NET NEUTRALITY
DoT Committee Report

May 2015

ACKNOWLEDGEMENTS

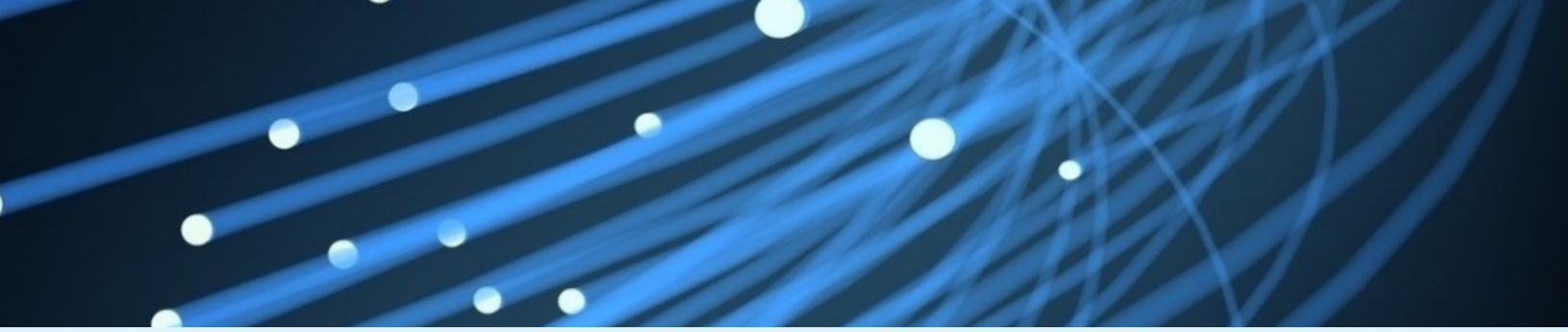
"Appreciation is the highest form of prayer, for it acknowledges the presence of good wherever you shine the light of your thankful thoughts"

ALAN COHEN

Every journey starts with a step. The committee commenced its journey in the midst of a vigorous debate that questioned different dimensions – constitutional, economic, technical and commercial. During its journey through consultative process, the committee was exposed to the wisdom existing in the digital community in India including civil society, OTT players, Telecom Service Providers and others. The committee was gratified by the approach adopted by all participants in the consultations to constructively support and advise the committee in finding a path to the vexed issue. The committee takes this opportunity to thank one and all who travelled with the committee on this journey for their constructive approach, the studied advice and support. The committee hopes that its report will be understood in this spirit of constructive co-operation. Our nation faces several developmental challenges and many of these challenges can be resolved through solutions emerging from the digital space. The committee has drawn inspiration from this thought and approached the issue with the diligence expected of it and is conscious of the burden that its recommendations may affect the course of policy for years to come.

First of all, the committee would like to thank all participants in consultations and respectfully acknowledges their contributions and advice. The volumes of suggestions, data, research papers and supporting documents presented to the committee represent the robust and active participation of all participants in this consultative exercise. No other consultation exercise in the Department of Telecommunications has seen the participation of such a wide range of participants from academics to activists and service providers to users.

The committee has also benefitted from the inputs provided by other government agencies that helped us examine the issues from different public policy perspectives. The committee is indebted to Shri G P Srivastava and Shri Shrikant Panda from the Department of Telecommunications for their valuable contribution.



The committee constituted a Working Group to sift through the mass of suggestions and papers and assist it in its work. Immense effort has been put in by this working group to do the background research and spent many sleepless nights in stitching together the wide diversity in thoughts encountered during consultations. The completion of the report would not have been possible in the short time that it had but for their dedicated efforts. Our special appreciation goes out to this group of young, dynamic officers - Abhay Shanker Verma, YGSC Kishore Babu, N S Deepu, Brajesh Mishra, Radhacharan Shakya, J. Ramesh, Bijoy Kumar Nath, G. Brahmaiah, Gulab Chandra Rai, R. Saji Kumar, Ritu Pande, Jitendra Kumar and Pankaj Salodia who worked tirelessly and cleared the path for us to bring clarity in our journey. The committee is indebted to these young officers and wishes them a bright future.

The committee recognises that some work has been done, a lot more is needed to mull over these recommendations and translate them into policy actions. The committee hopes that its recommendations bring some clarity to a heated debate and brings all players in digital space together in carrying forward the enormous potential that exists in our country to fulfil the aspirations and dreams of the young for whom the digital space can be liberating.

The committee submits this report and hopes that as one journey ends, another starts in a spirit of constructive co-operation.

A.K. Bhargava
(Chairman)

A.K. Mittal
(Member)

V. Umashankar
(Member)

Shashi Ranjan Kumar
(Member)

G. Narendra Nath
(Member)

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(Member Convener)

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CHAPTER 1

INTRODUCTION

"The internet is a reflection of our society and that mirror is going to be reflecting what we see. If we do not like what we see in that mirror the problem is not to fix the mirror, we have to fix society."

— VINT CERF

1.1 The Internet has transformed the world and society like never before. It has provided a platform for new opportunities through innovation. Internet has fostered the supremacy of ideas rather than capital. It is a universal platform that uses the same standards in every country, so that every user can connect to every other user with physical distances becoming irrelevant in the networked world. The Internet is a public resource that has no ownership, but is available to all those who are digitally connected.

1.2 In India, tremendous growth in telecommunications and convergence of communication and information technologies has created a unique digital platform for advancing the developmental goals. Digital India programme envisions access to digital infrastructure as a utility to every citizen, thereby making available high speed broadband internet as a core utility for delivery of services to citizens. The program envisions e-governance and services on demand and aims at digital empowerment of citizens.

1.3 India has demonstrated to the world its capacity to develop innovative business models in affordable mobile telephony suited to the requirements of a developing country. It has 997 million[1] telecom subscribers and 99.20 million broadband subscribers with an access to internet at speeds higher than 512 kbps. Out of about 300 million[2] subscribers accessing the internet, around 93% subscribers are on wireless media, whereas 7% are on fixed wire line media. Currently, both broadband and internet penetration in India is comparatively low in the global context.

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[1] The Indian Telecom Services Performance Indicators, October – December, 2015; TRAI report Jan 2015
[2] IAMAI Report

1.4 The telecom industry worldwide has experienced a paradigm shift from traditional voice to data. The rapid adoption of smart devices, availability of useful applications and online services are leading to significant amount of data traffic over the networks. The increase in internet and broadband penetration with the humongous growth in data traffic, has led to a tremendous increase in consumption of bandwidth. In India, despite rapid growth in data in recent years, voice continues to be predominant in the telecom space both in terms of revenues and traffic. However, in the last few years, the growth in voice revenues is slowing down and may perhaps start reducing in coming years.

1.5 In India, Internet traffic is likely to increase manifold in the next few years. There is a constant pressure for investment in network infrastructure and to expand capacities and increase penetration. Telecom infrastructure, being a capital intensive industry, will require significant investments by operators to meet the network capacity demands brought about by increasing broadband penetration, increasing speeds and increasing data usage. Telecom service providers have also started facing competition from unlicensed application platforms, termed Over-the-Top (OTT) players, in their traditional voice communication field. With an objective of enhancing revenue streams and to face competition from OTT players, telecom service providers have been exploring new opportunities for generating revenues from users and the content providers. Some of the models attempted by TSPs, such as charging higher data tariffs for VoIP services, charging content application providers and providing the content free to users (called "zero rating" plans), have raised concerns about Net Neutrality. This phenomenon is not unique to India but has been witnessed across the world.

1.6 In March 2015, the Telecom Regulatory Authority of India (TRAI) issued a consultation paper titled "Regulatory Framework for Over-the-Top (OTT) Services" wherein the issue of Net Neutrality in the backdrop of OTT services came to the fore. TRAI has stated that the objective of the consultation paper was to elicit views arising from the implications of the growth of OTT services bringing disruptive changes to the traditional revenue models and to consider whether changes were required in the current regulatory framework. The TRAI consultation paper sharply intensified the debate on Net Neutrality.

1.7 Department of Telecommunications constituted a committee chaired by Member (Technology) on January 19, 2015 to examine the issue of Net

Neutrality. The notification constituting the Committee and its terms of reference are available at **Annexure - I**.

1.8 The committee has met different stakeholders, including content and application providers, Multistakeholder Advisory Group (MAG) formed by Department of Electronics & Information Technology, telecom service providers, civil society, associations, academia and requested inputs from key departments of Government of India to elicit their views on Net Neutrality and the terms of reference. Details of stakeholders and representatives - invited/participated in the consultations are at **Annexure - II**. In addition, the committee also took note of the TRAI consultation paper, written submissions, emails & representations received in the Department as per details available at **Annexure - III**.

1.9 The Committee has observed few contextual trends that impinge on its recommendations, namely; the developmental objectives of Government enunciated through "Digital India" and "Make in India" and the need to foster innovation and investments. To achieve these developmental objectives; the Internet - that is open, democratic, affordable and non-discriminatory will play a critical infrastructural role. The emergence of unlicensed OTT players in communication services including traditional voice communications competing with licensed service providers have raised concerns regarding differential regulation of substantially the same service.

1.10 The committee took note of wealth of data and information available in public domain including best practices being adopted by various countries on the whole gamut of issues while preparing the report. The report examines the issue of Net Neutrality in a comprehensive manner taking views and demands of different stakeholders into consideration before making appropriate recommendations. The methodology adopted has been broadly assimilative, analytical and participative.

1.11 The Committee has carefully followed the debate that has been developing in the country for the past few months. The dominant medium of debate has been the on-line universe which itself underscores the criticality of the issues raised. Discussions in the print and electronic media have created a new awareness while participation of Civil Society has given it a new perspective. This entire discourse has immensely benefitted the Committee in its deliberations. The Committee has also taken note of a very enlightening debate on Net Neutrality in the Parliament. Committee recognises that the issues raised and concerns expressed would need to be comprehensively addressed with a national perspective keeping public interest at the fore.

CHAPTER 2

NET NEUTRALITY – THE WAY WE UNDERSTAND

"I read, I study, I examine, I listen, I reflect and out of all this I try to form an idea into which I put as much common sense as I can."

— MARQUIS DE LAFAYETTE

2.1 Open and non-discriminatory access to the Internet has revolutionized the way people communicate and collaborate, entrepreneurs and corporations conduct business, and governments and citizens interact. This has led to rapid growth in people-to-people, business-to-people and government-to-people communications shaping new forms of social interactions, businesses and governance. Thereby, Internet has emerged as a fount of innovation in all aspects of human life facilitated by the open, easy, inexpensive and non-discriminatory access to the Internet and the related investments in constructing high speed networks enabling the explosion in data traffic to be carried. The debate on Net Neutrality has sprung from the desire to preserve and protect the open nature of the public Internet arising from the apprehensions of emerging new business models that may impinge on the inherent characteristics of the Internet as we know today.

2.2 There is no standard definition of Net Neutrality. Net Neutrality is globally understood as a network principle of equal treatment of data packets moving across the IP networks. The concept has been used more broadly to describe the open and non-discriminatory access to the Internet. Attempts have been made by many to define the contours of Net Neutrality. Some of these are detailed below:

(i) The Body of European Regulators for Electronic Communications (BEREC) has attempted a definition of Net Neutrality. BEREC believes that a literal interpretation of network neutrality, for working

purposes, is the principle that all electronic communication passing through a network is treated equally. That all communication is treated equally means that it is treated independent of content, application, service, device, sender's address, and receiver's address. Neutrality towards the sender and receiver address implies that the treatment of data packets is independent of both users – sender and the receiver - at the edges of the network.

(ii) Professor Tim Wu, who coined the word "Net Neutrality", had the following to state: "Network neutrality is best defined as a network design principle. The idea is that a maximally useful public information network aspires to treat all content, sites and platforms equally. This allows the network to carry every form of information and support every kind of application"

(iii) For other proponents, Net Neutrality means ensuring that all end users are able to access the Internet content, applications and services of their choice at the same level of service quality, speed and price, with no priority or degradation based on the type of content, applications or services. Under this view, data is transmitted on a "best effort" basis, with limited exceptions.

2.3 On the Net Neutrality continuum, there are two views on the opposite sides of the scale.

2.3.1 On one side of the scale, the view held is that every user must have equal access, via the internet and, more generally, electronic communications networks (regardless of distribution platform) to all of the content, services and applications carried over these networks, regardless of who is supplying or using them, and in a transparent and non-discriminatory fashion. Putting this view into practice comes up against a variety of constraints, such as having to protect the networks from attacks, and from problems of traffic, the need to install mechanisms to comply with legal obligations, maintaining acceptable level of QoS for some real time services etc. Therefore, the network has to be managed with traffic management tools. The traffic management practices adopted may or may not be acceptable from the Net Neutrality point of view.

2.3.2 There are other considerations as well. Unlike an infinite resource, the bandwidth of the Net is limited. There are users who require a whole lot more

bandwidth than, say, someone sending emails. If someone is using Skype or YouTube, he needs a lot of bandwidth and that too on priority without any significant delay, otherwise the service quality suffers. It can be argued that he should pay a higher price because he is using more space and his traffic needs to be sent on priority. But Net Neutrality proponents say that neither he should be given priority, nor he should be charged higher and his traffic should also be treated in the same way as others on best effort basis.

2.3.3 Moreover, all data packets are not created equal. Data packets of different applications (e.g. an email packet and a VoIP packet, a data packet carrying emergency service information versus another packet carrying video information etc.) have different characteristics and they need different type of treatment on the network for a variety of reasons. The concept of "One size fits all" does not work and networks are inherently designed to differentiate between different types of data packets so that they can be treated differently. Therefore, the puritan view of Net Neutrality has practical limitations and it does not work in the real world. In a pure world of data, there will be differentiation between data packets for one reason or the other, technology also permits this and therefore exceptions will have to be made within the overall principles of Net Neutrality.

The crux of the debate is about striking a balance between the two views.

2.4 Net Neutrality is often misunderstood as akin to the concept of Open Internet, which is a much larger all-encompassing description. Open Internet is the idea that the full resources of the Internet and the means to operate on it are easily accessible to all individuals and businesses. Open Internet is not limited to network operations alone but includes Internet Governance, open standards and protocols, transparency, absence of censorship, and low barriers to entry. Open Internet is expressed as an expectation of decentralised technological power equally exercisable across the user community, and is seen by some as closely related to open-source software. Proponents often see Net Neutrality as an important component of an Open Internet, where policies such as equal treatment of data and open web standards allow those on the Internet to easily communicate with each other without interference from a third party.

2.5 The commitment to Net Neutrality, explicitly and implicitly, has been expressed by countries and regulators across the world. However, there is also no doubt that the concept of Net Neutrality would need to be circumscribed

by certain unequivocal conditions that do not breach the core requirements of Net Neutrality as it is commonly understood. These conditions include the intrinsic need to protect networks from disruptive attacks, the management of the flow of Internet traffic, the need to comply with legal obligations, maintenance of acceptable levels of quality of service (QoS) for some real time services etc. This requires the network to be managed with acceptable tools for traffic management.

2.6 Also relevant to the issue is the nature of network development brought about by investment in infrastructure. Networks that rely more on optical fibre (fixed) than spectrum (mobile) are less impervious to network demands by user. Spectrum resource being inherently limited brings technological limitations on QoS for Internet delivery over mobile unlike optical fibre which has the capacity to expand to accommodate increased demands on its bandwidth resources. Communications in India has developed relying on mobile as the preferred medium so much so that currently 98% of all subscribers are wireless customers unlike most other countries in the world.

2.7 Reasonableness and transparency requirements imply identifying "acceptable" and "unacceptable" practices of traffic management. It is certain that commercial considerations cannot form the basis for acceptability. Principles such as network limitations, congestion management and legal public policy requirements amongst others can be permissible approaches to acceptable traffic management on the Internet.

2.8 The crux of the matter is that we need not hard code the definition of Net Neutrality but assimilate the core principles of Net Neutrality and shape the actions around them. **The Committee unhesitatingly recommends that "the core principles of Net Neutrality must be adhered to."**

CHAPTER 3

NET NEUTRALITY – INTERNATIONAL SCENARIO

"The Internet is becoming the town square for the global village of tomorrow"

— BILL GATES

3.1 Internet has created new business models reshaping the economic society globally. The Internet economy has created value through ideas incubated by start-ups in content and application development. The network operators have attempted to create a value proposition by leveraging their control over network traffic. The competitive conflict between application providers and network operators has been witnessed world-wide and has given birth to the issue of Net Neutrality. The Committee felt that it would be instructive to understand and learn from the policy and regulatory responses adopted by countries and regulators globally. The Committee studied the legislative and regulatory provisions in different countries on Net Neutrality in particular and approach to the Internet in general from the open sources. This section encapsulates the study of the international scenario.

3.2 The Committee noticed that only a few countries have taken a firm position on the issue, and in a few other countries the issues surrounding Net Neutrality were being deliberated. Net Neutrality is a complex issue and has different nuances specific to a country depending on its social, political and economic conditions. Accordingly, each country adopts different responses to the issue. On the basis of measures undertaken on Net-Neutrality, nations can be divided in the following three categories:

a) Countries which have taken no specific measures as the existing mechanism is often considered sufficient to address the issue e.g. Australia, Republic of Korea, New Zealand.

b) Countries that have adopted light-touch regulatory measures through transparency, lowering switching barriers, minimum Quality of Service (QoS) requirements etc. e.g. European Commission, Japan, United Kingdom.

c) Countries that have taken or propose to take specific legislative measures to enforce Net Neutrality principles (no blocking, no discrimination in treatment of traffic etc), subject to reasonable traffic management and other exemptions. e.g. Brazil, Chile, France, Netherlands, Singapore, USA (FCC rules)

3.3 The general categorization listed in the previous paragraphs hides some of the nuances that need to be highlighted in the context of the debate on Net Neutrality in India. These country-specific nuances are detailed below:

a) Chile was the first nation to enact Net Neutrality principles into law in July 2010. The main legal principles laid down are that: (i) ISPs may not arbitrarily block, interfere with, discriminate against, hinder or restrict the right of any Internet user to use, send, receive or offer any legal content, application or service on the Internet, or any kind of legal Internet activity or use; (ii) ISPs may undertake traffic management and network administration that does not affect fair competition; (iii) ISPs shall protect the privacy of the users; (iv) the users are free to add or use any kind of instrument, device or equipment on the network, provided they are legal and do not harm or adversely affect the network or quality of the service (vi) ISPs shall ensure transparency by publishing details of Internet access offered, its speed and the quality of the connection, making a distinction between national and international connections, and shall include information about the nature and guarantees of the service.

b) Norwegian Post and Telecommunications Authority (NPT) published "Guidelines for InterNet Neutrality" in February, 2009, after consultations with major stakeholders. The guidelines define three principles, namely: (i) Internet users are entitled to an Internet connection with a predefined capacity and quality; (ii) Internet users are free to send and receive content of their choice, use services and run applications of their choice, connect hardware and use software of their choice that does not harm the network; (iii) Internet users are entitled to an Internet connection that is free of discrimination

with regard to type of application, service or content or based on sender or receiver address; (iv) Traffic management on an operator's own network to block activities that harm the network, comply with orders from the authorities, ensure the quality of service for specific applications that require it, deal with special situations of temporary network issues.

c) South Korea is the most wired country in the world with the largest optical fibre penetration and the highest internet speeds. The country has not officially adopted any legally binding decision on Net Neutrality but has published "Guidelines for Network Neutrality and Internet Traffic Management", which includes the right to use lawful content, application, service, and non harmful devices or equipment freely.

d) UK follows a light-touch regulatory approach. OFCOM has not imposed strict restrictions on traffic management, but instead relies on existing regulation and market structures. ISPs follow a voluntary code of practice which was developed by stakeholders. However, few of the major ISPs have refused to sign the Open Internet Code of Practice.

e) Brazil has recently passed a legislation known as the Marco Civil da Internet (The Civil Internet Regulatory Framework) in April 2014 which gives legal backing to enforcement of Net Neutrality principles.

f) The debate on Net Neutrality has occupied regulatory, political and judicial mind-space in the United States of America (USA) for some time. The Federal Communications Commission (FCC), the communications regulator in USA, declared a set of regulations for an open Internet in 2010. The necessity for these regulations arose from disputes that arose between ISPs and application service providers (e.g. Comcast v Netflix). These regulations were challenged in U.S Courts by ISPs and were struck down in January 2014. Thereafter, FCC came out with a consultation paper in May 2014 that asked for a response, amongst other questions, to a query as to whether 'paid prioritisation' that permits ISPs to charge content providers to provide greater bandwidth for their end-users, should be allowed. FCC was swamped with over a million mails in response to the consultation paper. The

recent FCC rules announced in February 2015 have been decided by the regulator with a slim 3-2 majority and have been promptly challenged in U.S Federal Courts on grounds of breach of constitutional guarantees – the First and the Fifth Amendments. The FCC regulations adopt 3 bright line rules for Net Neutrality i.e. "no blocking", "no throttling" and "no paid prioritization". Reasonable network management practices are permitted only for managing the technical and engineering aspects of the network and not to promote business practices. ISPs are also required to publish consumer friendly information about their practices to maintain transparency.

3.4 Despite differences, certain common principles can be identified across the countries who have taken active position on Net Neutrality. These include no blocking, no throttling, no paid prioritization, freedom of access and to receive or use content, no discriminatory practices, reasonable traffic management and support for innovation. Other issues that find common mention are the need for transparency, prescription of QoS, low cost of switching etc. However, on some issues like zero rating and VoIP, countries have taken widely varying position. For example in USA, VoIP as a managed service does not come under the Internet Rules, in Brazil blocking of VoIP is not allowed, in UK and Italy there is no restriction on differential charging of VoIP and in South Korea, TSPs/ISPs can charge for mobile VoIP.

3.5 Apparently, countries all over the world are grappling to find balance between competing positions and interests in Net Neutrality debate, while maintaining sufficient leeway for larger public goals. Very few countries have opted for specific legislations for enforcement of Net Neutrality provisions. In its recently released report "2014 Web Index", Web Foundation has found in its study across 86 countries that 74% of countries lack clear and effective Net Neutrality rules and/or show evidence of price discrimination. **The international best practices along with core principles of Net Neutrality will help in formulating India specific Net Neutrality approach. Considering the large internet user base and the critical role that Internet plays in our economic, social and political space, India should take a rational approach and initiate action in making an objective policy, specific to the needs of our country. The timing for this is apt, taking into consideration the exponential growth of content and applications on the Internet.**

CHAPTER 4

STAKEHOLDER PERSPECTIVE OF NET NEUTRALITY

"We may convince others by our arguments, but we can only persuade them by their own."

— JOSEPH JOUBERT

4.1 The increasing importance of the Internet for society has led to an intense debate about how to preserve and enhance this shared resource as an open platform for all communications. Besides the operators and OTT players, consumers and civil society have equal stake in how internet is run. Therefore, government and regulator obviously have responsibility to consult the stakeholders before arriving at any policy formulation on an important issue like Net Neutrality.

4.2 To understand the stakeholder perspective in detail, different stakeholders were invited by the Committee for discussions. By and large, the discussions centred around the Terms of Reference of the committee. The stakeholders expressed their views on a range of issues including Net Neutrality principles, traffic management, licensing and regulation, charging of content providers, competition, security and privacy, peering arrangements, interconnection issues, public internet versus managed services, VoIP services, level playing field, positive discrimination, innovation, zero rating, public policy etc. The views expressed by the stakeholders during the discussions are summarized below, categorized under different issues. It may be added here that these may not be exhaustive and may not be accurately categorized due to reason of maintaining brevity.

4.2.1 NET NEUTRALITY PRINCIPLES

a) In general the OTT players want strict implementation of Net Neutrality.

b) The Multistakeholder Advisory Group (MAG) formed by the Department of Electronics and Information Technology is a mixed group with representatives from different stakeholder groups. Many MAG members categorized Internet as public good and asked for upholding of important concepts like Net Neutrality, Net Equality, Equal Access and Internet for all. Since access is a major issue in India, Net Neutrality policy should be aimed at increasing access but core principles of Net Neutrality like no throttling and no blocking should be enforced. Internet is a platform where one can exercise his/her freedom of expression as guaranteed under the constitution. Overall, the Internet has been successful because of openness and supporting innovations and absence of requirement of permission to operate and this scenario should continue.

c) The civil society members consisted of individuals as well as consumer group associations, who had mixed views on Net Neutrality. Underlying view of most of Civil Society members was- one should follow the fundamental principle of Tim Burners Lee in regard to Internet i.e. "all of the internet, all of the people, all of the time". The core principles of Net Neutrality are no blocking, no throttling and no prioritization of any data or site. User rights and connectivity are most important. There is no need to provide certain rights to certain intermediaries and destroy the fabric of the web. "Brightline rules" should be in place like - Networks should deliver on Best Effort basis; No Negative discrimination; Transparency; Internet based services should not be degraded due to specialized services; positive discrimination in certain forms can be allowed subject to conditions.

d) All the major Telecom Service Providers, who participated in the discussions, supported Net Neutrality but were of the opinion that Net Neutrality has to be defined in Indian context. It should be based on principles like no denial of access, no unreasonable discrimination (price, priority, traffic management), fair and reasonable practices.

e) In the view of Industry associations, there are three aspects to Net Neutrality debate –(i) Issue of level playing field (OTT v/s TSP); (ii) Open and non-discriminatory access to the public internet; (iii) WWW, the content part and content neutrality. Net Neutrality doesn't mean free access – neither free access to the user nor free

access to the content provider. It is related to "equal access" to all. Therefore, Net Neutrality is an "access" related issue. Accordingly, minimum Net Neutrality requirements are non-discriminatory and equal access. Net Neutrality should be adapted in India having broad features-(i) Absence of unreasonable traffic discrimination; (ii) Enhanced internet access; (iii) Open internet / no blocking / no throttling; (iv) Facilitation of innovation; (v) Reasonable traffic management and prioritization (good for the end user). Traffic management principles should be declared by the operator.

4.2.2 TRAFFIC MANAGEMENT

a) OTT players want no fast lanes, no blocking, no throttling and no data prioritization.

b) According to MAG, since the application mix on the internet is varied so the internet has been designed to handle differential service classes, for which different traffic management tools are available. IETF has also prescribed standard methods to handle differentiation. Even LTE has different classes of service. This differentiation is required to improve user experience. Consumption always has power law distribution i.e. small number of users will always consume large fraction of service / bandwidth and so they need to be controlled. This can be addressed by differential pricing or via differential service grade. Traffic management is also required for prioritization of emergency services. Some participants were of the view that TSPs/ISPs should not have discretion in traffic control.

c) In the view of Civil Society participants, if, at all, there has to be prioritization, it has to be service agnostic so as to maintain Net Neutrality. Network management has to be transparent and traffic management practices should be declared for users to make informed choice.

d) In the view of TSPs/ISPs, traffic management is a must for network management for many reasons, like e.g. maintaining the health of network, emergency services etc.

e) In the view of industry associations, Internet is not designed to treat all packets as equal. There are classes, priority flags etc. to manage

the traffic on the Internet. Therefore, Net Neutrality cannot be there in absolute sense. Traffic management is essential to - manage volumes, manage emergency and time critical services, protect against malware, control in case of data usage exceeding threshold, congestion control etc.

4.2.3 LICENSING AND REGULATION

a) OTT players are of the opinion that public policy should be holistic and not based on a single industry. The current legal framework in India with the Indian Telegraph Act, Information Technology Act, Broadcasting Laws, Competition Act etc. are adequate and no additional laws are required. Therefore they are not in favour of a licensing and regulatory regime for OTT players. If, at all, any kind of regulation is needed, it should be ex-post regulation (regulated after).

b) In the view of MAG players, the IT act does not address issues like blocking, throttling etc. The Telegraph act doesn't cover information services. As per Indian Telegraph Act, voice is licensed no matter who provides it in whatever form. Therefore, OTT communication providers may be licensed/regulated, with some light touch regulation. Some other MAG participants were of the view that Licensing leads to monopolization and cartelization. So Internet should remain self-regulated. Regulation should be done only if there is proven market failure either for TSPs or OTTs or for curbing illegal practices.

c) According to civil society members, at the heart of the Net Neutrality debate is the discrimination between the "infrastructure layer" (carriage) and the "applications layer" (content). The carriage has to be separated from content. Telecom policy is grounded in users rights with components like common carriage, compulsory carriage and compulsory interconnection to ensure seamless telecom services to users. However, in the internet era, there are new concepts regarding service; QoS consideration, Smart pipe etc. not covered by law. Regarding contents, 95% of the contents on the net don't pose problems to anyone. e.g simple services like web pages, E-commerce, applications which make life simple like taxi application, ticketing applications etc. They should be spared from licensing/regulation.

Some participants did not want any regulation because they feel regulation will kill the content sector.

Some civil society participants said that few major content creators in the market are debarring the content creation within the country. Regulation should address this issue. Further, regulation has to address two conflicting issues and create a balance – create a level playing field for all but also not to create hurdles for new start-ups.

d) In the view of some of the TSPs, OTTs need not be licensed but some sort of registration / authorisation is required. They support light touch regulation of OTTs. However, OTT communication services especially VoIP need to be regulated, as they are cannibalising the revenues of TSPs/ISPs. They advocated for 'same service- same rules' policy.

e) According to industry associations, the telegraph act mentions "public" telephony. Word PLMN also means "Public" Land Mobile Network. Therefore providing services to the "public" comes under the section 4 of Indian telegraph Act. Since public telephony is licensed and regulated and same should be applicable to OTT communication services also.

4.2.4 CHARGING OF CONTENT PROVIDERS

a) OTT players said that the content providers are already paying TSPs/ ISPs by way of hosting charges, connectivity charges, domain registration charges etc. Therefore, there is no reason to charge them additionally for content also. In their view charging leads to discrimination between different content providers.

b) According to MAG, in one economic view, discrimination is legitimate; but social acceptance is low for price discrimination. For purpose of discrimination, OTTs should be carefully defined because they encompass all types of applications. In case of price discrimination, government/regulator should prescribe floor and ceiling prices and mandate minimum bandwidths.

c) According to TSPs, for the internet revolution to happen in India, data prices for retail customers have to be kept low. Every MB of data is subsidized and only 1/6th of the cost is realised. This subsidiza-

tion can happen from voice revenues only. Therefore, communication OTTs have to be reasonably charged as well as regulated. It was also said that OTTs be asked to pay infrastructure charges to TSPs after certain threshold.

4.2.5 COMPETITION

a) In the view of MAG, vertical integration by TSPs/ISPs is not desirable and internet should remain flat.

b) In the view of civil society, service providers can act as gatekeepers thereby affecting competition. In the past, service providers have prevented competitor's entry for years, and were levying high charges. Now they intend to make Internet use difficult. They cannot stop the march of technology and have to cope with technological evolution.

c) According to TSPs, Market forces will take care of anti-competitive practices.

4.2.6 SECURITY AND PRIVACY

a) In the view of OTT players, generally security issues are always brought forward to suppress competition and increase regulation. This practice should be discouraged. OTT players are also serious players and allegations like fly by night operators, no investment in country, not following security norms etc. are false.

b) In the view of MAG, traffic blocking should be done only in cases of security threats. IT act provides privacy of sensitive information & not personal information privacy.

c) According to civil society, security is a significant issue in VoIP and it may be addressed by targeting specific needs.

d) According to TSPs, Data Privacy, Safety and National Security requires at least minimum regulatory enforcement on OTTs as well. TSPs are asked to stop service/ intercept etc., but OTTs are not. Security concerns are not taken into consideration for OTTs. They should be asked to register with security agencies. Bare minimum requirements have to be satisfied by OTT – by placing servers in India. According to TSPs overseas OTT players are bypassing the national security and privacy laws. So our country needs to enter into bilateral agreements with

those countries to protect the security and privacy in our country.

e) According to industry associations, TSPs/ISPs are required to adhere to security requirements. OTT players should also be subjected to same requirements.

4.2.7 INTERCONNECTION AND PEERING

a) MAG participants said that empirically validated model proves that revenue asymmetry causes paid peering, which is good for user. Paid peering gets content closer to the customer and hence "loads faster" and makes it more attractive. Regulatory oversight of interconnection is required to preserve Net Neutrality.

b) According to civil society, "Infrastructure" and "Content" operate on different layers. Termination charges make sense at the infrastructure/network layer, where one network connects to another network. There should be no termination charges at the application/content layer where the content resides. Interconnect regulation is important to see that ISPs don't exploit content providers. This is also required to increase transparency and preserve competition. It was also suggested that NIXI should be opened up to all network operators and not just the licensed ISPs for exchanging traffic in a neutral manner.

c) According to TSPs, domestic IP traffic is supposed to remain within India, and NIXI was created for this purpose, but the OTTs violate this.

4.2.8 PUBLIC INTERNET AND MANAGED SERVICES

a) In the view of civil society representatives, Internet based services should not be subjected to licensing. Specialized services need to be regulated after dialogue. Regulatory parity can be there between specialized service and traditional telecom services, but not with Internet based OTT services.

b) According to TSPs, Net Neutrality principle is applied only for retail broadband or public internet. It has nothing to do with enterprise services, which are driven by commercial agreements.

c) According to industry associations, Enterprise services are different

from public internet and therefore such services are kept away from the scope of Net Neutrality issues. Even FCC has recognized this and they have kept such services out of the "open internet rules". Enterprise services are tailor made, SLA based, one-to-one arrangement between the TSP and Enterprise. These are commercial arrangements with guaranteed QoS, SLAs etc. and therefore are kept out of the Net Neutrality debate.

4.2.9 ABOUT VOIP SERVICES

a) In the view of OTT players, VoIP has hardly impacted the voice revenues of TSPs/ISPs as the proportion of VoIP calls is very less. Moreover, OTT services have helped to increase the consumption of data by end users, which in turn is increasing the revenues of TSPs/ISPs, which is actually benefitting them.

b) According to MAG, clear distinction is required whether OTT communication is "service" or "content". Communication services need license just like the TSPs & ISPs. Some participants also demanded unrestricted VoIP.

c) According to civil society, competing applications like voice OTT services were eroding revenues of the government and the TSPs, creating security and privacy concerns, causing direct as well as indirect losses. Therefore, government should allow full VoIP services to all OTT players in partnership with the TSPs, as they are already licensed. That will take care of various issues like lawful interception, security, privacy, taxation, issue of level playing field etc.

d) According to TSPs, licensed TSPs have suffered loss on international traffic due to the OTT players. Industry Investment is of the order of Rs.750000 crores till now, and for the next 5-6 years at least Rs.500000 crores has to be invested. India needs infrastructure investment, which is now getting threatened by OTT players due to arbitrage. Therefore, the OTTs also should be subjected to the same regulatory regime as the TSPs and same service - same rule should be applied to them as well. Impact on revenue – Even if 1% VoIP substitutes 1% of TSPs voice traffic, then it will have an impact of Rs 1200 crores on TSP revenue.

e) According to industry associations, in addition to Net Neutrality, there is also the concept of "Net Equality". If we compare a poor guy with featureless phone and another guy using a smart phone and doing VoIP calls at a cheaper rate, where is the equality? TSPs/ISPs pay 30% revenue to the government. OTT players provide similar services but pay nothing. As such it is a loss to the Government.

4.2.10 LEVEL PLAYING FIELD

a) In the view of OTT players, when TSPs bid for spectrum, they knew of market risks. Technology continuously changes and now TSPs face business risk. They have to adapt.

b) According to some MAG members, Facebook, Google, Viber etc. are big companies, but while operating in India they are not following the LEA security norms, regulatory norms or pay taxes to government etc. It is unfair to subject only TSPs/ISPs to such norms. Therefore, same service, same rules should be adopted when comparing TSPs and OTTs as they are offering same service. Some other MAG members were of the view that TSP offerings and OTT offerings are different and cannot be equated. Rather OTT /content providers are the reason why people come to the internet, which drives data usage and leads to revenues for TSPs/ISPs.

c) According to civil society, parity between OTT communication and Telecommunication need not to be aimed at, as they operate differently.

d) According to TSPs, OTT players are competing with TSPs, who are regulated. Government has to look into this aspect of regulated vs unregulated and same service same rule should be applied.

e) According to industry associations, principle of "same service, same rules" should be followed.

4.2.11 POSITIVE DISCRIMINATION

a) According to MAG, if government wants to give services free on the internet (like zero rating), it is considered as positive discrimination and not seen as violation of Net Neutrality. Therefore, it should be permitted in public interest. Government can provide Zero rated

channels to citizens for essential services (public interest zero rating), based on clear public policy and principles and on non-commercial terms.

b) In the view of civil society, regulation should address the negative externalities, to keep them in control and not impede positive externalities. Regarding prioritization for government websites / zero rating, network should provide access to all users in a neutral manner. Since the Government focuses on public good, the act of the government needs to be viewed differently from the act of private industry. They are not on the same footing. Government can do prioritization of citizen services or zero rating, where the services are free for all users irrespective of the access network used by them.

4.2.12 INNOVATION

a) In the view of civil society, end to end principle should be followed. Innovation happens at the edge of the network (content creation) and drives the need of users for network access. Therefore, government should try to maximize the end to end connectivity without promoting any kind of silos.

b) According to TSPs, Innovation cannot be the prerogative of one player in the ecosystem. Innovation happens not only on the content side, but also on the network side. Network side innovation is also important and cannot be ignored or prevented.

4.2.13 ZERO RATING

a) Amongst OTT players, there are mixed views. There is some difference of opinion among large and small OTT players. Large OTT players say that Zero rating helps to increase Internet penetration because Internet access is offered free. It is part of marketing of services. There are many Zero rating models – (i) Internet.org is free to users, free to operators, non-exclusive – open to any operator. Motivation of Internet.org is to provide access. (ii) Sponsored data are acceptable models in many countries. On the other hand, smaller OTT players consider Zero Rating as discriminatory and against the principles of Net Neutrality because they feel that they don't have the resources to enter into such arrangements with TSPs/ISPs. Also such arrangements influence consumer choice to prefer the free content over others.

b) According to some MAG members, it should be market specific and not TSP/ISP specific. Zero rating should be allowed with some regulation and not only on the content but also on the pipe/download. Some other MAG participants were of the view that, if the purpose is to promote access, then instead of "zero rating", give certain amount of free data with unrestricted access to any content.

c) Among civil society participants, there are views both in favour and against Zero rating. According to some members, "Zero rating" services exist in different flavours. It is the scope and size of the service, which we have to see to decide what constitutes violation of Net Neutrality - Is it discrimination? Is it product differentiation? Worldwide there is a practice of "Give free" to "Get rich". This is done in every market; then why apply restrictions only to Telecom? Most zero rating services follow this view. They are giving the internet access (of certain websites only) free to the user to promote the usage of their services. Some civil society participants said that "Zero rating" is a short term approach to bring people on the internet, as it violates core Net Neutrality principles. If the goal is to take the internet to the masses, there are better ways than "zero rating". There are some examples of Bangladesh, Sri Lanka, Philippines where they have achieved this goal by many innovative methods. e.g. voucher system for internet access in Sri Lanka, free wi-fi in Philippines etc.

d) According to TSPs, zero rating is an innovation to increase internet penetration and attract users to it. Sometimes customers ask for Al-a-carte service – (Say Rs 15 for whole month for Facebook).So product offerings for the user have to be designed that way and zero rating is also a product offering.

e) According to industry associations, "Zero Rating" is a commercial arrangement and not related to Net Neutrality. Commercial arrangements come under anti-competitive laws and should be taken care of under the same. So "zero rating" can be kept out of the purview of Net Neutrality. Some participants were of the view that instead of zero rating, free internet can be given. Free internet for initial internet users matter. If someone has never experienced internet before, giving him free for the first time matters. These are marketing techniques.

4.2.14 PUBLIC POLICY

a) According to civil society, from a public policy perspective, it needs to be considered that India is a paradox – 80% is yet to be connected, but it also has the 3rd largest Internet user base. Therefore, creation of infrastructure is more important because it extends connectivity. The internet is popular because of content. If it has some value for the user, the user will pay to the ISP to access that content. Hence content creation is important and needs to be protected.

b) According to TSPs, they are committed to Net Neutrality but the principles should be applied uniformly to all players in the ecosystem end to end. TSPs have said that OTT interests have to be seen separately from Net Neutrality as they are different issues. However, communication OTT and Non Communication OTT should be treated separately.

c) According to industry associations, Net Neutrality has to be discussed under the larger umbrella of internet governance involving international organizations like ICANN and ITU. Net Neutrality benefits only a small section of the population with smartphones at the cost of a much larger population not having access to the internet. But larger consumer interest should be the prime objective, which can give appropriate direction to the Net Neutrality debate. In the Net Neutrality debate, government intervention should not interfere with commercial agreements. Government should only specify the principles (e.g. interconnection, regulation etc.)

Discussions with various stakeholders on range of issues related to Net Neutrality have set the context and the basis of analysis for the committee.

CHAPTER 5

INNOVATION, INVESTMENT & ENTREPRENEURSHIP

"An entrepreneur searches for change, responds to it and exploits opportunities. Innovation is a specific tool of an entrepreneur hence an effective entrepreneur converts a source into a resource."

— PETER DRUCKER

5.1 The principles governing the open internet include the ability of end-users to discover and access lawful internet-based content or applications of their choice and the ability of content and application providers to access end-users "without permission" from network operators. This open internet has yielded profound benefits through innovation in content and applications across a wide range of economic and social activities. Those that are successful are able to scale rapidly and globally in a comparatively inexpensive way – a key benefit of innovation without permission.

5.2 The internet openness promotes innovation, investment, competition, and other national broadband goals and the remarkable increase in broadband infrastructure investment and innovation seen in recent years confirms the same. Both within the network and its edges, investment and innovation is flourishing due to its basic principles. This pattern of a virtuous circle through innovations in relation to network enhancement and internet-based content and applications can be expected to continue.

5.3 Intuitively, openness and low barriers to entry are central to innovation 'without permission' fostered through growth of internet-based content and application providers. The major application & content providers were all new entrants at some point, and the power of ideas pushed through the open internet helped them to establish themselves. Further, attaining the scale inexpensively in comparison to traditional businesses was a key benefit derived from the open interconnectedness of the digital world.

5.4 Open models and interoperable environments drive down the cost of innovation. The lower the costs of entry, the lower the risk to innovators, and more the innovators. An internet based on open standards has proved to be a very effective platform for innovation. This has brought the freedom to innovate to everyone, from the largest multinational to the self-employed. Anyone with an idea can, at least in principle, use the open internet as a vehicle for testing their idea in the market. The result has been an unprecedented explosion in the availability of new content and services to consumers. These have transformed a wide range of economic and social activity, including the way we buy and sell goods, consume content , play games, search for information, participate in social networks, and so on.

5.5 It is universally accepted that innovation spurs investment and generates spin offs in the economy. Examples are airline booking, hotel reservations, taxi transportation etc. where aggregated service sourcing through Internet applications have enabled businesses to reduce costs and design new pricing models tailored to individual customers without the applications provider owning inventory, property or directly providing the end-service. The Internet economy has fuelled innovation at the edges of the network and beyond. This has facilitated better business opportunities and consequential investment in hard infrastructure. On the other hand, there is a separate requirement for investment in networks.

5.6 The innovation in the ICT in India has become an important component in socio-economic development. Internet entrepreneurship today has captured the imagination of the Indian youth. The low cost of bootstrapping a business combined with the creative nature of the Internet has encouraged millions to launch their own ventures. The most obvious impact of the Internet for entrepreneurs is the creation of a whole new segment of online start-ups. Clearly, an open internet is playing catalyst role for innovation and growth.

5.7 Investment in networks is a sine qua non condition for spread of broadband and through broadband, the growth of the Internet economy. If investment in networks falls then the impact would be felt in terms of access, speed and quality of services. This would affect the spread of Internet and use of the Internet for innovation at the edges of the network. Innovators and potential customers alike must have access to high quality and affordable broadband Internet. The network itself must be resilient to promote investments. There is a symbiotic relationship between expansion of broadband

infrastructure through investment (both Government and private) and the opportunities thrown up by an explosion of innovation in Internet content and applications. One cannot survive without the other. Therefore, innovation and infrastructure have both to be promoted simultaneously and neither can spread without the other. **The endeavour in policy approach should be to identify and eliminate actions that inhibit the innovation abilities inherent in an open Internet or severely inhibit investment in infrastructure.**

5.8 Internet has been loosely termed as a public good. In traditional economic theory, however, public goods have two characteristics i.e they are non rivalrous in that when a good is consumed or service utilised, it does not reduce the amount available to others and that they are non-excludable in that it is not possible to exclude non-payers from consuming the good or utilising the service. Both characteristics do not strictly apply to the Internet. Network congestion, limited spectrum availability on mobile networks, demands placed on network including spectrum resources by specific services render Internet accessed over telecom networks rivalrous. The pay-to-connect principle makes access to Internet excludable. Therefore, Internet cannot be termed as a true public good though to some extent it can be termed as a quasi-public good. Nonetheless, the future character of the Internet as an all-encompassing medium of access to services makes public Internet a social good rather than a pure public utility that it was in the past. In the world of the future, those who remain unconnected to the Internet may find themselves excluded from a substantial part of the socio-politico-economy of the country. This makes the public policy need to stimulate investment in networks and development of country-specific content and applications all the more necessary.

CHAPTER 6

PUBLIC POLICY PERSPECTIVE OF NET NEUTRALITY

"Wishful thinking is not sound public policy."

— BJORN LOMBORG

6.1 The Internet from the very beginning signified interconnectedness sharing information and providing a platform for fostering innovation. Internet has functioned on the "end-to-end principle" characterised by 'dumb' networks carrying information to 'smart' terminals. Internet has been a medium that has created innovation in technology, business and governance. Internet has thrown up several challenges for public policy but it should not lead to restrictions both on network creators or network users that unnecessarily and unjustifiably stifle experimentation and further innovation in technologies and business models either in telecom networks or the larger economic world.

6.2 The open, democratic nature of the Internet has kept information and content accessible by the user largely unrestricted. There is a view that diluting neutrality of the 'Open Internet' may compromise the independence and diversity of information. With the explosive growth of social media and the use of Internet as a platform for expression of thoughts and opinions, it has been argued that the equal access to Internet is integrally linked to freedom of expression. The question as to whether the carrier (ISP/TSP) should have the ability to choose the content that gets delivered to the user, and affect the basic architecture of the internet, has formed a significant argument in favour of Net Neutrality. The majority view is that only the user should have the unbridled right to access the lawful contents on the Internet without the carrier having the ability to discriminate – either through price, speed or quality - content available on the Internet. Some proponents of Net Neutrality while accepting the need for traffic management have argued

that disclosure of practices (voluntary or mandated) adopted for traffic management by carriers should be supplemented by a right of the user to seek additional information from them with an objective to secure Net Neutrality.

6.3 The Internet platform has potential to deliver public services to the citizen, irrespective of their social status, in an effective and efficient manner. This type of electronic delivery of services is viewed as harbinger of good governance, enhancing the ability of governments to reach the unreached and an agent for reinforcing democracy. The extension of broadband services to rural areas and delivery of internet services over it has enormous socio-economic benefits. It is feared that violation of Net Neutrality may impose another layer of (negative) discrimination against the economically and socially disadvantaged sections of society in the delivery of internet services. Conversely, it has also been argued that governments should retain the power of positive discrimination to enable prioritisation of services to meet developmental and delivery challenges such as education, primary health and emergency services. Public policy approaches should allow flexibility to determine priorities based on the overall vision without affecting the ordinary user's ability to access information platforms and commercial services.

6.4 The term "Digital divide" describes a gap between those who have ready access to information and communication technologies and the skills to make use of those technologies and those who do not have such access or skills. Digital inequality transcends economic and social inequality in a world where ICT is at the centre of socio-economic progress. There are two main barriers that come in way of bridging the digital divide, i.e. lack of access to ICT infrastructure and lack of knowledge of its use. Low education levels, poor socio-economic advancement and lack of digital infrastructure and the high cost of such infrastructure act as barriers to universal digital access.

6.5 The correlation between economic growth vis-à-vis increase in broadband penetration has been recognized the world over. The growth is further aided by societal applications like tele-education, tele-medicine, skill development, e-governance, entertainment and employment generation by way of high speed access to information and communication. The 2015 rankings of Networked Readiness Index[2] that includes infrastructure as one

[2] The global information technology report 2015, World Economic Forum

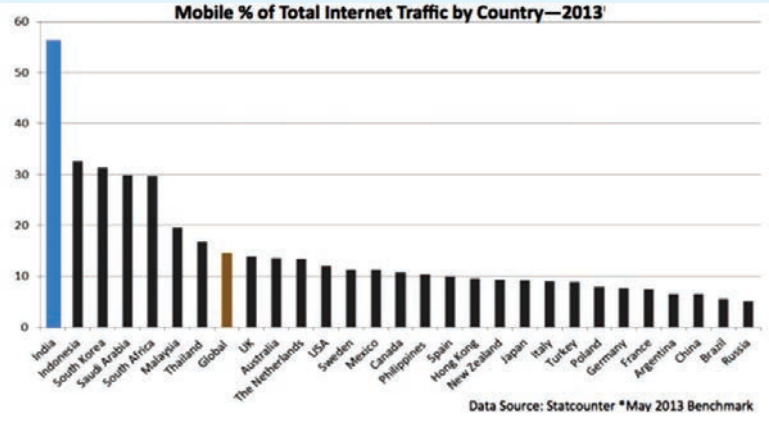
of the parameters places India at 89th position globally. India's comparative position on some of the important fronts in the digital world has been provided in the World Economic Forum Report 2015. With regard to infrastructure availability and usage, India is placed generally beyond 100th rank but it ranks very high globally on affordability of mobile cellular tariffs and fixed broadband internet tariffs where it is placed at the 7th and 4th position respectively in 2014.

6.6 As per the TRAI monthly subscription data, the number of broadband subscribers increased from 60.87 million at the end of March 2014 to 99.20 million at the end of March 2015 indicating an annual growth rate of 62.97%. Segment-wise broadband subscribers and their monthly growth rates are as below:

Table 1 : Broadband Subscription Details

Segment	Broadband Subscribers (in million)		Annual growth rate (%)
	As on 31st March 2014	As on 31st March 2015	
Wired subscribers	14.86	15.52	4.44
Mobile devices users (Phones and dongles)	45.61	83.24	82.5
Fixed Wireless subscribers (Wi-Fi, Wi-Max, Point-toPoint Radio & VSAT)	0.4	0.44	10
Total	60.87	99.20	62.97

6.7 India is unique in the dominance of mobile as the medium of internet connectivity. The chart below indicates that the extent of dominance of mobile internet as percentage of the total internet traffic as of 2013 in India in comparison to other countries:



Graph 1: Mobile Internet traffic across countries

6.8 The over-reliance on mobile as the media for internet connectivity has public policy implications in so far as the approach towards Net Neutrality and investment in infrastructure is concerned in comparison to other countries. Firstly, there would a necessity to promote and incentivise investment in optical fibre infrastructure across the country. Secondly, the availability of spectrum resources and demands placed by different services on available spectrum resources may require greater recourse to network and traffic management. Another public policy response would be to make more contiguous spectrum available for managing the rapidly growing demand for data over the Internet.

6.9 The telecommunications market in India is price sensitive. India has the lowest voice tariffs in comparison to other countries globally. The significant increase in mobile penetration has been possible due to the low cost of telecom services aided by a low-cost device ecosystem. However, the mobile broadband market has not taken off in comparison with other countries due to the comparatively high cost of devices as also the cost of data services. Public policy necessities dictate that an ecosystem approach that aims to lower cost of investment, create publicly funded infrastructure and bring down costs of devices to access broadband must be adopted.

6.10 Digital India Programme is an umbrella programme which aims to transform India into a digitally empowered society and knowledge economy by leveraging IT as a growth engine of new India. Digital India is transformational scheme to also ensure that Government services are available to citizens electronically across the country. The vision of Digital India is centred on three key areas – infrastructure as utility to every citizen, governance and

services on demand, and digital empowerment of citizens. It requires that affordable broadband access is available to all for which investment in infrastructure has to be facilitated.

6.11 Public policy interventions require that the State should create and facilitate creation of infrastructure to bridge the digital divide and provide affordable access. The ability of network providers to generate sufficient revenue streams and incentivise investment in network infrastructure supports the ability of the State to bridge the digital divide rapidly. There is a possibility that increased data rates[3] or reduced investment in expansion of broadband network may inhibit broadband penetration. Affordable access requires an investment climate that reduces costs and supports business models tailored around the ability and willingness of the user to pay for customized service offerings. Market failure in ensuring private investment in broadband infrastructure would require recourse to the Universal Service Obligation Fund for public funding of investment drawing upon scarce public resources. Therefore, public policy intervention needs to ensure that affordable access and investment in broadband infrastructure are not counter-posed against the core principles of Net Neutrality.

6.12 Another element of public policy arising from the Net Neutrality debate is its effect on competition. The endeavour of economic public policy over centuries is to promote competition by peeling away those elements that constrict or constrain competition. Mobile telephony in India is a classic example where the benefits of competition have been realized in what was earlier a public sector owned and later, a closely regulated market. Public policy direction has been to regulate anti-competitive behaviour of firms that can exercise market dominance by control of factors of production or predatory pricing or adoption of other unfair trade practices. The impact of Net Neutrality or the absence of it in the public policy imperative of ensuring competitive markets has to be assessed. The market for Internet content provision depends on eyeballs visited as the measure of content or application access. In the mass of content available in the public Internet, to be easily visible is the best tool for enhancing business. Content providers have an incentive to leverage the gatekeeper role of networks to collaborate and collude with TSPs/ISPs to stand above competition. Although such practices may enhance consumer

[3] For example – in USA, one estimate shows that Net Neutrality could impose anywhere from $10 - $55 each month on top of an average broadband access charge of $30.00 (http://internetinnovation.org/files/special-reports/Impact_of_Net_Neutrality_on_Consumers_and_Economic_Growth.pdf).

welfare in the short run, the distortion in content markets would result in immense damage to the fabric of the Internet economy besides affecting the spread of innovation. While it may be legitimate for content providers to use business tools such as advertisements, reaching the consumer through the control of access or influence over access may have a deleterious impact on the economy.

6.13 Overarching public interest also requires that in the context of Net Neutrality, exceptions be carved out for specific areas of national benefits such as delivery of emergency services or desirable public or government services.

6.14 **To conclude, the primary goals of public policy in the context of Net Neutrality should be directed towards achievement of developmental aims of the country by facilitating "Affordable Broadband", "Quality Broadband" & "Universal Broadband" for its citizens.** The approach accordingly should be

- Expand access to broadband;
- Endeavour through Digital India, to bridge the digital divide, promote social inclusion;
- Enable investment , directly or indirectly, to facilitate broadband expansion;
- Ensure the functioning of competitive markets in network, content and applications by prohibiting and preventing practices that distort competitive markets;
- Recognize unbridled right of users to access lawful content of their choice without discrimination;
- Support the Investment-Innovation Virtuous Cycle and development of applications relevant and customized for users.

CHAPTER 7

INTERNET: FREEDOM OF EXPRESSION AND USER RIGHTS

"Perfect freedom is as necessary for the health and vigour of commerce as it is to the health and vigour of citizenship"

— PATRICK HENRY

7.1 Internet has emerged as a public space where people can freely speak, share, communicate and advocate. It is a vibrant platform for discussion, debate and dialogue where many voices can speak at the same time without one intruding into the other. Besides, social media applications, most websites – whether informational or commercial – provide mechanisms for expression of opinions, user reviews or discussion posts. More importantly, the Internet is an equal opportunity platform that offers equal digital space for expression irrespective of age, caste, creed, religion, wealth or gender. In any democratic country that values basic human rights, the need to preserve the Internet as a free space for expression becomes an important element of public policy.

7.2 The development of the Internet as a space that is neither managed nor directly supervised by the State has lent to its growth as an open forum. However, to keep the Internet as an open medium requires certain legal and constitutional guarantees to be built so that these guarantees can be invoked through enforceable mechanisms in case of breach. After all, in the course of history, the basic human freedoms were protected when these freedoms got enshrined in a written constitution that described the obligations of the State in preserving them and creating an independent adjudicatory mechanism that would enforce these fundamental rights in cases of alleged violation by the State.

7.3 Before the Internet came to occupy the public discussion space, mass media was the main channel of public opinion. The press was seen as the public

watch-dog and protection of media freedom was a key area of judicial pronouncements. But mass media was a space where expression of opinions was channelized through editorial supervision. Thereby, there was both a possibility of capture placed side-by-side with self-regulation that kept what society would have considered objectionable or undesirable from coming to the fore. The Internet, on the other hand, is a public sphere where supervision is a practical impossibility. This character of the Internet can be affected if network operators become "gate keepers" gaining control of traffic channelized through the network by identification of the data packets flowing through it. This technology called "deep packet inspection" gives TSPs and ISPs State-like power to control the Internet and can affect constitutional freedoms in case of possible misuse. Therefore, the obligation of the State is to ensure that the even the remote possibility of the continued existence Internet as a free public space being compromised needs to be quashed with explicit mentions of what a network operator can do and what it cannot in relation to the traffic carried by it. The obligations and liabilities of TSPs and ISPs need to be clearly stated from the context of Internet freedoms.

7.4 Internet has evolved as a medium for public discourse affording the ability to citizens in a democratic polity to express their views unhindered and participate in governance activities. It has shaped thoughts, given voice to ideas and influenced political developments. The Internet is the new media that seeks recourse to constitutional guarantees of fundamental rights to ensure that it remains free and democratic. In an emerging digital world where the Internet can influence the course of politics, the necessity to keep the Internet free from influences that can be misused cannot be over-emphasized.

7.5 The right to freedom of expression is a human right under Article 19 of the International Covenant on Civil and Political Rights, which includes freedom of an individual to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of his/ her choice. It is key to the development, dignity and fulfillment of every person and is also essential for ensuring other human rights. At a national level, freedom of expression is essential for democracy, good governance and socio economic development.

7.6 The writers of the Indian constitution understood the importance of civil liberties, as pillars of democracy that need to be protected by the State. In

particular, the Freedom of expression was seen as the means of formulating public opinion. Therefore, the constitution has guaranteed to all the citizens of India the freedom of speech and expression as one of the fundamental rights. The emergence of social media and technological advancement has added new dimensions to the freedom of expression. For any policy formulation exercise, it is of utmost importance to ensure that freedom of expression is secured in all respects.

7.7 The constitutional guarantees on freedom of speech and expression in the physical space apply equally to such freedoms being exercised over the Internet. Article 19(2) of the Constitution of India places reasonable restrictions in the exercise of the freedom of speech and expression in the interests of sovereignty and integrity of India, the security of the State, friendly relations with foreign countries, public order, decency or morality, or in relation to contempt of court, defamation or incitement to an offence. Thereby, the exercise of freedoms over the Internet cannot be absolute but has certain limitations on grounds mentioned in the Constitution. However, the limitations over the Internet can be specified and enforced only by Government in an accountable manner.

7.8 **The Committee recommends that user rights on the Internet need to be ensured so that TSPs/ISPs do not restrict the ability of the user to send, receive, display, use, post any legal content, application or service on the Internet, or restrict any kind of lawful Internet activity or use.** The arbiter of what constitutes legality in relation to the content, application or service can only be determined by Government with scope for judicial adjudication in case of any dispute.

CHAPTER 8

OTT SERVICES AND IMPACT ON TELECOM SECTOR

"The Internet is the first thing that humanity has built that humanity doesn't understand, the largest experiment in anarchy that we have ever had."

— ERIC SCHMIDT

8.1 Over the Top (OTT) applications have emerged through innovation fostered by the Internet to meet latent demand for common customer products and services at a lower cost using digital connectivity. OTT service providers have become an important entity in the Internet economic eco-system. The consultation paper of TRAI defines OTT service provider as a service provider offering ICT services, which neither operates a network nor leases network capacity for service provision. Clearly, OTT service provision has come to occupy an important place in the economy and is an inseparable part of the Internet world.

8.2 OTT applications are enabled by delayering of communications networks through Internet Protocols (IP) that permit the applications layer to function independent of the media layers. IP has facilitated the separation of "carriage" from "content", which has allowed content provided by OTT service providers to be carried over the top of communication networks to directly serve end-users at the edges of the network. In OTT transactions, the network operators link the OTT service provider and end-users without being responsible for the content carried over it.

8.3 For the purposes of the present report, OTT service provision can be broadly classified into two groups –

(i) **OTT communications services** – These services (e.g. VoIP) provide real-time person to person telecommunication services. These ser-

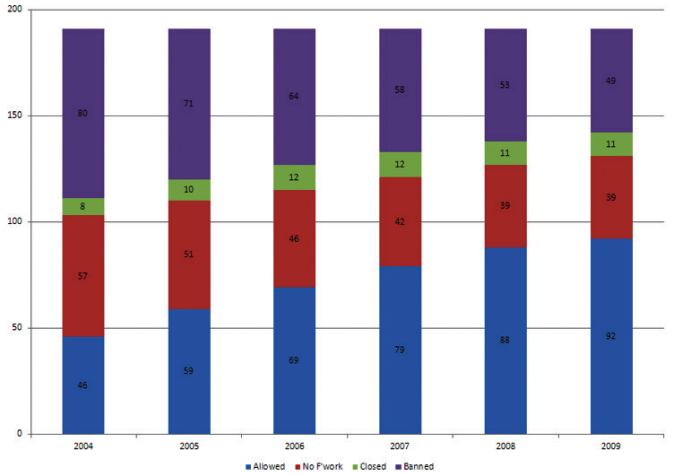
vices are similar to the telecommunication services provided by the licensed telecom service providers (TSPs) but are provided to the users as applications carried over the internet using the network infrastructure of TSPs. Essentially OTT communications services compete with the services provided by TSPs riding on the infrastructure created by TSPs.

(ii) **OTT application services** – All other OTT services such as media services (broadcasting, gaming), trade and commerce services (e-commerce, radio taxi, financial services), cloud services (data hosting & data management platforms/applications), social media (Internet based intermediary applications like Facebook, YouTube) offer services to end-users using the network infrastructure created by TSPs but do not directly compete with the service offerings for which the TSPs have obtained a licence under the applicable law i.e. the Indian Telegraph Act, 1885.

8.4 Different types of OTT applications place different demands on network resources in terms of bandwidth and priority, besides requiring sufficient server capacity by the OTT service provider, to render service of the desired quality to the end-users. In general, real-time applications require a higher priority in order to ensure that packet latency and jitter are managed by the network in order to give the desired quality of service. The demands on network resources as a factor in OTT service provision requiring real-time connectivity becomes more important in case of mobile media where spectrum resources would have to be dedicated during the period of real-time connectivity by the network. Therefore, it is natural to assume that reasonable traffic management practices may need to be adopted by the TSP in order to ensure that unreasonable demands on network resources are not placed by a few real-time OTT applications to the detriment of all other traffic.

8.5 Amongst OTT communication services, Voice over Internet Protocol (VoIP) was amongst the earliest OTT services to be offered. Depending upon the legal framework, different countries view VoIP either as voice or as data and accordingly attempt to regulate it. Some countries view VoIP as a voice service e.g. European Union, where VoIP can be classified as either an Electronic Communication Service or as a Publicly Available Telephone Service. On the other hand, many countries like Bolivia, Czech Republic, Egypt, Jordan and

the United States of America view VoIP as data. Initially most countries had banned VoIP services, but over time the number of such countries allowing VoIP services, but regulating such services, has been gradually increasing. The following chart drawn from the International Telecommunications Union (ITU) report shows the shift from outright prohibition to regulated permission in VoIP services:



(Source : GSR 2009 Discussion Paper- ITU)

Graph 2: Regulation of VoIP Services

8.6 In India, "Internet Telephony" was first permitted under the National Telecom Policy of 1999 which permitted Internet Service Providers (ISPs) to process and carry voice signals through the public Internet with effect from April 1, 2002. The form of restricted Internet Telephony permitted in India was restricted to communications between personal computers (PCs) or between a PC and a Public Switched Telephone Network (PSTN)/ Public Land Mobile Network (PLMN) abroad or between devices connected to ISP node with static IP addresses. However, TSPs could provide end to end service on VoIP as per their license. Thereby, voice communication to and from a telephone or mobile device connected to the PSTN/PLMN and following E.164 numbering was specifically prohibited to ISPs.

8.7 With increasing bandwidth speeds through technology development in networks and the development of smart phone devices with an operating system supporting OTT applications have enabled OTT communication services to be easily accessed over data path on PSTN/PLMN including termination on PSTN/PLMN abroad. The usage of OTT communication services grew with the advent of instant messaging services such as

WhatsApp and i-Message leading to shift in traffic from conventional messaging services offered by TSPs to OTT services over the Internet. Along with instant messaging, international voice calling also migrated to OTT service provisioning specifically on account of high costs of conventional international calls and the arbitrage available in substantially lowering the costs of communication. While both affected revenues of TSPs, neither had the effect of completely disrupting the business revenue models of TSPs. As per quarterly data published by TRAI, the outgoing minutes of usage (MOU) per subscriber availing GSM services per month for international calls has remained static at 0.3 minutes for the last 15 months (0.13% of outgoing minutes) indicating market stabilization in so far as shift to OTT applications for international voice calls are concerned. In terms of revenue, international voice calls contribute 3.45% of the adjusted gross revenues (AGR) for the Indian telecom industry as of September 2014. It has also impacted the revenues of ILD operators. However, operators have not shown much initiative in reducing this arbitrage which has further accentuated the subscriber behavior. In the case of international voice calling, the shift towards OTT services has certainly meant greater customer benefit in addition to lower international carriage and interconnection costs which lowered payments to foreign telecom companies.

8.8 However, OTT domestic voice call (local plus national) communication services have the potential of significantly disrupting existing revenue models of TSPs. Voice revenues (including rental revenue) contribute approximately three-fourths of total TSP revenues. TSPs in India show revenue realization of around 25 paise per MB for data services. In the case of a voice communications service, 1 MB of data is equivalent to 4 minutes of voice (@ 32 kbits/s according to G.729 codec)[4]. As per TSP data given during consultation, conventional voice calls have a revenue realisation of around 36 paise per minute, whereas a VoIP minute which is about 256 KB of data yields revenue of around 6 paise. With improvement in quality of service and related technological advancements, increasingly VoIP is viewed as functionally equivalent to conventional voice communication services. While it may be argued that reduced call costs may lead to higher usage and therefore, higher revenues, the demand elasticity of

[4] Conversion is dependent upon the codec used by the VoIP call. Here are approximate values for data consumption of the most common codecs used for VoIP: G.711 - 87Kbps, G.729 - 32 Kbps, G.723.1 – 22Kbps, G.723.1 - 21 Kbps, G.726 – 55 Kbps, G.726 – 47 Kbps, G.728 - 32 Kbps. Messenger services like WhatsApp, Skype use proprietary codecs and so the conversion ratio will vary thereby affecting the minutes of voice carried in 1 MB of data. However, G.729 is one of the most popular VoIP codecs, hence it has been taken as a reference.

such usage due to lower prices is yet to be conclusively and comprehensively evaluated. This pricing arbitrage of 6 times between conventional voice communications and VoIP offered by OTT has the potential of disrupting domestic telecom markets. This may have the undesirable effect of decelerating the pace of telecom infrastructure expansion, whereas the need is to boost investment in telecom infrastructure to increase broadband reach, speeds, bandwidth capacity and enhanced quality of service.

8.9 The problem is further exacerbated from the regulatory angle when viewed in the context of a licensed service provision co-existing with an unregulated service both competing for the same set of customers especially when the regulated service provider rides on the network infrastructure of the licensee to deliver the service. The existence of a regulatory arbitrage in addition to the pricing arbitrage adds a degree of complexity that requires a calibrated response to bring about a level playing field. It is relevant to note that the European Commission has made a policy pronouncement on May 6, 2015 for a Digital Single Market Strategy for Europe arguing, inter alia, that there is a need to review telecom rules to look at ways of ensuring a level playing field for players in the communications market to the extent that they provide competing services and also for meeting the long term connectivity needs of the European Union. The legal aspects of the issue have been dealt with in the Chapter on Legal, Licensing and Regulatory issues.

8.10 Innovation has been a key feature of the Internet and the emergence of OTT service provision has been an important example of such innovation. While OTT application services are a welcome development that substantially enhances consumer welfare at reduced costs, the creative disruption to existing service provision models wrought by OTT communication services, or more specifically domestic VoIP, needs greater examination. This is more so because VoIP using E.164 numbering has been prohibited in India. Evidently, the forward march of technology and innovation cannot be stopped, but policy-makers have the onerous task of ensuring that the transition is managed so as to balance various competing objectives in an adroit manner.

8.11 In view of the above discussions, the committee recommends the following :

(i) OTT application services have been traditionally available in the market for some time and such services enhance consumer welfare and increase productivity. Therefore, such services should be actively

encouraged and any impediments in expansion and growth of OTT application services should be removed.

(ii) Specific OTT communication services dealing with messaging should not be interfered with through regulatory instruments.

(iii) In case of VoIP OTT communication services, there exists a regulatory arbitrage wherein such services also bypass the existing licensing and regulatory regime creating a non-level playing field between TSPs and OTT providers both competing for the same service provision. Public policy response requires that regulatory arbitrage does not dictate winners and losers in a competitive market for service provision.

(iv) The existence of a pricing arbitrage in VoIP OTT communication services requires a graduated and calibrated public policy response. In case of OTT VoIP international calling services, a liberal approach may be adopted. However, in case of domestic calls (local and national), communication services by TSPs and OTT communication services may be treated similarly from a regulatory angle for the present. The nature of regulatory similarity, the calibration of regulatory response and its phasing can be appropriately determined after public consultations and TRAI's recommendations to this effect.

CHAPTER 9

NET NEUTRALITY & IMPACT ON TSPs

"Every threat to the status quo is an opportunity in disguise."

— JAY SAMIT

9.1 India has made extraordinary strides in telecom sector over the last two decades but the growth has been voice-centric. While India is close to having a billion subscribers on its network (996.49 million subscribers as on March 31, 2015), it is yet to touch a broadband subscriber base of 100 million that too at 512 kbps speed limits defined as broadband. The low broadband and internet penetration has kept a large proportion of citizens from being connected to the Internet economy. Voice contributes about three-fourths of the revenues of the TSPs. It is in this context of a voice-centric telecom sector thirsting for investments to expand reach, speed and capacity that the Net Neutrality debate has pitted TSPs against OTT service providers.

9.2 The telecom world of the future is centered on data growth. Certainly, the growth in data revenues for TSPs have indicated a robust trend in recent times signifying the country's movement towards a data-centric telecom sector. The Performance Indicators Report published by TRAI quarterly indicates that as on December 2014, data revenues now constitute 17.1% of the Average Revenue Per User (ARPU) per month as against 6.5% as on March 2013.

9.3 Telecom networks in India still are a mix of circuit switched and IP and full transition to IP networks is yet to happen. One emerging scenario could be when all networks embrace IP and smart-phones or Internet-enabled feature phones are used by all subscribers. If the transition to this scenario happens smoothly, the business model of TSPs would also have transformed into a data-centric model where voice communications would also become one of the many applications riding on a packet switched IP network. In this

scenario, the pricing arbitrage between voice communications by TSPs and OTT service providers would be substantially reduced. Another scenario predicts that if OTT communication services are allowed unhindered, they will substantially impact the revenues and consequently TSPs ability to invest impacting the transition to IP networks as well as expansion of broadband infrastructure across the country. The key public policy imperative is to manage the transition from voice-centric to data-centric networks with the concomitant change in technology.

9.4 TSPs have argued that their cumulative investments in the telecom sector is approximately Rs 7,50,000 crores and further investments of around Rs 5,00,000 crores would be required in the next five years to meet demand. TSPs further argue that the presence of a non-level playing field between them and OTT communications service providers works to their disadvantage. The pricing arbitrage is around 12.5 times in case of a voice call and 16 times in case of messages as per data put together by TRAI reflected in the table below:

Table 2 : Pricing Arbitrage (TSP Voice vs OTT Data call)

	TSP voice call	**OTT Data call**	
One minute call charges	50 paisa	4 paisa	25 p/MB; VoIP call 150 KB
Average holding time	2 minutes	12 minutes	Long holding time because of low cost
	TSP Message	OTT message	
Message cost	16 paisa	1 paisa	

(Source : TRAI Consultation Paper)

9.5 The Committee is of the view that the statement of TSPs that they are under financial stress due to the rapidly falling voice revenues and insufficient growth in data revenues, is not borne out by evaluation of financial data. As per TRAI[5] , the gross revenue of the telecom sector has increased from Rs 58,385.39 crore as on December 2013 to Rs 63,954.67 crore as on December 2014, a growth of 9.54%. The share of data revenues in total revenues

[5] Indian Telecom Service Performance Indicators Report for the quarter ending 31.12.2015, released by TRAI on 8th May 2015.

has increased from 12.07% to 17.1% over the year from December 2013 to December 2014 indicating a healthy growth rate in data revenues to compensate to some extent the expected shortfall in voice revenue growth.

9.6 TSPs/ISPs aspire to transform from "dumb pipe" providers to "intelligent pipe" providers, generating new revenue streams. These aspirations have larger public policy implications in the long run. TSPs/ISPs have the option of making the pipe bigger, monetize it better and make it more intelligent to deliver more through their own innovation. However, this need not happen at the cost of established principles of Net Neutrality and innovations at the edge.

9.7 Substantial investments would be required in the telecom sector if the goal of broadband connectivity reaching to at least 600 million subscribers by 2020 and average speeds of at least 2 Mbps with speeds of 100 Mbps available on demand is to be fulfilled. Disruptive changes brought about by advances in technology are generally to be welcomed but the conundrum for public policy and for Government is to ease the transition in public interest in case the disruptive change has the possibility of affecting the larger goals of the nation. The transition from a voice-centric business model to a data-centric model is inevitable and the attempt should not be to hold the tide back but to manage this transition.

9.8 The Committee also feels that existence of a regulatory arbitrage and a price arbitrage between TSPs services and OTT communications services resulting from a non-level playing field needs to be taken note of. Considering that broadband network in the country is still far from maturity due to limited penetration and poor network bandwidths, the possible full impact on TSP voice revenues is still not clear. TSPs may become reluctant to invest in expansion of broadband infrastructure if the possibility exists of competitive OTT communication services cannibalising expected increase in revenues from such investments. The immediate imperative for Government is to facilitate investment in broadband infrastructure and bring out policy certainty in the investment climate. Consequently, ensuring a policy and regulatory level playing field in OTT domestic voice communications is extremely important at the present juncture.

9.9 Apart from the economic argument, TSPs have also forwarded the argument of level playing field in terms of regulatory oversight, security burden, taxation, VoIP price arbitrage and OTT infrastructure localization etc.

For OTT domestic communication services, price arbitrage and resulting substitution is the main argument advanced by TSPs for non-level playing field. This issue is accordingly dealt with in preceding paragraph and in the previous chapter. The issue of taxation is beyond the scope of the Committee, hence the Committee refrains from making any specific recommendation. Issues impinging on network and national security, localization of OTT infrastructure have been dealt with later in this report.

9.10 To summarize, the Committee favours regulatory oversight on OTT communication service providers as recommended in the previous chapter. The Committee believes that for OTT application services there is no case for prescribing regulatory oversight similar to communication services.

CHAPTER 10

TRAFFIC MANAGEMENT & NET NEUTRALITY

"Technology is dominated by two types of people: those who understand what they do not manage, and those who manage what they do not understand."

— ARCHIBALD PUTT

10.1 With increasing number of users on the internet, their online activities have also changed dramatically. This is leading to the IP transport networks becoming increasingly congested. Service providers i.e. both TSPs and ISPs use the IP transport network to carry voice, video and internet traffic. To ensure that networks operate efficiently, they restrict or ration traffic on their networks, or give priority to some types of traffic over others generally during peak periods. This is known as 'traffic management' or 'traffic shaping'.

10.2 Traffic management has often been opposed on Net Neutrality grounds as being injurious to consumers' interests. An alternative view of traffic management is that it is a way to make the consumer experience more controlled and less subject to the vagaries of Network conditions, especially congestion. By treating different types of data traffic differently, traffic management allows the performance of services to be managed individually so that the most Quality of Service (QoS) sensitive services receive the better QoS from the network. In an unmanaged situation, consumers would not understand and predict the factors that affect their experience, whereas in a traffic managed situation there is potentially more certainty and more transparency, and a better overall quality of experience for the majority of customers.

10.3 ITU has published various recommendations for differential treatment of network traffic on transport networks and their effect on user experience,

like the ITU-T G.1010 recommendation, which defines the multimedia QoS categories from an end user viewpoint and M.1079, which defines the categories in IMT-2000 mobile environment. These recommendations form the basis for defining realistic QoS classes for underlying transport networks and QoS control mechanisms. According to G.1010 recommendation, the key parameters which impact users are delay, delay variation and information loss, which need to be minimized. For this purpose various types of traffic can be classified into 8 classes. Some classes are error tolerant and some are not. The traffic in each class can tolerate only certain delay, jitter and packet loss characteristics. Therefore, the priority and QoS have to be attributed accordingly with highest priority to voice and video traffic and lowest priority to non-critical background services. Therefore, it is necessary to distinguish the different types and treat them accordingly.

10.4 Mobile networks are different from normal transport networks in the sense that the capacity limitation happens due to the limited radio spectrum and not due to the core network. Hence, even if there is ample capacity in the core network, the end to end user experience will be impacted by the capacity constraints in the radio spectrum. Therefore, M.1079 recommendations, basically based on G.1010, are applicable especially to the IMT-2000 mobile networks for ensuring end to end QoS based on user experience. From a user's perspective, performance needs to be expressed by parameters which focus on user-perceivable effects, rather than their causes within the network; are independent of the networks internal design; take into account all aspects of the service from the user's point of view which can be objectively measured at the service access point; can be assured to a user by the service provider(s).To achieve the different QoS objectives, as applicable to packet networks, traffic management tools can be used by TSPs/ISPs to control the transmission of IP traffic to consumers for satisfactory user experience.

10.5 As voice, video & control traffic have different characteristics, they will have especially predefined QoS parameters set in the network based on the Latency, Jitter & Packet Loss requirements for voice, video and control traffic. Within 'Internet traffic', generally same QoS is followed irrespective of the service/ content, this is because devices operating at Layer-2 or Layer-3 do not have the intelligence to identify the type of content information available at the Application Layer or above. The differentiation of the 'Internet traffic' and setting the appropriate QoS level can be done only by devices having

the capability of Deep Packet Inspection (DPI) which operate at Layer-7 or above. These devices can identify the type of application in the packet by (a) Inspecting the packets application layer protocol (b) Analyzing the data pattern inside the packet. Once the layer-7 device identifies the packet as belonging to a specific application like Skype, YouTube, http browsing etc, the device can set different QoS levels for these packets in its Layer-2/3 labelling. This Layer-2/3 label in the packet is used for traffic management by the routers/switches which operate in the core and aggregation network. According to Net Neutrality proponents, this type of differential treatment of IP packets is violation of Net Neutrality principles.

10.6 There are many methods to manage as well as audit the Service Provider's network traffic. Traffic management methods have been continuously evolving. Some of the more popular methods are QoS (Quality of Service); DPI (Deep Packet Inspection); data volume caps; setting consumer broadband connection speed etc. "QoS" and "DPI" are network management practices but "data volume caps" and "setting consumer broadband speed" are business practices. From a Net Neutrality perspective QoS and DPI are important.

10.7 The following are few categories into which the traffic management implementation may be classified –

(a) *Differentiation* - It is the practice of treating different types of traffic differently. E.g. TSPs VoIP traffic (SIP), TSPs VoD/IPTV service, Internet etc. Based upon the type of traffic and delivery requirements, Service Providers may control the flow. As per ITU-T the traffic can belong to different classes with different delay and error-tolerant characteristics. Different types of IP traffic have to be treated differently for a variety of reasons, some of which are given below–

(i) To ensure that the limited IP transport network capacity is used optimally by all users, e.g. congestion control, in order to ensure all end users receive acceptable service.

(ii) Successful delivery of many time-sensitive services (such as real-time IPTV, video conferencing, VoIP etc., and control traffic thereof by addressing QoS based concerns on the Latency, Jitter & Packet Loss.

(iii) Emergency services.

(iv) Guaranteed services to enterprises based on commercial agreements and SLAs, e.g. VPN traffic.

(v) Subject Internet Traffic to certain policies (dropping of packets / blocking of sites) implemented based on the advice of the security agencies or court order.

(b) *Maintain the Security and integrity of network* – Internet traffic also consists of undesirable elements like viruses, worms, spam, DOS (Denial of Service) attack etc. Therefore, it becomes important to protect the network elements from such undesirable traffic. *Since this is a legitimate requirement for maintaining the health of the network, it is not considered as violation of Net Neutrality.*

(c) *Congestion control* – With the IP traffic ever increasing by leaps and bounds, it has become difficult for the ISPs to constantly upgrade the network for handling the increasing traffic. Therefore, almost all ISPs resort to some kind of congestion control during peak periods to ensure that the network doesn't collapse under the traffic load. This type of control can be either application-agnostic (i.e. treat all IP traffic in the same manner) or application-specific (e.g. sparing the time sensitive applications and performing congestion control on time insensitive applications).

Application-agnostic congestion control being a legitimate requirement cannot be considered to be against Net Neutrality. However application-specific control within the "Internet traffic" class may be against the principles of Net Neutrality.

(d) *Packet prioritization/de-prioritization* - Wherever queues occur in a network, higher priority traffic such as TSPs SIP VoIP will get through whereas lower priority traffic such as Internet traffic, as a whole without discrimination, may be delayed or suffer packet loss. This is typically applied today in the core and aggregation network, but may in future migrate closer to the access network, when the aggregation network moves closer to the end user in a flat IP network in order to increase the effectiveness of traffic management, to maximize network utilization and to minimize the effect on users.

10.8 TSPs/ISPs may not always treat the network traffic in neutral ways. The above mentioned traffic management methods could also be used to derive some undue advantage without reasonable justification. Such practices will then have implications for Net Neutrality and so need to be regulated.

10.8.1 Illegitimate traffic management techniques could lead to discrimination by fixed or mobile TSPs/ISPs with market power in favour of their own applications, content and services, thus harming both competition and consumers. For example VoIP services provided by ISPs are in direct competition to voice telephony services provided by traditional fixed / mobile operators. Therefore, when traditional fixed / mobile operators are also functioning as ISPs, they may have a tendency to block or slow down the VoIP traffic of competing ISPs.

10.8.2 When TSP/ISPs start blocking/throttling of competing applications/ services from different content providers, or prioritize certain traffic based on exclusive arrangements, the incentive to develop new and innovative applications and services by the other content providers goes down. Start-ups will have a difficult time to establish their business. Without the cash flow that major companies enjoy, start-ups might not be able to afford the fees necessary to deliver content to customers. Telecommunication companies can pick their preferred partners, subsidize the data costs for their apps, and make it much harder for new entrants to compete with the incumbents. This will be detrimental to innovation.

10.8.3 Discrimination may lead to degradation of quality of service. Mainly two types of degradation of quality of service may occur (i) Internet access service as a whole - (e.g. caused by congestion on a regular basis). This happens because, when traffic is throttled / blocked by the TSP/ISPs, there is a ripple effect on the routers where traffic starts piling up as the IP packets are not cleared as fast as they are arriving. This leads to artificial network congestion. (ii) Individual applications - VoIP, VoD and sometimes sensitive P2P applications (e.g. video call on Instant Messenger) services get degraded in quality because they are very time sensitive.

10.8.4 Unreasonable traffic management also puts users at disadvantage. For example blocking of tethering applications on mobiles as done by some operators in other countries. Tethering application allows the customer to use the data connection to run Internet applications on another device, such as a laptop. Clearly, this allows many more opportunities to use innovative

services on a phone. The main reason for constraining devices from 'tethering' is simply to extract more payments via a second contract. Yet a customer has paid for a certain amount of data within fair use limits already. There seems to be little reason to block the use of such applications, except to exploit the closed device to maximize payments. While the means of managing traffic is through the device and its contract, rather than through packet management, this is considered a 'Net Neutrality' issue, as the network operator is using traffic management techniques to create unreasonable management of their network.

10.9 In view of the above, it becomes very important to make transparent disclosure to the users, of traffic management practices adopted by the TSPs/ISPs. However, these disclosures can be very difficult to understand and further even to detect misuse of traffic management, unless there is a mechanism to address the concerns of the users. For example, it can be difficult to determine whether any degradation in the quality of a broadband service is attributable to:

- the use of a traffic management technique by a network operator or ISP such as 'bandwidth throttling'
- the selective blocking or delay of IP packets linked to a particular service e.g. torrent traffic, P2P traffic
- the preferential allocation of a households broadband connection speed to specific services and/or
- some other unrelated factor such as congestion in the core IP network or poor quality of the internet last mile connection or too many users trying to access the same service from a limited capacity internet server.

10.10 Nevertheless, TSPs/ISPs should be mandated to make adequate disclosures to the users about their intervention practices to maintain transparency and allow users to make informed choices. It is also necessary for the regulator / government to lay down rules for disclosure and also for what practices can be allowed/disallowed, keeping in view the principles of Net Neutrality. A suitable grievance redressal mechanism is also required to be put in place.

10.11 Due to variety of traffic on the IP transport network, the concept of one size fits all does not work and differentiation becomes an essential function

for network management. But many consider the use of traffic management tools as compromising the openness of the internet. There is a delicate balance between ensuring the openness of the Internet and reasonable and responsible use of traffic management by TSPs/ISPs for legitimate needs. To draw a line between these two objectives is challenging and is the crux of the matter surrounding the Net Neutrality debate. Due to many reasons, network operators differentiate and manage the traffic. Some are essential and some can be avoided not being in tune with Net Neutrality principles. Operators may be prohibited from practices considered as contrary to Net Neutrality principles.

10.12 The Committee recommends that legitimate traffic management practices may be allowed but should be "tested" against the core principles of Net Neutrality. General criteria against which these practices can be tested are as follows:

(i) TSPs/ISPs should make adequate disclosures to the users about their traffic management policies, tools and intervention practices to maintain transparency and allow users to make informed choices.

(ii) Unreasonable traffic management, which is exploitative or anti-competitive in nature, may not be permitted.

(iii) In general, for legitimate network management, application-agnostic control may be used. However, application-specific control within the "Internet traffic" class may not be permitted.

(iv) Traffic management practices like DPI should not be used for unlawful access to the type and contents of an application in an IP packet.

(v) Improper (paid or otherwise) prioritization may not be permitted.

(vi) Traffic management is complex and specialized field and enough capacity building needs to be done before undertaking such an exercise. Mechanism to minimize frivolous complaints will be desirable.

CHAPTER 11

CONTENT DELIVERY, INTERCONNECTION & MANAGED SERVICES

"Content is King"

— BILL GATES

11.1 The traditional forms of content provision are facing profound structural change. Traditional forms of content delivery, such as free-to-view television and newspapers, are coming under increasing pressure partly as a result of emerging competition from the online delivery platforms. Advertisement revenues on which revenue models of traditional content delivery were based are split with the new delivery platforms over the Internet. With increasing penetration of the internet and broadband, there is a tendency among all content providers to deliver every type of content through the internet.

11.2 In the future, it is expected that content aggregators will deliver content directly to the user device (set-top-box, computer, television or smart phone) through a broadband connection. Content aggregators would aggregate content providers and tie up the delivery mechanism, creating a new value chain. As the range of devices able to support over-the-top delivery proliferates, new business models develop and competition intensifies, it is possible that consumers will be able to access content through multiple devices from anywhere on the internet. Such services, particularly television, if delivered in high definition format, will inevitably consume considerable internet bandwidth. This will lead to high data usages and higher revenues for the TSPs/ISPs provided they have the required network capacity. This approach of putting all possible content on the Internet is leading to congestion on the Internet. Realising this, content providers are devising new techniques to improve the user experience, and some of these new techniques may have implications on Net Neutrality.

11.3 TSPs/ISPs link the content provider to the user on the Internet. They charge their retail customers but generally leave the content providers free. Content providers offer possibilities for new revenue streams for TSPs/ISPs to supplement revenues from retail customers. If this business model proliferates, then TSPs/ISPs no longer retain an incentive to remain neutral in the market for content constituting a possible conflict and impacting Net Neutrality.

11.4 Many online service providers now use Content Distribution Network (CDN) to distribute content over the network. CDNs help to move content to the edge of the internet and closer to the user, normally using an overlay network, before being offered for internet access, to prevent the quality of the services being impacted by traffic congestion in the internet core. When consumers request content, it can then be delivered from a local server operated by the CDN provider, rather than a remote internet server which would require the content to be delivered over the internet core. There are a number of third party CDN providers such as Akamai, EdgeCast, Google, Yahoo etc. who have built their own CDNs to deliver their content faster to the end-user. Another trend has been for some ISPs to provide their own CDN solutions to other service providers wanting to avoid congestion in the internet delivery chain as well as the internet core. To improve the user experience further, CDN providers are also directly peering with large ISPs through mutual agreements. However, the views regarding these arrangements differ across the pale of the Net Neutrality debate.

11.5 Net Neutrality proponents argue that such peering arrangements give preference to the traffic of certain large content providers over others, which is considered as equivalent to paid prioritization. Smaller content providers who cannot afford to have such arrangements are discriminated against and their content reaches comparatively slowly to the end user impacting user experience. Another view is that these CDN servers are serving all customers of the service provider uniformly and enhance the user experience without any discrimination.

11.6 The Committee is of the opinion that CDN is an arrangement for management of content as a business strategy. Making available one provider's CDN to others on commercial terms is a normal business activity. Discrimination in access or adoption of anti-competitive practices by them is best left to be covered under the law related to unfair trade practices.

11.7 Managed Services, also known as specialized services, are tailor-made services provided to enterprises or big business concerns for increasing business productivity. Managed Services may include bouquet of services in the area of telephony, domestic/international data connectivity, video, internet services. An enterprise's business may rely on this ICT backbone, spread across its business operations geographically.

11.8 According to TSPs, enterprise services are different from public internet services. Enterprise services are customised to the requirements of businesses and are Service Level Agreement based, one-to-one commercial arrangements between the TSP and Enterprise. These are in the nature of private networks rather than public communications and therefore, do not impinge on Net Neutrality. The opposite viewpoint warns that managed services might be a mask to circumvent Net Neutrality principles, giving TSPs a platform on which they are better placed to bargain with specific high value customers. Another argument is that the TSPs/ISPs may design services around the managed services plan, to circumvent the non- discriminatory rules of Net Neutrality.

11.9 Since the managed services and public Internet share the same telecom resources at different points in the network, therefore, issues of inter se priority in traffic emanating from the two would arise. Managed services, perceived as enterprise-related services, gets the highest priority of QoS along with voice and video. This may be allowed without affecting the minimum guaranteed QoS of "Best Efforts public Internet". **The Committee is of the considered view that managed services are a necessary requirement for businesses and enterprises, and suitable exceptions may be made for treatment of such services in the Net Neutrality context.**

11.10 While locating information on the Internet, search engines are important as user tools of finding information, for locating digital address and for published information to be easily found. Information that cannot be found on the Internet is in principle non-existent to the potential user. A website, which is not listed by a search engine, cannot be found unless the user knows the specific address of the site. Thus, search engines work as aids as well as potential barriers to information retrieval on the Internet. Search engines on the Internet function on commercial terms and conditions, at times transparently revealed and at times confidential. The ability of search engines to erase or blur digital existence on the Internet cannot be overlooked, if such ability transfers control over information available on

the Internet to a few. This adds another dimension to Net Neutrality, viz. "search neutrality", which is a principle that search engines should have no editorial policies other than that their results be comprehensive, impartial and based solely on relevance. The market concentration of the search engines space has also the ability to distort the freedoms and user rights on the Internet. The ruling of the European Commission in May 2014 can be noted in this context, which based on its 1995 Data Protection Directive held that its Directive applied to search engines too and gave the right of users of the Internet to seek removal of personal information in digital space by search engines and social media platforms. **This Committee refrains from making any specific recommendation on search neutrality, but flags this issue as a concern for public discussion.**

11.11 As the internet is evolving and more players are entering into it, organizations are competing as to who will control the customer relationships. Firms are also competing for a share of advertising revenues and consumers' expenditure. Content providers are experimenting with technologies like Digital Rights Management (DRM) as a means by which they can establish greater control over how their content is accessed, consumed, stored and shared by end users. On the other hand network operators are using DPI techniques to manage the flow of traffic across their networks, again to control what the user can access or cannot access, probably violating the Net Neutrality requirement.

11.12 As the value chain is taking shape, network operators and content providers are bargaining over how future rents will be divided and technical measures such as DPI and DRM are being deployed to strengthen relative negotiating positions. Advance technologies enable the collection of data, both on the effective demand for particular pieces of content and on how particular consumers engage with the content. The data generated is in itself extremely valuable, which can be sold to third parties as well as being used to target advertisements or services based on user behaviour. Control of that data is one reason why the competition between ISPs/network operators and content providers is so intense.

11.13 Since the ISPs/TSPs are regulated by Indian laws, there is reasonable protection against the leakage and misuse of such data by them. However, content providers are largely unregulated and especially those who are not based in India. Response to this issue will have to await a comprehensive law on privacy and data protection in the digital and physical space.

CHAPTER 12

TARIFFS & NET NEUTRALITY

"Nothing is cheap which is superfluous, for what one does not need, is dear at a penny"

— PLUTARCH

12.1 The communications sector has evolved from monopoly service provision to a competitive market structure. The presence of competition has permitted tariff fixation for telecom service provision to move from regulator fixed tariffs to regulatory forbearance giving TSPs/ISPs the liberty to provide customer choice in service plans with related tariffs and rates depending on market forces. Innovative tariff have allowed service differentiation and customer choice in planning usage. The mobile revolution was greatly aided by specific pre-paid tariff offerings that catered to the poorest sections of society with limited usage co-existing with post-paid tariff plans that were aimed at the richer sections of society with high usage. With increasing costs of service and greater pressure on bottomlines, TSPs and ISPs have resorted to creating tariff plans that charges for usage based on the content or applications sourced by the user. Differential data tariff plans linked to type of usage and zero rating plans are a few such examples. These actions in tweaking tariff plans disturb user choice and market provision which has serious implications on Net Neutrality.

12.2 Under section 11(1)(c) of the Telecom Regulatory Authority of India (TRAI) Act, 1997, determining tariff is a function performed by TRAI and lies within its jurisdictional domain. As of now, TRAI follows a policy of forbearance for telecommunication services where competition exists subject to the condition that all tariff plans need to be reported to TRAI. TRAI examines the tariff plans and may intervene if they breach any of TRAI's regulations. However, TRAI does not presently examine the tariff plans filed by TSPs/ ISPs from the view-point of Net Neutrality principles. In case Net Neutrality principles are clearly laid down by law or through licensing conditions, then tariff plans filed before TRAI would need to be tested on the corner-stone

principles of Net Neutrality to check if the plans do not violate the principles. If the tariff plans violate Net Neutrality principles then TRAI has the powers vested in it under the TRAI Act to disallow the tariff plan. Therefore, **the Committee recommends that tariff plans offered by TSPs/ISPs must conform to the principles of Net Neutrality set forth in guidelines issued by the Government as Licensor. TRAI may examine the tariff filings made by TSPs/ISPs to determine whether the tariff plan conforms to the principles of Net Neutrality.**

12.3 ISPs sometimes resort to traffic control to achieve some business objectives or meet some contractual obligations. For example, ISPs provide unlimited data plans with FUP (Fair Usage Policy). Here the traffic from the customer is throttled / blocked depending upon his subscription plans and usage after he exhausts a certain data volume limit. They may also set different broadband speed to subscribers based upon the data pack they have chosen. Such practices as mentioned above are widely accepted business practices and hence are not considered as violation of Net Neutrality.

12.4 A "walled garden" refers to a "closed platform" or "closed ecosystem" where the carrier or service provider has control over applications, content, and media, and restricts convenient access to non-approved applications or content. This is in contrast to an "open platform" where consumers have unrestricted access to applications, content, and much more. Such "Walled Gardens" can also be created with ISP/content provider initiated offers, e.g. zero rating packages. Zero Rate packages are offers where TSPs/ISPs make mutual agreements with content providers, either on exclusive or non-exclusive basis, to offer content free of cost to the end user. From a Net Neutrality perspective, when such an arrangement is exclusive in nature, where others are excluded, then they are in effect creating a walled garden where only the mutually agreed content will reach the user and the user may have no access to other's content. Therefore, such exclusive arrangements are generally viewed as anti-competitive and violating Net Neutrality principles which should be discouraged. However, it may be mentioned here that not all zero rating plans are controversial or against the Net Neutrality principles. Free wi-fi or free internet coupons are some such examples.

12.5 The Committee has closely looked into zero rating plans suggested by some TSPs recently. Zero rating is also called "toll-free" or "sponsored" communications. It is the practice of network operators to not charge end

customers for a defined volume of data offered by specific applications or internet services in limited or metered data plans e.g. free Facebook/ WhatsApp packs etc. According to them such plans help to increase internet penetration. "Zero rating" plans have raised concerns as shown by some of the arguments in favour and against given below –

a. Net Neutrality advocates believe that tariff plans that discriminate based on the content or applications accessed breach the principle of Net Neutrality that the network operator cannot discriminate between content sent, received or accessed by the user. Exempting selected sites and applications from data caps in pricing was alleged to be anti-competitive interfering with consumer's choice. Zero rating heavily favours sites, services and applications having the ability to strike deals with TSPs/ISPs, which may not have any incentive in entering into commercial tie-ups with companies that have a small market share or eye-ball. Such practices constitute an entry barrier to small start-ups in a competitive market for applications and services.

b. The contrary opinion of TSPs is that some zero rating plans increase consumer welfare by fashioning discounted tariff plans based on what limited number of applications customers want to access e.g. only Facebook/WhatsApp packs. In such cases, customers subscribe to data plans at a discounted price for chosen applications instead of the full data plan which cost at the same rate for access to the whole internet. In zero rating plans, the content providers and TSPs save on marketing and distribution costs by collaborating with each other and create producer surplus whereas users can choose the content they would like to access and pay lower charges creating consumer surplus. Therefore, TSPs argue that "zero rating" plans are mutually beneficial and an acceptable business practice.

c. TSPs have also argued that cost of data is not the primary deciding factor for choice of applications in e-commerce businesses. The cost of products sold on e-commerce sites and the user experience are the principal factors that determine consumer choice of application providers. Such e-commerce firms adopt the Internet as a medium to achieve economies of scale and eliminate physical stores and inventories that go along with it. TSPs further argue that "zero rating"

plans are also used for promotion of new content/services. New content providers generally don't have established infrastructure to deal with end users on an individual basis. The marketing, distribution and billing platforms of network operators can be utilised by these providers and the charges for these services built into a composite amount where the content provider pays the network operator and offers content free to the customers. Such arrangements help the smaller content providers to market their content and compete with established providers in the broader internet ecosystem.

d. TSPs draw a parallel with toll free services in traditional telecommunications as an accepted business practice for a while. Toll free services were popular because customers were able to call the companies without being charged for the call. Companies benefitted by reaching customers and offering better services. Similarly zero rating plans allow the data charge to be paid by the content provider rather than the consumer analogous to toll free calls.

12.6 The Committee, after consideration of all opinions expressed by Net Neutrality proponents and network operators, feels that there are multitude of possibilities in designing tariff plans and it would not be possible to either pre-think all possibilities or determine its validity with respect to Net Neutrality principles. The Committee is of the opinion that a conclusion on whether the tariff plans specifically breach Net Neutrality would have to be seen in the context of the design of the tariff plan and the outcomes it generated, including its ability to distort consumer markets. Therefore, the Committee proposes that tariff plans (including zero rating plans) be dealt in following ways-

(i) **Ex-ante determination** – Before a licensee launches any tariff plan, the same would need to be filed before TRAI within a reasonable period prior to the launch of the plan. TRAI would examine each such tariff filing carefully to see if conforms to the principles of Net Neutrality principles and that it is not anti-competitive by distorting consumer markets. Such a filing requirement would include a deemed approval clause, if the regulator does not decide within a reasonable period. This would ensure balance of interests protecting the liberty of TSPs/ISPs to design specific tariff plans attuned to specific customer demands and at the same time ensure that the principles of Net Neutrality are not breached.

(ii) **Ex-post regulation -** Complaints on tariff plans may be dealt with on a case by case basis through an adjudicatory process to be specified by the regulator and after giving a reasonable opportunity of being heard. Imposition of penalties or financial disincentives could be considered if the principles of Net Neutrality are violated. However, the measurement principles are to be defined to gauge whether the tariff plans impinge on Net Neutrality principles.

12.7 The Committee felt the need to discuss the issue of "Internet.org" and determine whether similar mechanisms disturb Net Neutrality. Internet.org is a partnership between Facebook and few companies (Samsung, Ericsson, MediaTek, Opera Software, Reliance and Qualcomm) that plans to bring affordable access of selected Internet services to less developed countries by development of new business models around the provision of Internet access. It has been criticized for violating Net Neutrality principles and favouring Facebook's own services over its rivals. In India, it provides restricted Internet access to subscribers of one TSP. Until April 2015, Internet.org users could have free access for only a few websites, and Facebook's role as gatekeeper in determining what websites were in that list was seen as violating Net Neutrality. In early May 2015, due to severe criticism, Facebook announced that the platform would be opened to websites that met its criteria. Participating websites have been asked to meet three criteria:

(i) Explore the entire internet so as to give users a taste of the public Internet and therefore help them see its value;

(ii) Efficiency of data use so that it would be economical for carriers to allow free access to the websites; and

(iii) Technical specifications optimized for browsing on a wide range of devices including smartphones and less sophisticated mobile devices.

12.8 Content service providers have become very evolved and complex over time. They have devised new ways to reach the customer to give a better experience while accessing the content. At the same time large organizations with market power have started creating closed ecosystems which protect their business model in the long run. Also new business models are being devised by large organizations to increase their user base, but unfortunately some of these initiatives are considered non-competitive, restrictive and in

conflict with Net Neutrality principles. The Committee was conscious that the market for content provision indicates that clear market leaders emerge in a short-while and if such market leaders are able to dictate the path to specific content, then the principles of non-discriminatory access from a user view-point can be compromised leading to distortions emerging in the content provision market and consequent implications for the larger Internet economy and emergence of new innovations. **The Committee, therefore, is of the firm opinion that content and application providers cannot be permitted to act as gatekeepers and use network operations to extract value, even if it is for an ostensible public purpose. Collaborations between TSPs and content providers that enable such gatekeeping role to be played by any entity should be actively discouraged.** If need be, Government and the regulator may step in to restore balance to ensure that the internet continues to remain an open and neutral platform for expression and innovation with no TSP/ISP, or for that matter any content or application provider, having the potential or exercising the ability to determine user choice, distort consumer markets or significantly controlling preferences based on either market dominance or gatekeeping roles.

CHAPTER 13

LEGAL, LICENSING & REGULATORY ISSUES

"Laws should be like clothes. They should be made to fit the people they are meant to serve"

— CLARENCE DARROW

13.1 The telecommunications sector in India is regulated through a combination of legislations and licensing conditions. The Indian Telegraph Act, 1885, the Indian Wireless Telegraphy Act, 1933, and the Telecom Regulatory Authority of India (TRAI) Act, 1997 and subordinate legislation enacted thereunder invest the Central Government with licensing powers and provide the regulatory framework for the telecommunications sector. Licenses granted under section 4 of the Indian Telegraph Act, 1885, stipulate the terms and conditions circumscribing network operations and provision of services by telecommunication service providers. Content regulation follows ex post enforcement mechanisms with offences and punishments prescribed under the Information Technology (IT) Act, 2000.

13.2 As per applicable guidelines, TSPs/ ISPs are allowed to provide Internet access through use of any device/technology/methodology. TSPs/ISPs are also permitted to provide Internet Telephony, through use of personal computers (PCs) or IP based customer premises equipment (CPE) through public Internet connecting the following:

a. PC to PC; within or outside India;

b. PC/a device/adapter conforming to standard of international agencies in India to PSTN/PLMN abroad;

c. Any device/adapter conforming to standards of international agen-

cies connected to ISP node with static IP address to similar device/ adapter within or outside India;

13.3 The guidelines also provide that Internet Telephony is a different service in its scope, nature and kind from real time voice as offered by other licensed operators like Basic Service Operator (BSO), Cellular Mobile Service Operator (CMSO), Unified Access Service Licence (UASL), National Long Distance Operator (NLDO), International Long Distance Operator (ILDO) and Public Mobile Radio Trunk Service (PMRTS).

13.4 The existing instructions require application service providers, termed as Other Service Providers (OSPs), using telecom resources[6] or establishing an OSP Centre[7] in India to register with the licensing authority. With the growing opportunities in digital applications and services delivery including the emerging world of the Internet of Things (IoT), the importance of the OSP using telecommunications networks to provide applications and services is expected to become important. Although registration requirements exist for OSPs, practically such registration has worked as a voluntary instrument rather than an enforced mandate.

13.5 Does Net Neutrality as a concept find any guidance from our present legal framework? Telecom legal framework in India is unique. Although foundation of this framework is based on more than a century old Act, the provisions in Act, especially the definition of "telegraph" and "power to license telegraph" have been ingeniously used to manage the regulatory changes brought about by advancements in communications and networking technologies so far. For this purpose, rules and a large body of licensing terms and conditions have been created. In relation to Net Neutrality, the only relevant reference is available in the scope of Internet Service license and the Internet Services authorization under Unified License which stipulates that the subscriber of Internet services shall have unrestricted access to all content available on Internet except for such content which is restricted by the Licensor or designated authority under law. This provision does not enable a mechanism for prescribing the principles and rules of Net Neutrality and define the enforcement methods. Since amendment to licensing terms and conditions

[6] 'Telecom Resource' means Telecom facilities used by the OSP including, but not limited to Public Switched Telecom Network (PSTN), Public Land Mobile Network (PLMN), Integrated Services Digital Network (ISDN) and/or the telecom bandwidth provided by authorized telecom service provider having valid licence under Indian Telegraph Act, 1885.

[7] 'OSP Centre' means the infrastructure at a location in India used by the OSP for providing the Application Services.

follow a simple process, it is possible to build an enabling clause in the licence conditions through which the Government can acquire the ability to specify enforceable guidelines for prescribing the principles and rules of Net Neutrality. This can be an immediate solution to a vexed problem without recourse to the enactment of a new law in the short term.

13.6 The Committee, therefore, recommends the incorporation of a clause in the license conditions of TSP/ISPs that will require the licensee to adhere to the principles and conditions of Net Neutrality specified by guidelines issued by the licensor from time to time. The guidelines can describe the principles and conditions of Net Neutrality in detail and provide applicable criteria to test any violation of the principles of Net Neutrality. Suggested guidelines are given in Annexure IV.

13.7 A key issue that has emerged in the debate regarding Net Neutrality is the treatment of OTT service providers who offer services similar to traditional telecommunication services. The Indian Telegraph Act grants exclusive privilege to the Central Government for the establishment, maintenance and working telegraphs. The Act empowers the Central Government to grant a licence to exercise the privilege of establishment, maintenance and working telegraphs. The word "telegraph" is defined in section 3(1AA) of the Act to mean any appliance, instrument, material or apparatus for transmission or reception of voice, electronic data, exchange of messages, photos, and videos through optical media, wires, electromagnetic emissions or radio waves. A view arising from legal considerations is that all OTT services fall under the ambit of Indian Telegraph Act and require a license to be granted for service provision. It may be recalled that in the initial days of the Internet era, operation of electronic mail services required a licence to be issued by the Central Government. The need for a licence for such public e-mail services was dispensed with later and migrated to Internet Service License. **The Committee feels that there should be a separation of the "application layer" and "network layer" as application services are delivered over a licensed network. Further, OTT application services are not similar to licensed communication services thereby precluding the possibility of regulatory arbitrage arising from competition between licensed service providers and OTT application service providers. As has been discussed in detail in the Chapter on OTT Services and Impact on Telecom Sector, a distinction from the economic angle and from the existence of regulatory arbitrage can be considered in so far as**

exclusive OTT international voice communications, OTT chat and OTT messaging services are concerned. In a sense, where regulatory intervention is not required, the need to subject the service provision to licensing requirements can be dispensed with on the same basis as that for OTT applications services. On the limited aspect of domestic OTT communication services, where the regulatory arbitrage arising from similar services being provided by such service providers in competition with licensed telecom service providers and this arbitrage is a matter of serious concern for policy makers, the Committee reiterates its view that domestic OTT communication services should be regulated through exercise of licensing powers available under section 4 of the Indian Telegraph Act to ensure a level playing field.

13.8 The Committee also recognises that the extant provisions in the Indian Telegraph Act, 1885 may not be adequate to deal with the advancements in communications technology and developments in communications services in recent years. The communications sector continues to experience remarkable changes fuelled by innovations in technology and service delivery. Communication is no longer confined to voice, nor is it limited to data, broadcast and video. It is now possible to provide communication services using Internet Protocol (IP) based devices and such transactions are different from the services provided by traditional circuit switched networks. The ever-expanding digital world touches nearly all aspects of our modern lives. The applications market has emerged as a vibrant component of the communications sector beyond the pale of traditionally regulated telecommunications. The applications market now leads the way into new communications behaviours, opening the door to new business models and a redefinition of the role of the consumer. The digital ecosystem has radically changed the way people communicate by giving the consumer an active role along with a multitude of choice. Further, the emergency of an array of new smart and connected devices, including wearable devices such as watches, glasses and health bracelets, has allowed consumers continuous connectivity. New devices connecting machines-to-machines, the "Internet of things", are also on the anvil. In the times to come, access to online services would become vital for socio-economic existence. Therefore, in a fast-changing, constantly evolving and dynamic sector, new regulatory paradigms have to emerge to facilitate innovation and growth.

13.9 The world has moved towards convergence of all forms of communication with a trend towards fragmentation of the value chain in the communications sector. Networks, services, applications and devices have all grown in diverse ways and have evolved into separate markets. Presently, networks and services are linked together and licensing was done in a composite manner for both. With the growth of OTT applications, the line between licensed telecom services and unregulated applications area has become blurred. With technological development, the communications sector has evolved from natural monopoly to a competitive sector. Multitude of devices for connectivity has emerged where issues of inter-operable standards have arisen. The regulatory framework has to embrace the fast-changing trends and be suitably structured so as to flexibly adjust to the requirements of an evolving communications sector. There is a need to define a new legal architecture to keep pace with the technological developments that explicitly protects Net Neutrality but retains the ability of the State to ensure national security, maintain public order, safeguard privacy and protect data. **Accordingly, the Committee recommends that a new legislation when planned for replacing the existing legal framework must also incorporate principles of Net Neutrality. Till such time as an appropriate legal framework is enacted, interim provisions enforceable through licensing conditions as suggested by the Committee may be the way forward.**

CHAPTER 14

SECURITY & PRIVACY ISSUES

"If you think technology can solve your security problems, then you don't understand the problems and you don't understand the technology."

— BRUCE SCHNEIER

14.1 The security and integrity of communications networks is of immense importance to the nation's economic infrastructure, strategic interests and social order. Therefore, the security of networks cannot be allowed to be compromised in any manner. Public policy objectives such as national security, public order, decency and morality, protection of privacy, data protection, public safety and disaster communications call for a measure of regulatory action on communications service providers. Law enforcement agencies and national security agencies need to be provided access to communications networks and data regarding communications flow to protect larger public interest.

14.2 The powers to lawfully intercept and monitor communications are derived from section 5 of the Indian Telegraph Act, 1885. Such powers can be invoked on occurrence of any public emergency or in the interest of public safety in the interests of the sovereignty and integrity of the nation, the security of State, friendly relations with foreign States, public order or for preventing incitement to the commission of an offence. Rule 419A of the Indian Telegraph Rules, 1951, lay down the procedural requirements for lawful interception and monitoring. The Indian Telegraph Act, 1885, also affords protection to users of telecommunication services from unlawful or unauthorised interception.

14.3 The Central Government or any State Government has the powers to intercept, monitor, or decrypt any information available in any computer resource under section 69 and section 69B of the Information Technology Act, 2000. The rules for lawful interception and monitoring of Internet traffic is drawn from the Information Technology (Procedure and Safeguards for

Interception, Monitoring and Decryption of Information) Rules, 2009 (the Interception Rules), Information Technology (Procedure and Safeguards for Monitoring and Collecting Traffic Data or Information) Rules, 2009 (the 'Traffic Data Rules').

14.4 The terms and conditions of the license granted to telecom and internet service providers forms the next layer of the legal framework for national security considerations and protection of privacy. Significant requirements under the terms and conditions of the license are that the network and network related elements for service provision be located within India besides defining the use of encryption keys by subscribers for traffic carried over the network. Additionally the service providers are expected to retain call data records (CDR) and IP data records (IPDR) to be produced to authorised officers acting in aid of investigation of offences, public order and protection of national security. Similar conditions are imposed by countries world-wide and such conditions have proved to be extremely valuable in the context of protection of life and property, investigation of criminal offences and preservation of national security.

14.5 New application services that supplant traditional communication services (voice, instant messaging) or provide intermediation services over the Internet (social media, video sharing) have emerged that transfer the ability to lawfully intercept traffic moving over networks away from constitutionally governed, democratically established and accountable governments to private companies providing such services. This aspect has become a significant concern for Governments across the world. The providers of these application services use advanced encryption technologies that impedes law enforcement agencies in lawful interception and monitoring. Such application providers are also not amenable to national legal jurisdictions. This has thrown up new challenges for law enforcement agencies and Governments. Undoubtedly, law enforcement agencies' access to information and records from telecommunication service providers has been of immense importance in investigation of crimes and offences and preservation of national security. Loss of this ability has the possibility of compromising national security and law enforcement capabilities. While these challenges have a peripheral bearing on the issue of Net Neutrality, nevertheless given the extreme impact that unthinking action may have, there is a need to deeply consider co-ordinated international and national

measures to address these challenges.

14.6 The existing law affords protection to the subscriber from unlawful interception as well as unlawful access to data and information. These provisions act to safeguard privacy and ensure data protection. However, this ability stands affected with the advent of application providers where the data and information reside outside national jurisdiction. New business models have emerged where the service is provided free to the user, but the information generated out of the usage of service can be monetised without the specific knowledge of the user or provided to external agencies without consent (e.g. the Snowden saga). The only instrument available is reliance on the statement of the application service provider without any legal ability to monitor or enforce in case of breach or suspected breach of trust in data protection. While local hosting requirements by application service providers have been resorted to by some countries, such conditions are generally termed to be onerous for conduct of legitimate businesses. **Therefore, there is a need for a balance to be drawn to retain the country's ability to protect the privacy of its citizens and data protection without rendering it difficult for business operations. One possibility is to identify critical and important areas through public consultations where there may be a requirement to mandate local hosting or retaining enforcement capabilities in cases of breach.**

14.7 Some of the security related measures may be in the nature of ex ante obligations (lawful interception, security audit etc) whereas others would be in the nature of ex post enforcement (public order, prohibited content, protection of privacy, data protection). It is, therefore necessary for duly authorised legal entities to have the ability to seek implementation of the ex ante obligations and ensure ex post enforcement. With the rapid transformation of the ICT and the expected emergence of new forms of communications, there is probably a need to define a new legal architecture for meeting the challenges to security.

14.8 The Committee believes that national security is paramount, regardless of treatment of Net Neutrality. It therefore recommends inter-ministerial consultations to work out measures to ensure compliance of security related requirements from OTT service providers.

CHAPTER 15

ENFORCEMENT, OVERSIGHT & CAPACITY BUILDING

"A good plan implemented today is better than a perfect plan implemented tomorrow."

— GEORGE PATTON

15.1 The ongoing debates and brainstorming on various issues encompassing Net-Neutrality are still in a formative stage, and likely to throw new challenges for regulators and policy makers in time to come. Since Net-Neutrality has many dimensions impacting economic, regulatory and public policy aspects, there may be instances in various domains such as integrity of the network, investment, traffic & tariff management, privacy & security etc. where the implications of Net Neutrality would require expert examination on case to case basis. For this purpose, we need to put in place an enforcement and monitoring system with clearly defined processes along with an oversight mechanism. There is also an urgent need for adequate capacity building across different domains within the Government and DoT in particular.

15.2 Based on the discussions in earlier chapters, the committee suggests the following enforcement process

(i) Core principles of Net Neutrality may be made part of License conditions and the Licensor may issue guidelines from time to time as learning process matures.

(ii) Since Net Neutrality related cases would require specialized expertise a cell in the DOT HQ may be set up to deal with such cases. In case of violations, the existing prescribed procedure may be followed. This would involve two stage process of review and appeal to ensure that decisions are objective, transparent and just.

(iii) Tariff should be regulated by TRAI as at present. Whenever a new tariff is introduced it should be tested against the principles of Net Neutrality. Post implementation, complaint regarding a tariff violating principle of Net Neutrality may be dealt with by DoT.

(iv) Net Neutrality issues arising out of traffic management would have reporting and auditing requirements, which may be performed and enforced by DoT.

(v) QOS issues fall within the jurisdiction of TRAI. Similarly reporting related to transparency requirements will need to be dealt with by TRAI. TRAI may take steps as deemed fit.

15.3 Enforcing Net Neutrality principle is a new idea and may throw up many questions and problems as we go along. Learning and course correction will have to be built in the system itself. For this purpose, a strong Oversight mechanism will be needed. **The Committee recommends that a Oversight process may be set up by the government to advise on policies and processes, review guidelines, reporting and auditing procedures and enforcement of rules.**

15.4 Technological advances can be disruptive. Cost for not being prepared for such disruptive changes can be steep. It is the right time for fine tuning the priorities, focus and capacity building within the government, licensing authority (DoT) in particular, so that it may facilitate the Indian consumers, investors, telecom companies, government organizations and all other stakeholders in facing technological changes and challenges.

15.5 This capacity building within the DoT will enable it to address issues at stake. First step in this direction would be substantive engagement in discussions with academia, private sector, and civil societies; taking timely action of referring such issues to regulatory bodies and enforcement agencies concerned, and more importantly taking informed decisions, inter-alia, based on the recommendations of such bodies and/or consultation with the other stakeholders. At times, the government will also need to engage in discourse with outside experts, to facilitate the free flow of ideas.

15.6. Another important aspect of capacity building is training and skill development. Training needs should cover not only technical aspects but

governance, policy, law and other related areas as well. There are plenty of training and skill development needs of the entire ICT sector, which is beyond the scope of this committee. However, we would like to comment that while India makes software for the world, the Internet content especially in Indian Languages is very less. Encouraging local content creation through skill development may help achieve the objective of localization of content better than through any regulation.

15.7 Institution building is also part of capacity building. Within DOT, Telecom Engineering Centre needs upgradation and orientation in terms of technical know-how, improved human resource and internet engineering capabilities, to address technical issues in the field of Internet and converging ICT sectors. The training institute of DoT, National Telecommunication Institute for Policy Research, Innovation and Training (NTIPRIT) will also need to be strengthened in the area of Internet Policy, law and regulations and futuristic technologies. Collaboration with academia and private sector will be essential in this endeavour. **The committee also recommends setting up of a think-tank with best talent to deal with the complexities of the new digital world.**

15.8 In the recent Net Neutrality debate, it has been seen that there is unexpected awareness about the subject, especially amongst the youth. This needs to be channelized to create positive energy. Creating awareness through training programmes, seminars and workshops about opportunities and responsibilities that internet brings is a timely requirement.

CHAPTER 16

WAY FORWARD

"The only limit to our realization of tomorrow will be our doubts of today"

— FRANKLIN D. ROOSEVELT

16.1 Digital connectivity has emerged as a key driver of economic and social development in an increasingly knowledge intensive global scenario. India needs to play a leadership role in ushering a new digital age. Government of India has initiated the programme of Digital India, which is designed to transform India into a digitally empowered society and knowledge economy. The program envisages digital connectivity to citizens as a public utility. This provides us a guiding benchmark against which to measure the issues related to Internet space.

16.2 Internet has also emerged as a destination for public discourse. In a free, democratic country, the Internet has increasingly become an important platform of information dissemination and exchange of opinions and views. Just as India values its constitutional guarantees of freedom of speech and expression, it also values an Internet that is open. The resulting discourse on Net Neutrality has led to an intense debate that is refreshing, timely and welcome.

16.3 The debate on Net Neutrality is refreshing because it is about future and not about past or present. It is about young and their enterprise. It is also about the success in putting the infrastructure on ground and the ground that we still have to cover. It is about freedom and equality as much as it is about regulation and level playing field. Clearly, the debate on Net Neutrality is multi-dimensional and solution to this cannot therefore be uni-dimensional. The way forward is the quest for these multi-dimensional solutions with a holistic, national outlook to the vexed issue of Net Neutrality.

16.4 At the root of our discourse is the recognition that we have different stakeholders with different perspective and sometimes diametrically opposite views and prescriptions. This Committee has tried to assimilate these vastly differing opinions and objectives and arrive at its recommendations. On the Net Neutrality continuum, the Committee has sought to carve its own path in comparison to international responses. India is the land of Buddha who preached the Middle Path. Some tenets of His Eightfold Middle Path are important - right understanding, right thought, right speech, right action, right mindfulness and right efforts. In the context of Net Neutrality, the approach of the Committee has been as follows:

i. Right Understanding – Understanding needs of all stakeholders, their views and concerns, participative policy formulation

ii. Right Thought – Build and support an open, free, innovative, non-discriminatory and inclusive Internet

iii. Right Speech – No throttling and blocking of the lawful content on the net. Support freedom on the Internet with reasonable safeguards within constitutional parameters.

iv. Right Action – Enshrine core principles of Net Neutrality in current operable mechanism. Use well established processes for implementation, enforcement and oversight

v. Right Mindfulness – Provide for reasonable and legitimate traffic management but disallow paid prioritisation. Prescribe and ensure right QOS and transparency requirements

vi. Right Livelihood – Promote innovation as well as investment. User rights and business models align to deliver progress. Test tariffs against core principles of Net Neutrality

vii. Right Concentration – Keep watch on disruptive changes that technology brings and adapt. Level playing issues need level headed approach

viii. Right Efforts – Leave infrastructure development and application or content development to those who are best capable of doing it. Regulatory boundaries between the two should be finely calibrated. Build capacity and capability within.

16.5 In order to follow this Middle Path, in order to explore the best possible options to create a virtuous cycle, we must embrace change and move forward and towards Dharma i.e. maintaining transparency, neutrality, privacy, security and the democratic fabric of the Internet. At times, philosophy provides answers to the larger questions of freedoms, equality and choice raised by disruptions through advancements in technology and commerce. The Committee hopes that this philosophy has imbued its approach to its recommendations on the issue of neutrality of the Internet.

CHAPTER 17

SUMMARY OF RECOMMENDATIONS

"Grant me the serenity to accept the things I cannot change, the courage to change the things I can, and the wisdom to know the difference."

— REINHOLD NIEBUHR

While the recommendations with context have been provided in various chapters of the report, same are being summarized below for the sake of convenience-

1. The Committee unhesitatingly recommends that "the core principles of Net Neutrality must be adhered to."

2. The international best practices along with core principles of Net Neutrality will help in formulating India specific Net Neutrality approach. India should take a rational approach and initiate action in making an objective policy, specific to the needs of our country. The timing for this is apt, taking into consideration the exponential growth of content and applications on the Internet.

3. Innovation and infrastructure have both to be promoted simultaneously and neither can spread without the other. The endeavor in policy approach should be to identify and eliminate actions that inhibit the innovation abilities inherent in an open Internet or severely inhibit investment in infrastructure.

4. The primary goals of public policy in the context of Net Neutrality should be directed towards achievement of developmental aims of the country by facilitating "Affordable Broadband", "Quality Broadband" and "Universal Broadband" for its citizens.

5. User rights on the Internet need to be ensured so that TSPs/ISPs do not restrict the ability of the user to send, receive, display, use, post any legal content, application or service on the Internet, or restrict any kind of lawful Internet activity or use.

6. OTT application services have been traditionally available in the market for some time and such services enhance consumer welfare and increase productivity. Therefore, such services should be actively encouraged and any impediments in expansion and growth of OTT application services should be removed.

7. There should be a separation of "application layer" from "network layer" as application services are delivered over a licensed network.

8. Specific OTT communication services dealing with messaging should not be interfered with through regulatory instruments.

9. In case of VoIP OTT communication services, there exists a regulatory arbitrage wherein such services also bypass the existing licensing and regulatory regime creating a non-level playing field between TSPs and OTT providers both competing for the same service provision. Public policy response requires that regulatory arbitrage does not dictate winners and losers in a competitive market for service provision.

10. The existence of a pricing arbitrage in VoIP OTT communication services requires a graduated and calibrated public policy response. In case of OTT VoIP international calling services, a liberal approach may be adopted. However, in case of domestic calls (local and national), communication services by TSPs and OTT communication services may be treated similarly from a regulatory angle for the present. The nature of regulatory similarity, the calibration of regulatory response and its phasing can be appropriately determined after public consultations and TRAI's recommendations to this effect.

11. For OTT application services, there is no case for prescribing regulatory oversight similar to conventional communication services.

12. Legitimate traffic management practices may be allowed but should be "tested" against the core principles of Net Neutrality. General criteria against which these practices can be tested are as follows:

    a) TSPs/ISPs should make adequate disclosures to the users about their traffic management policies, tools and intervention practices to maintain transparency and allow users to make informed choices

    b) Unreasonable traffic management, exploitative or anti-competitive in nature may not be permitted.

c) In general, for legitimate network management, application-agnostic control may be used. However, application-specific control within the "Internet traffic" class may not be permitted.

d) Traffic management practices like DPI should not be used for unlawful access to the type and contents of an application in an IP packet.

e) Improper (Paid or otherwise) Prioritization may not be permitted

f) Application-agnostic congestion control being a legitimate requirement cannot be considered to be against Net Neutrality. However application-specific control within the "Internet traffic" class may be against the principles of Net Neutrality.

g) Mechanism to minimize frivolous complaints will be desirable.

13. Traffic management is complex and specialized field and enough capacity building is needed before undertaking such an exercise.

14. CDN is an arrangement of management of content as a business strategy and does not interfere with others business. Making available one provider's CDN to others on commercial terms is a normal commercial activity. It should at best be covered under law related to unfair trade practice.

15. Managed services are a necessary requirement for businesses and enterprises, and suitable exceptions may be made for the treatment of such services in the Net Neutrality context.

16. This Committee refrains from making any specific recommendation on search-neutrality, however, flags this issue as a concern for public policy.

17. Tariff plans offered by TSPs/ISPs must conform to the principles of Net Neutrality set forth in guidelines issued by the Government as Licensor. TRAI may examine the tariff filings made by TSPs/ISPs to determine whether the tariff plan conforms to the principles of Net Neutrality.

18. Content and application providers cannot be permitted to act as gatekeepers and use network operations to extract value in violation of core principles of Net Neutrality, even if it is for an ostensible public purpose.

19. A clause, requiring licensee to adhere to the core principles of Net Neutrality, as specified by guidelines issued by the licensor from time to time, should be incorporated in the license conditions of TSP/ISPs. The guidelines can

describe the principles and conditions of Net Neutrality in detail and provide applicable criteria to test any violation of the principles of Net Neutrality.

20. New legislation, whenever planned for replacing the existing legal framework, must incorporate principles of Net Neutrality. Till such time as an appropriate legal framework is enacted, interim provisions enforceable through licensing conditions as suggested by the Committee may be the way forward.

21. National security is paramount, regardless of treatment of Net Neutrality. The measures to ensure compliance of security related requirements from OTT service providers, need to be worked out through inter-ministerial consultations.

22. Suggested enforcement process is as follows:

(i) Core principles of Net Neutrality may be made part of License conditions and the Licensor may issue guidelines from time to time as learning process matures.

(ii) Since Net Neutrality related cases would require specialized expertise, a cell in the DoT HQ may be set up to deal with such cases. In case of violations, the existing prescribed procedure may be followed. This would involve two stage process of review and appeal to ensure that decisions are objective, transparent and just.

(iii) Tariff shall be regulated by TRAI as at present. Whenever a new tariff is introduced it should be tested against the principles of Net Neutrality. Post implementation, complaint regarding a tariff violating principle of Net Neutrality may be dealt with by DoT.

(iv) Net Neutrality issues arising out of traffic management would have reporting and auditing requirements, which may be performed and enforced by DoT.

(v) QoS issues fall within the jurisdiction of TRAI. Similarly reporting related to transparency requirements will need to be dealt with by TRAI. TRAI may take steps as deemed fit.

23. Enforcing Net Neutrality principle is a new idea and may throw up many questions and problems as we go along. For this purpose, an oversight process may be set up by the government to advise on policies and processes,

review guidelines, reporting and auditing procedures and enforcement of rules.

24. Capacity building through training, institution building and active engagement with stakeholders is essential. In order to deal with the complexities of the new digital world, a think-tank with best talent may also be set up.

ANNEXURE-I

NOTIFICATION OF GOVERNMENT

Government of India
Ministry of Communications & IT
Department of Telecommunications
New Delhi-110001

No. 12-30/NT/2015/OTT Dated 19.01.2015

Subject: Constitution of Committee on net-neutrality.

A committee consisting of following members has been constituted with the approval of Competent Authority on net-neutrality :

1.	Shri A.K. Bhargava, Member (T)	-	Chairman
2.	Shri A.K. Mittal, SrDDG, TEC	-	Member
3.	Shri Shashi Ranjan Kumar, Jt. Secy (A)	-	Member
4.	Shri V. Umashankar, Jt. Secy.(T)	-	Member
5.	Shri Narendra Nath, DDG(Security)	-	Member
6.	Shri R.M. Agarwal, DDG(NT)	-	Member & Convenor

Terms of Reference of the committee are as follows:

1. To examine the pursuit of Net Neutrality from a public policy objective, its advantages and limitations.
2. To examine the economic impact on the telecom sector that arises from the existence of a regulated telecom services sector and unregulated content and applications sector including over-the-top (OTT) services.
3. To examine, assess and specify qualifications on the applicability of the principal of net-neutrality from the security, traffic management, economic, privacy and other stand-points.
4. To recommend overall policy, regulatory and technical responses in the light of examination and assessment of the issues in the first three terms of reference.

First meeting of the committee is scheduled on 21.01.2015 at 16:00 hrs in the chamber of Member(T)

Copy to:

1. Sr PPS to Secretary(T): For kind information pl.
2. Sr PPS to Member(T): For kind information & n/a pl.
3. SS(T)/ SrDDG(TEC)/Jt Secy(A)/ Jt Secy (T)/ DDG(Security): For kind information & making it convenient to attend the meeting on 21.01.2015

---sd---
(R.M. Agarwal)
DDG (NT)

ANNEXURE-II
LIST OF INVITEES / PARTICIPANTS

CIVIL SOCIETY/ ACADEMIA / MEDIA	
1.	Centre for Internet and Society
2.	Software Freedom Law Centre
3.	Akshara Foundation
4.	Internet Democracy Project
5.	Digital Empowerment Foundation
6.	IT for Change (ITfC)
7.	Media for Change
8.	National Foundation of Citizen Rights
9.	Medianama.com
10.	PLR Chambers
11.	Mobilelaw.Net
12.	LEGAL ERA
13.	Seth Associates
14.	National Law School of India University
15.	ICMR
16.	Tele Users Group of India(TUGI)
17.	Consumer Unity & Trust Society(CUTS)
18.	Pacific Telecommunications Council India Foundation (PTC India Foundation)
19.	Savetheinternet
20.	Press Club of India
21.	Ford Foundation
22.	Indian Institute of Technology Delhi
23.	National Law University, New Delhi
24.	Indian Institute of Management, Ahmedabad
25.	Delhi School of Economics, New Delhi
26.	Shri Ram College of Commerce, New Delhi
27.	Centre for Digital Economy Policy research / Dept of Mgmt Studies,IIT Delhi

28.	AJK Mass Communication Research Centre, Jamia Milia University, New Delhi
29.	ISOC
30.	APNIC
31.	India.com
32.	B.K. Syngal, Dua Consulting
33.	Legal and academic expert
34.	DSCI
35.	SFLC
36.	Naresh Ajwani
37.	World Wide Web Foundation
38.	Oxford Internet Institute
MULTI-STAKEHOLDER ADVISORY GROUP	
Government	
39.	Secretary, DeitY
40.	JS (CT-CS & PP & R), Ministry of External Affairs
41.	Joint Secretary (P&A), Ministry of Information & Broadcasting
42.	Joint Secretary(T), Department of Telecommunications
43.	Director, National Security Council Secretariat
44.	JS (PS-II), Ministry of Home Affairs
45.	Joint Secretary, Trade Policy Division, Department of Commerce
46.	Deputy LA, Department of Legal Affairs
Private Sector	
47.	Mr. Sujith Haridas, Deputy Director General, Confederation of Indian Industry (CII)
48.	Mr. Vikram Tiwathia, Member, Communications & Digital Economy Committee, Federation of Indian Chamber of Commerce & Industry (FICCI)
49.	National Association of Software and Services Companies (NASSCOM)
50.	Associated Chamber of Commerce and Industry in India (ASSOCHAM)
51.	Mr. Rajesh Chharia, President, Internet Service Providers' Association of India (ISPAI)
52.	Mr. Rajan S Mathews, Director General, Cellular Operators Association of India (COAI)

53.	Dr. Subho Ray, President, Internet and Mobile Association of India (IAMAI)
54.	Mr. Pankaj Mohindroo, National President, Indian Cellular Association (ICA)
55.	NK Goyal ,Chairman, Telecom Equipment Manufacturers Association (TEMA)
56.	Association of Unified Telecom Services Providers of India (AUSPI)
57.	Mr. Tapan K Patra, Director, Association of Competitive Telecom Operators (ACTO)
58.	Dr. Kamlesh Bajaj, Chief Executive Officer, Data Security Council of India (DSCI)
59.	CMAI
Civil Society	
60.	Director, Centre for Science Development and Media Studies (CSDMS)
61.	Mr. Osama Manzar, Director & Founder, Digital Empowerment Foundation (DEF)
62.	Mr. Parminder Jeet Singh, Executive Director, IT for Change (ITfC)
63.	Pranesh Prakash., Executive Director, Centre for Internet and Society (CIS)
64.	Director, Internet Society (ISOC)
65.	Mr. Prasanth Sugathan, Counsel, Software Freedom Law Centre
66.	Ms. Subi Chaturvedi, Founder & Hon. Managing Trustee, Media for Change
Academia	
67.	Prof. D Manjunath, Indian Institute of Technology Bombay
68.	Professor Huzur Saran, Indian Institute of Technology Delhi
69.	Dr. V. Sridhar , International Institute of Information Technology, Bengaluru
70.	Ms. Chinmayi Arun, Assistant Professor of Law and Research Director, National Law University, New Delhi
71.	Professor Rekha Jain, Indian Institute of Management, Ahmedabad
72.	Professor Rahul De', Indian Institute of Management, Bengaluru
73.	Centre for WTO Studies (CWTOS), IIFT

Technical Community	
74.	CEO, National Internet Exchange of India (NIXI)
75.	DG, National Informatics Centre (NIC)
76.	Scientist 'G', Indian Computer Emergency Response Team (I-CERT)
77.	Executive Director,Centre for Development of Advanced Computing (C-DAC)
78.	Joint Secretary (Internet Governance), DeitY
ASSOCIATIONS	
79.	AUSPI
80.	CMAI
81.	COAI
82.	ISPAI
83.	NASSCOM
84.	OSPAI
85.	TEMA
86.	ACTO (Association of Competitive Telecom Operators)
87.	IAMAI
88.	ITU-APT Foundation of India
89.	Cyber Café Association of India
90.	ICA
91.	CII
92.	ASSOCHAM
93.	FICCI
94.	Telecom System Design Manufacturers Association (TSDMA)
95.	GSMA
96.	PHD Chambers
97.	CABLE OPERATORS FEDERATION OF INDIA (COFI)
98.	News Broadcasters Association(NBA)
99.	CEAMA
100.	M2M Paper
101.	TAIPA
102.	Star India
103.	Indian Broadcasting Foundation

OVER-THE-TOP SERVICE PROVIDERS	
E-commerce	
104.	Flipkart
105.	Indiatimes Shopping
106.	Letsbuy.com
107.	Snapdeal
108.	aaramshop.com
109.	Jabong
110.	PayU
111.	Groupon
112.	Zomato
113.	PayTM
114.	Amazon
115.	ebay
116.	one 97
117.	CommonFloor.com
Social Networking	
118.	Viber
119.	Google
120.	Facebook
121.	Skype
Travel	
122.	Zoomcar
123.	Cleartrip
124.	MakeMyTrip India Pvt. Ltd
125.	Travelocity
126.	Yatra.com
Others	
127.	Air2Web
128.	IMI Mobile
129.	india games limited
130.	Inspira
131.	packet shaper technologies

132.	Naukri.com
133.	Owntastic
134.	Coupik.com
135.	adonstream.com
136.	Zapak
137.	Hungama
138.	ibibo web
139.	Edureka
140.	Localbanya.com
141.	Triveous
142.	NetApp India pvt. Ltd.
143.	Intel
144.	Smartprix.com
145.	Microsoft
TELECOM SERVICE PROVIDERS / INTERNET SERVICE PROVIDERS	
146.	Aircel
147.	Airtel
148.	BSNL
149.	IDEA Cellular Limited
150.	MTNL
151.	Reliance Communication Ltd
152.	Reliance Jio Infocomm Ltd
153.	SSTL
154.	Tata TeleService Limited
155.	Vodafone
156.	Uninor
157.	Videocon
158.	Tata Communications Limited
159.	Data Infosys Limited
160.	Software Technology Parks of India,
161.	Opto Network Pvt. Ltd
162.	Siti Cable Network Limited
163.	Dishnet Wireless Ltd
164.	Vodafone Spacetel Limited

ANNEXURE-III
LIST OF RESPONSES RECEIVED

SL. No.	Organisation/ Individual
1	AUSPI - Association of Unified Telecom Service Providers of India
2	NASSCOM - National Association of Software and Service Companies
3	ISPAI - Internet Service Providers Association of India
4	ACTO - Association of Competitive Telecom Operators
5	ASSOCHAM
6	GSMA
7	IAMAI - Internet and Mobile Association of India
8	COAI - Cellular Operators Association of India
9	OSPAI - Other Service Providers Association of India
10	IAFI - ITU-APT Foundation of India
11	Idea Cellular
12	Vodafone
13	Reliance
14	Aircel
15	MTNL
16	MTS
17	Uninor
18	TATA Communications
19	Mr Rajeev Chandrasekhar, MP, Rajya Sabha
20	Dr. Jitendra Awhad, MLA, Maharashtra
21	MediaNama.com
22	S.C.Bharadwaj
23	DUA Consulting Pvt Ltd
24	National Law University (NLU- CCG)
25	Telecom Watchdog
26	Infocom Think Tank
27	Dr D. Manjunath IIT Bombay
28	Bhaskaran Raman Prof IIT Bombay & 52 others

29	IT for change
30	Mr Mahesh Sharma, MP
31	World Wide Web Foundation
32	DS Cell, DoT
33	DDG AS
34	CEO NIXI
35	TRAI
36	Facebook
37	Aravind Ravi Sulekha
38	Jame Wilwo
39	Rahul Chavan
40	Bhuvnesh Thakar
41	Ashok Kumar
42	N K Mathur (Infocomm Think Tank)
43	Guns Down
44	navdesk vikatan (Ananda Vikatan Publishers Pvt Ltd)
45	tushar bhandari
46	Samanvai Chaturvedi
47	Anil Kumar
48	Abhijeet Apsunde
49	Vivek Ananth
50	Amitabh Satyam
51	Gaurav Gautam
52	Srinath Beldona
53	Iza Maryam
54	Akshat Sahu
55	Abhinav Juneja
56	Kalyan Tudy
57	Ish Goel
58	Deep Bhatnagar
59	Raghvendra sudhir
60	Kumar Suyash
61	Srivatsa Sharma

62	Peter Dunn
63	K S Raju
64	Astha Vyas
65	Tejas thakker
66	Aditya Kashyap
67	Yogesh G Krishnan
68	Aditya Rai
69	Karthik Keyan
70	Dhananjay Devasper
71	prateek singhal
72	Ritesh Singh Sikarwar
73	pritam biswas
74	Ashwani Kumar Singh
75	Shailendra Bhide
76	Abhijeet Apsunde
77	ankush chopra
78	Shanmugavel
79	Aastik Bhushan
80	Raman dhillon
81	Abhay Sehgal
82	Gurpreet Singh
83	Arun Jayaprakash
84	Siddharth Coelho-Prabhu
85	Sadananda Aithal
86	Sagar Dhotre
87	Yogi Raj
88	Tathagata Satpathy (Member of Parliament Lok Sabha Dhenkanal Orissa)
89	Sauhard Nagpal
90	Rahul Verma
91	Change.org
92	Prashant Verma
93	Premal Shah

94	Ramakant Pradhan
95	Shivam Tripathi
96	S.K.Bhanja
97	Kamlesh Jain
98	Sai Sarkar
99	Nishant Saxena
100	Abhishek
101	Dhruv Aggarwal
102	Shashank Kothi
103	Ajit Raina
104	Change.org
105	Shubham Agarwalla
106	Naveed M
107	Shyam Sundar
108	Abhishek Srivastava
109	Mrigesh Priyadarshi
110	Abhishek kumar
111	Abhi Kumar
112	Pravin
113	Vipin Nair
114	Akhil Singh
115	Anurag
116	Purbey
117	Prashant Priyadarshi
118	Matu Agarwal
119	Paritosh Mathur
120	Chethansagar
121	Shashank Kothi
122	Girish Lolage
123	Aswin
124	Sandeep Verma
125	parth patel
126	Piravi Perumal, Chairman, Consumer Watchdog

127	K R Prakash
128	Sandeep Mohanty
129	Vaidyanathan Vallaban
130	Narendra K V
131	Shravan Vallaban
132	Aurif Bin Thaj
133	Amarnath R
134	Chaitanya Kamat
135	Dinesh Itankar
136	Harpal
137	Ketan gupta
138	Farhaan Ginwala
139	Sridharan S.
140	Aditya Gupta
141	Mita Shenai

ANNEXURE-IV
SUGGESTED GUIDELINES

1. The guidelines specified herein may apply to all licensed service providers authorised to provide internet services within the jurisdiction of India, under various licensing regimes of (UASL/ISP/UL etc.) of Government of India.
2. The licensees will follow the Net Neutrality core principles.
3. An indicative list of criteria to be used for testing the core principles are described below:

User Rights	Subject to lawful restrictions, the fundamental right to freedom of expression and non-discriminatory access to the internet will apply
Content	Right to create and to access legal contents without any restrictions
Application & Services	Freedom to create and access any Application & Service
Devices	Freedom to connect all kinds of devices, which are not harmful, to the network and services
Blocking	No blocking of any lawful content
Throttling	No degradation of internet traffic based on the content, application, services or end user
Prioritization	No paid prioritization which creates discrimination
Transparency	Transparent disclosure of information to the users for enabling them to make informed choice
Competition	Competition to be promoted and not hindered
Congestion and Traffic Management	Reasonable and legitimate traffic management subject to ensuring core principles of Net-Neutrality
QoS	QoS to be ensured as per best practices and national regulations
Interconnection	Broad monitoring to ensure Interconnection happens between ISPs/CP/APs as per need and regulations, and intervention only when needed.
Privacy	Online privacy of the individuals to be ensured
Security	Scrupulously follow the extant security guidelines
Data Protection	Disclosure of user information only with consent of the user or on legal requirements

Note:

(i) These guidelines are not applicable for OTT application providers and managed services provided by TSPs.
(ii) Enforcement process will be as prescribed by DoT/TRAI from time to time.

GLOSSARY

AGR	Adjusted Gross Revenue
BEREC	Body of European Regulators for Electronic Communications
BSO	Basic Service Operator
CDN	Content Distribution Network
CDR	Call Data Records
CMSO	Cellular Mobile Service Operator
CPE	Customer Premises Equipment
DOS	Denial of Service
DOT	Department of Telecom
DPI	Deep Packet Inspection
DRM	Digital Rights Mechanism
E.164	ITU-Recommendation : The International Public Telecommunication Numbering Plan
E-Commerce	Electronic Commerce, also known as eCommerce
FCC	Federal Communications Commission
FDI	Foreign Direct Investment
GSM	Global System Mobile
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information Communication and Technology
IETF	Internet Engineering Task Force
ILDO	International Long Distance Operator
IMT-2000	International Mobile Telecommunications for the year 2000 (3G)
IoT	Internet of Things
IP	Internet Protocol
IPDR	IP Data Records
IPTV	Internet Protocol Television
ISP	Internet Service Provider
IT Act	Information Technology Act
ITU	International Telecommunication Union
ITU-T G.1010	ITU-T Recommendation on End user multimedia QoS categories

LEA	Law Enforcing Agency
LI	Lawful Interception
LSA	Licensed Service Area
LTE	Long Term Evaluation
LTSP	Licensed Telecom Service Provider
MAG	Multistake Advisory Group
MB	Mega Byte=1024 Kbytes, 1 Kbyte=1024 Bytes
MOU	Minutes of Usage
NIXI	National Internet Exchange of India
NLDO	National Long Distance Operator
NN	Network Neutrality, popularly known as Net Neutrality
NPT	Norwegian Post and Telecommunications Authority
NTIPRIT	National Telecommunication Institute for Policy Research, Innovation and Training
OSP	Other Service Provider
OTT	Over –The-Top
P2P	Point to Point
PLMN	Public Land Mobile Network
PMRTS	Public Mobile Radio Trunk Service
PSTN	Public Switched Telephone Network
QoS	Quality of Service
SIP	Session Initiation Protocol
SLA	Service Level Agreement
SMS	Short Messaging Service
TERM	Telecom Enforcement Resource Management
TRAI	Telecom Regulatory Authority of India
TSP	Telecom Service Provider
UASL	Unified Access Service Licence
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network

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