

TIM response to BEREC Consultation on Net Neutrality Regulatory Assessment Methodology

05 July 2017

General comments

TIM welcomes the possibility to comment the regulatory assessment BEREC made to support National Regulatory Agencies with the implementation of the Net Neutrality provisions of the Regulation 2015/2120, concerning monitoring systems.

The main focus of the document is on measures and tools related to the performance and quality of the internet access service provided to customers.

We believe that “best practise” analyses and recommendations on these issues should be based on specific fundamental principles, so as to avoid taking misleading and non-effectively functional paths:

- BEREC analysis carried out in the past on Internet Access Service quality monitoring can be considered a useful starting point, but the coherence with the Net Neutrality rules defined in the Regulation 2015/2120 (after the previous BEREC analysis) should be ensured.
- quality of service measurement parameters and methodologies should be based on consolidated technical and scientific foundations; substantial and stable standardisation is already available in Europe by ETSI, a recognised body also at regulatory level in the European regulatory framework. The selection of parameters and related measurement methodologies that are considered relevant and representative from the end user perspective to measure Internet access service (IAS) quality is already set in the relevant ETSI standards as defined by the STQ Technical Committee. In coherence with the regulatory principle of promotion of the use of standards and specifications defined by the international standardization bodies, ETSI standards on QoS indicators and measurement methodologies should be taken as a reference and are to be included in the proposed analysis and complied with.
- quality measures refer to the Internet Access Service (IAS) that is the object of the prescriptions of the Regulation 2015/2120 and it is defined as a connectivity service. Therefore the IAS performances relevant in the EU Net Neutrality Regulation context remain those related to the Internet connectivity provision and, as to the liability which may be ascribed to the single ISP, to the IP network domain over which the single ISP has direct control.
- measurements related to individual applications using Internet Access Service are dependent on multiple factors, not necessarily linked to IP connectivity. They are not under the control of IAS providers and they are outside the scope of Net Neutrality rules. The measurements should focus on the compliance of IAS IP connectivity performances with respect to what indicated in the contractual conditions of the subscribed IAS offer.
- the comparability of the results of the different measurements is key for the whole methodological system to have a genuine purpose and sustainability; this demands to meet stringent requirements, to be defined during the planning stage of the measurement system.
- measurements carried out on an (almost) continuous basis are questionable, both in relation to their sustainability - since the impact on the networks of any measurement should always be minimal in terms of network occupation – and in relation to their usefulness, due to the considerable amounts of non-comparable and doubtfully sound data they produce.
- inherent differences and limitations among fixed networks, wireless access networks and mobile networks, in particular deriving from radio access are to be taken into account. Any assessment should be in line with these objective differences.
- all obligations concerning IAS quality monitoring must be reasonable and proportionate, and shall take into account related costs and generally additional burdens on ISPs so as not to create distortions in the competitive environment in the whole internet ecosystem.

Consequently, TIM believes that the approach of BEREC document should be reviewed in line with the above-mentioned principles and should ensure its sustainability and technical feasibility in order to comply with the Net Neutrality Regulation.

We deem this the only means to comply with the obligations set by the Regulation 2015/2120 without affecting effective measurement systems already present at National level. Indeed, where these established systems already deliver sufficient results, NRAs should refrain from re-adjustments that burden industry and may confuse customers who have got used to the established tool.

Below you may find specific contributions on the various chapters of the document.

Comments on chapter 3

As to the IAS parameters and QoS measurement methodologies, the section should be based on the activities already developed and consolidated, also from the scientific point of view, by ETSI and therefore, with regard to IAS, on the ETSI ES 202 765-4. This is the essential basis to avoid or at least to minimise confusion and uncertainty effects, as well as unjustifiable burdens on the operators.

In particular as to the IAS speed measurements, it is necessary to start from the ETSI standard to define the parameter, its statistical significance and the measurement methodologies to be applied. We do not believe that it would be advisable and viable that BEREC indicates ex-novo the more or less appropriate measures to be followed.

It should be mentioned that the only measurement system defined by ETSI already in use is the one based on measurements at “http” level and, therefore, the introduction of different modalities, possibly uncertain and proprietary, is to be avoided, also to ensure results comparability.

It should be noted that, also in accordance with the EU NN Regulation, these measurements are only referred to statistical performances related to the IP connectivity as perceived on average by the end user and BEREC should not trespass the requirements of the reference regulation. In particular, measurements related to the applications performance should not be assessed, since compliance with the EU regulations in force pertains to IAS provision and to ensuring the respect of the contractual conditions of the subscribed offer.

The same approach is to be applied also to the measurements related to delay, variance of the delay and packet loss, based on the tenets established by the reference ETSI standards. Other proprietary modalities would create a great deal of confusion and instability, as well as a considerable uncertainty for the comparability of the measurements.

With regard to the issues related to potential priorities, bottlenecks, effects of the specialised services, etc. TIM maintains that the EU Regulation does not require the NRAs to establish invasive measures, but essentially to detect any anomalies that could emerge on the market, especially those reported by the final customers. In these scenario, the NRAs may undertake *ad hoc* case by case assessments of the ISP behaviour, to ascertain the necessity to adopt specific measures.

When looking more into the details of this chapter, the BEREC states that the proposed measures are intended to:

1. Empower the end user to validate the commitments of their IAS provider.
2. Monitor the general IAS quality and confirm that the IAS performance is developing sufficiently over time when taking into account technological evolution.
3. Support the detection of any prioritisation and/or throttling of selected applications compared to other applications running over IAS.
4. NRAs may also use the data to increase transparency (e.g. interactive maps showing performance in a geographic area).

Regarding these four objectives it is important to highlight that these have in many cases already been achieved today by NRAs; for instance by AGCom through the methodology and tools used in its decisions related to measuring the quality of the broadband Internet access service.

In particular, the choice made by the operators to delegate the measurements to a third body identified by AGCom enables the achievement of the necessary decoupling and independence indicated by the BEREC document.

In order to avoid, as properly addressed by the consultation document in paragraph 5, that the features of the customer’s PC negatively affect the measurements undertaken, in the context of the AGCom measures all PCs/smartphones carrying out the measurements should have the same hardware configuration and the same software installation. These measurement agents, besides, taking the measurements in the same locality and with comparable network features for all operators, make it possible to obtain comparable measurements and to

discriminate between problems related to the inherent features of the measuring point and problems arising from the network configuration set up by the operator. Another important feature of this approach is related to the servers in which these measurements are carried out, which are identical for all operators and are positioned at the interchange nodes.

Moreover, since the planning of the measurements and their implementation are carried out by the third party without any intervention of the operator, any change of network features and traffic shaping policies by the operator is virtually impossible. Finally, also the servers are under the full control of the third party and their configuration/address can be changed over time without informing the operator, making it impossible to assign the measurements a network priority out to the detriment of others.

The monitoring of these measurements over time gives an opportunity to measure and assess both the introduction of the desired infrastructure improvements and the application of traffic shaping policies.

As to the measurements, TIM believes that these should be carried out in compliance with the reference ETSI standards and specifications based on bit exchange with http protocol as to the speed calculation both in download and in upload (with bit count for a constant transfer time for each transmission direction) and with the forwarding of ICMP packets measuring the round trip delay and its variation towards a server positioned at the nearest NAP. We deem that a permanent measurement is not at all necessary to calculate these indicators and it may be even counterproductive since, on the one hand, the network would be uselessly burdened and, on the other, this measured traffic could be recognised and branded as a priority. A dozen or so measurements per hour for each element repeated in the 24 hours/day may be a first useful frequency measurement, to be possibly adjusted if necessary on the basis of the assessment of the reliability of the measurements.

It is therefore important to use the http protocol to measure data transmission speed and, specifically, to transmit one or more test files (constructed according to the features defined by ETSI) of standard size between the measurement server and the measurement client, separately for download and upload, observed for a specific period of time. The number of files to be used depends on the line nominal speed and is to be determined in a pre-qualification phase so as to saturate the nominal bandwidth available.

In particular the data transmission speed V , measured in bit/s is

$$V = \frac{N}{T}$$

where N is the number of bits counted during the transmission and T is the fixed lapse of temporal observation.

The carrying out of the measurements provides for the opening of a http session between client and server (without a proxy being present) and the T interval starts from the first bit downloaded.

In practise, for the calculation of this indicator, to maintain a 10 seconds lapse of temporal observation T , it is necessary that the measurement term is of at least 12 seconds, since the first seconds (at least 2) are intended for the pre-qualification of the line in order to achieve the optimal conditions for the performance of the measurement itself.

As to the measurements of the round trip delay and of its variation, carried out through the use of PING control, we believe that the time out to be applied is that of the ICMP protocol itself (TTL ICMP Packet RFC 792), that a significantly lower number of measurements is sufficient as long as there is no correlation between them i.e. between a control and the following there be a sufficient lapse of time, not less than 10 seconds.

Comments on chapter 4

In principle we are entirely opposed to associate aspects of higher level of the network, such as for example the blockage of TCP/UDP ports, to the features of the IP connectivity provided by the IAS. In fact, the management of TCP/UDP level and higher levels usually does not concern the IAS service, apart from totally legitimate functionalities such as the NAT usage. Besides, the configuration of firewalls, antivirus and other functions present at the terminals and/or outside of the network domain under the responsibility of the single ISP would have a role of confusion and uncertainty.

Consequently, the set of assessments proposed in section 4 would determine extreme uncertainty as to the meaning of the potential outcomes and, above all, it would be difficult to understand who in the end-to-end provision chain of the Internet connectivity is blocking.

The potential measures related to reachability of IP addresses are unsustainable in practice and completely ineffectual in the outcomes, since Internet can have temporary areas of non-reachability for its "best effort" nature and as a set

of interconnected autonomous networks. Potential temporary non-reachability cannot be imputed to any specific entity present in the provision chain.

Also in these cases we deem it appropriate a monitoring by the NRAs on the market and on potential complaints or anomalies reported by final customers with regard to reachability to start, when the problem is demonstrated and lasting, further exploration of single cases.

Possible actions on DNS to manipulate configurations are deemed outside the scopes of the EU NN Regulation, since this does not concern “traffic management” issues but potential harmful or even fraudulent conducts on the system which ensures the Internet functioning. Indeed, end users can set autonomously DSN configuration and this manipulation is out of the control of the ISP.

Finally, we point out the inability, inconsistency and unsustainability of potential recommendations to submit the Internet ecosystem to continue measurements, also because nothing can be ascribed to a specific ISP.

In relation to the QoS of single applications, in principle this approach is considered non-consistent, since the EU NN Regulation is merely related to Internet access services and therefore to the IP connectivity provided without unfounded and/or unreasonable interferences. Consequently the measurements are to be limited to the IP connectivity provided. The IAS offered does not provide links with the performance of specific higher level applications, also because application level techniques of optimisation (CDN, storage, etc.) may be used which have nothing to do with the NN.

Also in this case, upon specific indications or complaints on real anomalies, the NRAs can explore potential issues possibly present on single applications. This is particularly important since, as also highlighted in the consultation document, these are “tests” by their nature approximate.

It should be noted that some configurations present on the terminals due to the installation of firewalls and antivirus, as highlighted at 4.1.3, in fact block the traffic to/from some ports and to/from some specific addresses or alter the address resolution modes via DNS. All this would make therefore the notifications of anomalies found during the test absolutely non-valid.

Also, it is not clear how it would be technically feasible, unless making use of external probes or traffic sniffing mechanisms (choice that could introduce other regulatory issues and we do not agree with), to assess the content of paragraph 4.1 of the consultation document (*“Therefore, it is recommended to send some data and verify the integrity of the received data to ensure that the connection is established to the measurement server.”*)

As to the crowdsourcing and to the possibility to choose it in the scope of the assessments related to the Net Neutrality, our comments are as follows:

First of all we agree with what stated by the BEREC in chapter 2 on the inherent and substantial uncertainties of these measures (*“For in-browser or app based crowdsourcing measurement tools it is hard or even impossible to have full control over the all factors such as the end user environment that impact measurement results. This introduces a possibility for error in measurement results that cannot be fully avoided. This methodology provides guidance on how to increase the accuracy and reliability of such measurement results.”*)

Besides, the measurements obtained with such modalities cannot be used in any way with the objectives illustrated within the consultation document, in particular aimed at obtaining certain and not potential or even incorrect measures (cfr 4.1.1 *However, in the case of crowdsourcing approach it may be possible to compare large number of results from different end users. Setups or disturbances in the end user environment may produce measurement results that incorrectly indicate certain traffic management practices. In case a large number of measurements indicate the same traffic practice, the likelihood that these practices are indeed occurring due to the operator's network setup increases*). There are too, as also indicated in paragraph 6.1 of the consultation document, other relevant limitations in the validation of the data obtained and in the inability to meet the statistical validity of the monitored sample.

Therefore, we deem approaches of the crowdsourcing type non-sustainable and not applicable for the regulatory validation of the compliance of the EU Regulation related to NN; in fact, this possibility should be withdrawn from the final version of the BEREC document.

Comments on chapter 5

As amply demonstrated in the ETSI standardisation, there is no certainty on the measurements carried out autonomously by the customers; only a designed and standardised measurement system can ensure reliability and comparability features. The speed test measurement should be considered only indicative to activate an in-depth examination at the NRAs discretion.

This section shows the inconsistency, unsustainability, risks and, therefore, ineffectiveness for reaching the regulatory objectives of measurements carried out by the final customer; we believe that BEREC should take note of the inconsistency of the approach proposed in the document.

Also, it is not clear how it would be technically feasible, unless making use of external probes or traffic sniffing mechanisms (choice that we do not agree with), to assess the content of paragraph 5.4. (*NRAs should retrieve and store all relevant measurement results and associated environmental information to enable analysis of the effect of end user environmental factors upon the measurement results, to allow a better assessment of results.*)

Comments on chapter 6

As indicated in the previous sections, the issue of the measured data assessment is closely related to the measurement modes adopted and to the reliability, certification and comparability of data. Clearly, only measurement modes designed and implemented in a consistent and rigorous way may then provide meaningful and validated data, also to be used for regulatory purposes.

As to speed indicators (minimum, maximum, normally available, advertised) we emphasise as follows.

- **Maximum speed**

Considering that the value is only differentiated on technological bases and not per single final customer, to differentiate this value from the value advertised, would create a logical nonsense since if we indicate as maximum value a value lower than the one advertised, in fact we would implicitly state that the value advertised is never achievable.

Therefore the maximum value can only coincide with the advertised one.

- **For the speed normally available two values should be defined:**

1. the value of the speed normally available;
2. the time rate when that value is available for a specific period of time, chosen as:
 - 95% of times on a whole day
 - 90% of times in «peak» hours

We point out the difficulties/unsustainability of having to indicate a single expected value for all customers (customers that in fact have performances related not only to technology or network load but also to peculiar features for each customer, such as the distance from the exchange or cabinet).

This said, a more sustainable definition should be achieved, such as:

→ speed normally available (to differentiate according to technology) = maximum speed x G x C_n

where the two multiplicative factors G and C introduced enable the taking into account of geographical distribution and network load. In detail:

- **G (range 0-1):** geographic distribution factor to be calculated on the basis of the most probable/middle/average (to be defined) localisation of the customer.
- **C (range 0-1):** load factor in peak hour to be calculated on the basis of potential congestion hours liable to reduce the maximum speed of the network.

As to potential specific measures, likely to be extremely uncertain and approximate, as also stated in the consultation document, we believe that once measured the IAS performance, in compliance with the performance constraints covered by the contract, no further measures or hypotheses of any significance deriving from specialised services should be considered. The potential cases where evidence is found can be assessed on a case-by-case basis.

Any issue related to the performance assessment of specific application is outside of the Net Neutrality context, since the NN is only related to guaranteeing the performance at IP connectivity level; besides, the cause which may influence the performance of specific applications are multiple and not derivable through potential additional measures.

Also in this case, we believe that only following potential evidence of specific critical cases, the potential non-compliance of the IAS requirement of non-discrimination and/or the presence of reasonable grounds for difference in treatment may then be assessed.

Comments on chapter 7

The certification of a national measurement system is important to provide reliable information and should be based on a certain and definite set of national measurement parameters and methodologies based on ETSI technical standards. It is not an issue of regulatory concern but mainly a technical-normative issue.

Moreover, it is possible to certificate (always based on ETSI standards) in a limited way also a measurement client which the customer may use independently, but without legal force. Following negative measurement outcomes on the performance, the customer could request the NRA to carry out a measurement of regulatory value, through a certified measurement system, to ascertain the actual situation.