Reliance Communications Limited's Response to the Consultation Paper on Net Neutrality

Executive Summary

A. **The Indian telecom landscape has an unparalleled uniqueness that warrants stipulation of Net Neutrality regulations that are tailor made for India instead of adopting other countries templates.**

B. **'Net Neutrality' should ideally be based on categorization of content as (a) 'Non-Commercial', (b) Commercial (Without Advertisements) i.e. the content that carries 'No Advertisements', 'No Enticements' and is provided at 'No Charges' to the consumers; and (c) Commercial (With Advertisements). Traffic of categories (a) and (b) should be governed strictly by the principles of Net Neutrality viz, 'No Blocking, No Throttling' and 'No Prioritization'; The TSPs should be permitted to have commercial arrangement with providers of traffic of category (c) without compromising the QoS experience on the (a) and (b) category traffic.**

C. **The key to ensuring non-discriminatory access to content on the Internet is the adherence to the core principles of (a) No Blocking, (b) No Throttling and (c) No Prioritization, by all the stakeholders in the internet eco-system viz, Users, TSPs, ISPs, Content Providers / aggregators / distributors and device OEMs.**

D. **Being privacy issues, 'No Inspection of data Packets' should not be included as part of the core principles for ensuring non-discriminatory access to content on the Internet. Discretion should be mandated for permitting DoT directed packet inspection for LIM purposes.**

E. **'Pricing of data services' should be left to the competitive market forces to decide instead of including it as a core principle for ensuring non-discriminatory access to content on the Internet.**

F. **Specialised services, enterprise solutions, Internet of Things, CDNs and their video traffic should be excluded from the scope of NN.**

G. **The authority should regulate the peering of the foreign Content Providers / Aggregators / Distributors with the Indian TSPs.**

H. **A balanced mix of two approaches suggested in the CP, viz, the 'Narrow Approach' complemented with the 'Broad Approach' would be most preferable in the Indian context.**

I. **The parameters elucidated under para 3.4.1 at page 21 of the CP should be regarded as reasonable TMPs.**

J. **Application-specific discrimination within a category of traffic should not be viewed more strictly than discrimination between categories.**

K. **Preferential treatment of particular content, activated by a users' choice and without any arrangement between a TSP and content provider should not be permitted.**

L. **Only (a) Emergency situations and services, (b) Restrictions on unlawful content and (c) Maintaining security and integrity of the network, should be treated as exceptions**

to any regulation on TMPs and (d) Services that may be noticed in public interest by the Government / Authority based on certain criteria should not.

M. **The complaints for violation of NN principles shall have to be investigated through an analysis, correlation and corroboration of the content providers' servers, TSPs' NEs and intermediary NLD / ILD networks logs.**

N. **It would be ideal to have a regulation in place that mandates maintenance of content closer to / within the TSPs network.**

O. **A combination of all the suggested models of transparency viz, Disclosures provided directly by a TSP to its consumers, Disclosures to the regulator, Disclosures to the general public over the TSPs' websites would be preferred in the Indian context.**

P. **NN primarily being a QoS issue, TRAI is adequately empowered to take necessary actions in case of any detected violation.**

Q. **The scope of QoS regulations, for the NN framework, shall have to include the regulation for QoS of all the stakeholders of the NN eco-system.**

R. **The licensed entities (TSPs) are mandated to host their data within India and subject the same to audit by TRAI. Therefore, we envisage no challenges in monitoring for violations of any NN framework on account of disclosures and information from TSPs. Similar stipulation of local hosting shall obviate any envisaged challenge of monitoring the violations alleged by the Application providers.**

S. **The existing customer surveys being conducted by TRAI shall also provide the requisite feedback to the Authority.**

T. **We are in agreement with the disclosure fields mentioned in the Information Disclosure Template at Table 5.1 and suggest that the same be published on the website of the respective TSPs.**

U. **No, collaborative mechanism with representation from TSPs, content providers, consumer groups and other stakeholders, for managing the operational aspects of any NN framework should not be adopted.**

V. **The vagaries of the type of device, browser, operating system being used by the customers are beyond the control of the operators therefore, the authority should pragmatically consider amending the Standard of Quality of Service for wireless data services (Amendment) Regulations, 2014 (10 of 2014) and permit the operators to put a disclaimer for the same on their respective website.**

Preamble

A. Uniqueness of Indian Telecom Landscape

1. The telecom sector in India has seen phenomenal growth over the initial license phase of the TSPs. One of the major learning through this growth of the telecom sector has been that the Indian telecom landscape is unique in respect of the typical requirements of its customers, hypercompetitive telecom market and the requirement of operating through a volatile security situation within the country.

2. **Customer Characteristics.** The Indian consumer has typical requirements from the telecom services that make the Indian telecom landscape stand apart from the other western telecom markets. The customer's requirements in India are unique on following counts,

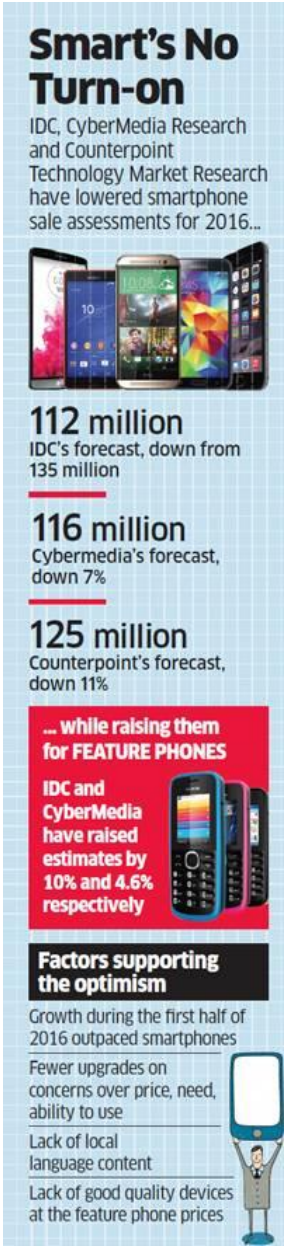
   a. The customers are obsessively price conscious both for the services and devices.

   b. The customers want support for local vernacular for messaging in their devices.

   c. Despite India being the fastest smart phone growth market in the world, still majority of the customers are reluctant to adopt smart phones[1].

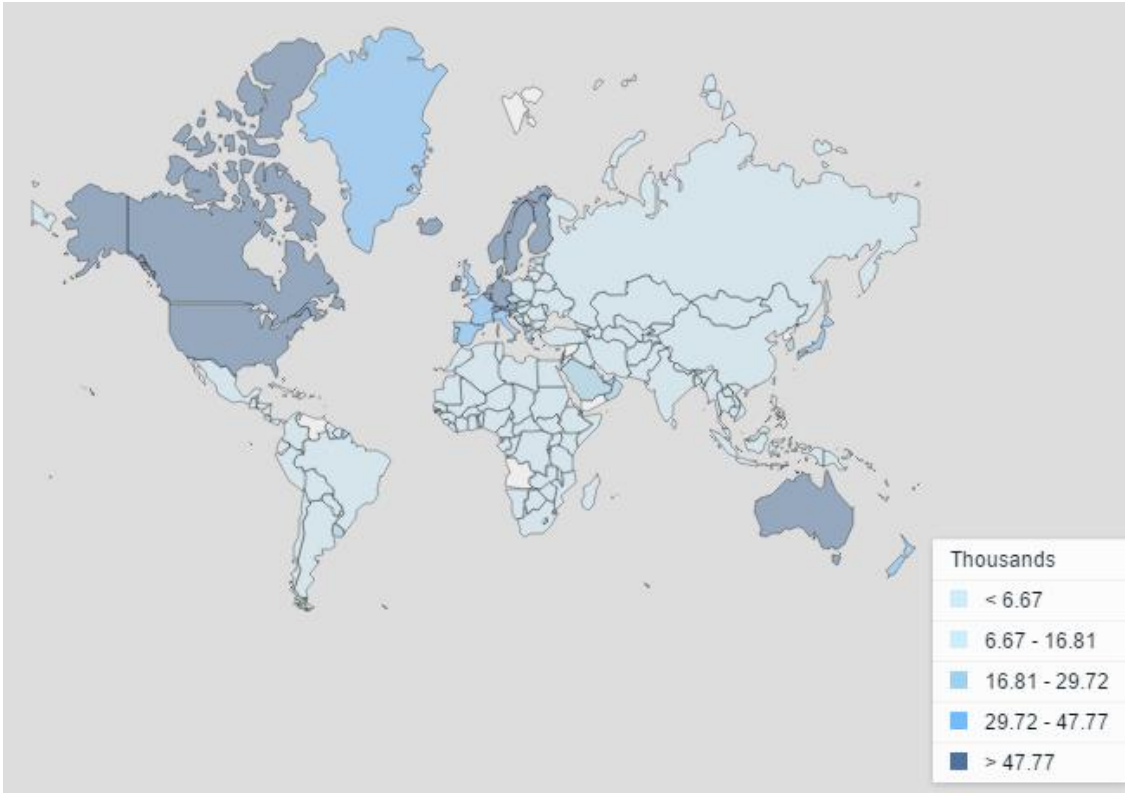
3. **Hypercompetitive Telecom Market.** Against an average of 3 to 4 telecom operators in most of the countries, Indian telecom market is characterized by a large number of telecom operators. Consequently, the Indian telecom market stands out in terms of offering lowest tariffs that too through self regulation. Ultimately it's the Indian customer who reaps the benefits of such low tariffs for telecom services.

4. **Income Disparities of Indian and Foreign Customers.** As per the World Bank's website, the per capita income of the countries that have been cited in this consultation paper is in the range of USD 11000 to 54000 (Australia is USD 61900, EU on an average would be USD 40000, Brazil is USD 11700, Japan is USD 36100 and USA is USD 54600). As compared, India's per capita income of USD 1500 is still in the lowermost quarter of their ranking table (Please refer the map on the next page). This disparity of income is distinctively discernable from the fact that the Indian consumer is extremely price sensitive and they always try to push the envelope for maximising gains on every penny spent by them. Therefore, **emulation of a net neutrality template for access to internet services of these countries for defining net neutrality principles for the Indian scenario would be unfair to the Indian consumer.**



Graphics 1 : Source[1]

[1] http://economictimes.indiatimes.com/tech/hardware/feature-phones-will-continue-dominating-indian-markets-in-2016/articleshow/54515304.cms



Picture 1: Map Showing GDP per capita (current US$) as per World Bank Web Site

Source :http://beta.data.worldbank.org/indicator/NY.GDP.PCAP.CD?view=map

5. **Highest Taxation.** In contrast to an average of approximately 5% taxes on the telecom industry across the world, the Indian TSPs are required to share almost 23% of their revenues with the government through their contributions towards Spectrum Usage Charges (SUC), License Fee (LF), Universal Service Obligation Fund (USOF), etc. The higher taxation coupled with hyper competition, directly translates to limited revenue earnings and larger periods of RoI for the Indian TSPs.

6. **Arbitrary RoW Charges.** Unlike other countries, where provisioning of RoW is facilitated for the growth of the telecom network's capacity and coverage footprint; provisioning RoW is considered as a revenue earning opportunity for the local municipal authorities. Till Nov 2016, RoW was being charged randomly and at times astronomical charges were being quoted by different government agencies across India. Though a uniform RoW policy has been promulgated by the DoT but its effective implementation is yet to be seen on ground.

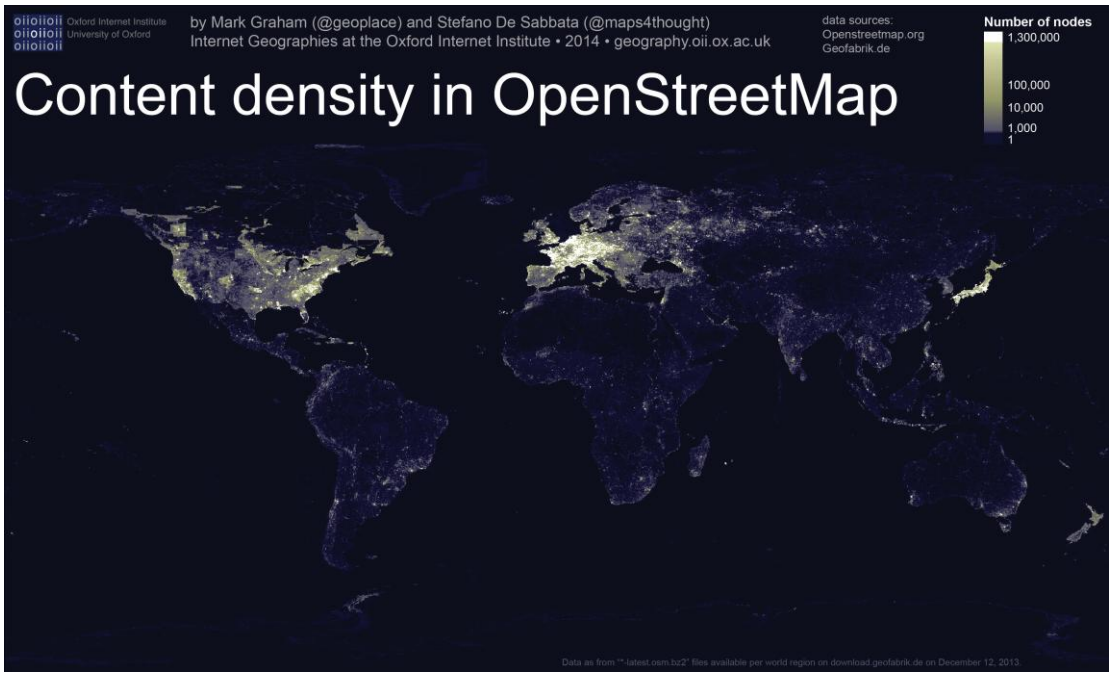
7. **Volatile Internal Security Situation.** As a country India also has the unique distinction of having been continuously subjected to political volatility for more than 35 yrs since early 1980s. Accordingly, unlike the western democratic societies that enjoyed relatively stable periods during this time and could afford better social liberties, India is required to subject its citizens to greater scrutiny (and at times restrictions) for their security.

8. **Inadequate Network Support Infrastructure.** Unlike the developed western countries where the terrestrial optical fibre based network is the primary network and same is supplemented with the mobile and satellite networks, in India, mobile network is the primary network. The terrestrial network is still building up and hence is not available for adequate backhaul support to the mobile network. Given to the lack of coordinated / structured urban development which

leads to frequent cuts in optical fibre and sealing / removal of existing towers the TSPs find it difficult to maintain their existing networks thereby requiring them to frequently manage traffic for maintain the services and QoS.

9. **Inadequate Spectrum Holdings for Servicing one of the Largest Telecom Markets.** As compared to almost 150 MHz of spectrum being held by the telcos of other countries, Indian TSPs have just about 50 MHz of spectrum for provisioning services to one of the largest telecom markets. This skewed mismatch between availability of spectrum and the size of the market leads to customers experiencing unintentional, unwarranted and highly avoidable congestion (blocking) of services.

10. **Dark Continent for Content.** India is among the dark continents from a content perspective as,



Picture 2: Content Density as per OpenStreet Map
Source : OpenStreet.com

a. Out of 75 K Autonomous Systems Number (ASN) India has only 1503+ ASNs. Consequently, based on the amount of content owned / aggregated and traffic demand within Indian Territory, by the foreign Content Providers / Aggregators / Distributors, there exists a highly skewed traffic imbalance in favour of the foreign Content Providers / Aggregators / Distributors.

b. The foreign content providers / aggregators / distributors have their own commercial arrangements in place for preferential treatment of traffic with content owners. This disadvantages Indian Content Providers / Aggregators / Distributors in terms of higher cost of operations and makes it not only harder for them to grow, but also affects the affordability of Indian content for the Indian user viz-a-viz foreign content. In Europe and other parts of the world there have been numerous investigations over content owners and

device OEMs for misusing there dominant position in the market[2]. Such monopolistic practices ultimately lead to delivery of content being impacted to the Indian consumer.

11. **The Indian telecom landscape, therefore, acquires an unparalleled uniqueness that warrants stipulation of Net Neutrality regulations that are tailor made for the Indian Telecom customer, Indian Security environment and the Indian telecom industry. Templating the same based on other telecom markets would certainly not be prudent.**

B. <u>Net Neutrality is not Just About TSP</u>

12. Internet being an eco-system that encompasses different stakeholders such as access services provisioning entities (TSPs and ISPs), content services provisioning entities (Content Providers / Aggregators / Distributors, services enabling entities (Device Manufactures) and services subscription entities, i.e the users, 'Net Neutrality' cannot and should not be seen in the context of TSPs alone. In fact 'Net Neutrality' should be seen in the context of customer experience as all these stakeholders have the ability and capability to affect the same. For a credible 'Net Neutrality' framework, its scope has to be expanded to include these stakeholders, especially the Content Providers. In light of the discussions held over the past one year, 'Net Neutrality' is being practically wielded like a weapon, by the dominant content providers, to bully the TSPs into providing 'Settlement Free Peering' (SFP). In India, more than 50% traffic is that of Youtube i.e. video. Despite TSPs best efforts for provisioning good QoS to its customers, the Youtube kind of video traffic essentially degrades or kills the customers' experience at the expense of much more essential content. Therefore, it is felt that, **'Net Neutrality' should ideally be based on category of content instead of its treatment by the TSPs.** The boundaries for legitimate handling / treatment of each type of traffic can then be drawn more clearly.

13. It is therefore suggested that the **content be classified as follows**.

    a. **Non-Commercial.** Content that carries 'No Advertisements', 'No Enticements', and is provided at 'No Charges' to the consumers. E.g. traffic related to,

        i. Governance.

        ii. Education.

        iii. News only.

        iv. Health and Hygiene.

        v. Safety and Security.

    b. **Commercial (Without Advertisements).** This can be considered to be traffic to and from,

        i. Company websites carrying no adverts, i.e. for information only.

        ii. Commerce / Banking Services sites.

    c. **Commercial (With Advertisements).**

        i. Family entertainment.

        ii. Adult entertainment.

[2] http://europa.eu/rapid/press-release_STATEMENT-16-1506_en.htm and http://www.wsj.com/articles/eu-files-formal-charges-against-google-over-android-conduct-1461145354

14. **TSPs should be obligated to ensure high QoS experience and fairness (Total adherence to Net Neutrality principles) to the content of Category (a) and (b) without any compromise.**

15. **As regards traffic from category (c), the TSPs should be allowed to have commercial arrangement with them without compromising the experience on the other three categories listed in the previous paragraph.**

16. Further, it is brought out that according to the 11th Annual Cisco Visual Networking Index (VNI) Forecast, in India, the total Internet video traffic will be 80 per cent of all Internet traffic in 2020, up from 51 per cent in 2015 and a large portion (49%) of this is will be HD video. This coupled with the unprecedented increase in the volume of traffic will put enormous strain on the operator's infrastructure in terms of both engineering and operations. It is estimated that with the rollout of LTE and the predominance of mobile data in India these figures would be breached much ahead of time. Therefore, **within the content classifications suggested above, from QoS perspective, it is imperative that the traffic be further classified as 'Video' and 'Non Video' and the TSPs be permitted to have commercial arrangements for 'Commercial Video' traffic for ensuring adequate network resource provisioning and QoS for other applications.**

17. Detailed responses, to the specific questions asked in the consultation paper, are given in subsequent paragraphs.

Detailed Response

Question 1: What could be the principles for ensuring non-discriminatory access to content on the Internet, in the Indian context? [See Chapter 4]

Question 2: How should "Internet traffic" and providers of "Internet services" be understood in the NN context? [See Chapter 3]

(a) Should certain types of specialised services, enterprise solutions, Internet of Things, etc be excluded from its scope? How should such terms be defined?

(b) How should services provided by content delivery networks and direct interconnection arrangements be treated?

Please provide reasons.

Our Response

In the "Unique Indian Context",

Principles for ensuring non-discriminatory access to content on the Internet should be (a) No Blocking, (b) No Throttling and (c) No Prioritization for any content / stakeholder in the internet eco-system / user.

The key to ensuring non-discriminatory access to content on the Internet is the adherence to these core principles by all the stakeholders in the internet eco-system viz, Users, TSPs, ISPs, Content Providers / aggregators / distributors and device OEMs.

'Pricing of data services' should be left to the competitive market forces in India for ensuring affordability of services.

'No Inspection of data Packets' should not be included as part of the core principles for ensuring non-discriminatory access to content on the Internet.

Yes, specialised services, enterprise solutions, Internet of Things, etc should be excluded from the scope of NN.

1. Formally, 'The Internet' has been defined as the global system of interconnected computer networks, i.e. a network of networks, that uses the Internet protocol suite (TCP/IP) to link devices worldwide. In a broader sense, 'The Internet' can be construed to be an eco-system in itself which encompasses different stakeholders such as,
   a. Access services provisioning entities (TSPs and ISPs).
   b. Content services provisioning entities (Application or Content Providers / Aggregators / Distributors).
   c. Entities provisioning Interconnection between Content services provisioning entities (NLDOs / ILDOs).
   d. Services utilization enabling entities (Device Manufactures).
   e. Services subscription entities, i.e the users.
2. Accordingly, 'Internet Traffic' can be inferred to be the data traffic that is exchanged / transported between / generated by any of these entities and 'Internet Services' would be primarily the services provided by any of the Access services provisioning entities (TSPs and ISPs), Content services provisioning entities (Application or Content Providers / Aggregators / Distributors) and Entities provisioning Interconnection between Content services provisioning entities (NLDOs / ILDOs).
3. In the context of NN, it is the important that the symbiotic networking relationship amongst all these above mentioned stakeholders remains unbiased or neutral or non discriminatory. With the advancements in technology, all stake holders, including the users, have the potential to upset this unbiased / neutral / non discriminatory nature of this symbiotic networking relationship through blocking / throttling / prioritising data traffic resulting in a biased / non neutral / discriminatory network. Therefore, for non discriminatory access to the content over the internet it is imperative that all the stakeholders should ensure that they on their part should not indulge in (a) Blocking, (b) Throttling and (c) Prioritization of any content / stakeholder / users on a selective basis. Accordingly, **most of the regulators across the world have defined the core principles for ensuring non-discriminatory access to content on the Internet or NN as, (a) No Blocking, (b) No Throttling and (c) No Prioritization for any content / stakeholder in the internet eco-system / user over the network and it is recommended that the same should be enunciated for India as well.**
4. Of late two additional issues viz (a) "No Inspection of the data packets" and (b) "Pricing of data services" have also gained traction to be included as part of the core principles of Net Neutrality. It is submitted that 'Packet Inspections' whether 'stored' or 'in motion' are more of a privacy / data protection concern and therefore should not be part of the net neutrality discussion. Albeit, given the volatile political situation being forced on India by external forces, there could be requirements of packet inspection in national interest and for ensuring security of Indian citizens. Therefore, **just as for voice communication, discretion should be mandated for permitting packet inspection, i.e. to be allowed only on explicit permissions from the relevant level of authority.**
5. Despite having one of the largest internet user base India, which is continuing to grow rapidly, India still has extremes of data users from the uninitiated to the avid users. There is a teething need to narrow down this gap for which affordability of data services shall play an important

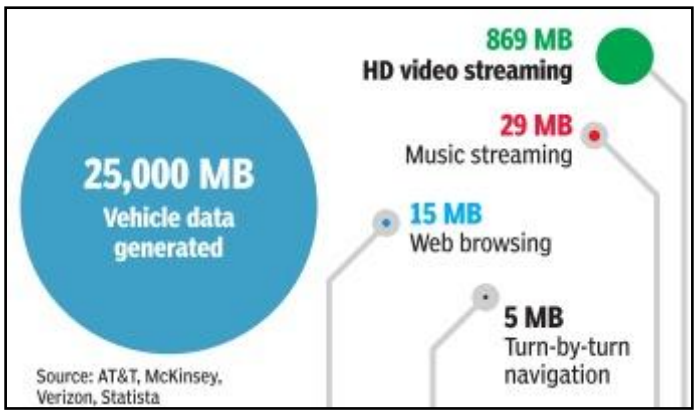
role. The same is reinforced through various independent research works conducted by reputed organizations such as the IAMAI and Ericsson. As per an IAMAI and Boston Consultancy Group report titled "India@Digital.Bharat creating a $200 billion internet economy" published in Jan 2015, *"reach, affordable access and improved awareness"* have been listed as being *"the primary drivers of the rapid growth, or lack thereof, in India's online population"*. As per Ericsson's Apr 2015 Consumer Insight Summary Report titled, "The changing mobile broadband landscape: Understanding the diverse behaviour and needs of smartphone mobile internet users in urban India", one of the key findings for "barriers to mobile broadband", especially *"for those who do not use mobile broadband, affordability and digital literacy are prime obstacles to adoption"*. As per the Global Survey on Internet Security and Trust (2014), conducted by the Centre for International Governance Innovation and Ipsos, a market research company, by polling over 23,000 internet users in 24 countries (https://www.cigionline.org/internet-survey), "*some 83 percent of users said they believe that affordable internet access should be a basic human right".* As per the UN Broadband Commission 2014, "*high-speed, affordable broadband has been described as a foundation stone of modern society".*

6. Realising the need for increasing the affordability of data services, the entire internet eco-system has been endeavouring to provision services at least prices / free of cost. If the content services providers have provisioned their services free to their customers, the device OEMs on their part have been bringing better handsets at lower prices for the masses. **In line with this requirement of increasing the affordability of data services, the TSPs too had launched innovative tariff structures for the data services, including free access to a collection of websites, for the masses.**

Exclusion from Core Principles of NN

7. We agree to the exceptions to the above mentioned NN core principles, as elucidated in the consultation paper itself and the enforcement of which is not the TSPs discretion but mandated for implementation, should be as given below,
   a. The existing fair usage policy of reduction of access speed beyond a certain data usage.
   b. Congestion management for,
      i. Ensuring that the application latency is maintained within permissible limits at all times.
      ii. Controlling any sabotage of the network through any kind of malpractice, such as flooding, DDOS attack, Malware, etc, which affects services for a large number of customers.
   c. Lawful restrictions directed to be imposed by the Government / LEA agencies.
   d. Prioritization for communications for emergency and disaster management services.
8. In addition to the above reasonable traffic management exceptions we would also recommend that the 'Enterprise access services' and Internet of Things (IoT) / Machine 2 Machine (M2M) communications related traffic management practices too should be considered legitimate and should be covered under the exception rule. This is so as,
   a. **Enterprise access services.** These are akin to provisioning of bulk services which are made use of for profiteering by the enterprises.

b. **Internet of Things (IoT) / Machine 2 Machine (M2M) communications.** In certain IoT / M2M services, say like healthcare, etc, the M2M device(s) are often required to report their presence / reachability and serviceability at regular short duration intervals as well as receive instructions in an emergency situation and hence require that their traffic is prioritized. On the other hand, most of IoT / M2M services are not time critical and hence can be subjected to limitations for better QoS for the regular data traffic. As per an article, "Statoistics - soon, your car will generate much more data than video streaming" published in times dated 24 Feb 17 (Graphics 2 below refers), connected cars would soon be generating more data than most of the existing applications. The article states that "In many western countries cars have become computers on wheels--they come fitted with more than 100 censors that keep tabs on location, performance, driving behaviour and physical parameters. To perform these tasks, often in real time, cars are connected to the internet and generate huge volumes of data. Statista compared an hour's data generation in the US with some typical online activities in the same period. Cars on Indian roads will soon guzzle similar amounts of data".



Graphics 2 : Source[3]

Treatment of Content Delivery Networks (CDNs)

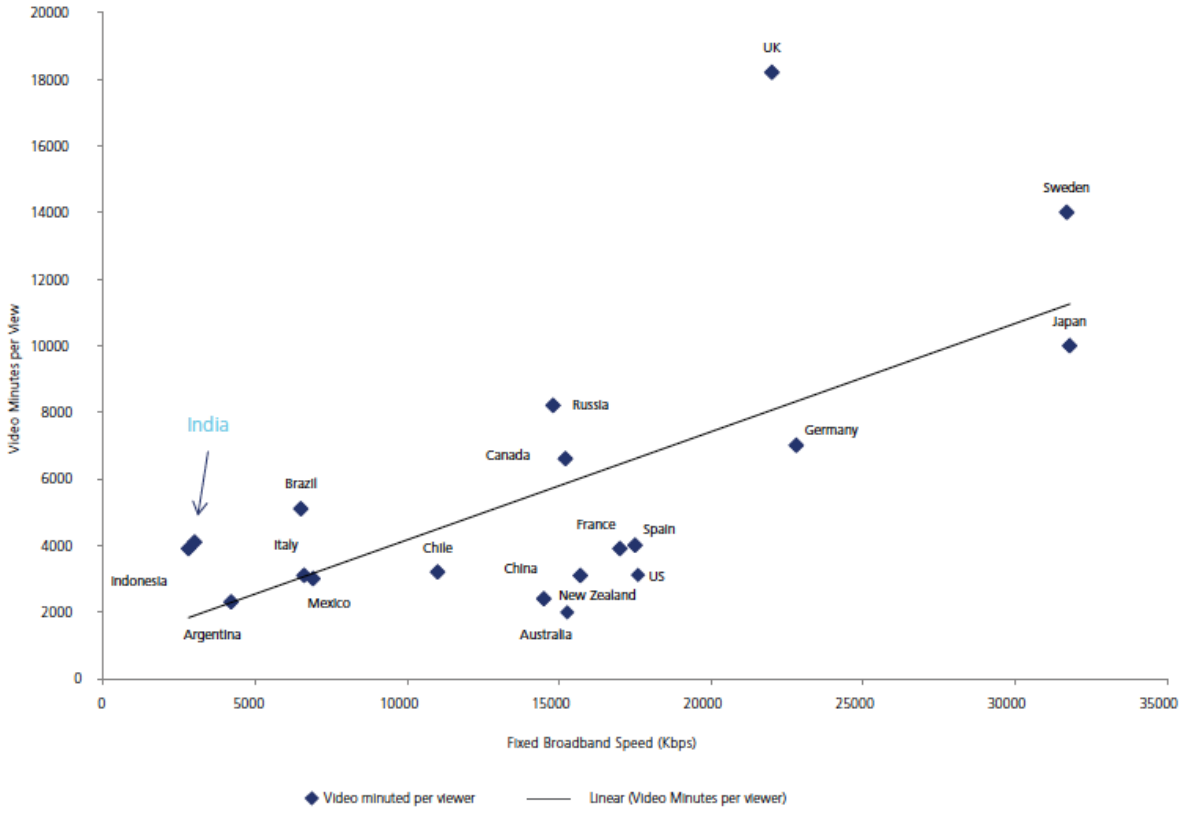
9. A snapshot of how the average speed impacts the increase in video traffic is detailed below for reference. Various studies have enumerated this and have suggested usage of alternative QoS mechanisms rather than the current ones[4]. Consequently, the operator has to classify traffic types (data vs Video vs HD video etc.), use differentiated traffic treatment, use specialised equipment to handle this video tsunami.

10. The net neutrality forum in fact, cites as an exception to net neutrality that the subscriber can on his own, without any incentives being granted to him, ask for a specific content to be given and the TSP can handle traffic in a specific manner without violating any net neutrality principles[5]. In fact 3GPP has already expanded traffic class definitions to include varied types of video instead of having a singular video class as shown in the table given at **Appendix I**.

[3] Feb 24 2017 : The Times of India (Delhi) article "Statoistics - soon, your car will generate much more data than video streaming".

[4] https://www.researchgate.net/publication/221324318_Impact_of_the_Multimedia_Traffic_Sources_in_a_Network_Node_Using_FIFO_scheduler and http://airccse.org/journal/cnc/5313cnc08.pdf and https://www.cs.utah.edu/~kobus/docs/wcw2002.slogan.2.pdf

[5] https://www.thisisnetneutrality.org



Picture 3: Showing a snapshot of how the average speed impacts the increase in video traffic
Source : CISCO VNI Report 2015

11. India has around 800 live television channels that are pumping an average 4 Mbps of content to 1 Billion Indian population. If this content were digitized, then 3.2 Gbps of SD Video data or 10% of HD will add another 3.2 Gbps of live video content into India's Internet infrastructure. To enable this, let's say Google, the largest content network provider, deploys human resources at the premises of every Indian television channel to acquire their content for YouTube. Thus, Indians would be accessing Indian content through a US distributor resulting in no contribution to the Indian exchequer. Therefore, **there is a genuine need to Indianize Indian content distribution and allowing telecom operators to have a separate Video Class of service in their network as video cannot be treated like other data packets due to its stringent constant jitter.**

12. Additionally, it is brought out that large scale video streaming did not exist when the Internet's underlying peering and transit arrangements were put into place. These arrangements were, and are, based on bilateral traffic flows whereas video is a one way flow from the content provider to the user through the TSP's network. In the past, live events such as cricket matches have accounted for 17 million concurrent live streams. This kind of traffic is capable of overwhelming network and interconnects capacities needed for delivering content across networks. This kind of traffic for short periods of time will keep testing the engineering and traffic management capabilities of the TSP. Ensuring TSP's manage event based video traffic based on their own classification, will ensure overall better quality of internet experience. Therefore, this should thus not be considered as a violation of net neutrality guidelines and the CDNs should be kept outside the ambit of net Neutrality discussions.

13. Another aspect as to why CDNs should be taken more seriously in our country is because it is far easier to reach out to people through video than via texts / data, which can reach only a select population. Given our vast array of local vernacular, a few Internet companies like Ustream are eating out the ISRO's OU bandwidth & DSNG market & retaining the content as theirs. It is suggested that the **MIBs Video Archival monitoring should now start mandating such Content Providers / Aggregators / Distributors to store their archives in local TSPs domestic cloud setup and incentivize them to increase their traffic.**

14. Therefore, it is imperative to have a separate Video Track and for such similar traffic to be kept outside Net Neutrality discussions. Hence, **it is strongly suggested that the CDNs and their video traffic should be considered as an exception to the 'prioritization' core principle for NN and paid or otherwise should be allowed for video traffic.**

15. While the misuse of the above mentioned reasonable traffic management measures cannot be ruled out, however, it is brought out that resorting to any of the services prohibiting techniques viz, Blocking / Throttling / Paid Prioritization / unwarranted Packet inspection shall be detrimental to the business of the TSPs themselves as it would lead to preclusion of a set of customers from their subscriber base.

Direct Interconnection / Peering Arrangements

16. The foreign Content Providers / Aggregators / Distributors, almost without exception, leverage their dominant traffic imbalance to get preferential domestic Internet peering on their own terms, typically free of cost. This is termed by them as 'Settlement Free Peering' (SFP). Such SFP arrangement, firstly, denies the government the revenue share it gets today from peering arrangements between TSPs and TSPs and Indian Content Providers / Aggregators / Distributors and secondly, pose security risks as they facilitate the bypassing of the legitimate blocking rules that DoT directs to be implement at the gateways of TSPs / Large ISPs. Therefore, **for ensuring better affordability of Indian content for the Indian Users and from security point of view, there is a need for the authority to regulate the peering of the foreign Content Providers / Aggregators / Distributors with the Indian TSPs.**

<u>Our Recommendations</u>

17. In view of the foregoing, in 'Indian Context' following are recommended for ensuring non-discriminatory access to content on the Internet.

    a. **Principles for ensuring non-discriminatory access to content on the Internet should be (a) No Blocking, (b) No Throttling and (c) No Prioritization for any content / stakeholder in the internet eco-system / user.**

    b. **The key to ensuring non-discriminatory access to content on the Internet is the adherence to these core principles by all the stakeholders in the internet eco-system viz, Users, TSPs, ISPs, Content Providers / aggregators / distributors and device OEMs.**

    c. **'No Inspection of data Packets' should not be included as part of the core principles for ensuring non-discriminatory access to content on the Internet as packet inspections whether 'stored' or 'in motion' are more of a privacy / data protection concern. However, due to the prolonged unsecure environment imposed on India's citizens, discretion should be mandated for permitting DoT directed packet inspection for LIM purposes but only on explicit permissions from the relevant level of authority on need basis.**

d. **Affordability of data services and proliferation of broadband services are the most critical factors for the Indian Diaspora. In light of the hyper competition in the Indian telecom market and price sensitivity of the Indian customers, 'pricing of data services' should be left to the competitive market forces to decide instead of including it as a core principle for ensuring non-discriminatory access to content on the Internet.**

e. **Specialised services, enterprise solutions, Internet of Things, etc should be excluded from the scope of NN.**

f. **There is a genuine need to Indianize Indian content distribution and allowing telecom operators to have a separate Video Class of service in their network as video cannot be treated like other data packets due to its stringent constant jitter.**

g. **MIBs Video Archival monitoring should now start mandating Content Providers / Aggregators / Distributors to store their archives, especially for local content, in local TSPs domestic cloud setup and incentivize them to increase their traffic.**

h. **It is strongly suggested that the CDNs and their video traffic should be considered as an exception to the 'prioritization' core principle for NN and paid or otherwise should be allowed for video traffic.**

i. **For ensuring better affordability of Indian content for the Indian Users and from security point of view, there is a need for the authority to regulate the peering of the foreign Content Providers / Aggregators / Distributors with the Indian TSPs.**

Question 3: In the Indian context, which of the following regulatory approaches would be preferable: [See Chapter 3]

(a) Defining what constitutes reasonable TMPs (the broad approach), or

(b) Identifying a negative list of non reasonable TMPs (the narrow approach).

Please provide reasons.

Our Response and Recommendation

In view of the foregoing discussion in response to questions 1 and 2, it is recommended that a balanced mix of two approaches suggested in the CP, viz, the 'Narrow Approach' defining that No blocking, No Throttling and No Prioritization complemented with the 'Broad Approach' defining the permissible exclusions would be most preferable in the Indian context.

Question 4: If a broad regulatory approach, as suggested in Q3, is to be followed: [See Chapter 3]

(a) 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?

(b) Should application-specific discrimination within a category of traffic be viewed more strictly than discrimination between categories?

Our Response

The parameters elucidated under para 3.4.1 at page 21 of the CP should be regarded as reasonable TMPs.

Therefore, the traffic needs to be categorised and objectively defined based on the application which is generating that traffic.

No, application-specific discrimination within a category of traffic should not be viewed more strictly than discrimination between categories.

1. We are in complete agreement with the reasonableness of TMP, as elucidated under para 3.4.1 at page 21 of the CP. Therefore, any action taken by the TSPs for ensuring better QoS for all of its customers, without providing / offering any preferential treatment to any Content / at the cost of any Content, without any commercial considerations, should be considered as reasonable TMP.
2. Therefore, apart from the traffic classifications as per the international standards bodies, the traffic needs to be categorised and objectively defined based on the application which is generating that traffic. Similar traffic generated by different applications is required to be treated differently, viz, differentiation is required between,
    a. The video being streamed for entertainment / gamming and online surgery / surveillance / decision support, etc.
    b. The chat messages being exchanged between humans and for M2M services.
3. As brought out in our response to questions 1 and 2, while commercial considerations based differentiation for M2M services should be permitted, the same should be barred for general purpose / social services.
4. However, within the ambit of core principles of NN, as elucidated earlier in response to question numbers 1 & 2, no application specific discrimination should be permitted for traffic generated by similar applications, viz, the traffic of two applications, streaming video for entertainment purposes, has to be treated equally without any differentiation amongst them.
5. On the other hand there is definitely a need to differentiate between traffic generated by different categories of applications. The traffic handling standards, as defined by various international standardization bodies such as 3 GPP etc, should be the norm for traffic generated by different categories of applications.

Our Recommendations

6. Our recommendations are as follows,
    a. **The parameters elucidated under para 3.4.1 at page 21 of the CP should be regarded as reasonable TMPs.**
    b. **Therefore, the traffic needs to be categorised and objectively defined based on the application which is generating that traffic.**
    c. **Application-specific discrimination within a category of traffic should not be viewed more strictly than discrimination between categories.**

Question 4 (c): How should preferential treatment of particular content, activated by a users choice and without any arrangement between a TSP and content provider, be treated?

Our Response

No, preferential treatment of particular content, activated by a users' choice and without any arrangement between a TSP and content provider should not be permitted.

1. TSPs size their networks based on certain mathematically modelled criteria. All components of the network, right from the spectrum bandwidth, network elements capacities and capabilities and even the network management and operations tools are decided based on the outcomes of the mathematical model.

2. **Wireless Broadband Connectivity.** The throughput for a wireless connectivity is limited by the spectrum available with the operator. Accordingly for wireless networks, TSP's set up the network management parameters for providing the best QoS to all their customers without any discrimination / differentiation. **Permitting user activated preferential treatment of particular content would potentially disturb the optimal QoS provisioning settings of the network and lead to QoS issues for other customers. It is envisaged that such tools would form part of the default applications in handsets and can possibly be used as a differentiator similar to the RAM and processors of the user's devices.**

3. **Wireline Broadband Connectivity.** Differential throughput data packs are permitted to be sold as legitimate data packs for all customers subscribing to wireline broadband services. The network management parameters are therefore, setup based on the experience of subscription of various throughput data packs. **In case, customers are permitted to activate preferential higher throughput they would game the system by purchasing cheaper data packs that officially offer lower throughput and exercise their options for increasing the same.**

Our Recommendation

4. In view of the forgoing it is strongly recommended that **preferential treatment of particular content, activated by a users' choice and without any arrangement between a TSP and content provider should not be permitted.**

Question 5: If a narrow approach, as suggested in Q3, is to be followed what should be regarded as non reasonable TMPs? [See Chapter 3]

Our Response and Recommendation

Any Blocking, Throttling and Prioritization of traffic due to commercial considerations / non-commercial yet malicious anticompetitive intent that impedes on the QoS being provisioned for a particular content / being provided to other subscribers should be regarded as non reasonable TMPs.

Question 6: Should the following be treated as exceptions to any regulation on TMPs? [See Chapter 3]

(a) Emergency situations and services;

(b) Restrictions on unlawful content;

(c) Maintaining security and integrity of the network;

(d) Services that may be noticed in public interest by the Government/ Authority, based on certain criteria; or

(e) Any other services.

Please elaborate.

Our Response and Recommendations

Yes, (a) Emergency situations and services, (b) Restrictions on unlawful content and (c) Maintaining security and integrity of the network, should be treated as exceptions to any regulation on TMPs.

No, we do not recommend treatment as exceptions to any regulation on TMPs for 'Services that may be noticed in public interest by the Government / Authority based on certain criteria' as most of the public interest services are either subsidised or paid for by the government. A similar approach is recommended to be adopted for digital services as well.

Question 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: [See Chapter 4]

(a) Blocking;

(b) Throttling (for example, how can it be established that a particular application is being throttled?); and

(c) Preferential treatment (for example, how can it be established that preferential treatment is being provided to a particular application?).

Our Response

1. Definitions of 'Blocking', 'Throttling' and 'Prioritising / Preferential Treatment' is recommended to be as given below.

    a. **Blocking** – Any unlawful (i.e. not authorised by the licensee) obstruction to access a particular URL / URI of Non-Commercial (that does not bear any advertisements), Commercial (Providing Information about a company but without any advertisements) and Commercial (Commerce / Services) content, by the TSP in exchange for commercial considerations / anti-competitive agreements either with a third party or otherwise, should be considered as 'Blocking'.

    b. **Throttling** – Any intentional (unless authorised by the licensee) degradation / Slow down / Alter / Restrict / Interfere with / Discriminate / Impair / hinder the audio / video stream or the time taken to access a particular URL / URI of Non-Commercial (that does not bear any advertisements), Commercial (Providing Information about a company but without any advertisements) and Commercial (Commerce / Services) content, by the TSP in exchange for commercial considerations / anti-competitive agreements either with a third party or otherwise, should be considered as 'Throttling'.

    c. **Prioritising / Preferential Treatment** - Any intentional (unless authorised by the licensee) acceleration of the audio / video stream or the time taken to access a particular URL / URI of Non-Commercial (that does not bear any advertisements), Commercial (Providing Information about a company but without any advertisements) and Commercial (Commerce / Services) content, by the TSP in exchange for commercial considerations / anti-competitive agreements either with a third party or otherwise, should be considered as 'Prioritising / Preferential Treatment'.

Tests, Thresholds and Technical Tools that can be Adopted to Detect their Deployment

2. As brought out in our response to questions 1 and 2, in the context of NN, it is the important that the symbiotic networking relationship amongst all the stakeholders remains unbiased or

neutral or non discriminatory. Therefore, for effective monitoring, it is imperative that the audit of one stakeholder is correlated and corroborated with the audit of another stake holder. If an App claims to be getting throttled in a particular TSP's network, then verification of the gateway logs of only that TSP shall not suffice. **The findings of the analysis of the Server logs of the App provider shall have to be correlated and corroborated with the similar audit findings of the logs of the TSPs logs and other intermediary NLD / ILD networks.**

3. Indulgence in any of the three practices of 'Blocking', 'Throttling' and 'Prioritising / Preferential Treatment' by any of the internet eco-system constituents would be violation of the basic principles of Net Neutrality, however, it requires extensive tests for various sites from the connections provided by an SP (ISP / TSP) to determine this. While site **audit of configurations of the Network Elements of the TSPs / ISP should be the last resort**, following steps are recommended as testing tolls for monitoring indulgence of the TSPs / ISPs in non NN practices.

    a. TRAI should crowd source the speeds / access of various sites from the connections provided by various TSP / ISPs.

    b. TRAI can start an APP which can be used to test various URLs / URIs / IP addresses from the connections provided by TSP / ISPs. The results of these can go to a TRAI repository.

    c. The tests must be carried out over a period of atleast 3 months to arrive at a credible suspicion of violation of NN principles. Also, these tests should be utilized to arrive at the benchmark for the time taken for accessing / streaming for that particular content.

    d. This needs to be done over a larger period of time as there may be temporary glitch.

    e. The data stored in such repository can be used to check the reachability of any content vis-à-vis other similar content by the same provider / same content from different providers.

    f. In case the results are outside the calculated thresholds on a consistent basis both, the concerned TSP / ISP and the content provider should be asked to show cause and explain / correct the situation within a predefined time and also provide the logs and capacity of their respective NE / Servers.

    g. Only based on the outcome of collection of data, its analysis, correlation and corroboration can the TSP / ISP judged as a violator of NN principles.

4. Given the fact that internet adoption is growing by leaps and bounds in India, it is felt that **it would be ideal to have a regulation in place that mandates maintenance of content closer to / within the TSPs network. The content provider's setup too should be mandated to have adequate capacity and use the CDN services of the domestic TSPs.**

Our Recommendations

5. In view of the foregoing, following are recommended,

    a. **The complaints for violation of NN principles shall have to be investigated through an analysis, correlation and corroboration of the content providers' server logs with those of the TSPs' and intermediary NLD / ILD networks.**

    b. **Audit of configurations of the Network Elements of the TSPs / ISP should be the last resort.**

c. **It would be ideal to have a regulation in place that mandates maintenance of content closer to / within the TSPs network.**

d. **The content provider's setup too should be mandated to have adequate capacity and use the CDN services of the TSP.**

Question 8: Which of the following models of transparency would be preferred in the Indian context:[See Chapter 5]

(a) Disclosures provided directly by a TSP to its consumers;

(b) Disclosures to the regulator;

(c) Disclosures to the general public; or

(d) A combination of the above.

Please provide reasons. What should be the mode, trigger and frequency to publish such information?

Our Response and Recommendations

A combination of all the suggested models of transparency viz, Disclosures provided directly by a TSP to its consumers, Disclosures to the regulator, Disclosures to the general public would be preferred in the Indian context.

These disclosures can be made on the respective website of the TSPs.

The trigger for publishing these could be any change / amendment in the earlier published TMPs. The change could be TSP initiated for valid traffic management or regulator directed.

The frequency for publishing these disclosures should be within 3 days of the TMPs being amended for any reason.

Question 10: What would be the most effective legal / policy instrument for implementing a NN framework in India? [See Chapter 6]

(a) Which body should be responsible for monitoring and supervision?

(b) What actions should such body be empowered to take in case of any detected violation?

Our Response and Recommendations

Effectiveness and balanced approach of TRAI for regulating, monitoring and supervising the telecom sector and has been proved beyond any doubt and the same should continue for implementing a NN framework in India.

Promulgation of regulations by TRAI would be the most effective legal / policy instrument for implementing a NN framework in India.

NN primarily being a QoS issue, TRAI is adequately empowered to take necessary actions in case of any detected violation.

Question 10 (c): If the Authority opts for QoS regulation on this subject, what should be the scope of such regulations?

Our Response and Recommendation

The scope of QoS regulations, for the NN framework, shall have to include the regulation for QoS of all the stakeholders of the NN eco-system.

1. As brought out in our response to questions 1 and 2, in the context of NN, it is the important that the symbiotic networking relationship amongst all the stakeholders remains unbiased or neutral or non discriminatory. Hence, **the scope of QoS regulations, for the NN framework, shall have to include the regulation of QoS of all the stakeholders of the NN eco-system.**

Our Recommendation

2. In view of the foregoing, it is recommended that **the scope of QoS regulations, for the NN framework, should include the regulation of QoS for all the stakeholders of the NN eco-system.**

Question 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: [See Chapter 6]

(a) Disclosures and information from TSPs;

(b) Collection of information from users (complaints, user-experience apps, surveys, questionnaires); or

(c) Collection of information from third parties and public domain (research studies, news articles, consumer advocacy reports).

Our Response and Recommendations

The licensed entities (TSPs) are mandated to host their data within India and subject the same to audit by TRAI. Therefore, we envisage no challenges in monitoring for violations of any NN framework on account of disclosures and information from TSPs.

TRAI is already getting the feedback on data speeds being offered by various TSPs, from the customers, through its 'MySpeed' App. Similar App could be provided for testing of data download speed from a particular app.

The existing customer surveys being conducted by TRAI shall also provide the requisite feedback to the Authority.

India being one of the largest consumers of internet services is presently a net exporter of information. **From monitoring perspective, it is important that the geographic area of hosted facility of the App co-operates with the auditors appointed by TRAI. This could prove to be a major challenge for establishing the veracity of claims of violation of NN principles.**

Our Recommendations

1. Summary of our recommendations is as follows,

    a. **The licensed entities (TSPs) are mandated to host their data within India and subject the same to audit by TRAI. Therefore, we envisage no challenges in monitoring for violations of any NN framework on account of disclosures and information from TSPs.**

b. **TRAI is already getting the feedback on data speeds being offered by various TSPs, from the customers, through its 'MySpeed' App. Similar App could be provided for testing of data download speed from a particular app.**

c. **The existing customer surveys being conducted by TRAI shall also provide the requisite feedback to the Authority.**

d. **From monitoring perspective, it is important that the geographic area of hosted facility of the App co-operates with the auditors appointed by TRAI. This could prove to be a major challenge for establishing the veracity of claims of violation of NN principles.**

Question 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? [See Chapter 6]

(a) What should be its design and functions?

(b) What role should the Authority play in its functioning?

Our Response and Recommendation

No, we are not in favour of adopting a collaborative mechanism, with representation from TSPs, content providers, consumer groups and other stakeholders, for managing the operational aspects of any NN framework.

As has been brought out in our earlier responses, NN is a QoS issue and TRAI is adequately empowered to initiate actions against the erring TSP. Therefore it needs to be regulated through a regular monitoring authority. The authority shall have to exercise its executive powers for deciding any alleged violations from any of the stakeholder and hence, a collaborative approach is not recommended.

Question 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? [See Chapter 6]

Our Response and Recommendation

NN being a QoS issue, it's promulgation as a technology agnostic guideline can be adopted as a mechanisms to be deployed so that the NN policy / regulatory framework may be updated on account of evolution of technology and use cases.

Question 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. [See Chapter 5]

Question 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? Please explain with reasons.[See Chapter 4]?

Our Response

We are in agreement with the disclosure fields mentioned in the Information Disclosure Template at Table 5.1 and suggest that the same be published on the website / POS of the respective TSPs.

The parameters listed in the question are beyond the control of the operators and hence it is suggested that the Standard of Quality of Service for wireless data services

(Amendment) Regulations, 2014 (10 of 2014) be amended to permit the operators to put a disclaimer for the same on their respective website / POS.

Broadband Service Provisioning Through Wireless Network

1. We completely agree with the authorities view that the quality of Internet experienced by a user would certainly be impacted by factors such as the type of device, browser, operating system being used. The statement of fact is true for provisioning of broadband services irrespective of the underlying network, i.e. wireline or wireless.

2. In the wireless domain the complexities are further accentuated due to the stochastic behavior exhibited by the wireless channels. Such stochastic behaviours cannot be captured as a structure algorithm that can accurately enable their control. Even with the best of the handset, most advanced browser and OS, a customer can experience poor QoS due to the vagaries of the wireless data services environment.

3. These constraints for the delivery of QoS for broadband service are akin to the returns from the stock market. Just as the returns from the stock market cannot be predicted accurately, the situation is similar for delivery of QoS for broadband services irrespective of the channel(s) of delivery, i.e. wireline or wireless.

4. Therefore, most pragmatically, it is suggested that the Standard of Quality of Service for wireless data services (Amendment) Regulations, 2014 (10 of 2014) be amended to permit the operators to put a disclaimer, as given below, for their broadband services.

   "Wireless Broadband Services are subject to risks of simultaneous availability of ideal conditions of weather, a subscriber's handset, subscriber's location, the website that the subscriber is accessing and the loading of the network. As with any investment in securities, data speeds of wireless services can go up or down depending on the factors and forces, as listed above, and the operator is not in a position to provide any assurance or guarantee that the stated ideal speed of data services will be achieved.

   Please read the ideal service conditions carefully on the Service Provider's Website before subscribing to the services. The subscriber may also consult TRAI's 'MySpeed' App for inputs on the Service Provider's services. However, past performance of the Service Provider in a Service Area is not indicative of future Quality of Service. Please consider your specific connectivity requirements before subscribing to the services."

5. The operators can also be permitted to declare 'Ideal QoS delivery requirements' (Theoretical) for broadband services and the conditions under which the same is achievable can be published on the individual operator's website. A suggested list of parameters and their ideal conditions is listed at the **Appendix II** to this response.

Our Recommendations

6. In view of the foregoing, it is recommended that **since the vagaries of the type of device, browser, operating system being used by the customers are beyond the control of the operators therefore, the authority should pragmatically consider amending the Standard of Quality of Service for wireless data services (Amendment) Regulations, 2014 (10 of 2014) be amended and permit the operators to put a disclaimer for the same on their respective website / POS.**

Appendix I

Table Showing 3GPP Traffic Class Definitions Which Includes Varied Types of Video Instead of Having a Singular Video Class

QCI	Resource Type	Priority	Packet Delay Budget	Packet Error Loss	Example Services
1	GBR	2	100ms	10^{-2}	Conversational Voice
2	GBR	4	150ms	10^{-3}	Conversational Video
3	GBR	3	50ms	10^{-3}	Real Time Gaming
4	GBR	5	300ms	10^{-6}	Non-Conversational Video (Buffered Streaming)
65	GBR	0.7	75ms	10^{-2}	Mission Critical user plane Push To Talk voice (e.g., MCPTT)
66	GBR	2	100ms	10^{-2}	Non-Mission-Critical user plane Push To Talk voice
5	non-GBR	1	100ms	10^{-6}	IMS Signalling
6	non-GBR	6	300ms	10^{-6}	Video (Buffered Streaming) TCP-Based (for example, www, email, chat, ftp, p2p and the like)
7	non-GBR	7	100ms	10^{-3}	Voice, Video (Live Streaming), Interactive Gaming
8	non-GBR	8	300ms	10^{-6}	Video (Buffered Streaming) TCP-Based (for example, www, email, chat, ftp, p2p and the like)
9	non-GBR	9	300ms	10^{-6}	Video (Buffered Streaming) TCP-Based (for example, www, email, chat, ftp, p2p and the like). Typically used as default bearer
69	non-GBR	0.5	60ms	10^{-6}	Mission Critical delay sensitive signalling (e.g., MC-PTT signalling)
70	non-GBR	5.5	200ms	10^{-6}	Mission Critical Data (e.g. example services are the same as QCI 6/8/9)

Appendix II

IDEAL CONDITIONS OF PARAMETERS AFFECTING DELIVERY OF BROADBAND SERVICES THROUGH WIRELESS CHANNELS

Throughput (Mbps)		**1**	**2**	**5**	**2**	**4**	**7**	**2**	**4**	**7**	**5**	**8**	**12**
Weather		Sunny											
Subscriber's Handset	Original Equipment Manufacturer (OEM)	Reputed											
	Authenticity of IMEI	Authentic											
	RAM	Minimum 2 GB											
	No of Application(s) Active Simultaneously	1											
	Sensitivity (dbm)	-117			-120								
	Handset Capability	Cat 6											
	64 QAM	Support required											
	Carrier Aggregation (CA)	Support required											
	Subscription Profile	No Throttling on speed											
Subscriber's Location	Nearness to the BTS	Near to 100 Mtr											
	Number of subscribers accessing the net simultaneously from 1 Node-B/E Node -B	12	7	2	15	8	4	15	8	4	18	11	7
Website Server	Number of hops from Service Provider's gateway	1											
	Number of subscribers accessing the site simultaneously	Accesing server should not have congestion , we could not define this number											
NETWORK QUALITY	CQI	25 and above	22 and above										
	RSRP	better than-75	better than-75										
	Backhaul	16 Mbps	100 Mbps										

***** All conditions are to be satisfied simultaneously for achieving the ideal data speed.