of service requirements will not deliver value at this stage. However, we support multiple testing methods that can provide unique insights and deliver better value for our customers in this competitive market place.

## Annex 1 - BT Proposal for Traffic Management Principles

We are committed to:

- **Transparency** - we will give customers meaningful information on their usage and on the network management techniques we deploy. We will provide an indication of the minimum and general level of experience our customers can expect – subject to their available access speed and the applications simultaneously using their connection.
- **Open access** –customers should be able to use their internet connection to access and run the content and applications of their choice (provided they are legal). We will not block any legal service or seek to charge content or applications providers for basic service. An individual user's experience will depend on the access level/technology purchased and any relevant contractual conditions.
- **Fair competition** – A competitive market is the best way to protect everyone's interests rather than regulation. Customers should have a wide choice of internet access providers and should be able to switch between providers without penalty subject to their contracts.
- **Adaptable networks** – internet access providers should be free to deploy techniques to manage congestion and optimise the performance of the various applications using their networks. We may limit throughput of non time-critical applications in order to provide a better experience for all customers. We may also prioritise time-critical applications where this is necessary to deliver an acceptable performance. Network upgrading will be a continuous process in response to demand. A variety of commercial models will develop, some of which may include customers or application providers paying for enhanced capability, such as prioritised delivery.
- **Freedom of expression** – we will not interfere with our customers' freedom of expression (other than as necessary to deal with legal requirements).
- **Commercial activity with no undue constraints to innovation** – Internet actors should be free to develop new services and new business models which may differ from today's.