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PUBLIC CONSULTATION ON THE OPEN INTERNET AND NET NEUTRALITY IN EUROPE
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My comments:

Question 1: Is there currently a problem of net neutrality and the openness of the internet in Europe? If so, illustrate with concrete examples. Where are the bottlenecks, if any? Is the problem such that it cannot be solved by the existing degree of competition in fixed and mobile access markets?

The author here as a senior specialist in communication protocols, signalling, waiting queue analysis, networking architectures and performance features was already waiting 20 years that the question raises about NN since the occurrence of IP/internet following hype - out of(agreed) impressive multimedia (Browser based) Web on the top - and post-hypes - also impressive increased physical bitwise(!) transmission speeds from where the Internet overwhelmed its problems so far - and a very strange, destructive so called Internet economy!

The introductional answer is: **There was never a NN**! And no openness!
(The author here wonders, why and how it took so long to raise officially the discussion here.)

This comes from following: (bidirectional and symmetric) “IP” was never designed for networking, meaning operational nodes (traditional “routers”, latest called “switches” waiting queue free) between, nor as a “net”working service to share links incl. local loops/access: 1.) It was originally designed to simple (and therefore released from military research), closed(!!) peer-to-peer “hosts” connecting(/”Inter”-networking) - really with nothing between(!) - and “subnetworking” (compare e.g. LANs, others) behind(!) so called hosts for other kind of stations there. (From a bird eyes´ view the overcrossing links appear like a “net”.) 2.) It is “connectionless(!)”, meaning no(!) automated end-to-end-control and no steering at all in packet forwarding/relaying operations, although a “connection oriented” layer option (TCP) above(!) introduced. 3.) Working on a so called socket mechanism, API like, in end stations (for context switching there), it has e.g. no(!) channels (physical/virtual/logical) for traffic separation, saying the multiplexing function is missing! (In aggregated flows this causes the passionate, for all suffering “burstiness” phenonema. 4.) It is uncapable of nodal “fast Code Switching” (, although each data packet carries in the header form where it comes from and goes to). 5.) It is, was und remains actually an explicit&implicit closed control loop(/”feedback”) based a(!)synchronous packet (re!-)transmission (windowed Ack/Nak, ReceiveNotReady, etc.) scheme (applied queuing theory), giving in principle poor or none at all time characteristics/guarantees. (In the authors feeling, an implicit “open” loop technology of reduced or none feedbacks fits better for carrying voice, TV, etc. packet streams - so far on the way already) 6.) And other many missing protocol characteristics for transparent, independent service sourcing, etc..
One of the effects is, that freely routed heavy traffic load connections naturally sucks bandwidth and switch resources, and then applications with only a few packets are deferred - you my call “discriminated”.

And with the extension, the traffic shaping had reached a level of drops/discards of unpleasant packets, which - with protocol competence - can be regarded as tremendous causing retransmission as detected lost and so causing further delays.

Nevertheless, IP/internet is there (plus further enrichments), will remain, spreads - and I use it too - as a new and somehow universal medium (plus alternatively plain old media out of good reasons!).

Actually (and simple spoken - or you may call it a paradigm shift): to work and give automaticly sufficient performance achievements, an IP stacked net(working) (ref. OSI model) requires s.th. below, s.th. on top and s.th. beside (see here later) - if an mostly manually (closed!) operational effort for steering efficient flows of traffic data, sometimes called network management, should not explode, neutralizing benefits.

Question 2: How might problems arise in future? Could these emerge in other parts of the internet value chain? What would the causes be?

Relying only on IP and ignoring fundamentals of communication engineering, it had come so far that e.g. layer 2 (ref. OSI model: “frame” retransmission, etc.) below with contribution to any QoS and of big importance for most reliable (direct) access and intermodal links, was lost (, and what the author here honestly has to regret; only on Fibre based communication it is a good question whether to leave it out). But others recognized their opportunity to build complete Internet access services on Layer 2 e.g. with the so called PPP (Point-to-Point Protocol) standard, giving also way for more “at home” networked stations.

On the other hand and also others, as detected unefficiency of IP based global, public Internet for reliable, complete transmission and the mentioned loss of layer 2 protocol (and services), came the introduction of (overhead pregnant) “IP-in-IP”, also giving way for encryption within and/or “VPN” (Virtual Private Network) solutions for companies - and a good business (so far).

Being aware of all these principle restrictions and weaknesses and their overcome, some (network operator/carrier, service provider (ISPs), “system houses”, outsourcer, infrastructure vendors/manufacturers) made their fortune and gained significant market power, boosted by a flowting away competence of users (private, companies), what is actually happening in the cable (or air interface) and what for production processes in/of a “net”work” (, called “intelligence” if well done for capacity and other automatic treatments). As consequences, a industry concentration effect took place, farer going than a consolidation, ongoing - and this with respect to an introduced de(!)regulated, welcomed competitive market.

And, of course, there is a potential abuse behind (see below), hazards and threads.

Question 3: Is the (current) regulatory framework capable of dealing with the issues identified, including in relation to monitoring/assessment and subsequent enforcement?

In my opinion **not** enough.

As indicated, there are on the way already “open” loop technologies of reduced or none feedbacks fits better for carrying such high volume streams like packetized voice, TV, etc., actually coming very close “digital broadcast” media.

Together with regulated(!) traffic load/bandwidth separation and subscriber informed differentation schemes, methodology and tools (see below), such new categories (or unidirectional classes) can be brought in (or vice versus!); the same enabling for new forms of data services like most sensitive metering data transmission/switching. Dto. enabling for so called “virtual circuit, “eLine”, etc., comparable with old plan “Leased Lines” and rather similar performance indicators.

This is not only a main issue of to be defined minimum service quality set, although service parameters and some values are used (see below); actually it is a framing/encapsulation method and approach on any(!) layer (and protocol)!

Question 4: To what extent is traffic management necessary from an operators' point of view? How is it carried out in practice? What technologies are used to carry out such traffic management?

The practical task was/is/continues to distinguish out of different requirements e.g. less time-critical traffic plus(!) fighting (expected) randomly nad somehow regular and disruptive congestion, affecting overall efficient functioning.

The key is the **“Label Switching”**, where data packets are tagged like with aggregatable identifiers in an framing/encapsulating form(at) and forming virtual channels like so called (conceptional) “flows” (of same tag), resulting in a certain degree of delay free nodal forwarding (as already introduced) plus further mechanism. Basicly there are two enabling “flow concepts”: differential services (diffserv), out of the “mix” of multi-service-traffic, and integrated services (intserv) with reservation capability e.g. critical, constant parameters, both combinable (depending on the network structure), this with high consequences for network operating: Because not all packets can “flow” and never same fast, saying, intended **“broadband” is not a common solution**. (Actually it makes it wonder).

But the evolution in the “IP world” came unfortunately other: from a TOS (Type of Service) field as Label, it made its way to COS (Class of Service) and introduced performance values (of unknown/unclear origin) and ending up in a mainstream as “priority”, very doubtful (see below)! Here it had come to a development stop(/dead end street), specially minded to those who had faith in this and relying to market dominant vendors. (In other continents it ist much different.)

From the appropriate “channel formation”, also the important effective support/safeguarding (s. ENISA report) for safety&security was not very much left. But in found its way into CIIP (Critical Information&Protection) standards like TESTA (where the author here was involved in the initiation and development) and in operation e.g. EU Commission, EMISA, Schengener Info System, etc. Please also note, that Label Switching is integral part of IPV6 (, although not very much wanted by Internet service providers because of a fading away business with naturally limited (resource!) of fixed address and dynamic ones from domain name services).

In the meantime the Label Switching technology exists now in 3 forms as spread:

- VLAN Stacking (Layer 1,5) for LAN infrastructures (incl. Bridging mechanism), but also newest offers for so called Metro-Ethernets/Access and Transport Providers
- Dto. SAN (Storage Area Networks) with „Switched GigaBit Ethernet“ and relatives in the „Cloud“
- MPLS (Layer 3,5) routed networks, specially minded for IP (and associated “Routing”-processes/protocols)
- And proceeded G(eneralized)MPLS (Layer 0,5) of Optical Network Switching (ASON), SDH transmission techniques and others „Framing/Encapsulating Methods“ in the Backhaul (/Backbone) incl. access concentration.

It is the strategic determination with platform characteristic for bandwidth dynamics sustainability, „Safety&Security related“ needs of application transport, so called VPNs creations and economic efficiency & accountability in the most important task, in which area which form (respectively also in combination is possible) is made use of and at least whose planning and operation responsibility: WAN up to global area, short distance and inhouse provided, Data Center supplied and specially mentioned „Cloud Computing“,

„Virtualization“ and „Enterprise Bus“/SOA Mainframing as well as processing joints („Grids“).

Question 5: To what extent will net neutrality concerns be allayed by the provision of transparent information to end users, which distinguishes between managed services on the one hand and services offering access to the public internet on a 'best efforts' basis, on the other?

See my answer question 14.

But, my statement here is referring to the outlines before - and this is the real regulation issue:

Who owns/commands the labels and has at ones disposal as well as arrange these incl. their committed denotation, owns the “power and **future of the networks**”.

Perhaps for an Universal Service directive from the EU wide ONPs (Open! Network Provisions) a framework can be deducted (, where the author here was involved; but this was many, many years ago.)

Question 6: Should the principles governing traffic management be the same for fixed and mobile networks?

In cellular “mobile networks” it differs very much reasoning the hard(!) channel structures of the air interfaces. (E.g. promised(?) speed is only an upper limit, hardly to reach.)

Some remarks:

Regarding UMTS(/GSM 3.0), for the background an IMS (“IP” MultiMedia Subsystem) was designed by 3GPP (and pushed by ETSI so far. But the author here has heavy constraints, because in theory and practise it has not up to now proofed to work under load - due to to many functional entities. (The author here counted up to 18(!), independently from infrastructural nodal switches, routers, etc.)

Regarding WLAN, 802.p(riority) see my comments below.

Regarding WiMax, there is a very far going, new and sophisticated “bandwidth” operating model (compare my comments in question 14) behind, really worth to be evaluated for NGN.

Question 7: What other forms of prioritisation are taking place? Do content and application providers also try to prioritise their services? If so, how - and how does this prioritisation affect other players in the value chain?

Obviously everything with **“priority” is a misleading expression**, brought into the wrong context and an ongoing misunderstanding out of this (; in conjunction with Label Switching some say: old fashioned(?) IP/MPLS - see above).

The real purpose is (still) to resolve occurrences like randomly and disruptive congestion or any other sudden unavailability/reduced or disturbed medium availability in the moment of access. (Please not, that a radio link may be worse than a “bad wire”.) So a waiting queue effect can always be expected in the moment of (each packet) access, which has to be handled, if desired on to be introduced criteria for sequencing. This can be found e.g. WLAN 802.11p(priorization).

It can not be neglected, that it might also give sense to an sudden overfreighted nodal “switch” (or its ports).

But, as mentioned before, a traffic shaping had reached a level of drops/discards of unpleasant packets according so called non-priorities, it can

be disasterous causing retransmission and so causing further delays plus the impact out of this requiring more(!) bandwidth in end effect.

In other words: it has to be avoided!

Question 8: In the case of managed services, should the same quality of service conditions and parameters be available to all content/application/online service providers which are in the same situation? May exclusive agreements between network operators and content/application/online service providers create problems for achieving that objective?

The author here has nothing against (alternative) “managed services”, more or less on confidence based, with (hopefully) contractual penalties. (Whether real damage claim and liability is covered by this, is a good question here.) But obviously huge penalties were paid in the past to companies (e.g. to hold the customer on his simplest complains with the formular: bigger customer, higher penalty, sometimes appearing corruptive), bringing service providers/carrier close to bankruption. (About cases/agreements between(!) any sort of providers and carriers or carrier-to-carrier incl. transit is not very much known; the same for private end user customers/consumer). Of course, it is the question on which evidence giving parameters and values, where the author noted quiet well a commonly agreed (and protocol effects not very much harming) approximately factor 10 multiplied against plain old data services before performance parameter values (see below), which were regulated at those days.

Question 9: If the objective referred to in Question 8 is retained, are additional measures needed to achieve it? If so, should such measures have a voluntary nature (such as, for example, an industry code of conduct) or a regulatory one?

I can not agree/understand logicly.

Question 10: Are the commercial arrangements that currently govern the provision of access to the internet adequate, in order to ensure that the internet remains open and that infrastructure investment is maintained? If not, how should they change?

It has to be said, that with (real) Label Switching the in turnover still and currently suffering operators/carriers operator and carrier appearantly try to avoid the necessary methodologies and tools, also a sort of extended(!) and automated network management, which would be a **huge invest** in a Software(!).

It is defined as **OSS/BSS** (Operation Support System/Business Support System) and more than only “support”.

It is the (otherwhere in the world already) the experienced enabling necessarity to install, control&measure (QoS, accounting, etc.), supervise, etc. packet data “flows”, as identifyable by Labels according collective, individual or composed relating parameters and values in customers desire or other relevance. (In a „GigaBit“ and beyond environment only(!) by this way neutral measurement&monitoring functions can be implemented, because the label is in the focus (/filter)). The Labels in definition, value semantics, etc. are administrated/”managed” and network wide plus furthers(!)/transit spread arranging “resource” in (shared) links and nodal switches, meaning “producing bandwidth”.

Further, in a value chain it is “open” for interfacing access of “Service Providers” and customers/end users (or on their behalf), so they may also arrange their traffic flows, etc.!!

Question 11: What instances could trigger intervention by national regulatory authorities in setting minimum quality of service requirements on an undertaking or undertakings providing public communications services?

This question is somehow misleading, if the answer should target minimum(?) QoS (parameters and their values). That is because, as the nature of the “open”, public Internet is, with “bad” QoS money can be earned, too.

Question 12: How should quality of service requirements be determined, and how could they be monitored?

Please see my answer of question 10.

But some additional remarks, outlining the complicity:

As mentioned, one of the protocol effects is - with easy measurement proof (not “ping”!) - that freely routed heavy traffic load connections naturally sucks bandwidth and switch resources, and then applications with only a few packets are deferred. High speed, as in broadband services, is not a solution for this problem; it makes it worse!

For information purpose: if and in underlying Ethernet there exist a usability - if as cross-layering implemented - with an artificial(!) signal (“JAM”) possible to interrupt a packet flow for the transmission opportunity of others like urgent packets: this is based on conventional CSMA/CD (historicly shared) channel (distributed multiple!) access method and (“multiplexing”) control, although mostly as in Ethernet transmission based point-to-point connections of the FD case not needed. (This method is also used for the sudden(!) congestion case to mitigate, but only this!)

Please also note, that the so called “open” Internet - in its global appearance, but also Europe wide, mostly nation wide and its regional/local operators/carriers - has not(!) sufficient mesh topology characteristics in the core, access/concentration networks and user direct connect(/”local loop”) with respect to redundancies; dto. not for any potential traffic load balance. (Load balancing - on parallel links or via diversion(s) incl. for peerings- is rather a critical thing with respect to performance warranties.) This situation is ongoing!

This also counts for flow of traffic between(!) networks, called peerings and “transit” providers/carriers, where often standardized (traditional) routing protocols were quoted, but quiet a few of doubtful efficiency or only partial in operation.

The author here agrees, that an heavily increasing a(!)symmetrical traffic thruput occurrence is notable (the same like on users´ access links) due to “content” delivery e.g. newest “cloud” services. (He has no idea how to handle this.) Please note, that it is a very good question, whether “asymmetric” transmission protocols for handling/avoiding performance losses/supporting asymmetric packet traffic flows, saying different directional speeds, could exist at all. (For this, “a”symmetric access services like ADSL and HSPDA/UP are only partially exploitable.)

Question 13: In the case where NRAs find it necessary to intervene to impose minimum quality of service requirements, what form should they take, and to what extent should there be co-operation between NRAs to arrive at a common approach?

Actually not, because other possibilities with transparency(!) exist (see below), enforcing the carriers´ and providers´ competitive efforts and business

achievements for customer satisfaction plus giving way to innovative products/new services of so called “intelligent(!) networking”.

Question 14: What should transparency for consumers consist of? Should the standards currently applied be further improved?

Please see first my answer of question 10.

Here we can go back approx. 10 years, actually further beyond initially for ATM (Asynchronous Transfer Mode with smallest packets (53 Bytes), called cells), referring to still valid and improvable standards (IETF, ITU, others) on professionally(!!) **distinguished “bandwidth models”** (for production and other purposes) to be all 4 offered in the consumer´s access. (By the way, ANSI defines “bandwidth” as the product of transmission speed and delay freedom.):
1.) “Best effort”, priority mechanism only for sort of optimization and selective “best path” (to be routed), and for conventional and competitive(!) SLAs (Service “Level”! Agreement)
2.) “Controlled load” on demand in 2 version: a.) blockade(!), if contractual performance parameters can not be fulfilled in the moment of access (comparable telephone call reject), b.) or expedited “policy” based for the case of degradation (e.g. bandwidth downgrade, (unrecommended) packet drops, jitter expand, etc., saying making it “slower”) as contractual(!) outlined.
3.)”Negotiated” during (to be introduced) setup phase in the “not always on connected”, but also for the case of increasing(/downgrade) capacity to meet an application´s demand
4.)”Guaranteed/assured”, which includes reservation schemes on a selective unhindered base, also for the “not always on connected” case.

(Please note that for the end user originated (with or without any justifying) data “bursts”, additionally quiet a few and effective “smoothing” mechanisms exists.)

All 4 models do somehow relate to “managed service”, to what we have learned so far, but vary very much on impacts and missing market outcomes yet.

This should be pan-European “regulated” by **BEREC** lead and coordinated!

Question 15: Besides the traffic management issues discussed above, are there any other concerns affecting freedom of expression, media pluralism and cultural diversity on the internet? If so, what further measures would be needed to safeguard those values?

The author here has no ideas.

Any other issues
I can only honestly recommend to continue work on these important matters (and to come back to a realism). More info can be revealed.

Sincerely

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P.S. The author here continues to fight on the definition and accountable size of the MTU (Message Transfer Unit).