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epicenter.works response to the public consultation[1] on BEREC Net Neutrality Regulatory Assessment Methodology

epicenter.works is a digital rights NGO with the mission to strengthen fundamental rights in the digital age. We are located in Vienna but work on European issues surrounding privacy, net neutrality and freedom of speech. We have contributed to the previous work of BEREC with our campaign SaveTheInternet.eu and given expert testimony in the BEREC Stakeholder Meeting on measurement methodology in Brussels on 14 March 2017. We would like to highlight our written response to that meeting[2].

First, we would like to thank BEREC for the opportunity to provide input in this procedure. We will provide our input structured congruously to the structure of the document under consultation.

1 http://berec.europa.eu/eng/document_register/subject_matter/berec/public_consultations/7093-draft-net-neutrality-regulatory-assessment-methodology

2 https://epicenter.works/document/353

1. Executive Summary.....2
2. General Remarks.....2
3. Measuring Internet access service quality.....3
4. Detecting traffic management practices that impact individual applications.....5
5. End user dependent factors that may impact the measurement results.....6
6. Measurement results assessment.....6
7. Certified monitoring mechanism.....8

1. Executive Summary

We welcome BEREC's efforts to standardise the certification procedure for measurement software according to Regulation (EU) 2015/2120. This consultation is taking place more than one year after the Regulation which obliged BEREC to develop this methodology went into effect. We urge BEREC to accelerate its standardisation process, amend the proposed document with additional necessary aspects to give guidance to NRAs and publish the timeline according to which NRAs will implement their mandate to to certify measurement software.

2. General Remarks

NRAs have a general obligation to closely monitor and ensure compliance with Articles 3 and 4 of the Regulation. This obligation will be difficult to satisfy without reliable measurements from end users based on certified measurement software, as foreseen by Article 4 (4) and Recital 18 of the Regulation. NRAs are also required under Article 5 and Article 3 (5) of the Regulation to gather data about the network as a whole, potentially discriminating traffic management practices, and the general quality of the Internet access service. The Regulation which established these obligations went into effect on 30 April 2016. Considering that now, more than one year after the Regulation went into effect, some member states still operate no certified measurement software, the timing of this consultation must be considered late. This procedural shortcoming is accompanied by the lack of transparency by ISPs to state the necessary information in their contracts ac-

cording to Article 4 of the Regulation. We therefore urge BEREC to publish information on a timeline, clarifying when its methodology will be finalised and when BEREC members are expected to commence their measurement operations.

The most important shortcoming of the document under consultation is the missing requirement of measurement data by the certified software to be published in the form of open data. Open data for measurement software creates transparency about the market, allows independent researchers to utilise the data to compare IAS offers and look for potential net neutrality violations.

Similarly, there should be a clear recommendation that certified measurement software is open source (ideally, free software that fully allows end users to modify and redistribute the software). Thereby, NRAs would not only allow each other to utilise and improve a common measurement toolkit, Europe could also contribute a more robust measurement suite to the entire Internet. This is particularly important as most of the currently publicly available measurement tools are outdated and no longer maintained.

Finally, an open data and open source approach inspires trust in the measurement operations and thereby creates allies like consumer protection organisations and digital rights NGOs, enabling them to recommend these measurement tools to their constituencies. Without such support by other organisations, it is questionable whether a sufficient number users would use the tools recommended by the respective NRAs and thereby deprive the accumulation of measurement data of the necessary bottom-up support.

3. Measuring Internet access service quality

Overall, this section gives a compact overview on best practices of measuring Internet access service quality. However, we would like to reiterate our previous remarks in the written response to the BEREC Stakeholder meeting on 14 March 2017, in that speed measurements with multiple HTTP connections are less likely to show congestion issues in the path of a connection. Therefore, we would argue that at least as a complimentary measure, single HTTP connection measurements should be included in the methodology.

Furthermore, we would again like to emphasise the necessity of computing multiple confidence intervals in the evaluation of measurement data, in particular where delay and delay variation is concerned. The output of the Linux *ping* utility suggested for evaluation only provides the 100% confidence interval (*min* and *max* values) as well as the 1σ confidence interval (the *mdev*-environment of the *avg* value). However, it is in particular the occasional occurrence of large delays that impacts the service quality of most applications. As such, various wide confidence intervals (e.g. 95%, 99%, and 99.9%) should also be made transparent to the user, allowing them to meaningfully assess service quality. Computing such confidence intervals would not preclude NRAs from incorporating the *ping* utility into their measurement tools as these intervals can be computed from the standard output of the utility.

We would also like to note that while the document accurately describes the trade-off between test duration (and thus user experience) and statistical significance, it is not necessary that the NRA makes a particular choice. Users should be free to choose between performing quick or thorough measurements of their IAS.

A special focus should be given to the potential prioritisation or modification of data traffic towards testing servers. Such pratices have been reported in the past[3]. If an ISP treats traffic to testing servers from an NRA or independent parties differently from regular traffic, this constitutes a violation of Article 3 (3) of the Regulation. Such traffic management practices would also circumvent the enforcement and monitoring obligation of NRAs and should therefore be considered particularly harmful. A consequence of this practice is the invalidation of the measurement results, leading not only to decreased trust of consumers in the measurement results, but also undermining the rights of end-users to test whether the contractually agreed bandwidths are actually delivered.

BEREC recommends that the measurement server should be located at the national internet exchange point (IXP), unless there is a specific reason for its placement elsewhere. In our written response to the BEREC stakeholder meeting on 14 March 2017, we recommended that multiple measurement servers should be used and that their placement should correspond to the traffic patterns and traffic destinations of end users. This is important in order to detect possible net neutrality violations that may occur as a con-

3 http://www.myce.com/review/internet-providers-caught-inflating-speed-test-results-78458/

sequence of interconnection agreements. As noted by paragraph 6 of the BEREC Net Neutrality Guidelines, interconnection practices are relevant for assessing whether the end-user rights under Article 3 (1) of the Regulation are respected. NRAs from different Member States could co-operate and share measurement servers in their respective national IXPs.

4. Detecting traffic management practices that impact individual applications

This section offers a comprehensive overview on the issue. We particularly welcome the listing of measurement variations for particular KPIs in section 4.2. Concerning the testing of individual websites in section 4.2.1, NRAs should allow users to recommend websites which should be tested. Additionally, we suggest the inclusion of an additional chapter on the testing of VoIP applications.

However, we do not agree with the following sentence in section 4.2.2:

> "Thus a mobile network providing IAS to predominantly small screen terminals would typically show lower bitrates, regardless of the performance of the network itself."

According to Article 3 (1) of the Regulation, end users have the freedom to use devices of their choosing. This includes using a mobile connection with a desktop computer or other devices connected to a home or office network.

It is also not uncommon for mobile devices to stream their video content to external displays, and some live streams, such as those of sports events, require a high resolution to allow the user to see details of the particular content irrespective of the size of the display.

In conclusion, the sentence in question should be deleted.

5. End user dependent factors that may impact the measurement results

We welcome the comprehensive assessment of BEREC concerning environmental factors which could impact the measurement, and particularly the prerequisites of end-user consent and high privacy standards.

If the additional information about the measurement environment cannot be collected via means available to the application (e.g, because the application is running in a web browser), the collection of such data should be an optional step after the measurement is performed[4]. Failing this, the user is held up in a lengthy questionnaire and might not even perform the measurement in the first place. The focus of NRAs should always be to gather as many measurements as possible and only then filter and weigh the collected data according to the additional information acquired. Section 5.4 suggests such an approach, but this practice should be clearly stated as a recommendation to NRAs.

A good solution to circumvent most environmental factors is to offer a measurement software suite which can be introduced into the Customer-Premises Equipment. Home routers are often aware of the network topology, are directly connected to the IAS and can account for potential cross traffic interference. Such implementations could be based on open-source CPE firmware products supporting a wide range of devices, such as OpenWRT[5].

6. Measurement results assessment

We welcome and agree with the data validation methodology laid out by BEREC. Particularly the mechanism by which VPNs are used to compare the results obtained through a particular network increases the validity of measurement results. Concerning the submission of relevant cases of net neutrality violations, we suggest publishing a list of contact addresses of NRAs where interested end users can submit such complaints. We

4 See for an example https://breitbandmessung.de

5 https://openwrt.org/

would also like to highlight the project RespectMyNet.eu, where we have gathered many of such user-submitted potential cases of violations of net neutrality, which we would happily handover for purposes of regulatory scrutiny.

In section 6.4 BEREC raises an issue of particular concern to us:

> "Most of the time, a measurement at the application level can only detect the presence of an inadmissible traffic management but not the cause or responsible network segment."

We suggest that this problem can be mitigated if there are several testing servers which the measurement software is utilising in its testing cycle. Civil society often uses server capacities of volunteers to run their testing operations. NRAs have the advantage of larger available resources and a clear mandate to cooperate with infrastructure providers. Setting up a dense network of testing servers in varying locations and network segments seems inevitable to gain a complete picture of the networks in question. This is particularly true for investigations into network congestion. Additionally, the use of only a single testing server poses a greater risk of prioritisation of network traffic from and to this testing server.[6] We recommend that BEREC amend the document under consultation to reflect this suggestion to NRAs.

In section 6.3.2 BEREC outlines a very important use case for the measurement operations of NRAs:

> "An NRA could assess the aggregated IAS QoS measurement results before and after the introduction of a certain specialised service."

In our understanding, this is the only approach to effectively enforce the Regulation safeguard that specialised services cannot be introduced if they would be to the detriment of the general quality of internet access services. Given that this requires a comprehensive data set of historic values on the network in question, it is noteworthy that to our knowledge several NRAs have not yet started measurement operations which would allow them to assess the effect of newly introduced specialised services. We therefore urge BEREC to state a clear timeline of the process of introducing network measurement operations in the single market and outline the countries which have not fulfilled their obligation under the Regulation.

6 See our comments regarding this matter in the section titled "Measuring Internet access service quality".

Concerning the maximum contractual speed, the document under consultation states in section 6.2.2,

> "Note that this recommendation does not specify how often or how many times the measured speed must reach the maximum contractual speed value to confirm that the delivered speed fulfils the contractual promise."

In choosing this phrasing, BEREC is less specific than in the definition of maximum speed that was given in paragraph 145 of the Guidelines:

> "The maximum speed is the speed that an end-user could expect to receive at least some of the time (e.g. at least once a day). An ISP is not required to technically limit the speed to the maximum speed defined in the contract."

Particularity as the maximum speed is often most relevant to consumers, comparability of products in the digital single market should not be undermined by invalidating recommendations BEREC has already agreed upon.

7. Certified monitoring mechanism

This chapter falls short of the necessary standardisation required to achieve comparability between measurement results. A harmonised regulatory regime entails the significant opportunity of empowering consumers with an ecosystem of measurement tools which satisfy BEREC's standards. Solely relying on national solutions to a common problem not only duplicates efforts in a field where open source and open data approaches would bring clear benefits, it also creates the real danger of smaller countries operating no tools with such certification. This would be a clear violation of the principles of the Regulation.

Article 4 (4) of the Regulation states (emphasis not in original):

> "Any significant discrepancy, continuous or regularly recurring, between the actual performance of the internet access service regarding speed or other quality of service parameters and the performance indicated by the provider of internet access services in accordance with points (a) to (d) of paragraph 1 shall, **where the relevant facts are established by a monitoring mechanism certified by the national regulatory authority**, be deemed to constitute non-conformity of performance for the purposes of triggering the remedies available to the consumer in accordance with national law."

Without a certified measurement software, the rights of end users to terminate a contract with an ISP not complying with its terms are effectively circumvented. The existence or non-existence of national legislation which gives further remedies to consumers has no effect on the obligation of NRAs under the Regulation. The development of such software is particularly relevant to other provisions of the Regulation as it empowers consumers to make informed decisions based on and in comparison to the information provided by ISPs in accordance with Article 4 (1).

In paragraph 161 of the BEREC Net Neutrality Guidelines and the current document, BEREC notes that the Regulation does not require Member States to certify a monitoring mechanism (emphasis not in the original):

> "**The Regulation does not require Member States or an NRA to establish or certify a monitoring mechanism. Therefore it is worth noting that a certified monitoring mechanism may be available only in some member states.**"
>
> [...] As the Regulation talks about a monitoring mechanism certified by the NRA, the question of when to certify a monitoring system and how to certify can be considered to be up to an NRA according to the national legislation and circumstances."

While the Regulation does not formally establish an obligation for NRAs to certify measurement software for end users, there is a clear obligation to closely monitor and ensure compliance with Articles 3 and 4 of the Regulation. In our opinion, this task will be very difficult to accomplish if the NRA cannot receive reliable input from end users.

We recognise that in smaller Member States, the capacity of the NRA to certify monitoring software may not be available. In such cases, NRAs could, and should, co-operate on developing and certifying monitoring software.

In our reading of the regulation, NRAs have a clear mandate to certify such a software, which plays a pivotal role in assessing possible net neutrality violations, and BEREC has a clear mandate to lay out the rules of such a certification which is clearly stated in Recital 18 (emphasis not in original):

> "Any significant and continuous or regularly recurring difference, where **established by a monitoring mechanism certified by the national regulatory authority**, between the actual performance of the service and the performance indicated in the contract should be deemed to constitute non- conformity of performance for the purposes of determining the remedies available to the consumer in accordance with national law. **The methodology should be established in the guidelines of the Body of European Regulators for Electronic Communications (BEREC)** and reviewed and updated as necessary to reflect technology and infra structure evolution. National regulatory authorities should enforce compliance with the rules in this Regulation on transparency measures for ensuring open internet access."

The document (Net Neutrality Regulatory Assessment Methodology) should outline the additional supervisory work that is expected of NRAs in order to fulfil their monitoring obligations under Article 5 (1) of the Regulation if a certified monitoring mechanism is

not provided to end users. This will also provide the appropriate incentive for NRAs to certify measurement software, perhaps in co-operation with other NRAs.

Concerning the remedies available to consumers we would also like to note that although technically true, the following sentence in section 7 highlights another shortcoming of the document under consultation:

> "The final ruling over which "evidence" is sufficient for triggering legal consequences however is still subject to court rulings."

Leaving such an important right of end users completely up to lengthy interpretation by the courts effectively reneges on the NRAs' mandate under the Regulation. The Regulation clearly intends NRAs to help consumers make use of the remedies available to them. We urge BEREC to give guidance on when and how end users can consider the evidence collected by the measurement software certified by the NRA to be sufficient to seek such remedies.