



12 April 2017

To:

Shri Asit Kadayan, Advisor (QoS)  
Telecom Regulatory Authority of India,  
Mahanagar Doorsanchar Bhawan, Jawaharlal Nehru Marg,  
New Delhi 110002

Dear Shri Kadayan,

**Subject:** Comments from the Internet Freedom Foundation towards the Consultation Paper on Network Neutrality

On behalf of the Internet Freedom Foundation, we wish to thank you for the opportunity to reply to this most recent consultation paper on network neutrality. As the TRAI has noted in the beginning of this consultation paper, this policy discussion has been actively ongoing for two years, with multiple consultations and conversations across the Department of Telecom and the TRAI. We appreciate the TRAI's efforts and focus on ensuring that all issues surrounding network neutrality are carefully examined, with ample opportunities for stakeholders to participate. As we indicated in our pre-consultation filing, given the extensive discussions and the time taken, it is critical that we now act to frame, discuss, and implement specific regulatory language to ensure meaningful bright line provisions that protect net neutrality, allow effective oversight, and provide remedy and redress for violations. This has been a long road traveled by the regulator, policymakers, and everyday users, and we hope that we soon reach our destination.

In particular, we believe that there is a problem around the absence of enforceable, clear bright line rules on net neutrality, which requires an urgent regulatory resolution from the TRAI. We also wish to strongly reject attempts by some lobby groups and other interests to undermine last year's landmark differential data pricing regulations. The clear policy stance taken by the TRAI there and the corresponding regulatory instrument should not be interfered with, particularly given that the regulations already provide for a review period of two years after their framing.

**Summary of our inputs:**

We submit that the TRAI should come to the following outcomes at the end of this consultation exercise:

- TRAI should undertake **immediate rulemaking** to put in place **bright line regulations** which indicate that they **apply to all provisioning of the internet via data services to consumers of service providers**. TRAI can do so using its powers under Section 11(1)(b) of the Telecom Regulatory Authority of India (**TRAI**) Act, building on the pre-existing UASL licensing conditions which contain language to prevent licensees from restricting access to the Internet.



- These regulations **should include provisions on the following:**
  - TSPs be prohibited from restricting access to content available on the internet to their subscribers. This should also state that
    - TSPs are not allowed to block access to any content available on the Internet except for such content which is restricted by the Licensor/designated authority under the applicable law (Section 69A of the Information Technology Act)
    - TSPs may not otherwise restrict access via throttling, interference, or other differential treatment with respect to the transmission of Internet traffic, with the exception of reasonable network management practices.
      - Operator deployed reasonable traffic management are practices to be employed at times of network congestion only—rather than as constant forms of discrimination. They should only be employed with care, and should not discriminate on the basis of the type of application or service.
- TRAI must ensure that its regulations allow it to **enforce** this mandate, allowing for complaints and information reports to be sent to service providers and TRAI, with final regulatory decisions and penalties made by TRAI in cases of abuse.
- All complaints made to TSPs should be also shared with TRAI, either by the providers or via a new complaint filing platforms. External parties must be allowed to **know the aggregate numbers of complaints per operator.**
- Any multi-stakeholder or cross-sectoral group must be formed so that it is an advisory body to TRAI, and one where TRAI staff (particularly the Quality of Service division and other teams involved in this subject area) can brief on their efforts to enforce and implement these regulations and be informed on the latest developments with respect to the state of the art and learnings in this sector, and wider internet innovation.

We provide question-wise responses below, responding to the specific issues and queries posed by the TRAI in the present consultation paper.

We are available to respond to any queries or render any other assistance that the TRAI might require as part of this consultation. You can reach us at [policy@internetfreedom.in](mailto:policy@internetfreedom.in)

Yours faithfully,

The Internet Freedom Foundation

[www.internetfreedom.in](http://www.internetfreedom.in)



## Inputs to questions posed in the consultation paper

### Q.1 What could be the principles for ensuring nondiscriminatory access to content on the Internet, in the Indian context?

**A.1** As we noted earlier in our filing to the pre-consultation paper published by TRAI last year, any discussion on network neutrality only makes sense in the context of the global Internet which allows Indians to be able to connect to the world and for global audiences to discover the knowledge, culture, and entrepreneurship of our people. We have been concerned by the push towards the usage of the phrase “in the Indian context” given its abuse by several telecom industry interests in their attempts to deny to Indians rights enjoyed by Internet users elsewhere around the world.

In fact the Indian context needs to be understood with the framing that our nation, with its proud democratic roots, requires a plural and diverse Internet. We reiterate that as a developing nation with less mature markets, we have an even greater need than developed nations to ensure that network neutrality is mandated by regulation to prevent violations. We submit that TRAI has already indicated its overall position regarding ensuring non-discriminatory access to content on the Internet in the explanatory memorandum it issued on the Differential Data Pricing Regulations in February 2017. As TRAI noted:

“... the right to express oneself as well as the right to receive information are critical elements in the use of the internet. The Authority is of the view that use of internet should be in such a manner that it advances the free speech rights of the citizens, by ensuring plurality and diversity of views, opinions, and ideas”

In the same memorandum, TRAI explicitly noted the importance on ensuring the global interconnectivity of our Internet, stating that:

“Any proposed changes in business models and commercial practices must also be seen in the context of the need to preserve the unique architecture of the Internet as a global communication network”

We would like to take this opportunity expand upon the enlightened discussion in Chapter 4 of the Consultation Paper to expand upon the identified guidelines (section 4.1.2) to identify key elements of what should shape the formation of core net-neutrality principles for the purposes of TRAI regulations:

1. **User Rights:** Subject to lawful restrictions the user must have non-discriminatory access to the internet ensuring her/his constitutionally protected right to freedom of speech and expression and right to privacy.
2. **Scope:** Any user must have access to all content, services and applications made available by any device connected to internet. By corollary, all users must also be free to create and serve content, services and application through their own devices.



3. **Innovation and enterprise:** Every individual and institution must be free to transact and conduct commerce over the internet. They should be able to freely buy and sell lawful content, applications and services without interference. Rent seeking behaviour on part of the access providers such as TSPs or other gatekeepers must be prohibited and punished exemplarily.
4. **Public interest in spectrum, public telecom resources:** Internet and telephony services are made possible by public right-of-way and spectrum licensed to TSPs. Public benefit and user rights should be paramount criterion in development of these services.

These principles have been recognised by our public leaders and policymakers. Responding to a lively debate to a Calling Attention Notice in the Rajya Sabha on May 5, 2016, Minister Ravi Shankar Prasad submitted on the behalf of the Union Government that:

“At the heart of digital connectivity is the public Internet — which has connected near and far, poor and rich alike. Internet is a new technology — its protocols were written not more than forty years ago. The public Internet — the worldwide web is only 23 years of age. In this short span of time, it has come to occupy the centre of the world. **This has been made possible by the open, democratic structure of the public Internet - equal and accessible to all those who are connected to the network.** In India too, the new age economic growth is being fuelled by the Internet. This Government notes with confidence the growth of Internet in India and wide platform it has offered for innovation, investment and creativity.”

[Emphasis our own]

The Internet Freedom Foundation has previously submitted to TRAI, “The universal principle of net neutrality is that **Telecom Service Providers/Internet Service Providers and/or any other gatekeeping entity must not abuse their position as access providers to influence the competitive balance between different voices on the Internet**”. Core principles for non-discriminatory internet must necessarily be rooted in the above mentioned guidelines. Furthermore, like the EU, we must specifically prohibit in all agreements between TSPs and subscribers, any commercial practices on part of the TSPs that violate the net neutrality principles identified based upon the above-mentioned guidelines, as well as any constitutional rights of the subscriber.

All methods through which TSPs may seek to exert such influence that are in violation of Net Neutrality constitute “Harmful Practices” and as such must be prohibited. Consistent with restricted practices identified by TRAI in Section 4.2 of the Consultation Paper these including but not limited to:

1. Discrimination in availability (blocking)
2. Discrimination in speed (throttling and preferential treatment to content, such as paid prioritization)
3. Discrimination in pricing (zero-rating, toll-gating etc. identified in the Discriminatory Pricing Order)



Telecom Service Providers such as Idea Cellular have also acknowledged their commitment to this position. In their submission to the TRAI on the Consultation Paper on Free Data, they state:

*“All operators have committed to a network where there is no blocking, no throttling and no paid prioritization”*

This should now be clearly encapsulated in regulatory language applicable to all service providers, providing a clear, certain standard that all can follow and plan operations on the basis of.

The Internet Freedom Foundation—in our earlier comments towards the the Pre-Consultation Paper on Net Neutrality—had previously also submitted the following definitions identified from a number of important stakeholders which are also broadly consistent with the guidelines identified above, and complementary to the international approaches outlined in Section 4.1 of the Consultation Paper. We are repeating these as it is our belief that together they point the way to a identification of core principles of network neutrality.

The Department of Telecommunications’ committee report on Net Neutrality noted:<sup>1</sup>

*“We don’t need to hardcode definition of Net Neutrality, but define principles, which include: **No blocking, no throttling, no paid prioritization, freedom of access and to receive or use content, no discriminatory practices, reasonable traffic management and support for innovation, the need for transparency, prescription of QoS, low cost of switching.**”*

According to the Global Net Neutrality coalition, comprising of 81 organizations globally:<sup>2</sup>

*“Network Neutrality is the principle according to which Internet traffic shall be treated equally, without discrimination, restriction or interference regardless of its sender, recipient, type or content, so that Internet users’ freedom of choice is not restricted by favouring or disfavouring the transmission of Internet traffic associated with particular content, services, applications, or devices.”*

In addition, Prof. Vishal Misra, Columbia University, defines Net Neutrality as:<sup>3</sup>

*“Internet is a platform where ISPs provide no competitive advantage to specific apps/services, either through pricing or QoS.”*

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<sup>1</sup> [https://www.mygov.in/sites/default/files/master\\_image/Net\\_Neutrality\\_Committee\\_report.pdf](https://www.mygov.in/sites/default/files/master_image/Net_Neutrality_Committee_report.pdf)

<sup>2</sup> <https://www.thisisnetneutrality.org/>

<sup>3</sup> <https://twitter.com/vishalmisra/status/631285727024672768>



**Q.2 How should “Internet traffic” and providers of “Internet services” be understood in the NN context?**

- **Should certain types of specialised services, enterprise solutions, Internet of Things, etc be excluded from its scope? How should such terms be defined?**
- **How should services provided by content delivery networks and direct interconnection arrangements be treated?**

**A.2**

**Internet services** should be defined consistently with the Differential Pricing order, as all traffic that are partially or fully routed over the public IP (v4 or v6) space. Traffic that is entirely over private networks (and is not routed over infrastructure and resources that require a license) should be exempt from these regulations.

The Differential Data Pricing Regulations already provide certain definitional language, and the TRAI should seek to ensure conformity with that as far as possible. In particular, the Differential Data Pricing Regulations state that

"data services" means services offered or provided to a consumer using any equipment, technology or medium, including wireless and wireline technologies, to access or transmit data over the internet.

"internet" means a global information system that is: (i) logically linked together by a globally unique address, based on Internet Protocol (IP) or its subsequent enhancements or upgradations; (ii) able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent enhancements or upgradations, or other IP compatible protocols;

This should be framed so as to include the specific activity of “internet service” as provided by licensed providers under the unified license.

**Specialised services.** Public resources such as spectrum and right-of-way should only be utilised for providing the public with access to open and public communication media, such as the global voice telephony network and the global Internet. The UASL should not permit any proprietary specialised services to be provided over public resources.

**Enterprise solutions.** Net neutrality regulation should prevent discrimination between different types of content or applications, but not discrimination between classes of users on different tariff plans. However, net neutrality rules — non-discrimination between applications by the ISP should apply to all Internet traffic, including “enterprise” traffic. Enterprises that need discriminatory QoS may do so with on-premise equipment (outside the licensed ISP’s network), or with a user-controlled QoS systems or specialised service offerings which do not seek to utilise public internet routing.



These restrictions are necessary to prevent TSPs from using “enterprise plans” and “specialized services” as loopholes to violate net neutrality rules.

**CDNs and interconnection.** There is potential for TSPs to abuse interconnection agreements to violate net neutrality principles, but we lack enough information for clear policy recommendations on this at present. Part of this information asymmetry is the nature of how the peering and transit ecosystems function, with any commercial arrangements in this space being directly negotiated by private parties with TSPs and not made available for study or trend mapping. TRAI should seek more information and put in place a reporting framework or knowledge sharing process for TSPs requiring regular disclosure of privately negotiated interconnection agreements, paid peering/transit arrangements. The TRAI may in the future consider whether it wishes to recommend or consider regulation on whether TSPs must provide fair, non-discriminatory and standardized offerings with respect to commercial data interconnection and paid peering/transit arrangements.

**Q.3 In the Indian context, which of the following regulatory approaches would be preferable:**

- **Defining what constitutes reasonable TMPs (the broad approach), or**
- **Identifying a negative list of non reasonable TMPs (the narrow approach).**

**A.3** The Internet Freedom Foundation supports the use a flexible regulatory approach that combine both “broad approaches” and “narrow approaches” as outlined in our response to Question 4 and Question 5. We believe it is crucial for the TRAI to put in place a bright-line regulation that explicitly prohibits TSPs from restricting access to content available on the internet to their subscribers and other forms of discrimination, with legitimate traffic management practices constituted limited exceptions to this. However, we reiterate that is imperative that TRAI to ensure the legal enforcement of the approaches we outline below.

**Q.4 If a broad regulatory approach, as suggested in Q3, is to be followed:**

- **What should be regarded as reasonable TMPs and how should different categories of traffic be objectively defined from a technical point of view for this purpose?**
- **Should application-specific discrimination within a category of traffic be viewed more strictly than discrimination between categories?**
- **How should preferential treatment of particular content, activated by a users choice and without any arrangement between a TSP and content provider, be treated?**

**A.4** We believe that regulations of TMPs should be based on the “ban application-specific discrimination, but allow application-agnostic discrimination” model recommended by Prof. Barbara van Schewick of the Stanford Law School in her paper “Network Neutrality and Quality of Service: What a Non-Discrimination Rule Should Look Like”.<sup>4</sup>

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<sup>4</sup> <https://law.stanford.edu/wp-content/uploads/2015/06/van-Schewick-67-Stanford-Law-Review-11.pdf>



*Network providers can enforce fairness among users and prevent aggressive users from overwhelming the network by allocating bandwidth among users in application-agnostic ways. During times of congestion ... network providers may limit the amount of capacity available to users of that link based on application-agnostic criteria [such as tariff plan and usage history, but not] interfere with how users use the (limited) capacity available to them.*

*[In addition,] network providers could allow users to choose which applications to prioritize or otherwise treat differently ... As long as the option to be prioritized or be treated differently is offered equally to all applications ... and the choice of which applications to prioritize or treat differently is left to the user, this form of network management [should be allowed].*

*Tools for application-agnostic congestion management are available today. For example, Comcast, the largest provider of broadband Internet access services in the United States, adopted an application-agnostic congestion management system in response to the FCC's order against Comcast in 2008. According to Comcast, "Comcast's trials and subsequent national deployment indicate that this new congestion management system ensures a quality online experience for all of Comcast's HSI [High Speed Internet] customers."*

Accordingly, the following broad rules can be specified.

- Only TMPs that are application-agnostic may be allowed. Application-specific TMPs should only be allowed if needed to address an exceptional and legitimate need (those detailed in Q6 b through d), and even in such cases the TMP must be as application-agnostic as possible. The reasonableness of any such exceptional TMP can be adjudicated by TRAI on a case-by-case basis on its own inquiry or when brought to knowledge by information reports or complaints to TSPs.
- There is no need to attempt any categorization of traffic or applications. Discrimination based on any such categorization will be arbitrary and open to abuse.
- User-controlled QoS, where the user chooses an application to receive preferential treatment, should be the preferred approach when considering legitimate traffic management practices.

**Q.5 If a narrow approach, as suggested in Q3, is to be followed what should be regarded as non reasonable TMPs?**

**A.5** The same principles given in the previous answer can be expressed as a blacklist as well: "No TMP that is application-specific should be allowed, other than to address an exceptional need as detailed below."

**Q.6 Should the following be treated as exceptions to any regulation on TMPs?**

- **Emergency situations and services;**





- **Restrictions on unlawful content;**
- **Maintaining security and integrity of the network;**
- **Services that may be notified in public interest by the Government/ Authority, based on certain criteria; or**
- **Any other services.**

**A.6** Yes; licensed TSPs may discriminate between applications if required to do so by the law after authorization by a legal authority or if necessary for the security and integrity of the network within the terms specified by the telecom license and overseen by law (particularly the Telegraph Act and the Information Technology Act).

TSPs should not be allowed to unilaterally designate “emergency services” or “any other services” to receive discriminatory treatment, any such decisions must be made by the government after following due process and open consultation. In some cases, Government may be able to designate certain services as emergency services within the purview of existing law and disaster response institutions, but that should be clarified and stated by the TRAI in its outcome from this consultation.

TSPs must disclose to the general public all such exceptional instances on at least a monthly basis. Detailed technical report of the extenuating circumstances that led to such instances as well as action taken must further be made available to TRAI for the purpose of auditing and to the general public.

TRAI should be empowered to audit these submissions and to impose fines on TSPs when their actions exceed these exceptions.

**Q.7 How should the following practices be defined and what are the tests, thresholds and technical tools that can be adopted to detect their deployment:**

- **Blocking;**
- **Throttling (for example, how can it be established that a particular application is being throttled?); and**
- **Preferential treatment (for example, how can it be established that preferential treatment is being provided to a particular application?).**

**A.7** Tools such as the TOR Foundations OONI (Open Observatory for Network Interference<sup>5</sup>) exist, in addition to now often used stacks and platforms such as M-Lab ([Measurement Lab](#)). TRAI should also consider conducting open competitions to encourage developers to build better tools for net neutrality enforcement and QoS monitoring, and either direct or support the deployment of network measurement testing nodes in Indian locations.

BEREC’s guidelines to national regulators on implementing net neutrality regulations<sup>6</sup> specifies a set of measurement requirements. The IETF is working on detailed technical

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<sup>5</sup> <https://ooni.torproject.org/about/>

<sup>6</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R2120&from=en>



standards<sup>7</sup> to guide the development of measurement tools. It is anticipated that the same tools that become available as a result of this effort would be usable by TRAI to enforce net neutrality in India.

**Q.8 Which of the following models of transparency would be preferred in the Indian context?**

- **Disclosures provided directly by a TSP to its consumers;**
- **Disclosures to the regulator;**
- **Disclosures to the general public; or**
- **A combination of the above.**

**What should be the mode, trigger and frequency to publish such information?**

**A.8** Disclosures in themselves should not be seen as sufficient to prevent violations of network neutrality, but they may serve as an additional safeguard and aid to enforcement. All disclosures of exceptional TMPs employed under the situations detailed in Q6 should be made to the general public by publishing on the TSP's website on at least a monthly basis and notified to all customers through their e-mail/SMS etc. In the event of exceptional outage or other network management event that lasts for a period of over 2 hours, such information should be made available within the next 24 hours.

Detailed technical report of the extenuating circumstances that led to such instances as well as action taken must further be made available to TRAI on a regular periodic basis for the purpose of auditing and made available to the general public under the purview of the Right to Information Act.

The failure to make such disclosure in time or improper/incomplete disclosure must lead TRAI to impose punitive and/or coercive damages on the service provider together with the refiling of the disclosure.

**Q.9 Please provide comments or suggestions on the Information Disclosure Template at Table 5.1? Should this vary for each category of stakeholders identified above? Please provide reasons for any suggested changes.**

**A.9** It is essential to also have this information in a standardized open format, such as CSV or JSON, that makes it possible for consumer rights organizations to analyze the data.

There should be a separate form for disclosing exceptional TMPs that have been employed in the situations detailed in Q6. This disclosure may be made at least monthly, and should include such information as the date and time, reason (category and details), list of affected applications/content/services, and details of the discrimination done.

The questions under "Application-Specific Traffic Management" and the question "Specific type of traffic" under "Application Agnostic Traffic Management" may be moved from the

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<sup>7</sup> <https://tools.ietf.org/html/draft-nieminen-ippm-nn-measurements-00>



regular “plan disclosure” form into the “exception disclosure” form, as such practices should ordinarily be forbidden, and only allowed in exceptional situations.

**Q.10 What would be the most effective legal/policy instrument for implementing a NN framework in India?**

- **Which body should be responsible for monitoring and supervision?**
- **What actions should such body be empowered to take in case of any detected violation?**
- **If the Authority opts for QoS regulation on this subject, what should be the scope of such regulations?**

**A.10** As we indicated in the beginning of this filing, the Internet Freedom Foundation believes the most effective legal/policy instrument for implementing a clearer, enforceable network neutrality framework in India at the present time would be the TRAI undertaking immediate rulemaking to put in place bright line regulations that apply to all provisioning of the internet via data services to consumers of TSPs. TRAI can do so using its powers under Section 11(1)(b) of the TRAI Act, building on the pre-existing UASL licensing conditions which contain language to prevent licensees from restricting access to the Internet.

Consistent with what we have stated previously, we believe that the TRAI should be responsible for the monitoring and supervision operator behaviour with respect to the provision of non-discriminatory access to the internet for Indian subscribers. In addition to powers to call for information and issue directions to licensed TSPs to remedy violative behaviour, TRAI should also have the authority to impose fines that are large enough to strongly deter violations, and recommend the cancellation of licenses for particularly wilful and egregious violations.

If the UASL and other telecom licenses are updated in the future - or fresh categories of licenses created - the TRAI should recommend to the Telecom Commission that those should those also contain conditions on net neutrality directly in the license text. Furthermore, in case the Telegraph Act and/or TRAI Act are substantively amended in the future, any such legislative proposals to Parliament should also contain provisions to codify net neutrality measures in any updated or new statutory text.

**Q.11 What could be the challenges in monitoring for violations of any NN framework? Please comment on the following or any other suggested mechanisms that may be used for such monitoring:**

- **Disclosures and information from TSPs;**
- **Collection of information from users (complaints, user-experience apps, surveys, questionnaires); or**
- **Collection of information from third parties and public domain (research studies, news articles, consumer advocacy reports).**

**A.11** All three methods should be used, as detailed in Answers 8 and 13.



**Q.12 Can we consider adopting a collaborative mechanism, with representation from TSPs, content providers, consumer groups and other stakeholders, for managing the operational aspects of any NN framework?**

- **What should be its design and functions?**
- **What role should the Authority play in its functioning?**

**A.12** We do not believe that a collaborative mechanism with representation from different stakeholders is appropriate for managing the operational aspects of the network neutrality framework in India. Consumer groups do not have resources that match TSP/ISPs and large content providers. As a result, any such “collaborative” mechanism will end up being dominated by the latter.

TRAI as the telecommunications regulator is duty bound to protect and represent the public interest - TRAI which includes the of non-discriminatory internet access. As we have stated previously, the framing and operationalisation of bright-line rules for net neutrality should be done by the regulator. Consistent with this stand we believe that TRAI should instead frame objective “bright-line” rules, as described in Q.4, that do not require continuous reliance on case-by-case adjudication or advisory opinions. Furthermore, TRAI should set up a complaint mechanism for members of the public to report net neutrality violations with a time-bound resolution mechanism (more on this in response to Q.13).

What is instead possible is an advisory committee to share best practices and to study regular updates from the QoS division of TRAI on the enforcement of these rules. This body would not act on enforcement, but would be updated on what is taking place and otherwise act as a discussion and best practices resource.

TRAI should form this body on a yearly basis, by way of calling for applications of candidates interested under different areas of expertise. The QoS Division (or the relevant dept/division enforcing the bright-line NN rules) should be required to regularly brief them, but should not be required to defer to this advisory body operational issues or enforcement decisions.

**Q.13 What mechanisms could be deployed so that the NN policy/regulatory framework may be updated on account of evolution of technology and use cases?**

**A.13** TRAI should provide a complaint mechanism for the public to report TMPs that violate the principles of net neutrality, whether they are prohibited by existing regulations or not. TRAI must institute a time bound resolution mechanism for redressal of such complaints. Investigations of these complaints can result in minor updates and closing of loopholes. Major changes may be made through a consultation process.

In addition, pro-active measures such as of periodic checks by TRAI and mandatory independent audits of TSP/ISP network management practices may be explored to ensure compliance.



**Q.14 The quality of Internet experienced by a user may also be impacted by factors such as the type of device, browser, operating system being used. How should these aspects be considered in the NN context?**

**A.14** This is not a network neutrality concern. Network neutrality concerns the behavior of licensed Telecom Service Providers/Internet Service Providers (and their equipment and software), not of end-users (or their devices and software).

The metrics monitored by any inspections by TRAI or independent audits (as proposed in Answer 13 above) should be at the last-mile point-of-access provided by the TSP/ISP but agnostic of end-user equipment.