Net neutrality in Europe

SUMMARY

Net neutrality means that data communications over a network are all processed in the same way, regardless of sender, receiver, application or content. This principle, and the fact that participating networks only make their 'best effort' to transmit all data, has historically underpinned the internet. However increasing demand for internet traffic, new applications that require guaranteed levels of service and the need for increased private investment in broadband network infrastructure have raised questions about this approach. Some internet end-users want specialised services that can guarantee that data for time-sensitive applications are delivered promptly, even at peak times.

Mandating net neutrality or allowing the development of specialised services at a higher price could have important effects on the development of the internet which underlies the European digital economy. A network traffic policy can influence the level of investment in broadband infrastructure or the degree of innovation for which the internet has become known. A given policy may lead to greater or reduced competition and consumer choice. Network traffic management and differentiated services have also been seen as a threat to freedom of expression and to the rights of European citizens to privacy and protection of their personal data.

The European Parliament is currently considering a proposed regulation that includes proposals concerning net neutrality. These proposals are controversial in their attempt to represent a 'middle way' between preserving an open, public internet and allowing new specialised services to meet specific needs.

Equality
Net Neutrality
Digital Rights
Regulations
Freedom
Rules

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EUROPEAN PARLIAMENT

What is net neutrality?

Network neutrality (or more simply, net neutrality) refers to how data transmissions are managed over an electronic communications network. A complex, multi-faceted concept, and one of the most challenging new regulatory arenas, it has given rise to various definitions, none of which can be considered entirely satisfactory, set or standard. For working purposes, the Body of European Regulators for Electronic Communication (BEREC) defines net neutrality to mean that all electronic communication passing through a network is treated equally (i.e. independently of content, application, service, device, sender or receiver). It is this definition that will be used here. (For an explanation of other technical terms, please see the 'data communications primer' annexed to this briefing.)

Net neutrality is an issue because increasing demands have put pressure on the internet on which the digital economy of the European Union (EU) depends:

- Internet demand continues to grow. The amount of network traffic using the Internet Protocol (IP) worldwide is predicted to increase threefold between 2012 and 2017, with more than half of that data coming from wireless and mobile devices.
- New data-intensive and time-sensitive applications are coming to the fore. These include voice transmitted over the Internet Protocol (VoIP), television delivered using the Internet Protocol (IPTV), online gaming and telemedicine. (It is predicted that by 2017 80% to 90% of all consumer internet traffic will be in the form of video.)
- Network infrastructure in Europe is not developing fast enough according to the European Commission (EC). More private investment in high-speed broadband infrastructure is needed to meet the Europe 2020 targets of the Digital Agenda for full EU broadband coverage at speeds of 30 megabits per second (Mbps) or more, and 50% coverage at speeds of 100 Mbps or above.

In the face of these increasing demands, network access and traffic can be managed in different ways. The *open* or *public* internet allows any internet user to connect to any content or applications provider and run any application. All participating sub-networks promise to make their *'best effort'* to forward all *data packets* indiscriminately, but they offer no delivery guarantee: in cases of network congestion, packets may be delayed or even dropped. Pricing differences for internet access concern only different volumes of data transmitted and different speeds of connection between the user's device and the network, not the quality of service. This 'neutral' approach has historically been the predominant one in the internet. The difficulty with this approach is precisely that there is no discrimination amongst packets: data associated with an e-mail message (where a few seconds delay would make no real difference) get the same treatment and priority as packets for a time-sensitive video or voice transmission (where a fraction of a second delay may disrupt communication or halt the application).

Alternatively, network operators can differentiate between packets on the basis of sender, receiver, application or even data content in order to (for example) give higher priority to time-sensitive applications and lower priority to others. In addition, a content-provider, end-user, or both, could pay a premium to guarantee timely delivery of their data. Network operators are also able to block access to certain services or make these services ineffective by slowing down data.

Such traffic management discrimination is already taking place in the EU. Network operators use a variety of techniques (including *deep packet inspection*) to block spam

(which makes up almost 95% of network e-mail traffic) or illegal content such as child pornography. They may also slow down or even block packets associated with certain kinds of services. A 2012 study by BEREC showed that 21% of fixed broadband subscribers and 36% of mobile access subscribers were affected by restrictions on peer-to-peer (P2P) services often associated with high-bandwidth file-sharing; 21% of mobile users were affected by restrictions on VoIP services. However the nature of the restrictions (sometimes not enforced) and the times when they were applied (essentially at times of network congestion during peak hours) mean that the effect on users' experience is less significant than those figures would suggest.

This kind of discrimination is considered 'reasonable' by some if it is used to manage network resources for the general benefit of users or to ration scarce *bandwidth* (particularly important for mobile access, because of limited wireless spectrum). However some operators may also use traffic management to hinder their competitors: for example a telecoms operator that wants clients to use its own telephony services could block an internet service like Skype. The reasons for doing so, and the effects that this discrimination has on internet use and society at large, lie at the heart of the net neutrality debate.

Infrastructure investment and innovation

The EU needs large amounts of private investment to build the broadband infrastructure necessary to meet its Digital Agenda targets and to meet increasing demand. Proponents of net neutrality regulation believe that enforcing 'no discrimination' rules in the face of large and growing demand (including the demands of bandwidth-hungry and time-sensitive applications) would encourage network operators to invest in more capacity to meet those demands. Opponents say that *specialised services* for data-intensive or time-sensitive applications would allow operators to charge for providing guaranteed levels of service and hence would provide the certainty and the financial incentives that are needed to justify infrastructure investments. Moreover allowing network operators to charge content and application providers for delivering their data reliably and quickly could provide additional sources of revenue and help share costs with those who make large profits from services built on top of the internet but who do not contribute directly to local infrastructure. However one economic study found the impact of network neutrality on investment ambiguous, and evaluating incentives for investment was identified by the EP's Impact Assessment Unit as a useful area for further investigation.

The internet has been a tremendous source of innovation: based on its data communications capacity, new companies and entire industries have developed from small operations, and the EU economy has benefited from efficiencies as well as employment. A study of 13 countries (mostly developed countries) credited the internet with more than one-fifth of the GDP growth experienced between 2005 and 2010 and with creating 2.6 jobs for every job lost. Proponents of net neutrality say that if network transmissions are treated equally, innovation would be encouraged. Small start-up companies could arrange for a server connected to the internet and immediately start offering innovative services to the hundreds of millions of users around the globe. Entrepreneurs would not have to negotiate with network operators or pay hefty fees to have their data delivered in a timely fashion, thus allowing them to compete with large, established incumbents. There would also be no risk that a network operator could try

to block the services of an innovative start-up because an established competitor was paying the operator for carrying its data.

However opponents of net neutrality point to the weakness of 'best-effort' public internet to deliver data-intensive or time-sensitive services. Innovation in these new services (e.g. remote surgery) could be hamstrung by poor quality of service as data from all applications face the same traffic jams indiscriminately. Requiring all subscriptions to include full internet could also discourage Internet Service Providers (ISPs) from putting together innovative packages of services to meet the needs of particular groups of users, e.g. discounted packages for users who are only interested in (low bandwidth) e-mail and web browsing.

Competition and consumer protection

An efficiently operating market for broadband internet access could avoid many of the concerns raised by potential blocking of, or discrimination against, specific internet content or services. Though numbers vary between Member States (MS), a 2012 study showed there were nearly 250 fixed-line and over 100 mobile operators in the EU, with no MS reporting less than three in either category except Cyprus (only two mobile operators). Informed consumers could make a choice among offers from different providers and choose the price, quality of service and range of applications and content that suited their particular needs. Given that 85% of fixed-line operators and 76% of mobile operators offer at least one unrestricted plan, consumers could punish any supplier who blocked or *throttled* an innovative new service by changing to another supplier, provided that contracts made switching quick and easy.

This free-market philosophy makes sense to experts who feel it is only normal that people have to pay higher prices to access applications that require a higher quality of service. Opponents of net neutrality regulation also point out that offers that have included only a limited number of services within a so-called 'walled garden', such as that of America Online (AOL), have often not done well in the market place. Competition law would deal with the most egregious cases of market failure and discrimination when an ISP used its 'significant market power' to exclude some services from the marketplace or to favour its own services or those of providers from which they received payment. While applying competition law may be time-consuming, a number of cases have been resolved with the intervention of the National Regulatory Authorities (NRA) in MS.

Pointing out weaknesses in these arguments, proponents of net neutrality regulation hold that public intervention is necessary to correct the current market situation. Competition law is not easy to apply to *blocking* or degrading of the quality of applications and content and can only be applied after the fact. To play their part in a competitive market, consumers need to understand what they are contracting for (transparency), they need to be able to verify that they are getting the service that they are paying for, and they need to be able to switch easily to a competitor provider if they are not happy with the services they are actually getting. None of these is easily achieved.[1] Although in the UK, the NRA and industry have made efforts to provide easily comparable data on internet offers, a consumer association in the UK found that traffic management concepts were poorly understood by consumers. In some cases, actual rates of delivery were much lower than those that had been promised and it may be difficult for consumers to detect whether access providers throttle certain kinds of

services, such as P2P services or VoIP. Even if consumers identify problems such as insufficient speed or blocked applications, switching may not be easy: access contracts may be bundled with other services (e.g. telephone or television) or with subsidised or leased equipment that makes it harder to switch. Moreover if a particular service is blocked not by the consumer's ISP but by a network operator in another MS, consumers will still not get access to that service even if they change internet-access supplier at their end.

Even more critically, if high quality specialised services take up a large chunk of existing bandwidth, network operators may downgrade the 'standard' open internet service, leading to poorer service for those who cannot afford to pay more. This may encourage a *'multi-lane'* or *'multi-tier'* internet that could lead to less competition and greater social exclusion. However to some extent a multi-lane internet already exists. Large content providers like YouTube have built, or have contracted for, Content Delivery Networks (CDN) that use private networks to deliver their content to servers located at various places on the edge of the internet in close geographic proximity to their customers. Their content has less distance to travel over the internet to reach the end user, and thus can arrive faster and more reliably than content of smaller competitors who cannot afford a CDN. By 2017, it is estimated that more than half of the world's internet traffic will pass through a CDN. As for risks that standard internet service will be degraded because specialised services take up too much bandwidth, NRA already have the power to impose a minimum level of service if public internet access becomes too degraded.

Freedom of expression and privacy

The internet has become a powerful tool for expressing opinions and encouraging democratic debate: through websites or blogs individuals can express a great diversity of views without the intervention of mainstream media. The internet is also used for a wide range of personal communications. Active network management measures like deep packet inspection, which can be used for 'reasonable' traffic management purposes (e.g. to ensure the efficiency of networks by blocking spam) or for actions which are beneficial to society (e.g. blocking child pornography) could be used for snooping on private communications, much like opening an envelope to look at the contents of a letter.

Proponents of net neutrality believe that an open internet, where users can connect to any site or use any application, is the best guarantee of freedom of expression. They fear that traffic-control techniques like deep packet inspection represent a step toward censorship, whereby governments could censure (or pressure commercial companies to censure) opposing points of view. By blocking or slowing down certain sites, or even just excluding certain services from specialised offers, network operators could make it harder for citizens to access sites expressing certain points of view.

Opponents of net neutrality regulation suggest that guidelines could indicate what kinds of traffic management techniques are permitted and under what circumstances (e.g. judicial supervision). One legal scholar has argued that private organisations (most ISPs are private) performing reasonable traffic management (including prioritising traffic) would likely not be acting contrary to the European Convention on Human Rights (though practices that clearly aimed at restricting competition or media plurality would be). On the other hand (perhaps surprisingly) a very strict codification of net neutrality

principles might be held by the same measure to restrict unfairly the freedom of ISPs to offer different levels of service (like different classes on airlines) and manage their businesses as they saw fit.

The EU context

In the 2009 reform of the Telecommunications Framework Directive, National Regulatory Authorities (NRA) in Member States (MS) were asked to promote net neutrality. Network operators are required to inform customers about quality of service levels and traffic management. NRA have the authority to impose minimum quality of service levels if necessary. At the time of the 2009 reforms, at the instigation of the European Parliament (EP), the EC made a declaration on net neutrality which acknowledged the desire of the EP and Council to enshrine net neutrality as a policy objective and regulatory principle. In 2011, the EC followed up with a Communication on the open internet and net neutrality which underlined concerns about blocking or throttling access to internet services as well as emphasising transparency in traffic management practices and the right of consumers to switch between providers. It promised to assess the need for further measures if it found evidence of significant and persistent problems.

European Parliament

In 2011, in a non-legislative resolution on the open internet, the EP highlighted the connection between net neutrality and various freedoms, encouraged NRAs to impose minimum quality-of-service standards and underlined the need for consumer protection. In a 2012 resolution on completing the digital single market, the EP called for strengthened governance of the digital single market and EU legislation on net neutrality. A 2013 resolution on implementation of a regulatory framework on electronic communications underlined the potential violation of the principle of net neutrality by specialised services.

Current proposal

In September 2013, the EC submitted a draft regulation on the European single market for electronic communications in which it proposed to harmonise rules to ensure unhindered connection to all content and services (except where necessary for 'reasonable' traffic management) in the 'public' internet. At the same time, the proposal would allow for the development of specialised services (sometimes called an internet 'toll road' or 'fast lane'). Some have interpreted the proposed legislation as a 'middle way' that enables operators to charge more for premium quality services but requires at least a basic 'open' public internet service.

The EP's Industry, Research and Energy Committee adopted on 18 March 2014 a report (rapporteur Pilar del Castillo, EPP, Spain) incorporating a definition of net neutrality in a recital. The text allows traffic management measures only if they are technically necessary and do not discriminate among content and application providers. It provides for specialised services ('enhanced quality services'), including those negotiated with content providers, as long as they do not replace the open internet ('internet access services') or degrade its general quality. Nevertheless, some Members pointed to a lack of clarity in definitions, the unenforceability of net neutrality, or to the possibility that specialised services will tilt the playing field in favour of big content providers.

Other EU institutions and bodies

In 2011 the **European Economic and Social Committee** delivered an opinion on the open internet and net neutrality that called for an EU-standard for 'minimum quality of service', grounds for exceptions to net neutrality for managing traffic, and the ability for operators to market specialised services. In 2011, **Council** supported net neutrality as a policy objective for the EU and MS so as to preserve the open character of the internet. In December 2013, Council welcomed the EC's objective of addressing net neutrality, but many ministers considered that better use could be made of current regulations.

In January 2014, the **European Data Protection Supervisor** criticised the EC's proposed regulation, saying that it would permit unlimited traffic management, large-scale monitoring and restriction of users' communications, contrary to data protection legislation and the EU Charter of Fundamental Rights. In 2012, **BEREC** stated that application-specific traffic management practices were not widespread (except for a few practices mostly on mobile networks) and that currently specialised services were not a threat to the 'best effort' internet. In 2013, BEREC expressed concerns about the proposed regulation, citing the complexity of the issues and weaknesses in analysis and consultation. As to net neutrality, it called for clarification of end-user freedom, a more complete definition of specialised services and broader criteria for forbidden practices.

Member States

One of the justifications for the 2013 proposed regulation was the perceived fragmentation of the digital single market into distinct national markets with inherent additional transaction and compliance costs for EU-level operators. Although some MS such as the **UK** have relied on voluntary codes of practice to reinforce transparency and competition and have welcomed specialised services as a way to monetise infrastructure investments, other MS have considered or adopted net neutrality legislation. After a Dutch telecom operator proposed charging extra for access to some Internet applications, the **Netherlands** became in 2012 the first MS to adopt a law with provisions on net neutrality, prohibiting operators from charging more for access to specific internet services, and only allowing blocking or throttling in case of network congestion, security threats, spam or legal enforcement. (Doubts, however, have been raised about the judicial force and clarity of some of the provisions). In 2013 **Slovenia** passed net neutrality legislation which also explicitly prohibits blocking or throttling of individual services, and bans tariffs based on the applications that an end user may run.

Similar initiatives have been considered or are imminent in other MS. In **Belgium**, legislation under consideration since 2011 would prohibit discrimination of network communications on the basis of content, sender or recipient. In a 2012 report the *Autorité de régulation des communications électroniques et des postes* (ARCEP), the NRA in **France,** concluded that competition and transparency were not sufficient to avoid harm to consumers from non-neutral actions; in March 2013 the *Conseil national du numérique* called for net neutrality legislation. In June 2013, the **German** Ministry for Economic Affairs and Energy published a draft regulation which recognised net neutrality as a political goal and regulatory objective but focused on consumer protection; it permits specialised services and prohibits certain traffic management practices. In December 2013, the new German coalition announced plans to make net neutrality one of the aims of the government; it proposed to reinforce the NRA, restrict deep packet inspection, and require each mobile operator to make consumers one offer that included VoIP.

Stakeholder views

Opinions on net neutrality among various stakeholders are sharply divided. Organisations such as European Digital Rights (EDRI), La quadrature du net (France), Bits of Freedom (Netherlands) and AccessNow are strongly in favour of network neutrality. Eight of these organisations have banded together to create the savetheinternet.eu website to oppose a multi-tiered internet and to promote modification or suppression of the concept of specialised services in the 2013 proposed regulation. BEUC, the European consumer organisation, supports EU-level legislation to ensure that consumers get the level of connectivity promised, to access whatever services and applications they choose and to be informed on when and how traffic is managed.

On the other hand, the European Telecommunications Network Operators Association (ETNO) calls for a broader definition of specialised services, greater flexibility in traffic management and establishment of minimum quality of service levels only in cases of significant market failure. GSMA, representing mobile operators worldwide, fears that the EC's proposal for net neutrality risks reducing operators' flexibility in offering customised services, hence limiting consumer choice and operator incentives to invest in infrastructure. BusinessEurope also underlines that any regulatory measures must avoid having a negative impact on (largely private) broadband investment.

Main references

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Endnotes

[1] Terminology or conceptual difficulties may also affect the results of surveys such as Special Eurobarometer 414 (February 2014) reporting the numbers of consumers who experienced 'blocking' of content or applications.

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Annex: A data communications primer

An electronic communications network using the **Internet Protocol** (IP) divides a data transmission (including text, images, voice or video) into separate segments or **data packets** for transmission. Each packet consists of a **header** with general information like sender and receiver's addresses, and a **payload** with data content. To transmit data, a **router** at each node in the network that receives a packet reads the header and forwards it on to another node along the path to the destination computer. Each network participating in the Internet makes its **best effort** (dependent on the amount of traffic and available resources) to forward packets quickly, but without any delivery guarantee: data will never be refused, but if capacity is exceeded packets may be delayed or dropped and the quality of all transmissions will decline.

Transmissions of voice, videos, online games or telemedicine services are **time-sensitive** so that delays in packet delivery can result in poor quality communication or application failures. Where traffic levels are high, the capacity or **bandwidth** of the network is limited, and the time required by a packet to arrive at its destination (**latency**) is long, network providers may try to ensure **Quality of Service** (QoS) by giving priority to the transmission of some packets and delaying others. Technically network providers can delay (**'throttle'**) or even **block** packets based on the source, the destination or the application; they may also do so if they suspect the packets are associated with illegal or malicious practices (e.g. spam). Using technology such as **deep packet inspection** (DPI), operators can examine in real time the data content of packets and decide to treat certain packets differently.

For a typical connection to the **open** or **public** internet (where consumers can connect to any end point or run any application, and data is transmitted on a best effort basis), consumers pay a subscription price for access to the network (perhaps with volume or speed limits) delivered over a telephone line, television cable or wireless or mobile telephone connection. However they may not be aware of whether the contracted level of service is really being provided, or how traffic management affects the way their applications run and their data is transmitted. In some cases, operators who also offer their own content or applications (**vertically integrated operators**) may try to throttle or block access to internet-based services that compete with their own for-fee services.

Moreover, network operators are interested in developing **specialised services** (also called **managed services**) where access restrictions on users and services as well as extensive traffic management can be used to provide higher quality of service (e.g. a guaranteed speed and quality of transmission). Requests from an end-user for a particular service may be refused when network capacity peaks in order to ensure the quality of service for others. Specialised services can be used to support high quality telephony, internet TV or (in the future) data-intensive applications yet to be developed. This differentiation in service could lead to a **multi-lane** or **multi-tier** internet, where specialised services have higher quality standards but a limited number of application or services (and at a higher price to customers and/or content providers); these 'toll lanes' would exist in parallel with an open, public internet allowing access to all services but using only a best effort approach (at a lower cost). Both types of access would share the same underlying physical infrastructure; operators conceivably could devote more resources to their specialised services with, as a result, degradation in the public internet access they offer.