RESPONSE TO THE CONSULTATION PAPER

ON

NET NEUTRALITY

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CHAPTER 3

Question 2: In the Indian context, which of the following regulatory approaches would be preferable:
   (a) Defining what constitutes reasonable TMPs (the broad approach), or
   (b) Identifying a negative list of non-reasonable TMPs (the narrow approach).

Response:

Regulations for Voice over Internet Protocol (VoIP) as a part of reasonable traffic management practices (TMP):

The emergence of VoIP services has drawn the attention of regulators as the arising use has resulted in to substitution. VoIP services use the traditional PSTN and consumers have been seen inclined to these services because of monetary benefits over use of telephony calls. The two relevant factors are Quality of Service (QoS) and latency sensitivity. The VoIP has been preferred by the users over traditional telephone services, since access charges are lesser, portability. Substitution effect could be seen here because the traditional telephone systems are being replaced by VoIP. One more advantage on the infrastructure side could the use of packet switching in place of circuit switching. The management practices regarding the Voice over Internet Protocol (VoIP) by the over the top (OTT) services are most relevantly related to latency sensitivity and Quality of service (QoS) provided.

Listed below are some of the issues pertaining to VoIP calls, these issues need to be available to the end users. These issues could be included as a reasonable traffic management practice for further consideration for regulation related to VoIP calls.

- Latency (Latency is the most bothersome because the entire network is involved from end to end. Latency can be measured in two ways: one direction and round trip. Latency is measured in miliseconds (ms). 250 ms is the desirable limit for a two way VoIP network. If the latency exceeds the limit beyond 500 ms the call becomes undesirable and it comes to the notice customers.
- Packet delay and packet loss: the information packets are passed through the network routers to reach the destination. Delays may occur due to configuration, capacity, performance and load. Each router introduces a latency of over 10 ms; to solve the issue of latency sensitivity, router must prioritize IP telephony ports over data ports. Packet loss may occur within a router if the router is overloaded with information. For a telephony packet loss this could be unacceptable if it reaches beyond 5%. This can be solved if bandwidth is saved for VoiP calls, prioritizing of packet data of voice calls.
- Quality of the terminal equipment should be ensured under these guidelines to safeguard the security, QoS and latency issues. Instead of restricting the equipment of the end users there should be specification laid out in a guide book for the users by the Internet Service Providers (ISPs). This is important because it is the entry and/or exit point at the public switching (PSTN)
- The VoIP service companies should be paying the requisite access charges to the PSTN for the use of the network infrastructure. This would act a tool to equalize the norms for both traditional telephone users and VoIP service providers.

- There should be a change in the pattern of charging for the rural as compared to the urban dwelling users of VoIP. This provides a gate away for cross subsidization for the rural people as the subscriber density is low, smaller exchanges and a lack of economies of scales as compared to urban dwellers.
- End-to-end analysis to set regulation related for the two terminals of the VoIP calls; this would result in distinguishing between the national and international calls assuring the safety and security of the content being transferred.
- The VoIP is only one part of an integrated group of Internet services, and the voice communication is ancillary to those services. In order to set specific regulations for the VoIP service, it would have to be offered on a separate standalone basis, not merely as a supplement to an existing Internet Service.
- For the Public: The regulatory intervention would require this criterion would be met, since computer-to-phone and phone-to-phone voice communications transmitted over the Internet would be available to all members of the general public. To and From PSTN Termination). This comes under the purview of regulations if access to internet is obtained via leased circuits, but if local loops are used instead of leased circuits to connect two termination points. Involving Direct Transport and Switching of Speech in Real Time; this criterion was not met because of the "unpredictable congestion risk" of VoIP in its current state which made it difficult to attain a comparable level of reliability and speech quality as produced by PSTN. However, "Where organizations offering phone-to-phone Internet voice are guaranteeing quality of speech by bandwidth reservation and claim themselves that the quality of the service is the same as circuit switched PSTN voice, this element of the voice telephony definition will obviously already have been met." *(Source: FCC guidelines)*
- According to the above mentioned guidelines, the VoIP services should be brought in the purview of regulation by the authority considering the types and ways of services accessed by the end users; this organization implementing it should keep in mind the quality check over the service provided by them, especially bandwidth, low delay and controlled jitter in order to achieve smooth functioning of the service.

Question 3: If a broad regulatory approach, as suggested in Q2, is to be followed:
(a) What should be regarded as reasonable TMPs?

Response:

Co-regulatory model for Traffic Management Practices. (TMPs)

There is a rise in the way Internet Service Providers (ISPs) interact with the consumer when concerned with data packets. What will define reasonable network management practices would stem from the fact that the concerned stakeholders are involved in the policy formulation. There are two very important parties that are involved in the delivery of a data packet to the consumer. The first party is the Internet service provider that provides for the infrastructure services. The other party is the competitive access provider, which provides content to the consumers, which includes video streaming services, gaming networks,

Internet applications, etc. These parties work in network synchronization, which help efficient delivery of services to the consumers.

According to Watal (2017), "ISPs and CAPs have an interest in cooperating with each other to implement such a solution as they are integrally and infrastructurally reliant on one another for innovation and success. For instance, while CAPs provide the content as well as the technology and relationships needed to distribute the content online, they are reliant on backbone ISPs that own the fiber optic highways used to move traffic among networks." Such cooperation will eventually limit the way ISPs discriminate with data packets. This cooperation also results in innovative practices to improve the experience of the users, "The ability of CAPs to develop more advanced and quality-sensitive applications, such as web conferencing, massively multiplayer online gaming sites, streaming videos, or telesurgery, depends on the ability of ISPs to provide a network that supports such applications." Watal (2017).

To decide what constitutes reasonable traffic management practices, the three stakeholders will play a vital role, ISPs, CAPs and, consumers. The regulatory body will act as a facilitator to let these stakeholders take part in the conversation regarding the NN debate and TMPs. Statutes taking decisions on what constitutes as Reasonable TMPs is a long process and becomes counter-intuitive on the long run.

Co-regulatory approach makes it possible for the stakeholders to quickly respond to a problem of network management practices. Such model is also dynamic is nature and responds to the ever-changing industry and consumer needs. This model also takes into account the private sector industry and bridges the gap between policy and industry itself.

Co-regulation model will be further easier to respond to changes if the suggestions by stakeholders fail to take place, "information gathered over time on the pitfalls and successes of a co-regulatory model can assist in perfecting the model to allow for reduced or greater government involvement in targeted areas and when it is evident that the co-regulatory model is not delivering its objectives, then information about its failings can be instructive in drafting more precise and effective statutory laws."

The bandwidth for the use of Internet is limited. Hence reasonable network restrictions are important for a lag-free access of Internet services to the users. Content and the use of bandwidth are common goods; hence the tragedy of commons is evident and this is where reasonable TMPs play a vital role in the process. 'Who' defines these reasonable TMPs is hence a dynamic process ever-involving stakeholders from wide array of fields. A dynamic, interactive model of co-regulation is important, "Co-regulation, if designed carefully with a mechanism for sustained and diligent oversight, can mean smarter governance and better regulation. By affording a proactive role for the State and a responsive role for industry with sanctions for oversight and omission, the proposed model of co-regulation helps resolve the problem of bandwidth scarcity without significantly undercutting incentives for application innovation or affecting consumers."

CHAPTER 4

Question 6: What could be the principles for ensuring non-discriminatory access to content on the Internet, in the Indian context?

Response:

Some principles that may help in ensuring non-discriminatory access to content on the Internet:

Equality in quality of service (QoS)

There is no universally accepted definition for the concept of net-neutrality. However, the most basic understanding is that it requires an ISP to treat all content and users equally. Marsden (2010) talks of two kinds of net neutrality- positive and negative net neutrality. Net neutrality is positive when the focus lies on delivering a faster, more reliable or guaranteed service. Negative net neutrality is where the focus lies on blocking or throttling of content.

Bandwidth capacity is put to the test during periods of peak traffic. During such periods, heavy users of data might use up a disproportionate amount of the available bandwidth capacity, at the cost of the user experience of low volume users. The latency experienced by low volume users in such scenarios is effectively a discrimination in access, as it represents a deterioration in the quality of service they receive vis-à-vis high volume users.

If we were to apply the definition of positive net neutrality given by Marsden (2010), it would involve management of the network by the ISP, with an aim to most efficiently utilise the network in providing equal QoS to all users. This could be a good method of positive-discrimination that benefits all stakeholders.

Accountability

Management of the network will need ISPs to implement monitoring techniques to identify high volume users. One of the most commonly discussed techniques is deep packet inspection (DPI). Now, it must be remembered that this technique can be used to both to optimise quality of service and also to throttle or block services. Here is where the principle of accountability comes in.

The ISP must be made accountable to the regulator through appropriate measures, to ensure that they do not misuse DPI and other similar techniques to unfairly discriminate between users, which will violate the idea of non-discriminatory access to all content on the Internet.

Affordability

It is worth mentioning here that non-discriminatory access to content on the internet cannot exist without access to the internet in the first place.

India today witnesses a scenario where there is in-equity in access to the internet. While a decline in data costs and increase in affordability levels of the people has succeeded in bringing millions online, there exists an equally large population that cannot afford to access the internet. Dedicated efforts need to be made in order to bring excluded sections online.

Question 8. The quality of Internet experienced by a user may also be impacted by factors such as the type of device, browser, and operating system being used. How should these aspects be considered in the NN context? Please explain with reasons.

Response:

Type of device, browser and operating system used by a consumer is based on individual preferences/choice and it is beyond the control of ISPs. Hence, ISPs shouldn't be held liable for any negative effect on the user experience caused by these factors.

TSPs may however notify TRAI regarding less than adequate QoS or user experience that may result from the use of certain types of devices, browsers or operating systems. TRAI may verify this information to ensure that ISPs do not use system this as an opportunity to promote some devices, browsers or operating systems over others. Subsequently, the information can be passed on to consumers.

CHAPTER 5

Question 9: Which of the following models of transparency would be preferred in the Indian context?

>   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?

Response:

Transparency is of vital importance to the upholding of net neutrality, as it enables consumers to make an informed decision about the TSP that meets their specific needs, consequently ensuring the end user's right to choose between different services. Transparency is a key factor in reducing information asymmetries that naturally exist between TSPs and end users, and can also empower end users to identify and act upon any deviations by TSPs from the principles of net neutrality.

However, transparency is not an end in itself. The ultimate aim of the any transparency policy is to enable end users to make informed choices. As such, this would include transparency not only relating to technical details and fees, but also relating to Traffic Management Practices (TMPs).

As highlighted in the Consultation Paper, information that is too technical or detailed may overwhelm end users. This calls for a **<u>combination of measures ("d")</u>** to maintain transparency.

The *BEREC Guidelines on Transparency in the Scope of Net Neutrality* (2011) emphasise the need to uphold the principles of accessibility, understandability, meaningfulness, comparability and accuracy, while also observing the principle of proportionality throughout.

<u>Disclosure to Consumers:</u>

Information disclosure by TSPs to consumers (a.k.a. a direct approach) should be mandatory and legally binding at all stages of the commercial association, i.e. before, at the time of, and after signing the contract. While it is acknowledged that too much information may be overwhelming, the information that is to be disclosed must be mandated by the regulator and not left to the TSP.

- **<u>Before and at the time of signing the contract:</u>** Explicit conditions detailing data caps and download limits (and the consequences of exceeding it such as extra charges or speed throttling) should be disclosed instead of resorting to fair use policies whose terms are not fully disclosed; information should also be provided about QoS parameters, performance, and packet loss as a measure of performance – this allows the consumer to compare different services, and enables him to fully understand the terms of the contract that he is signing.

  Details about TMPs must be disclosed at the outset itself – is congestion management application agnostic or application specific? Does its approach involve potential privacy issues such as deep packet inspection? Does the TSP engage in bandwidth throttling? Is certain traffic prioritised/ blocked, and if so what, when and why? Additionally, all this information needs to be related to its effect on the end user experience.

- **<u>After signing the contract:</u>** The consumer should remain informed of any changes to TMPs, usage information, whether he is approaching his bandwidth limit. In case of any planned changes to TMPs, sufficient notice (e.g. 30 days) should be provided in advance to the consumer, and he should be allowed to exit the contract without being subject to any penalty for early termination.

Additionally, the consumer should be entitled to any additional information from the TSP at any point during their commercial association.

<u>A Combination of Indirect and Direct Approaches:</u>

Specifically in the Indian context, it is suggested that an **<u>indirect approach</u>** to information disclosure be adopted and strongly encouraged in addition to direct information disclosures by TSPs to consumers. An indirect approach involves third parties making sure that the information provided to consumers is understandable. **<u>In India, this third party should be the regulator itself</u>.** Its responsibility would be disseminate the information that it considers relevant, and simplify it so that it is easy to understand by end users.

Towards this end, a **<u>formal platform</u>** consisting of the regulator, TSPs, consumer groups and technical experts should be established to enable free sharing of information.

The advantage of this approach is that it can adapt to the varying ability of different sections of end users to fully understand the terms of their contracts. An essential condition for the indirect approach to work should be that TSPs must not only make this information available to end users or to regulators, but to the general public at any given point of time.

In addition, free software tools must be developed that enable end consumers to monitor the services provided to them, which could be developed either by the TSP or by any third party.

It is important to account for **proportionality** in the implementation of these transparency norms, i.e. proportionality of costs incurred by TSPs, as well as cost of implementation and monitoring by the regulator. Costs are not only financial, but also involve any potential risks to the parties involved. Here, an effective indirect approach would reduce the need, and the related costs, for direct enforcement by the regulator.

Even with transparency measures in place, firms with significant market power in a particular market must be monitored. This would come into play in remoter areas of India where there is little to no competition amongst Internet Service Providers.

Providers of applications and content, especially those affected by TMPs will be able to provide information about TMPs used by TSPs that affect access to their services. Consumer groups would be helpful in the indirect approach, as they will be able to reach out to consumers and explain the impact of TMPs to end consumers. Technical experts would be able to provide more insights into how traffic is managed, and academic insights would help evaluate where transparency is needed in disclosure of technical information.

Role of the Regulator:

1. It is widely accepted that reasonable TMPs are required to ensure smooth functioning of the internet service. However, **what constitutes "reasonable" TMPs, in addition to minimum QoS standards, must be clearly defined by the regulator**. TSPs must not be allowed to block legitimate content (or render it virtually inaccessible) through discriminatory practices. Ensuring this will allow consumers to make informed choices or shift to another network, which is relatively easier in India's competitive telecom market.

2. The regulator must lay down standards for ensuring that this **information is understandable**, and ensure that these standards are being followed by TSPs. The imperative of understandability is especially important in India, where a large proportion of consumers of internet services (both presently and in the future) may not be able to fully comprehend the terms of their contracts.

3. The regulator must also set **common terms of reference** relating to different aspects of the internet service and reasonable TMPs – this will help simplify information provided to end users and ensure greater efficiency of overall transparency measures.

4. The regulator must **compile and publish** the information provided by TSPs on a website or any medium that can act as a centralised resource for information. This information can be divided into information relevant to end consumers, as well as

more technical details for third parties. This will be made easier by the common terms of reference set by the regulator. Consumers can also be provided information about the meaning of various technical terms and their impact on the end user experience, through simple explanations and visual aids such as infographics that make the content as easy to understand as possible.

CHAPTER 6

Question 11: What would be the most effective legal/policy instrument for implementing a NN framework in India?

(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?

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

Response:

Protection of consumers is one of the important functions of TRAI. This includes ensuring not the mere availability of a service but maintaining standards of Quality of Services. It also falls within TRAI's mandate to monitor and ensure compliance of the standards set so they are not mere words on paper.

In most nations where laws, hard or soft, have been applied for net neutrality the internet penetration is more than 50%. In India, internet penetration is less than 40%. This is an argument used as an opposition for the need of a legal provision to be put in place for net neutrality. But the fact of the matter being, that inspite of low internet penetration, [1]. If a regulatory structure is not put in place at present, it would become harder to tame the bull in the future. However nascent or basic, a structure needs to be put in place. It will evolve with the changing environment in the telecom sector. Using tools of regulation like setting performance indicators on the lines of the recent circular on QoS Codes of Practice is encouraged.

The Indian Context

A constant emphasis is placed on the Indian context. Let us try to decode this Indian context. One key observation has already been made in the form of the degree of penetration of

internet in terms of the percentage of population. Another distinguishing characteristic is that we house more wireless connections as compared to broadband. We need to look at each of the broad categories, as given by European Commission DG Information society, of information, entertainment, communication, presence, commerce do the users subscribe to most. Does this division differ from region to region or between age groups? Can regulations be customized to prioritise the QoS of that particular need of the region or any other sub strata that they come across which may improve the QoS of the desired service?

When we speak of transparency in QoS, from whose point of view do we talk about it - consumers, potential consumers, producers of content to reach to consumer, competing TSPs, general public. How do we give transparency to these stakeholders?

Stakeholders and their concerns

There has to be adequate interaction with all the stakeholders involved. The key players in the market include TSPs, Internet Service providers, content providers, consumers and SMEs as well. But this reflects basically the structure of a minimalist state. In a country like India where there is significant state intervention, research must be done to understand the stake of various state institutions in the telecom sector even though there is significant privatization. For example there might be certain apps which are started to compliment government schemes or facilitate the citizen-state interface. Which people use these apps, what is the frequency of their usage, do users feel that they are productive, what is the number of people who use it- these are some of the questions that need to be addressed in the Indian context.

Apart from that identifying the data usage patterns would help to locate the problems in QoS as well. For example understanding if the internet is used more for downloading, video conferencing, browsing, e-commerce etc. We need to acquaint ourselves with 3 basic terms here to assess speed- which is a major issue in QoS- latency, jitter, and reliability. As explained in the consultation paper, "If you 'ping' an Internet host (i.e. measure the duration of a round-trip for a small amount of data – a packet – to another computer): **latency** refers to how long the trip takes .**jitter** refers to how much the latency varies, generally between specific source and destination computers. **reliability** refers to how often the data makes it back – it is the converse of 'packet loss', which measures how many packets sent out get lost. Packets are deemed to be lost once they have passed through a certain number of routers – typically 255 – without reaching their destination." (Quality of Service Parameters for

Internet Service Provision- Final Report prepared for European Commission, DG Information Society). Accordingly while downloading might not be too sensitive too latency or jitters, reliability is a significant factor here. Similarly, video conferencing is highly sensitive to latency and jitters as compared to reliability. Identifying data usage patterns could guide us to in identifying which aspects of the telecom infrastructure India should prioritize.

It might not be possible to have identical standards of QoS for the entire Indian terrain. QoS can vary according to terrain, population density, number of electronic gadgets per person as a ratio of the total population, and the quality of telecom infrastructure. The list goes on to include factors like the level of development, adoption of the internet-time, purpose, initial use, developing trend of usage, what internet users look for on the internet, what kind of people use it, state of content business etc that determines the requirements.

Furthering the discussion on the usage patterns of the Indian diaspora The PR newswire comments that "On the basis of applications, the India content delivery network market is segmented as streaming, web acceleration, gaming, and CDN storage. In terms of value, the streaming segment is expected to expand at a CAGR of 24.5% while the web acceleration segment is expected to expand at a CAGR of 23.4% over the forecast period. On the basis of end-use verticals, the India content delivery network market is segmented as media & entertainment, e-commerce, TELCOs, healthcare, government & education, and others. In 2016, the media & entertainment segment is estimated to account for the highest market share of 47.2% and this is likely to increase to 58.1% by the end of 2026." This helps us in establishing the nature of content viewed by the Indian diaspora. The basis of prioritisation of content should be determined by a similar usage analysis of individual consumers, demographic composition as well as the time of the day when the content is being accessed.

The relevance of Content Delivery Network in QoS
Strengthening of Content Delivery Network is further emphasised for improving the QoS. It is increasingly becoming relevant in the age of the Internet of Things. The PR Newswire points out that "The costs of establishing a content delivery network are quite high (huge infrastructure costs and a high capital expenditure but less ROI in the initial stages). This can be quite challenging for new entrants heading into the highly competitive CDN market in India with high quality services. This market is likely to witness some key trends in the coming few years such as – reduced prices of CDN services, multi-CDN delivery and

streaming of content, CDN services support for IPv6, and the use of next-generation hardware to run content delivery networks."[2]

That delay interval, which we previously spoke about, is affected by a number of factors which may be specific to a given web page. But the physical distance between your device and the website's hosting server is a key determinant of the duration of delay. A CDN's targets this problem and attempts to virtually shorten that physical distance, the goal being to improve site rendering speed and performance.[3]

CDNs should be avoided for a localized website and is better for a website where the majority of your users are located regions different from your hosting. This is to avoid increasing the connection points between the visitor and an existing nearby server.[4]

Further, CDN plays a significant role by minimizing packet loss, faster loading, increasing scalability, eliminating pauses and accommodating heavy traffic, file mirroring, and optimizing live delivery.

QoS determination in Europe
Let us look at The Standards Of Quality Of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Fourth Amendment) Regulations, 2015 dated 15th October 2015 wherein financial disincentives are put under different categories that have different levels of penalty on the basis of frequency of non-compliance.

"A specific format should be made in which a compliance report shall be provided by all service providers in writing and also on a spreadsheet in respect of the parameters of QoS which should include a range of factors. The European Commission report tries to break this down. For example to quantify "slow speed" they use indicators like round trip delay measured in milliseconds and packet loss measured as percentage. It further quantifies the ability to connect according to the number of attempts required to achieve the connection, time to connect, time to connect during the busiest hour of the week, frequency of termination, as well as frequency and duration of ISP outages. The downstream connectivity is further calculated with the help of theoretical maximum speed of connection, connection speed achieved, latency, jitter and packet loss statistics communicating with the ISP, speed of download from ISPs, speed of download from ISPs mail server. Cost of internet access,

additional cost of website hosting, annual supplemental cost for domain management, and cost of technical support are used as variables for calculating the total cost."

Wireless v/s Broadband

As pointed out in the consultation paper, the share of wireless network is much more than the broadband connections we have. It is further pointed out that "wireless networks pose a bigger challenge on account of spectrum constraints, sensitivity to interference, physical obstructions, lower indoor coverage and varying number of active users."

Broadband connections are initially a rather consuming investment keeping in mind the usual constraints of creating infrastructure. With the Right of Way rules coming into the picture, the problem of limited infrastructure can expect to see a brighter future. The importance of the expansion of broadband services is stressed by Rajan Matthews, director general of the Cellular Operators Association of India , when he emphasises on the need for- "expanding cell site coverage as well as fibre implementation to support broadband services."

The Right of Way rules give "State governments the authority establish a single electronic application process for all appropriate authorities under its control". This would reduce the cost of operationalization and increase the ease of doing business. The telecommunication companies should pass on this saving to its customers at least partially, or invest in interfaces to improve the QoS."

The guidelines include that the "Service providers or tower companies would have to pay a one-time fee of Rs 10,000 with its application, for meeting administrative expenses. Companies that lay fibre will have to pay Rs 1,000 per kilometre. For removing or altering a tower or underground fibre on the request of a local authority, companies would have to submit a plan within 30 days and bear the entire cost. A minimum of 90 days will be granted for the removal or change to be done." This largely reduces the time, number of formal authorities that need to be approached, and hence the cost involved.

Looking to address issue of arbitrary rates imposed by various government bodies, DoT proposes that payments sought by the authorities should be calculated on the basis of applicable schedule of rates for works of similar nature executed by it from time to time.

Other suggestions would include the following

- Using tools of regulation like providing information to consumers relating to when a particular site might be slow or adoption of formats wherein a lesser advanced version of the site is being loaded to complement the speed availability at that moment. It can

be communicated to the consumer using dialogue boxes saying some features of the site may not load.

- If the consumer experiences a particular site not loading repeatedly while others are opening, a complaint form should be issues on the consumer's screen through which he could opt to complain if he wishes so.

- A licensing regime could be designed for the allocation of responsibilities among networks. The impacts of the same on QoS might not be identical across all states in India. What needs to be ensured is that best efforts are put in to provide maximum satisfaction to the largest number rather than concentrating excellent service to a particular group. It could also help in calculating demand v/s traffic carrying capacity

- For spectrum allocation, transactional instruments of regulation like contract/procurement can be used. Tools of authorisation in the form of licenses, certification and accreditation may be using QoS as parameters of granting of the same.

- Informational tools of regulation may be used to govern the terms of disclosure (e.g. on peak load management and guidelines on how to maintain consistent speed). Timings or situations in which priority will be given to latency sensitive traffic. Standard contracts must have certain benchmarks of fulfilling QoS that must be satisfied.

- Facilitate entry of new players to improve QoS to improve competition as 78% of the market share is concentrated with a few players. Comes under TRAI as well as CCI mandate which speaks of prevention of vertical integrations and partnerships that restrict competition. Any unfair practices that are purposefully restricting entries of new players into the market should be duly noted and acted upon.

- Use small surveys/ interactions with consumers so as to know what they use more and prioritise. The activity report, 2015 mentions that TRAI can monitor the performance through its quarterly Performance Monitoring Reports and Point of Interconnection congestion reports submitted by service providers. Also, direct communication with consumers in the form of public hearings or small surveys or feedback forms would also help analyse if the QoS is being maintained.

- Develop a rating system on the basis of the two basic determinants of QoS which is consumer response (which can be determined with help of voluntary by users of the QoS analysis test that's on the TRAI website) plus compliance with authority norms.

Exceptions to QoS as reasonably mentioned include matters concerning national security, infrastructural constrains, emergencies (natural, financial/economic, political instability).

Implications of *Active reforms* as practiced by countries like USA, through regulations passed by the sectoral regulatory Body. This should include, as mentioned in the paper, adoption of an ex ante mechanism that restricts any breach of NN principles and should lays down the consequences for it.

By keeping certain regulatory standards fixed and backed by legal consequences.

Transparency, fixed and mobile broad band must disclose the network management practices, performance characteristics, no blocking or unreasonable discrimination (with the exception of it being blocked by law). Disclosure of traffic management practices helps providers differentiate themselves in the marketplace and enables consumers to make better choices, stimulating competition among providers. It also makes the job of the regulator easier, supporting fairer and more effective regulation.

Setting up of **minimum non-discriminatory Qos** requirement by the sectoral regulator, non compliance of which would lead to regulatory interventions. Experience in the US, Canada and EU shows that after-the-fact disclosure requirements have not prevented discrimination. Transparency must be accompanied by substantive rules governing traffic management and Quality of Service

 Give the **licensing power to TRAI** and amending the license agreement adding the core principles of the network neutrality.

Privacy and freedom of the consumer is an issue which is overlooked in the debate of NN, should have special focus.

Like in the case of EU and UK the role for monitoring should be given to the **national regulator**, TRAI in the case of India, like Ofcom in the case of UK.

A **co regulatory model** approach between a multitasked holder body and the regulator should be considered. The composition of the multitasked holder body would be recommended by TRAI. The multi-stakeholder approach is to the best solution for dealing with Internet Governance related issues. multi-stakeholder body should be ushered in to spell out and monitor technical and operational aspects of net neutrality. Having all stakeholders involved –civil society, education/technical community, governments and private sector.

After the multistakeholder body is well established, over the years, it should swiftly aim to move towards **self-regulation.**

Question 12: What could be the challenges in monitoring for violations of any NN frame work? Please comment on the following or any other suggested mechanisms that may be used for such monitoring:
(a) Disclosures and information from TSPs;
(b) Collection of information from users (complaints, user-experience apps, surveys, questionnaires)
(c) Collection of information from third parties and public domain (research studies, news articles, consumer advocacy reports).

Response:

The regulatory framework should not interfere with TMPs carried out in a 'reasonable' and 'fair' manner. These practices should therefore be allowed to the extent that they facilitate competition, better QoS, freedom in trade, scope for innovation, coming up with better solutions to solve problems or challenges and efficiency. Interference by TSPs qualifies to be unreasonable when it engages in anti-competitive behaviour which may lead to undue advantage to one or more stakeholders at the cost of the other stakeholders. These TSPs often block, slow down the speed or even accord preferential treatment to certain content.

Users of the internet are entitled to use the internet connection to send, receive and use content according to their choice. A major issue of concern of non-disclosure of information regarding telecom management practices by the TSPs is that the consumers are denied their right to make an informed choice. They must be made aware of the terms on which internet services are being provided, which include aspects relating to the bandwidth, price and network management policies of TSP. They are entitled to receive internet connection according to predefined capacity and quality, which needs to be clearly specified and communicated to the consumers. In the case that the connection is shared with other services, it is important that it is clearly stated regarding how the capacity is shared between internet traffic and the other services. As long as the connection is not used to legitimise unlawful or harmful activities, and barring certain exceptions like emergency situations (as in the case of Brazil) or national security issues (as in the case of Japan), the user must be assured the basic internet connection that is free of discrimination with regard to the type of application, service or content.

The constant technological evolution is a major challenge for monitoring violations of net neutrality, with strategies like zero-rating emerging as potential threats to the core principles. Moreover, another major challenge in monitoring an NN framework is the information asymmetry present between TSPs and the other stakeholders. There would be greater transparency if information disclosure by TSPs is monitored. A TSP must hold the responsibility to communicate reasons for its practices to its broad consumer base, which includes direct consumers of the TSPs, the content producers and providers, competing TSPs, as well as the general public. Additionally, the cost of switching between ISPs must be brought down.

An effective mechanism that can be used to overcome these challenges of information asymmetry is to ensure disclosure by TSPs. Ofcom, the British regulator, suggested six features for the information that is provided to the consumers:

S.No.	Principles	Usage
1.	Appropriate	ISPs should disclose all the information that a consumer would require to make an informed choice.
2.	Accessible	The information must be easy to access. Basic information should be available at the point of purchase. Further detailed and technical information may be available online or on request.
3.	Understandable	Information should be made simple and understandable so that consumers can practically make sense of the traffic management practices.
4.	Verifiable	Consumers or even third parties should be able to verify any information that may be provided.
5.	Comparable	Consumers should be able to compare the data provided different TSPs
6.	Current	Information available to consumers should be recent and updated.

Such features of consumer information can be suitably integrated into the regulatory framework of the Indian context. These features could be non-binding but backed with general consumer protection laws that govern misleading conduct.

Voluntary commitments to information disclosure can be agreed upon by TSPs under the guidance of TRAI. If this proves ineffective, binding information disclosure obligations should be made necessary.

Introducing legislation on the subject would enable outlining provisions pertaining to information disclosure by TSPs. There has been a suggestion of third party intervention in simplifying information provided by TSPs to the consumers. However this would mean involvement of more parties in the process of information disclosure. An allocation of responsibilities among the third parties makes monitoring the process more tedious, and there may be more scope for regulatory arbitrage. This therefore is not a feasible solution. It would be more effective if the ISPs themselves are entitled to provide understandable information to consumers. The legislation can have provisions regarding failure to disclose and effectively communicate on the part of the ISPs. In the case of a default on the part of the ISP, it must be held accountable on the basis of these provisions. The regulatory authority must ensure that the information is not diluted in the process of simplification, and the users are well informed to take their choice.

TRAI can have a separate portal for collecting complaints and feedback on their website for the information provided by the TSP. User enabled apps can also be established for the same purpose. TRAI further must be liable to investigate into the complaints and act on it in case further action is found to be required. The legislation introduced must also have a legal mechanism for redressal so that consumers can complain about actions undertaken by the Authority. This would provide a system of checks and balances. The portal must also have a

space where third parties and the public domain can send in their reports and studies, which would provide insights from research. The validity and relevance of feedback and complaints received from these multiple sources can be monitored by the Authority.

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