



Comments of AT&T Global Network Services (UK) B.V.: Ofcom Consultation Paper on Traffic Management and 'Net Neutrality'

9 September 2010

Introduction

AT&T Global Network Services (UK) B.V. ("AT&T") respectfully submits these comments on the Ofcom Discussion Document on Traffic Management and 'Net Neutrality' published on 24 June 2010 (the "Consultation Paper").

Operating globally under the AT&T brand, AT&T's parent, AT&T Inc., through its affiliates, is a worldwide provider of Internet Protocol (IP)-based communications services to businesses and a leading U.S. provider of wireless, high speed Internet access, local and long distance voice, and directory publishing and advertising services, and a growing provider of IPTV entertainment offerings. AT&T Inc. operates one of the world's most advanced global networks, carrying more than 18.7 petabytes of total IP and data traffic on an average business day, the equivalent of a 3.1 megabyte music download for every man, woman and child on the planet. With operations in countries that cover 97% of the world's economy, AT&T Inc. has extensive experience as an incumbent and a new entrant, as a fixed line operator and a mobile operator, and in the dynamic areas of converged technologies and services.

In the UK and other EU Member States, AT&T Inc., through its affiliates, is a competitive provider of business connectivity and managed network services, serving more than 50% of the companies listed on the UK FTSE 100, and is a leading provider of bilateral connectivity services linking the U.S. with the UK and all other EU Member States.

AT&T appreciates the opportunity to express its views in this public consultation on Network Neutrality. AT&T hopes that its responses will be helpful to Ofcom in formulating a comprehensive strategy for the sustainable development of the Information Society within the UK, and among the UK and the globally interconnected Internet networks, allowing market participants to invest in the infrastructures and services which will benefit both consumers and businesses.

Summary

AT&T supports the goal of an open Internet, which means an Internet ecosystem that enables users to exchange ideas and communicate freely, gives them freedom to access the lawful applications and content they wish to use, and affords them the ability to choose and assemble packages of services and equipment that meet their needs.

Prior decisions by governments to avoid unnecessary regulation of the Internet are validated every day by the spectacular growth of the Internet and its remarkable contribution to culture, political discourse, and economic development throughout the world. The Internet has evolved from being a network that provided only file downloads and remote access to distant academic or government computers to being a vibrant global commercial network that now provides countless different services to millions of content and applications providers and billions of users.

The Internet has become the most powerful engine of economic growth in our time precisely because governments have wisely allowed market forces to shape its evolution free from prescriptive regulation that would have locked in place certain specific technologies or business models. Further dynamic advances are likely to occur in response to future technological change and consumer demand. Indeed, the Internet's next 40 years are likely to be just as dynamic as the past 40 years. To avoid limiting the future growth and development of the Internet, unless actual problems and harms are specifically demonstrated, Internet regulation should remain limited to protecting the basic customer freedoms associated with openness and customer value under which the Internet has always operated.

In particular, as Ofcom correctly concludes in describing its initial position in the Consultation Paper,¹ maintaining an open Internet does not require the implementation of new, prescriptive network neutrality rules that would restrict traffic management. With the new powers attributed to the National Regulators by the EU Directive *on Universal Service and Users' Rights relating to Electronic Communications Networks*,² potential problems can be solved readily by the National Regulatory Authorities in the event that any market failure actually does appear. As Ofcom emphasises, any discriminatory conduct by firms with significant market power is likely to be closely scrutinised to ensure there are no anticompetitive effects.³ Certainly, there is no evidence of any such general market failure brought on by a dominant participant abusing its market power, nor has there been evidence of an anticompetitive practice by an individual actor that has not been

¹ Consultation Paper, Sects. 1.11 & 4.54

² Directive 2009/136/EC of the European Parliament and of the Council, 25 Nov. 2009.

³ Consultation Paper, Sect. 1.11.



resolved quickly through the application of existing regulatory measures and procedures. Indeed, Ofcom notes that it has received “no formal complaints from industry that require investigation.”⁴

As Ofcom recognises, traffic management and other network practices to ensure quality of service for particular Internet applications and content have been widely used for many years without controversy. There is therefore no basis to the claims made by some that Internet traffic management or prioritisation practices now threaten the historic “neutrality” of the Internet and therefore require new prescriptive regulation. In addition, the rapid convergence of all electronic communications onto the IP platform and growing network demands will make the continued use of these traffic management practices increasingly important to consumers in the future to ensure their economic access to the content and information services they desire. That is especially the case for users of mobile broadband services, since mobile operators must rely heavily on the use of network management techniques to avert or respond to network failures or congestion of scarce spectrum and to allow customer use of latency-sensitive applications.

Arguments that regulators should now restrict traffic management and service differentiation by ISPs fail to take account of the longstanding non-controversial use of these practices by operators throughout the world. The adoption of such policies would create significant costs and practical difficulties for operators subject to these requirements and would undermine the UK’s most pressing objectives for the digital economy: expanding deployment of more capable broadband facilities and fostering investment in related technologies and services.

Substantial new investment is needed to support the unprecedented growth of Internet traffic and the increasing demands of its changing traffic mix and to extend broadband networks to increase the availability of broadband services. Most importantly, to fund these investments, and to expand broadband adoption, all network providers need to be able to price their services in manners that are attractive and affordable to consumers. Reliance on the expansion of facilities alone to meet Internet traffic growth would require significant additional construction leading inevitably to the need for consumer price increases that would reduce broadband adoption, even if it was possible for network operators to avoid the use of traffic management techniques simply by building additional facilities. In fact, because of the continued growth of bandwidth-intensive services, and the increasingly large and unpredictable spikes in Internet traffic, the construction of new facilities will not be sufficient by itself to maintain economic service capability and quality. Consequently, ISPs must place increasing reliance on traffic management practices to maintain services. Any restriction on the use of these practices would

⁴ *Id.*, Sect. 1.9.

limit the speed and functionality of Internet services overall and reduce the utility and value of the Internet for all users.

For these and the further reasons set forth in these Comments, AT&T shares the concerns expressed by Ofcom in the Consultation Paper regarding the potential harm that would be caused by the prescriptive regulation of traffic management. As Ofcom explains, there is no apparent “strong rationale for preventing ex ante all forms of traffic management,” and consumers may potentially benefit from network operators charging both consumers and content providers for guaranteed quality of service.⁵

Ofcom further notes that by “[m]aintaining a watching brief in the sector,” it will “be alert to potential difficulties arising in the market.”⁶ AT&T agrees that the role of regulators in these circumstances is to monitor the market to see whether real problems are developing. As the Organisation for Economic Co-operation and Development (OECD) and numerous economists have observed, the imposition of new regulation based on speculation of future harm is premature and potentially damaging.⁷ Similarly, European Commission Vice President Neelie Kroes noted at the ARCEP Conference in Paris on 13 April 2010 that “we should avoid taking unnecessary measures that may hinder new efficient business models from emerging.”⁸ If any corrective action is needed, AT&T believes that such action should be informed on a case-by-case basis by the specifically-identified problems.

AT&T also supports the use of consumer-focused principles requiring ISPs to furnish end-users with the ability to send and receive the legal content of their choice, use the services and run the applications of their choice, and connect the hardware and use the programs of their choice, provided they do not harm the network. These are similar to the principles adopted by the EU Institutions in 2009 and by the U.S. Federal Communications Commission (FCC) in 2005.⁹ This approach would preserve the openness of the Internet, while maintaining incentives for broadband providers to make the massive investments necessary to increase broadband

⁵ Consultation Paper, Sects. 4.54-4.55.

⁶ *Id.*, Sect. 4.56.

⁷ Organisation for Economic Co-operation and Development, *Internet Traffic Prioritisation: An overview*, at 5 (Apr. 6, 2007), available at <http://www.oecd.org/dataoecd/43/63/38405781.pdf> (concluding that it would be “premature for governments to become involved at the level of network-to-network traffic exchange and demand neutral packet treatment for content providers”).

⁸ See EUROPA Press Releases, <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/10/153&format=HTML&aged=0&language=EN&guiLanguage=en>.

⁹ See FCC, Policy Statement, *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, 20 FCC Rcd. 14986 (2005) (“*Internet Policy Statement*”), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf.



deployment. It also would encourage those providers to invest in the next-generation "smart" managed networks that are needed to support the innumerable new and varied Internet applications that will enrich our daily lives, as well as make us healthier, safer, more energy efficient, and more prosperous.

* * *

AT&T responds to the questions asked by the Consultation Paper as follows:

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

AT&T believes that congestion problems in the networks comprising the Internet are likely to continue for the foreseeable future. Even during this economic downturn, Internet traffic continues to grow at a tremendous rate. A recent report by Cisco notes that global IP traffic will quadruple from 2009 to 2014.¹⁰ The nature of Internet traffic is changing as well, with the fast-increasing usage of bandwidth-intensive applications like streaming video placing greatly increasing burdens on underlying networks. For example, Cisco expects video to account for over 90% of global consumer traffic and 66% of the world's mobile data traffic by 2014.¹¹

Increased investment is a critical element in responding to these unprecedented and increasing demands on the capacity of Internet access and backbone networks. Continued massive investment in fibre, wireless, and other network infrastructure is necessary to increase the bandwidth and Internet functionality available to consumers, even though competition and the unpredictability of consumer demand often make these investments exceptionally risky for the companies that underwrite them. While these risky, capital-intensive capacity upgrades are necessary steps that any network provider must take to keep pace with escalating bandwidth demands, alone they are insufficient steps to address these challenges.

As the attached Engineering Background explains (at pp. 11-12), operators cannot economically enlarge network capacity to ensure instantaneous delivery of all packets at all times, particularly with the escalating magnitude of unpredictable spikes in Internet traffic.¹² Any reliance solely on increased investment to meet

¹⁰ Cisco Visual Networking Index: Forecast and Methodology, 2009-2014, *available at* http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360_ns827_Networking_Solutions_White_Paper.html

¹¹ One minute of video requires 10 times the bandwidth as voice. Kleeman, Michael, "Point of Disconnect," University of California, San Diego, August 30, 2007, *available at* <http://cpe.ucsd.edu/assets/013/6535.pdf>

¹² Like conventional telephone networks, IP networks are sized to handle demand during periods of peak usage. The closer that peak usage is to average usage, the more efficient the network's cost structure will be, and the more predictably the network operator can recover those costs from the users of its network. According to some estimates, however, video applications roughly double the

escalating Internet usage would greatly increase network costs and in turn require huge increases in user prices. Ofcom thus properly recognises in the Consultation Paper that the use of traffic management techniques to maintain service quality over increasingly congested networks “provides ISPs with a greater degree of control over the need and timing of future investment in additional network capacity.”¹³ Even if there were no economic constraint on network expansion, experience has shown that network usage, particularly in the form of peer-to-peer file transfer applications, inevitably expands rapidly to fill new capacity. Consequently, network operators cannot simply construct higher-capacity facilities, but must also use greater network intelligence, including the ability to identify and provide the appropriate level of performance required by different applications traversing the network, to ensure that users can receive the service quality they desire.

As described below, Internet providers have made longstanding use of traffic management practices to ensure quality of service for their users. With increasing network congestion, Internet providers will be required to place even greater reliance on traffic management techniques in the future to manage competing demands on finite bandwidth.

Question 2: What do you think are possible incentives for potentially unfair discrimination?

AT&T concurs with Ofcom’s analysis described in the Consultation Paper that incentives to engage in exclusionary conduct in connection with traffic management are likely to exist only where a dominant participant is able to abuse its market power.¹⁴ In competitive markets, where consumers may respond to attempted exclusionary conduct by switching to rival operators, market forces prevent any harm to competition or consumers.¹⁵ Ofcom also properly concludes that any discriminatory conduct by dominant firms is likely to be closely scrutinised under existing regulatory and competition law procedures and there is therefore no reason to impose new blanket restrictions on traffic management to address such concerns.¹⁶ In addition, under the EU regulatory framework, any attempt to regulate traffic management would first have to demonstrate that the market fulfils the “three criteria” test to be susceptible to ex ante regulation.¹⁷ The European Parliament and

“peak-to-mean” ratio of traffic on IP networks because of the “viral” (self-intensifying) nature of popular video files.

¹³ Consultation Paper, Sect. A1.21

¹⁴ Consultation Paper, Sect. 4.18.

¹⁵ *Id.*

¹⁶ *Id.*, Sect. 1.11.

¹⁷ The three cumulative criteria for ex ante regulation are: high and non-transitory barriers to market entry; the market displays characteristics such that it will not tend towards effective competition over time; and insufficiency of ex post application of competition law alone. See Commission

the Council underscored the importance of this threshold requirement in the November 2009 telecom package, which noted that “[c]onsidering that the markets for electronic communications have shown strong competitive dynamics in recent years, it is essential that ex-ante regulatory obligations only be imposed where there is no sustainable competition.”¹⁸

The Consultation Paper states that Ofcom has received no formal complaints from industry regarding traffic management that require investigation.¹⁹ In the United States, the FCC has found it necessary to take action only twice: first, to stop Madison River Communications, a small rural competitive local exchange carrier, from unreasonably blocking the use of certain VoIP services by its customers; and second, to prevent the cable service provider Comcast from unreasonably interfering with certain peer-to-peer applications used by its customers.²⁰ In both instances, FCC actions directly targeted the specific practices in question and led to the voluntary resolution of both cases rapidly and effectively.²¹

For the reasons described in these comments and in AT&T’s comments filed with the FCC, AT&T believes that the FCC’s more recent proposal to adopt broadband provider-specific prescriptive rules is unwarranted.²² The FCC’s oversight of industry adherence to the principles embodied in the *Internet Policy Statement* it adopted in 2005 has been more than sufficient to ensure compliance with those principles and to foster an open Internet.²³ Instead of adopting onerous new

Recommendation of 17 December 2007 on Relevant Product and Service Markets, Art. 2, 2007/879/EC.

¹⁸ Directive 2009/140/EC of the European Parliament and of the Council, 25 Nov. 2009, at L337/37.

¹⁹ Consultation Paper, Sect. 1.9.

²⁰ See FCC Memorandum and Order, *Formal Complaint of Free Press and Public Knowledge Against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications*, 23 FCC Rcd. 13028 (2008); Order, *Madison River Commc’ns, LLC*, 20 FCC Rcd. 4295 (2005).

²¹ Although an appellate court subsequently found that the FCC had not identified an appropriate jurisdictional basis for its actions in the Comcast matter, Comcast has not suggested that it would reinstate the network management practices it used prior to the FCC’s review of those practices.

²² See Comments of AT&T Inc., GN Docket No. 09-191, (filed Jan. 14, 2010), *available at*: <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020377217> , <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020377218> , <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020377220> , <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020377221> , <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020377222> ; and Reply Comments of AT&T Inc., GN Docket No. 09-191, (filed Apr. 26, 2010), *available at* <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020437362> , <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020437363> , <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020437364> , <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020437365> .

²³ See Policy Statement, *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, 20 FCC Rcd. 14986 (2005) (“*Internet Policy Statement*”), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf .

regulation based on no credible data-driven evidence of any market failure, as the FCC proposes, AT&T supports an approach based on the consumer-focused principles adopted by the FCC in 2005, perhaps together with adoption of a new, fifth principle to encourage greater consumer-oriented transparency about network-management practices.

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

The Consultation Paper correctly observes that the Internet “is not truly ‘neutral’ even today.”²⁴ The paper describes existing IP router functionality allowing ISPs to prioritise certain types of Internet traffic, content-delivery networks (“CDNs”) used by content providers to avoid potential congestion and existing traffic prioritisation now offered by some ISPs.²⁵ Indeed, the Internet has never followed a principle of completely identical treatment of different applications and content. Rather, as described in the attached Engineering Background, content providers with capital resources have long purchased specialised network services in order to distinguish their traffic from other Internet traffic and to offer their end users better Internet experiences than would be possible without those quality-of-service enhancements.

Nearly three decades ago, the Internet Engineering Task Force (IETF) – the Internet’s standard-setting organisation – first included a “type of service” field within the Internet Protocol to enable prioritisation of real-time and other performance-sensitive applications.²⁶ The IETF expanded upon that capability in 1994 and 1998 by creating the “differentiated service code point” field (“DSCP” or “DiffServ”), and, as noted by the Consultation Paper, it has now incorporated an even more advanced version of this capability into IPv6.²⁷ Thus, “net neutrality” advocates who contend that no Internet packets should be provided with any transmission quality different to that given every other packet – regardless of whether this difference derives from guaranteed bandwidth or reduced packet loss, latency or jitter – are, in effect, trying to re-write the open, IETF-approved standards that have made the Internet such a tremendous success at supporting multiple services with varying transmission needs.

Broadband providers have long sold prioritised capabilities to enterprise customers, including content providers, to ensure proper handling of performance-sensitive Internet and other content through a broadband provider’s network. Such services

²⁴ Consultation Paper, Sect. 3.2.

²⁵ Consultation Paper at A1.21-A1.24.

²⁶ See Information Sciences Institute, *Internet Protocol DARPA Internet Program Protocol Specification, RFC 791*, at 11 (Sept. 1981), available at <http://www.ietf.org/rfc/rfc0791.txt>.

²⁷ See generally James F. Kurose & Keith W. Ross, *Computer Networking: A Top-Down Approach* 367 (5th ed. 2010).



can make use of packet-prioritisation techniques on several protocol layers, including DiffServ on the IP layer and analogous mechanisms on other layers, such as the ATM, Ethernet, and MPLS protocols. Broadband providers use the same service-differentiation technologies in the residential market to guarantee quality of service for performance-sensitive IP applications and content, such as IPTV and VoIP, that are offered to consumers over the same physical infrastructure as best-effort Internet access. In addition to these longstanding prioritisation techniques, application and content providers with the capital resources to purchase services from third-party CDNs such as Akamai or Limelight – or to build CDNs of their own, as Google and other large content providers have done – enjoy huge performance advantages over rivals without those resources. As the Consultation Paper makes clear, traffic shaping, CDNs and traffic prioritisation are all forms of Internet traffic management and demonstrate that the use of such practices “is not a new feature of the internet economy.”²⁸

Content providers are exploring even more advanced, cost-efficient new ways to distribute bandwidth-intensive, performance-sensitive content, including CDN collocation, where a content provider stores content on cache servers located within access/aggregation networks, and multicasting, where a distant access network’s routers instantaneously replicate and route multiple copies of packets to many different points within its access/aggregation network.

The use of these various techniques provide significant economic and consumer value by providing the appropriate level of performance required by different applications to allow users to receive the desired service quality while reducing the greater network investments and resulting increases in user rates that would otherwise be required. Their use becomes even more critical as the rapid convergence of all electronic communications onto the IP platform allowing the integration of voice, video and text into new multi-media applications for consumers raises the critical engineering challenge of making applications with different quality of service needs function as well as possible over a shared and increasingly challenged network infrastructure.

The Consultation Paper also properly notes that mobile networks face even greater challenges than fixed networks as the result of the mushrooming growth of mobile Internet traffic.²⁹ Mobile broadband networks must contend with spectrum constraints, a shared “last mile” radio access network, interference sensitivity, and other concerns that make it far more challenging to provide mobile broadband than fixed wireline broadband. Capacity and quality-of-service challenges for mobile broadband providers are particularly acute in the “last mile” radio access network,

²⁸ Consultation Paper at A1.18 & A1.20.

²⁹ *Id.* at A1.9.



where spectrum is shared among both users and cell sites; bandwidth can fluctuate based on interference and other issues; the number of users located in particular cells and their dispersion within those cells at any given time is variable; and the spectrum available for use is not infinitely (or even readily) expandable. These factors make it exceedingly difficult for carriers to ensure a constant supply of sufficient bandwidth to provide high-quality data transmission for broadband Internet access customers. Because of this, providers must continue to use a range of dynamic network-management techniques to respond to or avert network failures or severe congestion and to ensure that customers can enjoy latency-sensitive applications.

Question 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.

AT&T strongly disputes such claims. There is no basis to misplaced concerns that the prioritisation of packets associated with some content or applications necessarily “degrades” the performance of all other non-prioritised content and applications. Network engineers have been prioritising real-time and other performance-sensitive applications for years and have developed sophisticated algorithms to ensure proper handling of all traffic. As noted above, this practice has been followed because it is far more cost-efficient to prioritise applications that need prioritisation than to construct massively overbuilt networks and pass the unnecessary costs through to consumers.

This longstanding practice of handling IP packets differently, depending on the performance-sensitivity of their associated applications, is not a “zero-sum game” in any meaningful sense of that term. Some applications are highly performance-sensitive and thus need quality of service enhancements to function optimally, and accommodating those application-specific needs will not materially impair the performance of other, less latency-sensitive applications. For example, “in many multimedia applications, packets that incur a sender-to-receiver delay of more than a few hundred milliseconds are essentially useless to the receiver,” and such “characteristics are clearly different from those of elastic applications such as the Web, e-mail, FTP, and Telnet,” for which even “long delays” are “not particularly harmful.”³⁰ In other words, if ensuring quality of service for gaming or real-time video applications means a loss of several milliseconds in the loading of a webpage or a P2P file-sharing session, users of the latter applications will neither notice nor care.

In the United States, large, medium, and small providers alike have built IP-based, double- and triple-play platforms that are shared between prioritised IP traffic (IPTV

³⁰ James F. Kurose & Keith W. Ross, *Computer Networking: A Top-Down Approach* 598 (5th ed. 2010)



and/or VoIP) and unprioritised, best-effort Internet traffic.³¹ As AT&T's own experience has shown, differentiation among these service categories gives consumers a high-quality, high-value experience for *all* of these services.³² The best-effort Internet access service that AT&T offers today, over the shared U-verse platform, is far faster and more robust than it was just a few years ago when it was provided over a legacy DSL network that was *not* shared with managed IPTV and VoIP services. Indeed, the introduction of advanced services generally enhances the quality and capacity of best efforts traffic because the advanced services use on average only a small fraction of increased capacity installed for these services and router queuing algorithms ensure that the unused incremental bandwidth is available for use by best-efforts traffic.

There is also no basis to claims that regulatory intervention is required to address operators' agreements for enhanced service quality with applications providers. To be sure, the traditional model under which broadband providers recover essentially all of the costs of access networks from fees imposed on end user subscribers will become increasingly unsustainable as network operators continue to make the huge investments to accommodate the network demands imposed specifically by bandwidth-intensive applications, services and content providers that are used extensively by limited subsets of subscribers. Any regulatory requirement to forever adhere to the consumer-pays-all model championed by major applications providers would undoubtedly subject consumers to higher broadband rates than they would pay if broadband providers could recover some of the costs of bandwidth-intensive applications from the providers of those applications, and would artificially depress broadband subscribership. Further, the use of new cost recovery models would increase the incentives for content providers to develop applications and services that efficiently utilise network resources. Thus, Ofcom correctly concludes from its preliminary analysis that "the introduction of wholesale charging could be consistent with an efficient market outcome," while prohibiting network operators/ISPs from charging content and applications providers for access to consumers is "unlikely" to produce that result.³³

³¹ These providers range from AT&T, which provides IPTV services to millions of consumers over its shared U-verse platform, to mid-sized provider Surewest to more than *two hundred* rural telephone companies. See National Exchange Carrier Association, *Trends 2009: A report on rural telecom technology*, at 11 (2009) ("*NECA Trends 2009 Report*"), <https://www.neca.org/cms400min/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=2392> And, all of the major US cable companies offer managed VoIP services over the same shared facilities as their broadband Internet access services.

³² See AT&T, Press Release, *AT&T Wins Frost & Sullivan 2009 Market Leadership Award in Dedicated Internet Access Service*, Mar. 11, 2010, <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=30631>; AT&T, Press Release, *AT&T Wins Frost & Sullivan 2009 Video Company of the Year Award*, Mar. 11, 2010, <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=30629>.

³³ Consultation Paper, Sects. 4.29 & 4.39.

Claims that regulators should ensure equality of treatment for smaller applications and content providers fail to recognise that the Internet today treats various applications and content providers quite differently depending on their capital resources. As described in the Engineering Background, applications and content providers that can afford access to the content distribution networks of Akamai and others, or that can build their own such networks, as Google and Microsoft have done, already enjoy substantial performance advantages over rivals that cannot afford the use of such networks. Yet, no one suggests that this inequality of treatment warrants a regulatory solution.

There also is no basis to claims that operators would have an incentive to degrade best efforts Internet access in order to increase revenues obtained from prioritised services arrangements. Competitive market pressures prevent any such conduct, which would quickly drive customers to switch to rival operators that offered better performance. Indeed, providers have long offered quality of service enhancements to business-class customers, and no one has suggested that they have degraded bandwidth for the best-effort Internet access platform to increase the value of their prioritised services. To the contrary, Internet access speeds keep increasing year after year across the industry; broadband providers are investing billions to increase those speeds; and they are spending millions more on advertising to compete on the basis of such bandwidth.

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

AT&T is aware of no such evidence. To the contrary, traffic management practices have proliferated for years without controversy, and the Internet has never been healthier, more functional or more open. For example, just in the last few years, new social networking applications and multimedia sites have exploded in popularity:

- The video giant YouTube did not even exist in January 2005, but now delivers nearly 10.5 billion videos each month in the United States, and has recently begun offering high-definition video with a resolution of 1080p.³⁴
- The social networking site Facebook, which was created in 2003 and was confined to college campuses until 2005, now claims over 500 million users.³⁵

³⁴ See *1080p HD Is Coming to YouTube*, YouTube Blog, Nov. 12, 2009, <http://youtubeglobal.blogspot.com/2009/11/1080p-hd-comes-to-youtube.html>

³⁵ Facebook, Press Room, Statistics, <http://www.facebook.com/press/info.php?statistics> ; Douglas McIntyre, *Facebook gets funding offer from Russian private equity firm*, Daily Finance, May 23, 2009, <http://www.dailyfinance.com/2009/05/23/facebook-gets-funding-offer-from-russian-private-equity-firm/>.

- Twitter, which did not exist in 2005, is now the third most-used social network, with 55 million monthly visits.³⁶
- Amazon.com, which sold its first Kindle in late 2007, has altered the way that millions of people obtain and read books, periodicals, and blog content and has already prompted several competing services.³⁷

These content and application providers and others have changed the face of the Internet and society at large—all without any impediment from broadband providers. Indeed, the Internet has succeeded largely because broadband providers invested hundreds of billions of dollars into broadband network infrastructure to accommodate demand for these applications. Advanced network management techniques have also permitted fixed broadband networks to provide high quality IPTV services that are fully competitive with those offered previously only by cable and satellite television services. Similarly, 3G mobile broadband services have surged, and the mobile marketplace also boasts a range of wireless platforms that have spawned literally hundreds of thousands of wireless applications from third-party developers.

Question 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?

AT&T strongly supports this view and is aware of no evidence to the contrary. The benefits resulting from the use of traffic management are described in response to Question 3. In contrast, regulation limiting or prohibiting longstanding network management practices would cause significant harm by inhibiting the provision of widely used applications and services, and increasing consumer prices due to mandated inefficient network design and management, and thus reducing the deployment and adoption of the broadband services that are increasingly important to all countries' future growth and prosperity.

Banning all differential treatment of packets on the Internet, as some “net neutrality” advocates propose, would prevent different services, applications, and content from obtaining the quality of service they need to function efficiently and effectively. Under this view, latency-sensitive applications like streaming video would have to be given the same priority as email or large file transfers; an Internet VoIP emergency call could be treated no differently than a YouTube download; and a telemedicine

³⁶ Andy Kazeniak, *Social Networks: Facebook Take Over Top Spot, Twitter Climbs*, Compete.com, Feb. 9, 2009, <http://blog.compete.com/2009/02/09/facebook-myspace-twitter-social-network/>.

³⁷ See Mellissa J. Perenson, *Amazon Kindle Review: Igniting Interest in E-Books?*, PC World, Nov. 21, 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/11/21/AR2007112100030.html>; BBC News, *Plastic Logic e-reader aims to challenge Kindle*, Jan. 7, 2009, <http://news.bbc.co.uk/2/hi/technology/8446959.stm>.

application would need to be handled in precisely the same manner as the contents of a Web page. Indeed, imposing this form of “neutrality” on the Internet would have decidedly non-neutral results by discriminating *against* quality of service-sensitive applications like streaming video and VoIP that will not function reliably unless they are accompanied by quality of service enhancements that non-performance sensitive applications do not need in order to continue to function well.

Among the widely used services and arrangements that could be adversely affected by such a prohibition are services sold to business customers such as: Virtual Private Network (VPN) services providing network security and end-to-end quality of service enhancements; paid peering arrangements enabling content providers to peer directly with broadband networks for fast and cost-efficient delivery of their traffic to end-users; IP multicast arrangements under which a broadband network configures its routers to replicate a content provider’s packets instantaneously to the end users that have selected the multicast content; and CDN collocation arrangements under which a content provider stores its content in cache servers near or within a broadband provider’s network. Any limitation on these and other business-to-business quality of service arrangements would not only cause significant inefficiencies for the customers purchasing those arrangements, but would also force broadband providers to recover from consumers alone all of the network costs caused by bandwidth-intensive applications, resulting in increased consumer rates and harming efforts to expand broadband access.

Carried to its logical conclusion, prohibiting all differential treatment would require the abolition of content-delivery networks like Akamai or Limelight that leverage edge networks to provide online customers with lower latency and higher quality of service than the competition. Likewise, requiring that all data streams must receive equal treatment regardless of their application or content would force all application and content providers to design their applications and content using the same transport protocol – so that, for example, UDP-based applications that lack the ability to automatically “self-throttle” when faced with congestion do not arrogate network resources from TCP-based applications that can “self-throttle.”³⁸

³⁸ UDP applications “send out data as fast as [they] can,” even when they encounter congestion, “while [conventional] TCP-friendly applications deliberately send fewer and fewer packets” and may thus end up “starved of network resources.” Jon M. Peha, *The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy*, 1 Int’l J. of Comm’n 644, 651 (2007), available at <http://www.ijoc.org/ojs/index.php/ijoc/article/viewFile/154/90>. Nonetheless, when properly managed, UDP’s attributes can be beneficial for a range of purposes, including Domain Name System (DNS) queries. By the same token, some applications that use TCP can and do aggressively consume disproportionate amounts of subscriber bandwidth simply by opening up multiple streams (or “torrents,” as featured in some P2P technologies) to seize capacity for themselves. See, e.g., Bob Briscoe, *Flow Rate fairness: Dismantling a Religion*, 37 Computer Comm’n Rev. 63 (2007), available at http://www.cs.ucl.ac.uk/staff/bbriscoe/projects/2020comms/refb/fair_ccr.pdf (“Flow Rate Fairness”). Under a requirement to provide “equal treatment” of all Internet communications, the

As well as preventing the use of any traffic management tool that might be deemed to “discriminate” against certain applications or services, restrictions on traffic management would likely subject every network engineering decision to potential regulatory challenge and second-guessing. Such restrictions would compel engineers to determine in advance whether a measure was narrowly tailored enough to avoid liability, and to err on the side of caution, which would suppress technological creativity in responding to rapidly evolving network pressures. The result would be diminished service quality, potential risks to network security and reliability, and a reduced value and utility of the Internet for all.

The imposition of traffic management restrictions on mobile broadband services also would cause significant difficulties. Mobile operators must contend with mobility, spectrum constraints, interference, and other unique issues in a dynamic environment that is changing even more rapidly than its wireline counterpart. While it is impossible to predict which business models and engineering solutions will best meet consumers’ diverse needs in this environment, subjecting the mobile industry to restrictions on network management would preclude many service-enhancing business arrangements and practices altogether, undermine efforts to manage scarce spectrum resources, chill sensitive engineering and business decisions through endless regulatory second-guessing, and deter investment in new network technologies.

Question 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?

Question 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?

Question 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?

Question 10: How can compliance with transparency obligations best be verified?

AT&T believes that transparent disclosures of the terms and conditions applicable to a customer’s service are critical to create the conditions for genuine competition because they enable consumers to make educated choices based on real

disparate characteristics of these and other transport protocols would need to be homogenised to ensure that no packets receive priority over others.

differences among service providers. Under this principle, a broadband network operator should inform consumers, at an appropriate level of detail, about any material restrictions or limitations on their broadband Internet service so that they can make informed choices about which providers and service plans best meet their needs.

To make such choices, consumers need to know what they can do with the service they purchase, how much of it they can use, what applications they can run, and what quality they can expect. Such information should therefore include maximum and minimum connection speeds (where applicable), usage limits, and a general description of how traffic management practices may affect the user experience.³⁹

However, there is no reason to require providers to disclose the technical and often highly proprietary details of their particular network-management techniques that may assist their broadband competitors or third parties who may seek to evade those techniques to the detriment of the network and consumers. Otherwise, network engineers would face the impossible challenge of having to decide each time they employ a new management technique whether its prior disclosure would be required, and whether such disclosure would, or would not, create critical infrastructure vulnerabilities. Such disclosures also would be highly impractical because of the need for constant updates. Network management practices may change on a monthly, weekly, or even an hourly basis as the Internet ecosystem evolves and new congestion challenges and security threats emerge. AT&T therefore welcomes Ofcom's acknowledgement of the challenges involved in ensuring consumers are informed in a meaningful way about traffic management policies without creating an undue burden on industry.⁴⁰

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

The Consultation Paper notes that while Ofcom is empowered to impose a minimum quality of service, it is likely to “explore existing competition tools and consumer transparency options before considering a minimum quality of service.”⁴¹ Ofcom is properly cautious about mandating a requirement that may impose significant burdens on network operators and result in increased consumer rates. AT&T's view is that a minimum quality of service requirement should rarely, if ever, be necessary in competitive markets like the UK and other EU Member States where multiple

³⁹ See Directive 2009/136/EC of the European Parliament and of the Council, 25 Nov. 2009, Art 21(3)(d) (requiring “information on any procedures put in place by the provider to measure and shape traffic so as to avoid filling or overfilling a network link, and on how those procedures could impact on service quality”).

⁴⁰ Consultation Paper at Sect, 5.9 to 5.11.

⁴¹ Consultation Paper at Sect. 1.12.



operators compete vigorously based on their quality of service, in addition to price, service features, and the various other factors that customers may consider in making their choice of provider. Operators in these markets that fail to provide the service quality their customers expect risk losing business to operators that meet or exceed those expectations.

To replace this highly effective, market-based discipline with an Ofcom-mandated minimum quality of service requirement may increase operators' costs and would impose this additional burden without providing the assurance of earning an adequate return on investment that is a central feature of most "command and control" regulatory models. Any mandated standard also should recognise that some network users may desire service quality *below* current "best effort" handling if it is offered at a commensurately lower price (sometimes referred to as "scavenger" class). For example, in the machine-to-machine (M2M) context, some devices and applications may be highly tolerant of latency but may also need very low cost network connectivity to be economically viable. Minimum service quality requirements could thus have the unintended consequence of preventing these devices and applications from entering the market.

AT&T would be pleased to answer any questions concerning these comments.

Respectfully submitted,

A handwritten signature in black ink that reads "Mike Corkerry".

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