Final Act: The Few More Steps Needed to Restore and Protect Net Neutrality in Europe

Jean-Jacques SAHEL
Skype, London, United Kingdom

Abstract: Net Neutrality is not about limiting or delaying investment in Next Generation Networks (NGN) by somehow stifling network innovation, as some would have us believe. It is in fact about ensuring that what comes out of NGN rollout is what end-users want, and what will continue to fuel the economy, social progress, and the further enablement of (new and better) ways to enjoy freedoms of communication and expression.

Key words: Net Neutrality, open Internet, European legislation, Internet users' freedoms, public policy solutions.

■ Setting the scene

A lot of progress has been made in the net neutrality debate in Europe, since it started heating up around 2008 with discussions over a revised EU Telecom legislation. Awareness of the open Internet and its benefits has improved dramatically. To cite the European Commission,

> "This architectural feature is considered by many to have been a key driver of the growth of the Internet to date, and to have facilitated an open environment conducive to the spectacular levels of innovation seen in online applications, content and services networks." (EC, 2010a).

It may astonish some observers that there is apparently even a "near consensus on the importance of preserving the openness of the internet" from stakeholders in the debate (EC, 2010b). Many EU Member States have also publicly stated their support for net neutrality, from the UK (United Kingdom Department of Culture, Media and Sport, 2011) to Germany (German Ministry of Education and research, 2011; CDU, CSU & FDP, 2009, p. 143) or the French Parliament (*Le Monde*, 13 April 2011).

Yet for all these welcome words, the EU remains the region in the world that seems to suffer most from arbitrary restrictions imposed by network

operators on the open Internet. The majority of mobile network operators in several EU member states impose restrictions to certain Internet uses (including, but not limited to, the use of Instant Messaging, VoIP, video and streaming media, and any/all peer-to-peer software) and some countries even see all their mobile operators engage in such harmful discriminatory practices. There is little action to be seen from the authorities against this type of abuse, except for very few examples.

The Dutch *Tweede Kamer* bravely and fairly adopted specific protections against hindrances or blocking of lawful Internet applications and services (for this to become law, the *Eerste Kamer* will have to formally endorse the text). Norway has had self-regulatory guidelines on net neutrality for more than two years. French regulator ARCEP came out with extensively-researched recommendations to protect the open Internet. Yet, even in the French situation where the regulator has sent a clear signal (rather than taken regulatory action as such), encouraging the market to move in the right direction and deliver a situation where the open Internet is sustained, no movement has been witnessed from the mobile network operators: all of them still impose the very same restrictive conditions on the use of several applications, including any/all peer-to-peer to VoIP and newsgroups. It is as if they would rather bide their time and wait for the regulator to take action, rather than take the smart route of 'doing the right thing' by stopping their bad practices, and avoiding harsh regulatory action. In addition, vague theories have been peddled to politicians worried about meeting what may seem like ambitious broadband deployment and speed targets, whereby imposing net neutrality would stifle network investment, and hence, disrupt these worthy goals.

An obvious problem is that what 'the open Internet' or 'net neutrality' really means, continues to be vague in many people's minds. Even if high-level principles are agreed upon, the devil is in the detail. For instance, there seems to be an understanding that net neutrality rests on three principles: transparency, non-discrimination and universality. The principle of universality, defined as "Consumers having access to any lawful content, application or service on the Internet, subject only to reasonable network management" does provide a good definition of what the open character of the Internet is about. But the other two notions need clarification in order to be meaningful.

■ The main considerations

Traffic management

A starting point is that non-discrimination should not be about only traffic (or network) management practices. Traffic management is not a by-word for net neutrality and vice-versa: this is one of the misconceptions that has skewed the debate in the past few years. Traffic management has almost always existed in the Internet, although it may have started with little more than "dropping a few packets of data here and there" at exceptional moments of congestion. What is key, however, is how traffic management practices can be misused for very different reasons than 'managing traffic' in the strict, technical sense. Technical management of the network, in order to ensure stability and security of the network, and/or to improve 'impartially' the user experience, is accepted by pretty much everyone by now. As the French communications regulator ARCEP clarified:

> "[t]his type of constricting practice must nevertheless only be possible when it satisfies real technical imperatives, and can never involve banning or blocking an application or a protocol (including voice over IP, peer-to-peer or streaming), nor must it act as a substitute for investing in increasing network capacity, which is the solution that must prevail in the medium term." (ARCEP, 2010a, pp. 19, 33)

Without the regulator being forced to 'become an engineer', as some have cried wolf over, scoping what constitutes 'reasonable network management' is important and provides clarity and certainty to: (i) Internet users of any kind, who pay for their access to the Internet, ranging from the average end-user to the proverbial "power user" or geek, to online creators and innovators of all kinds, ranging from a local public authority, to a local or global artist, any blogger or social network user, to an Internet company, be it the proverbial start-up in a garage which hasn't yet proven itself, or an Internet success story, as well as (ii) ISPs and network operators. It has been done already by the Canadian regulator (CRTC, 2009), and ARCEP - which indicated that traffic management should "comply with the general principles of relevance, proportionality, efficiency, non-discrimination between parties and transparency" (ARCEP, 2010b).

But that is not all: other practices besides traffic management can be misused by network operators who control user access to the Internet. A case in point is charging mechanisms, whereby network operators charge

extra, or force users to contract on the most expensive tariffs, in order to enjoy specific uses of the Internet. This is already a widespread practice in Europe for tethering [1], VoIP or Instant Messaging. As a matter of fact, all French mobile network operators apply extra charges for particular uses, and are allegedly preparing to extend that discrimination to fixed Internet access (FRADIN, 2011). Regulators such as ARCEP actually commented that "[o]n the matter of Internet access […] as a general rule, no differentiation [should] be made between the way in which each individual data stream is treated, whether according to the type of content, the service, application, device or the address of the stream's origin or destination" (ARCEP, 2010a). Such recommendations can and should be read as applying more broadly than only to traffic management, to cover all the ways in which network operators treat traffic, whether technically, financially or otherwise. This is also why the Dutch legislator specifically amended its telecommunications law to "ensure the right to free access to the Internet in order to prevent telecoms operators blocking or charging over the top for services" (BIRD & BIRD, 2011).

Going forwards, the focus should be on existing and potential harm for either citizens/consumers or online innovation that might come from conditions surrounding access to networks, and how non-discrimination and/or 'fairness' principles may be applied to prevent, and if needed remedy, such harm.

Transparency

As for the effectiveness of transparency measures in achieving net neutrality, it is at best a debatable proposition. The whole premise behind using transparency as a policy tool is that it will enable consumers to 'vote with their wallets' by leaving providers that do not offer them the open Internet. Following that logic, European Commissioner Neelie Kroes even encouraged consumers to vote with their feet and leave those operators that don't allow Skype (ZD NET, 2010).

But when it comes to net neutrality, this rationale or hope is unfortunately false, because of the continuing and severe challenges encountered by European consumers in switching providers. The statistics confirm it:

[1] Tethering: using a mobile phone as a modem, by connecting a laptop or other computing device to the Internet through the connection of a mobile phone.

switching Internet provider is proven to be one of the biggest difficulties for consumers, even in the supposedly most competitive markets in Europe. In the UK for instance, the regulator Ofcom stated that switching rates for Internet access are lower than for any other utilities like electricity or gas, and as recently as in September 2010 found that almost half of UK consumers find switching broadband provider 'too much hassle' (OFCOM, 2010). The EU's overall Consumer Scorecard and Eurobarometer found similar evidence across the continent (COLLINS, 2010).

Examples of hurdles consumers face include early termination fees, handset exclusivity practices, bundling of handsets and service contracts, non-portability of email addresses supplied by and tied to the operator, residual number porting issues, etc. Even if you could switch easily, would you do so just for this or that website or app, even for the more famous ones, when switching depends on (and is complicated by) so many other factors like price and speed and volume? Given the cost, time and effort involved, a consumer may (even if aware of the initial restrictions they are affected by) decide that the switching costs exceed the loss in utility of the closed network, but the loss in utility remains - as does the discriminatory effect on the market for innovative Internet content applications, services, and devices.

In fact, relying solely on transparency measures may be not only insufficient, but could have the opposite effect of what the transparency measures are actually aimed at (promoting the open Internet), by creating a de facto loophole for network operators to apply restrictions of their own volition, for whatever motive, including socio-economically undesirable motives, because they are not made to fear any regulatory reaction to their abusive discrimination, as long as they inform consumers.

There is a clear risk that this could lead to a situation wherein all ISPs are in a sense encouraged to tier their offers to provide comparable "subsets", and whereby unrestricted Internet (without "subsets") becomes de-facto the highest tier/most expensive option. Clearly, this should be actively avoided.

We are already witnessing on the ground these very perverse effects of such sole reliance on transparency provisions in Sweden for example: until 2010 all mobile network operators offered access to the full, unrestricted Internet. But since then, when regulator PTS pronounced itself in favour of transparency as the only safeguard for the open Internet, one by one all mobile network operators introduced restrictions on users' ability to use VoIP (REALTID, 2011). Yet, Sweden like all other European countries boasts

what is supposed to be a very competitive mobile market, so much so that the European Commission explicitly decided to refrain from requiring national regulators to formally examine the competitive conditions and practices on mobile wholesale network access markets and mobile services retail markets (EC, 2007): a limitation we now need to address.

Competition law

Transparency can only be part of the 'ecology of solutions' (as policymakers like to say) necessary to preserve the open Internet. Some argue that this ecology of solutions only requires transparency and (traditional) competition law, because both mobile and fixed broadband markets are deemed competitive under EU competition law tests, or because mobile and fixed markets are (becoming) a single market characterised by competitive rivalry based on network investments, and so in such a dynamic environment, transparency will be sufficient to tackle net neutrality problems. Cue for certain EU stakeholders to snigger at the US 'duopoly', which 'must' explain why net neutrality has been such a hot topic over there. This is an inherently flawed argument precisely because once again it rests on a presumption that these markets are competitive enough to enable consumers to 'vote with their feet'

The reality is that by and large, despite a handful of high-profile cases, US end-users (and innovators) seem to enjoy a largely open Internet, both for fixed and mobile access. By contrast, the EU suffers from a flurry of restrictive, discriminatory, harmful practices, which only escape the notion of 'anti-competitive' because competition law as applied narrowly in Europe is ill-equipped to deal with the problem. So far as competition law is concerned, it is dependent on the qualification of a very narrow definition of what constitutes a 'market', a market participant being found as having 'a dominant market position', or on collusion having taken place, and on proof of abuse having taken place by a dominant undertaking on the defined market. No individual company has been found to be dominant in the EU retail fixed and mobile Internet access markets according to these criteria. In practice, the catalogue of restrictions which European national regulatory authorities are in the process of producing as I write is bound to find that a majority of EU countries witness restrictions on the usage of many Internet applications, ranging from VoIP to video, audio, instant messaging, tethering or newsgroups. The existence of unjustified restrictions to Internet use has certainly not been mitigated by the mere presence of a certain number of

providers at lower levels in the value chain, or their supposed competitive dynamics(SAHEL / SKYPE, 2010a, 2010b).

In short, it is clear that transparency and the application of competition law must go hand in hand with other behavioural constraints. These constraints may result directly from regulation, or from self- or co-regulatory measures taken by actors against the backdrop of the threat of regulatory intervention.

Mobile

As for the scope of these constraints or safeguards, they should quite clearly cover both fixed and mobile access to the Internet, despite certain calls for mobile to be treated differently because of its spectrum-related technical characteristics. This is the case especially because abusive practices (many clearly totally unrelated to technical characteristics) are particularly prevalent for mobile access to the Internet. It is particularly worrisome as mobile access is fast becoming key in accessing the web (OFCOM, 2011; MEEKER / MORGAN STANLEY, 2009). There is no justification for any difference between open Internet rules that would be applied to fixed or wireless: in applying open Internet safeguards, regulators will, where appropriate, make the necessary distinction in technical specificities between mobile and fixed when they monitor the market and/or when a case where harm is caused is initiated. Only genuine technical impediments should justify any deviation from the principle of open access to the Internet, and such deviations should remain minimal in any case, and certainly based on the principle of non-discrimination.

■ New issues should not divert attention

A number of areas of the Internet value chain are suggested for addition to the 'Net Neutrality question', like peering arrangements or such concepts as 'search neutrality' or 'device neutrality'. However, these new areas of investigation should not divert attention from the core net neutrality concern, which is the behaviour of the operator controlling the physical access network.

Tackling 'device neutrality'

Some of these questions may well be valid. Device neutrality is indeed directly related to preserving the open Internet, and experience shows why. It has been well documented that mobile device manufacturers have been heavily pressured by some network operators - aided by the fact that many such device manufacturers still depend directly on operators for their sales - so that certain applications and services are not usable on their devices (*Best of Micro*, 2008; *Trusted Reviews*, 2007). We are still clearly talking about harm to consumers and innovation effected by the entity in charge of the last mile physical network bottleneck. The difference is that this harm is inflicted indirectly, at the level of the end-user's device. It is also therefore harm to the device manufacturers who may be forced to reduce the functionalities - and hence, consumer appeal - of their products, for fear of seeing some of their major customers implement their threat and reduce orders.

Considering the peering question and the 'new idea' of a data termination charge

By contrast to the 'device neutrality' issue, some of the proposed additions to the 'list of net neutrality issues that need dealing with' may be worth looking into, but some of these entail real risk of taking the focus away from solving the core, existing abuses of consumer choice, competition and innovation, and may well create damage to the Internet ecosystem. The debate around the peering market is a case in point. It has indeed been suggested, particularly in France, that peering arrangements should 'evolve' in light of traffic imbalances, especially due to the rise of video streaming. For a start, the peering and transit market is subject to fully commercial arrangements, and most of the groups involved are large multinationals with the business and legal resources which have driven commercially beneficial outcomes in the past several decades of commercial transport network and access network development. No serious, in-depth analysis of market(s) for IP peering and IP transit suggests that there is market failure, quite the contrary (OECD, 2011). Far from that, the market is judged so competitive that the European Commission itself just this year did not hesitate to veto a draft decision by the Polish communications regulator to regulate IP traffic exchange (EC, 2010c). It also needs to be understood by regulators and by policymakers, that apart from a handful of 'Internet giants', all other entities

that generate large, medium or smaller volumes of Internet traffic, do not have peering arrangements with network operators.

This is not to say that there may not be cases of bad behaviour by certain actors in the IP traffic exchange market(s), that need to be looked at. However, there is a risk that including what may be lengthy investigations on IP traffic exchange market(s) amid the efforts to preserve the open Internet would only serve to delay the application of measures which are needed to prevent, stop and redress the abuse of open Internet/net neutrality principles already witnessed.

In relation to the debate on peering, questions are being raised about whether a 'data termination charge' should be applied to the delivery of online content [2]. It mirrors the debate which started (and should have ended!) years ago, when some network operators suggested that Internet companies should pay them to deliver their content, an idea further expounded in various pieces of research sponsored by the very same operators. Even if many analysts and experts have already largely rejected the basic tenets of this thesis (WILLIAMSON, BLACK & PUNTON, 2011; KENNY, 2011), the 'data termination charge' idea has the same flaws. We should move on from these issues, or unequivocally separate them out without delay, or, as with the other questions around IP traffic exchange, we risk losing more precious time rather than tackling the core, genuine and immediate problems at hand.

Adding an extra charge (and extra negotiation costs - often called 'transaction costs' in economic literature) to the costs of those entities that have activities online - private companies across all sectors of the economy, public administrations, and other end-users - would be highly problematic. First and foremost, it would adversely affect in particular the vast majority of actors on the Internet, who are small and medium-sized companies and organisations with uncertain revenue prospects (and it would reinforce the market position of some of the larger 'over the top' providers, who are in a position to pay).

A further, direct consequence would be that this majority of smaller entities would also likely only be able to afford to pay to target Internet users in their country of origin. How would a French SME, for example, justify

[2] For instance, amid recommendations supportive of net neutrality, the final proposal of the French Assembly in its report on net neutrality issued in April 2011, is to 'carefully assess the creation of a European "data call termination"' (as reported in *01NET*, 2011).

paying to deliver its content to South America or Africa, when it becomes all of a sudden far more complex and far more expensive to target only France itself? Such scheme would thus limit the opportunities for global commerce, free flow of information and social interactions enabled thus far by the global nature of the Internet. It would be like stopping planes from crossing borders and only permitting phone calls within a country. It would be like the Minitel that French people enjoyed for a while: great in the early 80s, but wholly inadequate and limited in the 21st century. Not only would it be a backwards move, but it would be very complex and costly to put in place.

Another unwelcome consequence of introducing such charge is the political effect it would have, well beyond the risk it poses to global commercialisation. For a repressive regime, introducing data termination charges is a wonderful opportunity. It is a seemingly normal, somewhat technical (hence difficult to understand and criticise), way of 'eliminating' any content you deem unsuitable. If for instance Amnesty International want to disseminate content to people globally including being accessible to people in country X, which the country's government may object to, there would be nothing simpler than to impose an overly expensive 'data termination charge' on such content providers, hence limiting the free flow of information through financial means. This is not mere conspiracy theory; the idea of introducing a data or NGN termination charge is not new: it emerged in international fora several years ago, and was promoted particularly by less savoury governments.

Fundamental rights

The link between net neutrality and freedom of expression is not new, but it is a consideration that has been barely touched upon by European technocrats. At the same time as many of them praised the liberating role of new technologies in the 'Arab Spring' of 2011, they were quite happy to see the very same new content, applications, services and technology being forbidden and hindered in Europe by commercial organisations. It is clear that restricting arbitrarily certain uses of the Internet has serious consequences for citizens' rights. Network operators and service providers should not have the right to dictate when, how or whether citizens can communicate with their friends and loved ones, or, indeed, with anyone. In the same way that in the past, telephone companies did not listen in to their customers' conversations or restricted what they talked about, so today's

network operators and Internet service providers should not be deciding what their customers are reading or accessing or putting online.

These risks have already been recognized by several inter-governmental institutions. The Council of Europe, guardian of the European Convention on Human Rights, included in its Ministerial Declaration and various other documents the principle that ""Users should have the greatest possible access to Internet-based content, applications and services of their choice, whether or not they are offered free of charge, using suitable devices of their choice," adding that traffic management measures or privileges should be non-discriminatory and justified by overriding public interest (Council of Europe, 2010; *The Register*, 2011).

With the same concern for freedom of expression, stemming from states' obligations under both the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights, the Organisation for Security and Cooperation in Europe (OSCE) described as "concerning that over 80% of the OSCE participating States do not have legal provisions in place yet to guarantee net neutrality" and recommended that the 56 "OSCE participating States should consider legally strengthening users' rights to an open Internet." (LARUE / OSCE, 2011).

Yet, such important concerns as the link between net neutrality and fundamental rights seem to be largely ignored in European discussions, over-shadowed by various 'sub-debates' that have blossomed as provisions of EC Directive 2009/140/EC and necessary new net neutrality regulations are about to be implemented across Europe. Rather than expanding the scope of work, it is high time for legislators, governments and regulatory authorities to focus and act on the areas of the value chain that exhibit the most harm, actual and potential, chiefly the operators of the last mile bottleneck of mobile, and in some cases fixed, networks.

■ Putting the word "best" back into "best efforts"

As implementation starts, several notions and mechanisms need be clarified or further explored, so that the authorities can most effectively redress current abuse, and prevent further degradation of the situation.

'Managed services'

First, there seems to be an agreement that network operators can offer their own, so-called 'managed' services, alongside the provision of 'best efforts' - open and neutral - access to the Internet. But there is little understanding (or is it little agreement?) on what is 'best efforts', what is a managed service, and whether they themselves should be subject to certain principles of good conduct.

ARCEP separated the best efforts, open and public Internet from the private networks that are used to provide managed services. They defined managed services as:

> "Services providing access to content/services/applications through electronic means, marketed by the network operator which guarantees certain specific features thanks to the process it uses on the network it owns and operates. Some of the classic features include guaranteed reliability rate, minimal latency, jitter (variation in time between packets), guaranteed endpoint-to-endpoint bandwidth, security level, etc."

This definition clearly encapsulates already well-known offerings such as voice over broadband (VoB), IPTV and video-on-demand that a number of operators market already. Nothing should stop operators offering such managed services - as long as the consumer still has the genuine choice and ability to access and use with good quality the open Internet, should they wish to use other online TV or video platforms for example.

When an operator offers to prioritise certain content, application or service as "managed services", it should be on a fair, reasonable and non-discriminatory (FRAND) basis, and transparently. Questions around the fairness and reasonableness of any exclusivity arrangements could be dealt with as they are today through competition and/or commercial law. Nevertheless, there are some unwanted behaviours that need watching on top of that, as the European Commission noted recently (albeit informally). (FRANKLIN, 2011). These would include: situations where capacity and quality of access to the Internet would be artificially rationed, thus leaving online providers no other choice but to enter into commercial agreements for managed services; the progressive extension of the proportion of the network that is dedicated to managed services, leaving the Internet to become a dirt road that will stop evolving despite the evolution in technology and needs; or as ARCEP suggested (ARCEP, 2010c, pp. 24-25), that agreements between an operator and a content provider for managed

services do not result in the degradation of other traffic streams and of the quality of Internet access for other users. Further, access to the full Internet should not become so over-priced compared to managed services, that the Internet becomes a utility available only to the richest segments of the population.

Taking these considerations into account would ensure that the Internet does not become a 'dirt road' compared to managed services, and avert a clear risk to diminish its social and economic value.

Best efforts and minimum quality of service

Preserving 'best efforts' access to the Internet seems to be an accepted buzzword in the EU of late (EC, 2011b), and under Article 22.3 of the revised EU Citizens' Rights Directive, national regulators are now empowered to impose a minimum quality of service to prevent blocking or degradation of service. This has led to questions over what 'best efforts' and 'minimum quality of service' Internet delivery actually mean and look like, which will be crucial as solutions to net neutrality abuses are implemented across Europe and beyond.

First, 'best efforts' is actually a well-established concept. As explained in Wikipedia (that authoritative source which already provided the European definition of 'traffic management' in Articles 20 and 21 of the revised EU Citizens' Rights Directive),

> "[b]est effort delivery describes a network service in which the network does not provide any guarantees that data is delivered or that a user is given a guaranteed quality of service level or a certain priority. The postal service delivers letters using a best effort delivery approach. […] The mailman will make his 'best effort' to try to deliver a message, but the delivery may be delayed if too many letters arrive to a postal office suddenly." (SHELDON, 2001).

In the Internet world, this means that data packets may be delayed or, in cases of acute network congestion, dropped. But 'best effort' does not mean minimum or worst, or limited to only e-mail and browsing of based web pages, as some participants in the debate seem to be implying.

With the understanding that preserving best efforts access to the open Internet does not mean providing the worst possible, but rather the best possible, albeit not guaranteed, access to the Internet, any end-user should

always be able to access the best efforts, global public Internet, whichever other / managed services they may also be subscribing to. In case ex-ante regulatory powers need to be exercised to set and update minimum quality of service levels, as provided for by the European legislation as amended in 2009, one would need to consider such aspects as connection speed, jitter and latency requirements necessary for end-users to benefit from what European legislation calls 'functional Internet access'. There is already plenty of evidence on what constitutes functional use for certain applications and services.

Already some countries have set minimum standards that can be used as benchmarks, at the high-level of download speed at least. In Finland for example, since July 2010 all Finnish citizens have a legal right to access a one megabit per second broadband connection, reportedly making Finland the first country to accord such a right. The US National Broadband Plan committed that:

> "[e]veryone in the United States today should have access to broadband services supporting a basic set of applications that include sending and receiving e-mail, downloading Web pages, photos and video, and using simple video conferencing […] with the following characteristics: [a]ctual download speeds of at least 4 Mbps and actual upload speeds of at least 1 Mbps; [a]n acceptable quality of service for the most common interactive applications" (FCC, 2010, Chapter 8).

Going further, Singapore's Info-communications Development Authority (IDA) has already set minimum quality of service requirements for fixed line Internet access, and is considering doing so for mobile access, as part of implementing its recent rules protecting net neutrality (Singapore Info-Communications Development Authority, 2011).

Recognised studies can also help dig one level deeper into the minimum requirements for specific classes of applications. A simple and internationally-recognised example that relates to VoIP applications is ITU standard ITU-T G114. It recommends that since callers usually notice round-trip voice delays of 250ms or more, there should be a maximum of a 150 ms one-way latency for VoIP transmissions (ITU, 2003).

■ Critical elements of a net neutrality "ecology"

With these important considerations clarified, the authorities can start setting up and using effective frameworks to prevent and deal with net neutrality abuses: an 'ecology' that combines transparency; competition dynamics; and specific protections of the open Internet including non-discriminatory treatment of traffic that has similar characteristics, underpinned by minimum quality of service requirements. In short, legislation should provide for, and regulators should enforce, the following principles:

- having "access to the Internet" should clearly mean access to all of the Internet, rather than a subset of it;
- limitations to end-users' 'Internet access' should only concern speeds or volume caps, except tor reasonable traffic management;
- traffic management is reasonable only if exceptional, relevant, proportional, efficient, transparent and non-discriminatory.
- provision of best efforts (open) Internet access should not be unduly and arbitrarily degraded, or its capacity rationed, or its retail price raised prohibitively, to the benefit of the operator's own or affiliated services;
- all end-users should benefit from a minimum QoS access to the Internet whichever other services they subscribe to, for both fixed and mobile access; what constitutes such functional Internet access would be assessed regularly so as to avoid the Internet becoming an under-invested 'dirt road', or, conversely, being affordable only to the richer segments of the population.

This is not the most complex set of solutions, nor is it particularly stifling. Network operators can respect net neutrality in practice easily, without compromising on innovative business models and differentiation; and indeed, some have already committed to do so (*Voice on the Web*, 2009). Similarly, in many parts of the world, notably Asia-Pacific, the response to the Internet demand growth conundrum has simply been to increase capacity, with the understanding that with the right tariff model which stimulates customer demand and makes meeting customer demand a profitable proposition , return on investment would follow: whatever one may hear in the context of net neutrality discussions, the most basic economic principle of all perhaps, is that demand is good for business...

Regulators should not have had to look at the issue in the first place: net neutrality is a good thing for all in the Internet value chain, including network operators (at the access, backhaul, national core, and international backbone levels). As Telecompaper analyst Tim Poulus put it simply:

> "Subscribers need a data connection for OTT [over the top] services. Operators profit from this as they sell broadband subscriptions (fixed or mobile). Even more important, without the OTT sector, the entire broadband market would be worth much less. Without all these useful applications from the likes of Google, Apple, Microsoft and others, we'd all be fine with an old-fashioned narrowband connection. […] operators are generating significant revenues in the lucrative broadband market, and if they know how to work with OTT players there are even more profits in reach. In short, there's no reason for operators to fear NN, and they can even see an opportunity in it" (POULUS, 2011).

However, the widespread net neutrality abuse we already witness today in Europe - manifest in such practices as blocking, degrading or charging more for the delivery of certain content; the use of certain applications or classes of applications, or putting pressure on device manufacturers so that certain applications and services are not usable on their devices - risks unbalancing the virtuous cycle we have known so far in the Internet value chain; and could therefore severely impact all actors in the ICT value chain and beyond, including telecom network operators themselves. Thus, if the recalcitrant network operators out there do not see the light, regulators should act without further delay.

As industry visionary David Isenberg pointed out:

> "Without the Internet, the minor improvements in telephony and TV certainly would not drive the buildout of a whole new infrastructure. The best way to do telephony would still be twisted pair. The best way to do Cable TV would be coax" (ISENBERG, 2009).

If it wasn't for the advent of the Internet and the information, content, applications and services that come with it, the telecom industry - and the wider economy and society - would not have grown and progressed remotely as much over the past twenty years. As ex-KPN CEO Ad Scheepbouwer stated in his parting interview, if a telecom company had invented Google search, it would probably have asked 10c per search, and search would never have taken off (*TIJD*, 2011).

Politicians should abandon any consideration of giving up net neutrality in return for meeting broadband deployment targets. Instead, they should focus on ensuring that citizens and businesses can access all that they want on the Internet. Delivering a crippled version of the Internet at 100Mbps would be pointless.

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