Response to TRAI Consultation Paper on Regulatory Framework for Over-the-top (OTT) Services

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Rekha Jain Radha Ravattu Rishabh Dara
Pranesh Prakash

Table of contents

1. Executive Summary

The principle objective of net neutrality is that "all the Internet traffic has to be treated equally without any discrimination"; but this has had different interpretations over varied contexts. While the discourse in India has often treated net neutrality as a singular policy construct, we break down net neutrality to

its various components. We then individually contextualise each component to the unique characteristics of the Indian telecommunications industry such as dependence on wireless internet access, the fragmented and non-contiguous distribution of spectrum, high competition between TEL-SPs and low digital literacy. The evolving nature of markets and networks are also considered while taking into account various public policy perspectives.

In this submission, we also argue for the need to introduce reasonable regulatory parity between functionally equivalent communications services provided by OTT-SPs and TEL-SPs. We compare the regulations for OTT-SPs under the Information Technology Act 2000 (as amended) with the regulations for TEL-SPs under the Telegraph Act 1885 (as amended), the license agreements (UL, UASL, ISP-L) and TRAI Regulations. Based on an analysis of the current laws and regulations, we suggest how TRAI needs to intervene to create this regulatory parity (for example in areas such as privacy, spam/UCC, interception etc.).

Through the above analysis, we recommend an overall regulatory framework that should be adopted by the Government. The framework takes a nuanced approach to various components of net neutrality, contextualised to India, and also attempts to bring reasonable regulatory parity. Instead of compartmentalising TEL-SPs and OTT-SPs as two distinct actors, the recommended framework considers a two-layered approach which recognises that there is an overlap between TEL-SPs and OTT-SPs. The first layer comprises of network and infrastructure (collectively called the network layer) and the second layer comprises of services and applications (collectively called the service layer).

The framework further divides the service layer into "Non-IP Services", "Specialised Services" and "Internet Based Services". The concept of "Specialised Services", which is borrowed from the European Union, refers to traditional services that have migrated to an IP architecture such as facilities-based VoIP calls to PSTN and IPTV, and are either logically distinct from the Internet or have special needs which the "best efforts" delivery of the general Internet cannot satisfy. This concept helps in applying different evaluation criteria to functionally equivalent "Non-IP Services", "Specialised Services" and "Internet Based Services". In the framework, "Specialised Services" are also recognised as an exception to net neutrality. The concept of "Specialised Services" also helps to create an incentive for continued investment in underlying infrastructure by TEL-SPs.

This framework has helped us to bring a more balanced approach from the perspective of both TEL-SPs and OTT-SPs, while also taking into account technological convergence. It has also helped us to bring a more nuanced approach to various issues comprising net neutrality such as zero rating, paid prioritisation etc. We have considered best practices from different international regimes and the pros and cons during implementation in order to determine the exceptions and boundaries of net neutrality that should be adopted in India.

2. Mandate of TRAI & Framing of Issues

Framing of Issues: Framing of issues is an important part of the policy development process. Recommendations that emerge from a consultation are largely driven by the way issues are framed. In the present consultation, the issues and questions have not been framed neutrally. For example, Question 8 raises a question specifically about the ETNO proposal, while ignoring the other regulations discussed in the same chapter. It is recommended that TRAI take greater care in drafting the issues/questions in the future.

Mandate of TRAI: Section 11 of the TRAI Act defines the functions of TRAI. It is submitted that TRAI should recognise the limitations of its mandate and forebear from providing recommendations on aspects that are outside the scope of its authority. For example, many of the concerns raised in the consultation paper, including issues such as regulation of e-commerce websites and competitiveness of brick and mortar establishments, though valid policy issues, are unfortunately strictly outside the scope of TRAI's authority. Likewise, it is strongly stressed that the issue of protecting revenue streams of TEL-SPs is outside the scope of TRAI's authority. It is recommended that TRAI should recognise the limitations of its mandate while providing its final recommendations to the Central Government.

Question 19: What steps should be taken by the Government for regulation of non-communication OTT players? Please comment with justifications.

Question 16: What framework should be adopted to encourage India-specific OTT apps? Please comment with justifications.

It is suggested that TRAI refrain from providing recommendations on regulation of non-communication OTT players. The mandate of regulating such services is that of the Parliament by amending the IT Act and its rules thereunder. While recognising the limitations of its own mandate, TRAI may recommend the need for a new converged regulator and a new converged legislation combining various aspects of Information Technology, Telecommunications and Broadcasting. The issues brought to the forefront by the rise of OTT services require a major overhaul of many related legislations and cannot be entirely addressed by incremental efforts of TRAI.

Question 5: Do you agree that imbalances exist in the regulatory environment in the operation of OTT players? If so, what should be the framework to address these issues? How can the prevailing laws and regulations be applied to OTT players (who operate in the virtual world) and compliance enforced? What could be the impact on the economy? Please comment with justifications.

Question 7: How should the OTT players offering app services ensure security, safety and privacy of the consumer? How should they ensure protection of consumer interest? Please comment with justifications.

Insofar as the above consultation questions concern non-communication OTT apps, these questions also exceed the mandate of TRAI.

3. Need to Contextualise Issues

Question 9: What are your views on net-neutrality in the Indian context?

One is not simply "for" net neutrality or "against" net neutrality - It's far more complicated! One has to have a nuanced look at the various components[1] of net neutrality, and contextualise these to the unique characteristics of the Indian telecommunications industry and the evolving nature of the technology, networks and markets. Each of these components may relate to multiple public policy issues such as competition, innovation, national security, freedom of expression etc, making any for-or-against stance simplistic and exclusionary.

However, over time, net neutrality has become a political issue wherein a for-or-against stance is necessary. Keeping that in mind, TRAI must, in essence, endorse the overall concept of net neutrality and the open nature of the internet. Any contrary decision could send a wrong signal to activists, investors and friendly countries. Nevertheless, while endorsing net neutrality and an open Internet, TRAI must not fall into the trap of treating net neutrality as a non-violable religion. TRAI must simultaneously recognise that net neutrality, as a policy construct, is not well defined and has different interpretations in different contexts. Specifically, in India, the interpretation of "net neutrality" is definitely a function of the Indian context.

3.1. Uniqueness of Indian Context

Constructs (such as "net neutrality") developed in foreign policy literature require to be contextualised to the Indian context and should not be adopted directly into the Indian policy regime. India is a one-of-its-kind market with unique characteristics. Some of the unique characteristics of the Indian telecommunications market include:

1. Dependence on wireless internet access (in contrast to wireline broadband)
2. Limited, fragmented and non-contiguous spectrum available with Indian TEL-SPs
3. Low spectrum/population
4. High cost of spectrum (price per MHz. per capita)
5. Low broadband penetration; Low penetration of 3G and 4G services
6. Lack of content in vernacular languages
7. Most content is hosted outside the country; most data is routed outside the country
8. Low enforcement of IT Act with foreign intermediaries
9. National security concerns are higher in India than most other countries

[1]Components of net neutrality may include no-throttling, no-paid prioritisation, no-blocking, no-discrimination, no charging of remote OTTs, no differential pricing etc. These are discussed in detail in a later section of this response.

10. High competition between TEL-SPs; relatively low switching costs
11. Perceived relevance of Internet to a large number of people
12. Low levels of digital literacy
13. Perceived equivalence of Internet and Facebook+Whatsapp
14. High sharing of passive and active infrastructure

3.2. Evolving nature of Technology, Networks and Markets

Technology, networks and markets are constantly evolving at a very fast rate. We capture a few important aspects that TRAI should keep in mind while developing its recommendations:

- **Convergence & 4G Networks:** With the advent of 4G, networks have finally transitioned from circuit switched networks to fully packet based networks. Like internet based services (e.g. Skype calls), now traditional services (e.g. PSTN voice calling) are also capable of being delivered over an IP based network and may share the same infrastructure as internet based services. India has also moved forward to the Unified Licensing regime in which, the Unified License (with authorisation for Access Services) now allows for interconnection between IP Telephony and the PTSN/PLMN network.
- **Evolving Nature of Market & Network:** The historical assumption of a TEL-SP only having a relationship with the local subscriber and peering/ interconnecting networks is no longer true. Over time, the market for a last-mile network has evolved into a multi-sided market. Besides the "local" side of delivery of internet access services to the subscriber, the TEL-SP also shares a "remote" side with OTT-SPs that are not directly interconnected with the last-mile network. Increasingly, many content providers are now also directly interconnect with last-mile networks through content delivery networks. This evolving nature of the network architecture and market needs to be accounted for in the contextualisation of constructs and issues.

4. Market Failures / Need for Intervention

TRAI, as a regulator, should only intervene in the case of a market failure. In the context of growth of OTT services, the following alleged market failures are identified from the consultation paper and different stakeholder presentations during the open house session.

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
Loss of revenue by TEL-SPs	TEL-SPs	• Revenue loss is primarily be-	No	None

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		cause of substitution of ILD voice services and SMS services. Growth in data revenue is projected to compensate for the revenue lost due to reduction in usage of ILD voice services and SMS services. • OTT traffic is not "free-riding" on the TELSPs' networks since: ▸ Value is created by all parties in the network, resulting in		

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		a cooperation game, and not a simple market where a TEL-SP sells access to subscribers to OTT-SPs. ▸ The OTT-SP generally does not pay the TEL-SP directly because they do not directly connect to the TEL-SPs' networks. Still, OTT-SPs pay their own ISPs ("content		

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		ISPs"), and interconnection charges are settled between content ISPs, transit ISPs, and TEL-SPs through transit and peering agreements.		
Incentive for TEL-SPs to roll out network infrastructure has reduced	TEL-SPs	• Empirical evidence suggests the opposite. TEL-SPs have continued to invest in LTE/ UMTS networks on a large scale despite substitution of facility based voice services by	No	None

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		internet based services. • The services provided by OTT-SPs provide value for the creation and use of the underlying infrastructure. Without OTT-SPs, there is limited need for networks interconnecting with the internet. Therefore, it is an incorrect argument that investment in network infrastructure will reduce as a result of OTT services. • Investment in		

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		network infrastructure can be encouraged by streamlining policy on spectrum management, right of way and interconnection. For example, DoT is yet to finalise rules for spectrum trading and sharing thus preventing the secondary market from reorganising fragmented and non-contiguous spectrum. Addressing these issues can increase		

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		investment in network infrastructure.		
Non-level regulatory compliances for TEL-SPs and OTT-SPs	TEL-SPs	• This is a cause of concern as there are non-level regulatory compliances for TEL-SPs and OTT-SPs even though they provide functionally equivalent services, which creates an non-level playing field. • While OTT-SPs are regulated under the IT Act, the regulatory compliances for OTT-SPs are not equivalent to those	Yes. TRAI should provide recommendations on this subject under Section 11(1)(a)(iv) of the TRAI Act.	There is need for intervention to introduce regulatory parity between functionally equivalent services provided by TEL-SPs and OTT-SPs. Refer to Section 7 for suggested interventions.

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		for TEL-SPs.		
Application/ service specific discrimination by TEL-SPs	OTT-SPs and Civil Society	• Limited competition between last-mile TEL-SPs and non-zero switching costs allow TEL-SPs to function as gatekeepers. This power can be exploited by TEL-SPs to discriminate (in the form of pricing, throughput, priority, access, etc.) between different content, classes of content, or source/ destination of the con-	Yes. TRAI should provide recommendations on this subject under Section 11(1)(a)(ii) of the TRAI Act.	Net neutrality should be codified and enforced in the license agreements between TEL-SPs and the Central Government. Refer to Section 5 in which various components of net neutrality have been analysed in detail.

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		tent, thus distorting competition between services, harming consumers, impacting freedom of speech and expression, and harming openness, diversity, and innovation by Internet content and communications providers. • How net neutrality needs to be contextualised to the Indian context and other policy issues concerning net neutrality are dis-		

Alleged Market Failure	Intervention Requested By	Analysis (Summary)	Need for Intervention	Suggested Intervention
		cussed in the following sections.		

In summary, intervention by TRAI is urgently required for:

1. introducing reasonable regulatory parity between functionally equivalent services provided by TEL-SPs and OTT-SPs; and
2. introducing net neutrality contextualised to the unique characteristics of the Indian telecommunications industry.

5. Public Policy Concerns

For each of these two interventions, there are additional policy concerns, which should be considered by TRAI in delivering its recommendations:

5.1. Intervention for net neutrality

Perspective	Rationale for net neutrality	Counter Arguments	Analysis
Freedom of Expression & Human Rights	• TEL-SPs should not be allowed to decide which content or service should get restricted or get priority. • All expressions should be treated equally and delivered on a best effort basis.	• There are reasonable restrictions to free expression. Non-neutral intervention may be required for prevention of spam, denial of service attacks, unsolicited communication, network management etc.	• A framework can be worked out for net neutrality that incorporates reasonable exceptions thus addressing concerns of both sides.
Competition Policy	• Last mile networks are "gatekeepers" as competition in net-	• India is a competitive market with low switching costs.	• The construct of net neutrality should not be directly imported from

Perspective	Rationale for net neutrality	Counter Arguments	Analysis
	works is restricted and switching costs are not zero. TEL-SPs should not be allowed to use their dominant position in networks to influence services. • Vertical agreements violating net neutrality have the potential to cause an adverse affect on competition.	• Competition in the Indian market is substantially different from its western counterparts. The unique characteristics of the Indian telecommunications industry are described in a previous section.	the western context. Its various components and exceptions should be evaluated in the Indian context.
Innovation & Entrepreneurship	• Any new OTT service is able to compete with an established service at an equal footing on the internet. This model should not be disrupted. • The internet has promoted innovation due to the fact that there are very limited regulations.	• Net neutrality is a deviation from the free market mechanism where TEL-SPs and OTT-SPs would be free to negotiate contracts and develop new business models. • This might hamper innovation at the networking level and at the TEL-	• Net neutrality regulations should create minimal regulatory interference and should have low compliance costs. It should seek to minimally impact innovation at both the OTT-SP level, as well as at the TEL-SP level.

Perspective	Rationale for net neutrality	Counter Arguments	Analysis
		SP business model level.	
Signal to Foreign Countries and Investors	• Endorsing net neutrality will send an investor friendly signal internationally to the business community that India is pro-Freedom-of-Expression and pro-Innovation. • Investors may be discouraged to participate in India's flagship programmes of Digital India and Make in India in the absence of net neutrality rules that ensure innovation and competitiveness in the service layer.	• Endorsing net neutrality would send a discouraging signal to the Telecommunications Industry in India which has invested substantial amounts in building infrastructure. • Companies that have operations in India could take advantage of tie-ups with local TELSPs to unfairly compete against foreign companies.	• Net neutrality is not only a regulatory issue but also a political and business issue and needs to be considered in that context.
Universal Service	• Universal service means universal, affordable, and accessible, and included in that implicitly is the require-	• Strict definition of net neutrality would prevent service-specific zero-rating, which enables	• Net neutrality regulations should not hamper increasing access, as long as that doesn't cause long-

Perspective	Rationale for net neutrality	Counter Arguments	Analysis
	ment that the access be unfettered.	greater access to poorer populations; local IXP/ peering-based zero-rating provides incentives in some cases to locate content in India, which helps the cause of universal access. • OTT-SPs do not contribute to the Universal Service Obligation Fund. • Most OTT-SPs do not provide content in vernacular languages.	term harm to effective competition. Governmental efforts ought to seek to provide universal access to the unfettered Internet.

5.2. Intervention for Regulatory Parity

Perspective	Rationale for Regulatory Parity	Counter Arguments	Analysis
State Concerns (National Security, Taxation etc)	• Lawful interception is a non-negotiable state policy that should be equally enforceable	• Interception of OTT-SPs is already mandated under Section 69 of the IT Act. • The internet is a space for in-	• The framework for lawful interception needs to be targeted and have sufficient safe-

Perspective	Rationale for Regulatory Parity	Counter Arguments	Analysis
	against communication services provided by OTT-SPs and TEL-SPs. • OTT services are being increasingly misused by terrorists and perpetrators of crimes. • TEL-SPs are taxed and share revenue whereas most OTT-SPs do not have such obligations. • Since OTT-SPs and TEL-SPs provide functionally equivalent services, the regulatory compliances for the two should be similar and should not create a non-level playing field with costly regulatory compliances for just TEL-SPs.	novation; any attempt at bringing regulatory parity should only reduce regulations for TEL-SPs and not increase regulations for OTT-SPs. • Regulatory compliances for network creation cannot be attributed to OTT-SPs as they do not operate in that layer. • TEL-SPs are allocated PSTN numbers and allowed to terminate calls on PSTN; while OTT-SPs are not allowed this functionality. This justifies the extra regulatory compliances.	guards to prevent misuse. • Lawful interception should be seriously enforced without exception; but should not create undue burden on small startups. • The existing regulations for TEL-SPs and OTT-SPs have been compared in Section 7 to determine how parity can be introduced. The regulations attributable to the network layer have been delinked from the regulations attributable to the service layer in this comparison.
Consumer Expectations	• Since services provided by	• The consumer is intelligent	• Regulations should en-

Perspective	Rationale for Regulatory Parity	Counter Arguments	Analysis
	OTT-SPs and TEL-SPs are functionally equivalent and substitutable in the minds of the consumer, there is an expectation of similar treatment with respect to issues such as privacy, emergency calling, spam, unsolicited communications, security etc.	and is able to distinguish between different services. • Owing to high competition, the consumer can switch to another provider in case he is dissatisfied with the terms of service. • The IT Act provides regulations for privacy etc.	force minimal standards for emergency calling, UCC etc., that should applicable to all functionally equivalent services.

Question 1: Is it too early to establish a regulatory framework for OTT services, since internet penetration is still evolving, access speeds are generally low and there is limited coverage of high-speed broadband in the country? Or, should some beginning be made now with a regulatory framework that could be adapted to changes in the future?

There is need for intervention by TRAI to bring reasonable regulatory parity between functionally equivalent services provided by OTT-SPs and TEL-SPs. There is is also need for intervention to amend the license agreements of TEL-SPs to introduce terms and conditions that codify and enforce a variant of net neutrality that is contextualised to the unique characteristics of the Indian telecommunications industry.

The preceding table in Section 5 for the different policy issues involved in the present consultation demonstrates that the policy problem is clearly of a "wicked" nature (Rittel & Webber, 1973). The various policy issues are constantly evolving and interdependent on each other; and there is no test for determining whether a solution is right or wrong. To deal with this, we suggest that any interventions by TRAI should be subject to constant review and reconsideration. Further, to make interventions future proof, any instrument adopted by TRAI should preferably be technology neutral.

6. Components of Net Neutrality

In this table, the different components of net neutrality are analysed in the context of the Indian telecommunications industry.

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
Transparency	• Norwegian guidelines provide that "if the physical connection is shared with other services, it must clearly be stated how the capacity is shared between Internet traffic and other services".[@norwegian2010] • The US open order 2015 states that "A person engaged in the provision of broadband Internet access service shall publicly	• Information asymmetry is a market failure, which needs to be corrected so that consumers can make informed choices about the service they use. • Transparency requirements create disincentive to violate remaining net neutrality rules; and make it easy to identify net neutrality violations. • Transparency	• Transparency requirements will impose high regulatory costs on TEL-SPs. • Transparency requirements may make the network more vulnerable to hackers by making operational data available. • Transparency requirements could undermine the effectiveness of network management practices as it	• TRAI should introduce a transparency requirement for standardised reporting of (i) Network management practices; (ii) Commercial terms of service; (iii) Sharing of traffic between internet based services and specialised services; (iv) Exercise of exceptions to net neutrality; (v) Service information

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	disclose accurate information regarding the network management practices, performance, and commercial terms of its broadband Internet access services sufficient for consumers to make informed choices regarding use of such services and for content, application, service, and device providers to develop, market, and main-	requirements will ensure that OTT-SPs have the requisite technical information for providing predictable services using TEL-SP infrastructure. For example, app developers need to know how the data for their apps will be treated. • Transparency requirements increase consumer confidence in the operator. • Transparency require-	would inform people how to circumvent them. • Consumers can not be expected to understand details of network management practices.	including privacy policy and redressal options. • Networks may redact information that may compromise the security and stability of the network only if this information would not be available to a network security expert after reasonable effort. • Reports should be available to the general public for free in a simple and accessible format. • TRAI should

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	tain Internet offerings."[@inc2015] • The US Open Order of 2010 suggests disclosure of network practices (congestion management, application-specific behaviour, device attachment to network, security), performance characteristics (service description, impact of specialised services), and commercial terms (pricing, privacy policy and	ments will increase the effectiveness of the regulator.		compile and publish these reports. • While transparency doesn't automatically result in better-informed consumer choice, since most consumers do not find network management practices easy to understand,[@cooper2015] it is a necessary cost to enable consumers to choose between competing TEL-SPs.

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	redress options). • The US Open Order 2010 report notes that "The rule does not require public disclosure of competitively sensitive information or information that would compromise network security or undermine the efficacy of reasonable network management practices. For example, a broadband provider need not publicly			

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	disclose information regarding measures it employs to prevent spam practices at a level of detail that would enable a spammer to defeat those measures".			
No blocking & No throttling	**Blocking:** • The US Open Order 2015 states that no blocking is allowed. "A person engaged in the provision of broadband Internet access service, insofar as such person is so	**Blocking:** • The concept of open internet is essentially based on the idea that no lawful content or non-harmful device can be blocked from the internet. • Freedom of Expression Issue:	**Blocking:** • A lot of unlawful content is publicly available on the internet. • People may want specific categories to be blocked. For example, the user doesn't want specific con-	**Block:** • TRAI should recommend to DoT that the terms and conditions of the Unified License agreement should be amended to enforce a no-blocking requirement for both in-

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	engaged, shall not block lawful content, applications, services, or non-harmful devices, subject to reasonable network management."[@ofcom2015] **Throttling:** • The US Open Order states that No throttling is allowed. "A person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, shall not impair or degrade lawful In-	TEL-SPs should not wear the hat of the judiciary and be able to decide which content, application or service should be available to the end user. • TEL-SPs may misuse the threat of blocking to extract differential income from different OTT-SPs. • TEL-SPs may block certain services to influence competition and promote their own services. **Throttling:**	tent to be accessible by their children. • Harmful devices which have a negative impact on the security and stability of the network or end user can be easily used. • In the public WiFi networks where the network is shared by large number of people, the sites which consume higher bandwidth will decrease the quality of	coming and outgoing traffic. • This should be subject to the exceptions identified under reasonable network management outlined later in the table. • In all other situations, blocking of content should only be possible under a direction under Section 69A or 79 of the Information Technology Act. [^2] • Networks may block devices

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	ternet traffic on the basis of Internet content, application, or service, or use of a non-harmful device, subject to reasonable network management."[@fcc2015] • The US Open Order report of 2010 recognises that "in some circumstances the distinction between blocking and degrading (such as by delaying) traffic is merely semantic." • The Netherlands law for net	• Throttling is equivalent to blocking since the effective consumption of a service would be reduced if its quality of service is degraded.[@broadbandtvnews2014] • Throttling, if service specific, will allow the TEL-SP to charge OTT-SPs.	other services.[@broadbandtvnews2014] **Throttling:** • Given spectrum constraints (limited, fragmented and non-contiguous), network management practices are extremely important in India. • Not all data requires the same QoS. For example, real time services like voice/ video call require higher priority than non-real time services like email wherein	that do not comply with industry established standards if they have the potential to affect the security and stability of the network. **Throttling:** • Rules for throttling should be similar to blocking. • Throttling should be allowed to deal with the situations identified in reasonable network management later in the table.

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	neutrality states that "of public electronic communications networks over which Internet services are provided and providers of Internet access services hinder or delay any services or applications on the Internet".[@netherlands2012]	Providers	slight jitter is not an impediment. Effective network management may require throttling of non-real time services. • Certain services like torrents for downloading movies consume a lot of network resources effectively degrading the quality of service for more essential services.	
No paid prioritisation	• The US open order 2015 states that paid prioritisation should be banned.	• OTT-SPs with deep pockets will be able to enter into deals with TEL-SPs	• There is a need for prioritisation of public services that require higher	• Paid prioritisation should not be allowed. • CDNs, paid peering, and

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	"A person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, shall not engage in paid prioritization."[@fcc2015] • Paid prioritization defined according to US open order "refers to the management of a broadband provider's network to directly or indirectly favor some traffic over other traffic, including through	to prioritise their data. Smaller competing OTT-SPs will not be able to afford such prioritisation - thus affecting competition and innovation. • 2. is a zero sum game in which prioritisation of some services may have a direct negative impact on other services when there is congestion. • Paid priority agreements can be a threat to	quality of service like emergency health services. • These are free market deals and the regulator should not intervene. • Users can anyway purchase packages for higher bandwidths, which as a result of the zero sum game, have a negative impact on other users. • Certain services like real-time voice calling may require to be prioritised over other services to	other such arrangements should not be considered as prioritisation as they do not change the priority of the data packets. • CDNs and other ASs should be allowed to directly interconnect with NIXI. Currently only licensed ISPs are allowed to interconnect with NIXI. NIXI should be restructured in terms of its composition, and its billing model

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	use of techniques such as traffic shaping, prioritization, resource reservation, or other forms of preferential traffic management, either (a) in exchange for consideration (monetary or otherwise) from a third party, or (b) to benefit an affiliated entity."	non-commercial end users, including individual bloggers, libraries, schools and advocacy organizations. • Paid prioritization may be seen as giving TELSPs an incentive to limit the quality of service provided to non-prioritized traffic.	maintain quality of service. • As an alternative to paid prioritisation, OTT-SPs with deep pockets can use CDNs with closer geographic location to get their data delivered faster to achieve higher quality of service. Therefore paid prioritisation will not have a significant impact on competition.	should be changed to allow for settlement-free peering.
No differential charges (Zero Rating)	• Netherlands law states that "The level of tariffs set by	**If charges are set low for certain apps:** • Walled Garden:	**If charges are set low for certain apps:** • People from eco-	• TRAI should forbid TELSPs from charging

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	the Internet access service providers for Internet services should not depend on the services and applications offered through it." [@netherlands2012, Article 7.4a] • FCC open order states that "A person engaged in the provision of fixed broadband Internet access service, insofar as such person is so engaged, shall not unreasonably discriminate in trans-	People's conception of the internet may get restricted to a few services that are zero rated. • Competition: Given the free access, users would prefer using zero rated services which may hamper competitiveness of startups that cannot afford zero rating deals. • Over-consumption: With zero rating and free usage of Internet there is a chance for wastage of	nomically underprivileged backgrounds will be able to access services for free, which they may not be able to access otherwise. • Zero rating will help in the increase of Internet penetration especially in the emerging economies. • Zero rating of e-governance services should be permissible. • Zero rating can be used as an instrument for	OTT-SPs a termination or content-carriage fee for terminating data on their network, or engaging in any deprecation of any quality of service metric with an aim to charge for carriage of content. • It is recommended that zero rating be permissible if and only if it is done in a non-discriminatory and transparent manner, within a regu-

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	mitting lawful network traffic over a consumer's broadband Internet access service. Reasonable network management shall not constitute unreasonable discrimination"[@fcc2010]	network resources. **If charges are set high for certain apps:** • Charges may be set high for certain apps to extract income from them, thus creating an non-level playing field and hindering innovation. • Lack of predictability in OTT business model if charges are suddenly set high. **General concerns:** • Deep packet inspection to make	promoting proliferation of content in vernacular languages. **General concerns:** • Subscribers have differential preferences and may prefer to pay lower charges for a select bouquet of apps or services. • Different apps have a different impact on network congestion, thus imposing different costs on the network. • Different apps affect the business model	lated marketplace, with specific anticipated anti-competitive practices being clearly prohibited ex-ante, [^3] and an easy to access and swift redressal mechanism for failure to abide by the regulatory framework. In this, the platform should be open to all internet based service providers without discrimination. The terms for using the

Components of net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
		app or content specific decisions may lead to privacy concerns. • If charges are set for a class of service (like VoIP calling), then those apps providing mixed services (like gaming with VoIP) may lead to difficulty in classification.	of TEL-SPs differently. TEL-SPs should be able to charge OTT-SPs accordingly. For example, a VoIP calling facility will lead to substitution of traditional telecommunications services.	platform (including prices) would be openly transparently published and uniformly applicable to all. • At the very least zero rating of e-governance initiatives should be permissible. • Over time, as data charges reduce and access to the Internet increases, zero rating will become redundant. The issue of zero rating is therefore transient.

7. Reasonable Exceptions to net neutrality

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
Network Management	• The US Open Internet order 2010 says that "Legitimate network management purposes include: ensuring network security and integrity, including by addressing traffic that is harmful to the network; addressing traffic that is unwanted by end users (including by premise operators), such as by providing services or capabilities con-	• Given spectrum constraints (limited, fragmented and non-contiguous), network management practices for congestion management and maintaining quality of service are extremely important in India. • Network management for maintaining the security, stability and integrity of the network are essential. • Different applica-	• Network management is a reasonable exception to net neutrality as long as it is not application or service specific. • Network management should not involve deep packet inspection wherein the TEL-SP has traffic management rules based on content or application. • TEL-SPs should not use network management to throttle services	• Network management should be a permissible exception to net neutrality. • In the following cases, network management may be service, application or user specific:[⁀9] (i) for network security, stability and integrity; (ii) for end user security; (iii) at end-user request; (iv) for prevention of spam and unsolicited communications.

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	sistent with an end user's choices regarding parental controls or security capabilities; and reducing or mitigating the effects of congestion on the network" • Prior to Amendment 243, the European directive stated that "Reasonable traffic management measures shall be transparent, non-discriminatory, proportionate and necessary to a) im-	tions and services require different quality of service. For example, real-time voice services require higher priority than messaging services. Similarly emergency health services may require preference over a gaming service. • Network management practices can be personalised for each user based on user request (such as for parental control).	of competitors or small innovators.	• All network management practices should be time bound and proportional. • To deal with network congestion, TEL-SPs should be allowed to create classes of services (and rate them on a scale from say 0 to 7) to prioritise delivery of services; as long as the TEL-SP is able to establish a well defined rationale for prioritising one class of service

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	plement a legislative provision or a court order, or prevent or impede serious crimes; b) preserve the integrity and security of the network, services provided via this network, and the end-users' terminals; c) prevent the transmission of unsolicited communications to end-users who have given their prior consent to such restrictive measures; d) minimise the	• Policy for network management has to be developed on a case to case basis. • Network management may be required to deal with UCC, Spam, Denial of Service attacks etc.		over another. • All network management practices which involve blocking, throttling, or prioritization of any service, class of service, or protocol must be transparently published, and made clear to customers, potential customers, and the regulator. • Where the TELSPs are providing a shared public WiFi network such as at an air-

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	effects of temporary or exceptional network congestion provided that equivalent types of traffic are treated equally. Reasonable traffic management shall only entail processing of data that is necessary and proportionate to achieve the purposes set out in this paragraph." • Netherlands law allows an exception to net neutrality "for the benefit of the			port, then throttling of certain classes of services (such as video streaming) may be permissible if it is causing degradation of other services.

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	integrity and security of the network, the service provider or the end user;" • "As exceptions to the neutrality rule, reasonable network management activities should be consistent with international human rights standards regarding transparency, narrow tailoring, and proportionality. Wherever possible, traffic management practices should be			

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	content- and application-neutral. This is the most reliable way to ensure that traffic management is applied fairly and evenly, and that the ISP is not selecting which specific content or applications to favor or disfavor."[@europirates2015] • Open Internet NPRM, the Commission proposed that "open Internet rules be subject to reasonable network management,			

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	consisting of reasonable practices employed by a provider of broadband Internet access service to: (1) reduce or mitigate the effects of congestion in its network or to address quality-of-service concerns; (2) address traffic that is unwanted by users or harmful; (3) prevent the transfer of unlawful content; or (4) prevent the unlawful transfer of content."			

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
Specialised Services	• FCC open order report 2010 recognises that "Our rules against blocking and unreasonable discrimination are subject to reasonable network management, and our rules do not prevent broadband providers from offering specialized services such as facilities-based VoIP." • FCC open order 2010 states that "The "specialized services," such as	• Net neutrality cannot be applied to traditional telecommunications services that have now migrated to an IP based infrastructure; For example, PSTN calls (VoLTE) are expected to deliver high quality of service and cannot be treated equivalent to Skype. • TEL-SPs should be free to use their networks to provide any services that require	• There is a fear that TEL-SPs may expand the scope of "specialised services" if the term is not properly defined. • "If high quality specialised services take up a large chunk of existing bandwidth, network operators may downgrade the 'standard' open internet service, leading to poorer service for those who cannot af-	• Specialised services should be recognised as an exception to net neutrality.[^4] • Quality of service to specialised services should not be secured at the expense of internet based services. • A service for which best-efforts delivery is feasible may not be classified as a specialised service.

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	some broadband providers' existing facilities-based VoIP and Internet Protocol-video offerings, differ from broadband Internet access service and may drive additional private investment in broadband networks and provide end users valued services, supplementing the benefits of the open Internet." • Amendment 236 in EU states that "Providers	higher quality of service as long as they keep such services logically distinct from internet based services. • Specialised services can help satisfy the need to guarantee the quality of certain forms of communication such as emergency health services. • TEL-SPs should be able to prioritise their own services on their own infrastructure as internet provided ser-	ford to pay more."	

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	of internet access, of electronic communications to the public and providers of content, applications and services shall be free to offer specialised services to end-users. Such services shall only be offered if the network capacity is sufficient to provide them in addition to internet access services and they are not to the detriment of the availability or quality of inter-	vices are competing with specialised services using the same IP architecture. • "Specialised services for data-intensive or time-sensitive applications would allow operators to charge for providing guaranteed levels of service and hence would provide the certainty and the financial incentives that are needed to justify infrastructure investments"[@digitaleurope2015]		

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	net access services. Providers of internet access to end-users shall not discriminate between functionally equivalent services and applications." • In Netherlands, the concept of specialised services is not included. Reason stated is, by restricting the scope of application of net neutrality rules to internet services, it is not necessary to rely on the concept			

Reasonable Exceptions to net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	of specialised services to protect the functioning of managed, non-internet based services. Both the open internet and the functioning of non-internet based services are better guaranteed without defining specialised services. [see @lseMediaPolicy2014]			

Question 8: In what manner can the proposals for a regulatory framework for OTTs in India draw from those of ETNO, referred to in para 4.23 or the best practices summarised in para 4.29? And, what practices should be proscribed by regulatory fiat? Please comment with justifications.

India needs to develop a new regulatory framework for itself while drawing learnings from other policy regimes. Although the ETNO proposal is flawed across numerous dimensions, there are a number of learnings for the Indian regulator. The ETNO proposal attempts to give regulatory recognition to the concept of a two sided market, wherein the TEL-SP is free to negotiate commercial terms with the "remote side" (i.e. the OTT-SP) for terminating traffic on its network. In the negotiation of such commercial terms, the TEL-SP may also offer paid prioritisation to OTT-SPs that require a pre-defined quality

of service. Such negotiations on the remote side (i.e. between the TEL-SP and OTT-SP) are envisioned to be free of regulatory interference and do not require regulatory approval. The process is left almost entirely to the free market.

The ETNO proposal, though proposed as a free market mechanism, substantially increases transaction costs (information, negotiation and contract costs) for doing business on the Internet. An OTT-SP would be required to negotiate terms with an average of 5 TEL-SPs in every country where it delivers its services. In addition to the transaction costs for negotiating these contracts, the OTT-SP will also be required to required to pay a fee for terminating traffic on these last mile networks. While such complications can be dealt with by large OTT-SPs, it would infeasible for small innovators and startups operating over the Internet. This is prohibitive especially in the context that the internet is projected as a disruptive technology that has substantially reduced transaction costs for doing business. Such an institutional mechanism also raises multiple public policy issues as those raised for no-throttling, no-paid prioritisation and no-differential charges, described in the preceding table.

In addition, unlike the promises made in the ETNO proposal, it is technically infeasible for TEL-SPs to promise end-to-end quality of service to an internet based service. A last mile network can not promise quality of service that will be delivered by transit networks in the internet architecture. We have alternatively proposed the concept of "specialised services" to address the need for a predefined quality of service that may be required by some services.

8. Recommended Framework for Intervention by TRAI

8.1. Introduction to Recommended Framework

In this section, we propose a set of principles that collectively prescribes the framework for intervention by TRAI. The framework provides guidelines for (i) introducing reasonable regulatory parity between functionally equivalent services provided by TEL-SPs and OTT-SPs; and (ii) introducing net neutrality along with details of its different components and exceptions. Both interventions are closely interrelated and should not be considered independently. In accordance with this objective, the principles are categorised into three groups. The first group is a general set of principles that apply to both interventions. The second group is a set of principles on introducing regulatory parity. The third group is a set of principles on introducing net neutrality.

The framework adopts a two-layered approach. The first layer comprises of network and infrastructure (collectively called the network layer). The second layer comprises of services and applications (collectively called the service layer). The framework further divides the second layer into "Non-IP Services", "Specialised Services" and "Internet Based Services". TEL-SPs operate over both the network layer and the service layer. Services such as PSTN voice calls

provided over a circuit switched network are referred to as Non-IP Services. The concept of "Specialised Services" is borrowed from the European Union. Practically, the term "Specialised Services" refers to traditional services that have migrated to IP networks (that are not interconnected with the Internet) such as facilities-based VoLTE calls to PSTN and IPTV. This concept is introduced to envision reasonable regulatory parity between functionally equivalent "Non-IP Services", "Specialised Services" and "Internet Based Services". In the framework, "Specialised Services" is also recognised as an exception to net neutrality. A short note with various definitions and critiques of "Specialised Services" is provided in Appendix 1.

8.2. Principles Comprising Recommended Framework

8.2.1. Group 1 - General Principles

1. The network layer and service layer of TEL-SPs should be delinked; or deemed to be distinct for the purpose of this consultation.
   - Explanation:
     - While OTT-SPs operate only in the service layer, TEL-SPs operate both in the network layer and the service layer;
     - Active infrastructure (including spectrum) is a part of the network layer;
     - Access to a data network and access to a voice network are a part of the network layer;
     - SMS, PSTN voice calls, OTT applications, VAS services etc are a part of service layer.
2. Services in the service layer should be sub-classified into "non-IP services", "specialised services" and "internet based services".[2]

   a. Services provided over a non-IP based architecture should be classified as "Non-IP services".

   b. Services provided over an IP based architecture in a closed network (i.e. not interconnected with the internet or relying on strict admission control) including facility-based services should be classified as "specialised services" (if they demonstrate the need for special treatment over and above the "best efforts" delivery guarantee possible over the Internet).
      - Explanation:
        - Concept of specialised services is borrowed from the European Union to refer to facility based services that have migrated to an IP architecture. Refer to different definitions of "specialised services" in Appendix 1.
        - Facility based services such as PSTN VoIP calls or IPTV services provided by TEL-SPs would be a part of "specialised services".
        - Voice over LTE/IP calls terminating on the PSTN would be treated as "specialised services" since they operate over a network distinct from the internet; even if they share the same network infrastructure

[2]Specialised Services is a construct imported from the European Union.

- it relies on strict admission control. In comparison, voice/video calls provided using internet data over LTE would be treated as "internet based services".
    - A regular Internet service must demonstrate a rational nexus between the differential treatment and its need in the form of demonstrating that "best efforts" delivery of IP packets do not suffice for the application or service.

c. Services provided over the internet should be classified as "internet based services". Such classification depends on the nature of the service and not the provider of the service: "internet based services" may be provided by OTT-SPs or by TEL-SPs.
    - Explanation:
        - OTT applications would automatically be classified as internet based services, unless it has specifically been classified as a "specialised service".
        - Voice and video calling over the Jio Chat application released by Reliance Jio (a TEL-SP) would be classified as an internet based service.

8.2.2. Group 2 - Regulatory Parity Principles

3. The network layer may be regulated by way of licensing.
4. Non-IP Services and Specialised services may be regulated by way of licensing.[3]
5. Internet based services should be regulated by instruments other than licensing. Such instruments should preferably be in the form of legislations like the IT Act and its rules thereunder.
6. There needs to be regulatory parity between communications oriented "internet based services" provided by OTT-SPs and TEL-SPs.
7. There needs to be reasonable regulatory parity between functionally-equivalent "internet based services", "non-IP services" and "specialised services" (refer Table in Section 7). However, the specialised nature of specialised services may require substantially different treatment, which should be determined on a regulation to regulation and a service to service basis.
8. Arguments for regulatory parity between the "network layer" and "internet based services" are incorrect as the two belong to different layers.
9. Regulations for "internet based services" may create sub-classifications such as communication services, market services and aggregation services, provided there is a reasonable nexus between the classification and the objective sought to be achieved by the regulation.[4]

[3]The current regime of a single license for the Network Layer and Specialised Services can continue.

[4]For example, regulations relating to emergency communications have a reasonable nexus with the category "communications services"

10. Regulations for "internet based services" need to be such that they promote innovation by small entrepreneurs and innovators while also incorporating concerns related to security, lawful interception and removal of unlawful content.
11. Regulatory parity may be sought to be arrived at by decreasing the existing regulations on TEL-SPs and not merely by increasing regulation on OTT-SPs.

8.2.3. Group 3 - Net neutrality Principles

12. Net neutrality should be codified[5] and enforced:
    a. Networks should be required to deliver all internet traffic on a best effort basis without discrimination on the basis of protocol, port number, content, device, service, origin/sender or destination/receiver.
    b. No negative discrimination by the TEL-SPs shall be allowed in the form of throttling, or blocking or paid prioritisation subject to the contextualisation described in Section 5.
    c. OTTs should not be required to pay the terminating network for termination of traffic.
    d. Publish transparency reports in exercise of all reasonable exceptions to net neutrality.
    e. Internet based services should not be degraded as a result of specialised services.[6]
13. There are certain reasonable exceptions to net neutrality including:
    a. Compliance with orders given by statutory bodies of law and court decisions.
    b. Specialised services (Alternately: net neutrality should only be enforced for internet based services)
    c. Reasonable network management
       - Discrimination for the sake of network management is only permissible if:
         - there is an intelligible differentia between the classes which are to be treated differently, and
         - there is a rational nexus between the differential treatment and the aim of such differentiation, and
         - the aim sought to be furthered is legitimate, and is related to the security, stability, or efficient functioning of the network, or is a technical limitation outside the control of the TEL-SP, and
         - the network management practice is the least harmful manner in which to achieve the aim.
    d. Measures based on direct request from the end user.

[5]This should be codified in the license agreement between the Central Government and Network Providers (TEL-SP).

[6]QoS parameters that are monitored by TRAI need to be disaggregated as TEL-SPs can not guarantee end to end QoS for internet based services.

- Explanation: At user request, the TEL-SP may block porn content.

e. Certain forms of positive discrimination may be allowed, subject to them meeting strict conditions such that they do amount to negative discrimination.
   - These should generally not be on the basis of content- or source/ destination, since that in general would have negative impact on competition, consumers, and network openness and diversity.
     - The only situation in which such positive discrimination (including paid and unpaid zero-rating) may be allowed is if it does not harm competition and consumers, and care is taken to ensure it only minimally harms openness and diversity.

       a. Paid zero-rating or zero-rating on the basis of a deal with an OTT must be strictly regulated.[7]
   - Other forms of zero-rating may be permitted as long as the regulator ensures it doesn't occur alongside TEL-SPs raising the cost of general Internet data packs for consumers (by raising prices or decreasing data caps).[8]

Question 2: Should the OTT players offering communication services (voice, messaging and video call services) through applications (resident either in the country or outside) be brought under the licensing regime? Please comment with justifications.

Question 17: If the OTT communication service players are to be licensed, should they be categorised as ASP or CSP? If so, what should be the framework? Please comment with justifications.

It is strongly urged that OTT-SPs should be regulated by instruments other than licensing. Preferably, OTT-SPs should be regulated through instruments such as the IT Act and its Rules thereunder. This is an imperative requirement for innovation on the Internet to continue to prosper. However, "communications" OTT-SPs should be encouraged to voluntarily adopt the Unified License through regulatory and economic incentives. This can possibly encouraged by introducing a trimmed down version of the Unified License with low regulatory compliance costs and zero revenue sharing. Such a voluntary license would authorise OTT-SPs to terminate calls on the PSTN. In return, the license could

[7]This regulation may be in terms of access to all OTTs to the marketplace, on non-discriminatory and standard terms; This regulation may be in terms of what additional content will have to be zero-rated (e.g., one level of hyperlinks from zero-rate content); This regulation may be in terms of requiring zero-rating of all of Internet content for a specific period of time, etc.

[8]For instance: A TEL-SP may voluntarily offering special "top-up packs" for traffic to and from specific OTT services, may offer zero-rated access to the Internet in exchange for viewing of advertisements, may offer zero-rated access to the Internet at low-speeds, creating an incentive for users to pay for higher speeds; or it may voluntarily zero-rate traffic from local Internet Exchange Points or from settlement-free peering arrangements insofar as the TEL-SP incurs lower costs from such traffic. These practices need to be disclosed by TEL-SPs and need to be monitored by the regulator.

impose slightly higher requirements for interception than presently imposed by the Information Technology Act.

The regulations for OTT-SPs and TEL-SPs cannot be exactly the same. However, there can be reasonable parity in the regulations that govern the two. Such reasonable regulatory parity can be achieved even if TEL-SPs are regulated by licenses and OTT-SPs are regulated by instruments other than licensing.

9. Correcting Regulatory Imbalances

Question 5: Do you agree that imbalances exist in the regulatory environment in the operation of OTT players? If so, what should be the framework to address these issues?

Yes. There are regulatory imbalances between functionally equivalent services provided by OTT-SPs and TEL-SPs. We present below a table that suggests interventions to introduce reasonable regulatory parity between functionally equivalent "internet based services", "non-IP services" and "specialised services". However, it is recognised that the specialised nature of specialised services may require substantially different treatment, which should be determined on a regulation to regulation and a service to service basis. It also recognised that arguments for regulatory parity between the "network layer" and "internet based services" are incorrect as the two belong to different layers.

The consultation paper highlights the regulatory imbalance between "internet based services", "non-IP services" and "specialised services". However, the consultation paper incorrectly posits that "internet based services" provided by OTT-SPs are completely unregulated. The following table attempts to outline the different regulations for OTT-SPs and TEL-SPs. The table also attempts to delink the regulations attributable to the network and service layers of TEL-SPs. The table also identifies the areas where there is regulatory imbalance and suggests a recourse.

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
UCC/ DND/ Spam	No clear legislation on spam. Previously partially covered by Section 66A(c) of IT-Act, which has now been struck down by the Supreme Court	TRAI Regulation on 200 SMS per day.[^20] TRAI Regulation on UCC.[@traiUCC2015]		Service	Yes	Spam & UCC over OTT services need to be regulated. However, the mandate to regulate spam is that of the parliament by creating a new act or amending the IT-Act, and not that of TRAI. TRAI may

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						however recommend to the Government to consider an amendment to such effect in the IT-Act.
Privacy and Confidentiality	Section 43A of IT-Act	License Agreements (UASL, [^21] UL. [^22])		Service	No	Section 43A is reasonably at par with clause 39.2 of the UASL. Additionally, there is a Privacy Bill presently under consider-

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						ation by the Government that also addresses privacy concerns relating to OTTs. **Question 7:** How should the OTT players offering app services ensure security, safety and privacy of the consumer?
Spectrum Al-			Wireless Op-	Network	No	There is no reg-

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
lotment including Auctions and Revenue Sharing			erating License r/w License Agreements (UASL, UL) r/w NIA			ulatory imbalance as the service layers of OTT-SPs and TEL-SPs are treated at par. See principle 7.
Interconnection of Networks			TRAI Regulations; Reference Interconnect Order (RIO); License Agreements (UASL, UL).	Network	No	There is no regulatory imbalance as the service layers of OTT-SPs and TEL-SPs are treated at par.

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						See principle 7.
Interconnection of Services	No regulation.	TRAI Regulations; Reference Interconnect Order (RIO); License Agreements (UASL, UL).		Services	Yes	It should remain mandatory for OTT-SPs to get a Unified License for interconnecting Internet Telephony with the PSTN/ PMLN. Alternatively, a trimmed down voluntary licensing arrangement

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						could be created that allows OTT providers to interconnect with PSTN and terminate calls on the PSTN. Such a license would create slightly higher regulatory compliances for interception etc. OTT services maybe

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						mandated to interconnect with each other if technically feasible and regulatorily desirable for a competitive marketplace.
Security & Integrity of Networks			License Agreements (UL). [^23]	Network	No	There is no regulatory imbalance as the service layers of OTT-SPs and TEL-SPs are

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						treated at par. See principle 7.
Interception & Decryption	Section 69 of IT-Act	Section 5 of Tele-Act; License Agreements (UASL, UL).		Services	Yes	While TEL-SPs are required to create infrastructure and be technically compliant with lawful interception requests, OTT-SPs are not required to be technically prepared for intercep-

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						tion; and may not be technically capable of honouring an interception request. There is need to move towards parity here. Ideally, the burden on TEL-SPs should be substantially decreased. The other option,

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						though infeasible in most instances, is to substantially increase interception requirements for those communication OTT-SPs that are based on server-side encryption and have achieved a minimum critical mass,

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						wherein whether an OTT-SP has reached critical mass (on the basis of minutes of usage, data consumption or subscriber base) would be determined by TRAI. Those OTT-SPs that provide lawful inter-

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						ception in other countries but refuse to comply in India should be blocked.
Subscriber Verification	No regulation.	License Agreements (UASL, [^24] UL. [^25]).		Services & Networks	Yes	Subscriber identity verification can effectively happen only at the network layer, given the fact that most service-layer platforms

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						do not have the means of tying a user's physical identity with their virtual existence. There are some OTT-SPs that bind their users to a network-layer identification like their PSTN number (e.g., WhatsApp),

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						in which case the demand for subscriber verification gets addressed despite the lack of regulatory parity.
Network Rollout Obligations			License Agreements (UASL, UL). [^26]	Network	No	There is no regulatory imbalance as the service layers of OTT-SPs and TEL-SPs are treated at par.

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						See principle 7.
Permission to terminate voice calls on the PSTN	No. ISP license prohibits connectivity of Internet Telephony with domestic PSTN. [^27]	Yes. License Agreements (UASL, UL. [^28]).		Service	Yes	It should remain mandatory for OTT-SPs to get a Unified License for interconnecting Internet Telephony with the PSTN/ PMLN.
Emergency and Public Utility Services	No regulation.	License Agreements (UASL, UL). [^29]		Service	Yes	Those OTT-SPs that reach a critical mass should be mandated to

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						provide these emergency services. For example, Skype provides emergency services in 4 countries including the United Kingdom. Similar requirements should be imposed by India as well.

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
Quality of Service	No regulation	TRAI Regulation on Quality of Service		Service and Network	Yes	QoS delivered by OTT services is not fully in the control of the OTT-SP, unless they launch a specialised service that provides QoS guarantees. In such a case, they may be subject to appropri-

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						ate regulation.
Bulk Encryption Prohibition	No regulation	License Agreements (UASL, [^30] UL. [^31]).		Service	Yes	This regulation needs to be removed completely for both TEL-SPs and OTT-SPs.
Domestic Routing of Network Traffic			License Agreements (UL). [^32]	Network	No	There is regulatory imbalance between UL (Access) and ISP License; However this imbalance is between two

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						kinds of licenses and does not involve the OTT-SPs since switching happens at the network layer.
End User Regulation (Cyber Crimes)	Section 43 of IT-Act	Section 43 of IT-Act		Service	No	Section 43 deals with end user cyber crimes and therefore equally applies to end users of OTT-SPs and

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
						TEL-SPs.
Blocking	Section 69A of IT-Act	License Agreements (ISP, UL), [^33] (UASL). [^34]		Service	No	There is reasonable parity.
Contribution to USOF			Section 9A of the Telegraph act		No	There is no regulatory imbalance as the service layers of OTT-SPs and TEL-SPs are treated at par. See principle 7.
SACFA		License Agree-		Network	No	There is no reg-

Regulations	OTT-SPs (Service Layer) Internet Based Services	TEL-SPs (Service Layer) Non-IP and Specialised Services	TEL-SPs (Network Layer)	Layer to which the regulation belongs	Regulatory Imbalance?	Suggested recourse for correcting imbalance; or justification for maintaining present imbalance.
		ments (UASL, [^35] UL. [^36])				ulatory imbalance as the service layers of OTT-SPs and TEL-SPs are treated at par. See principle 7.

10. Appendix 1 - Note on Specialised Services

10.1. Different definitions of Specialised Services

- **BEREC (2011):** "Specialised services" are electronic communications services that are provided and operated within closed electronic communications networks using the Internet Protocol. These networks rely on strict admission control and they are often optimised for specific applications based on extensive use of traffic management in order to ensure adequate service characteristics.
- **BEREC (2012):** Specialised services are usually designed to provide guaranteed characteristics of end-to-end connections (e.g. quality of service, availability and/or security). These characteristics are generally stated in contractual arrangements. Technically, specialised services typically rely on

access restrictions and extensive use of traffic management techniques or strictly enforced capacity planning and provisioning.

- **Digital Europe:**[9] "Specialised services" are designed for specific content, applications or services, or a combination thereof. Such services rely on traffic management or other networking techniques to ensure the desired or necessary level of network resources that determine subscriber experience (such as capacity, quality) with the aim to securing enhanced quality characteristics. They are delivered from end-to-end and are not marketed or widely used as a substitute for Internet access services.
- **Dynamic Coalition on net neutrality:** "Specialised services" are electronic communications services that are provided and operated within closed electronic communications networks using the Internet Protocol, but not being a part of the Internet. The expression "closed electronic communications networks" refers to networks that rely on strict admission control.
- **Amendment 235:** "Specialised service" means an electronic communications service optimized for specific content, applications or services, or a combination thereof, provided over logically distinct capacity, relying on strict admission control, offering functionality requiring enhanced quality from end to end, and that is not marketed or usable as a substitute for internet access service.

10.2. Conditions to the application of Specialised Services

- "Quality of service to specialised services is not secured by giving these services an explicit higher priority level than the internet based services, but rather by having adequate capacity reserved for the specialised services without this being done at the expense of Internet traffic."
- Providers of content, applications and services and providers of electronic communications should therefore continue to be free to conclude specialised services agreements on defined levels of quality of service as long as such agreements do not impair the quality of internet access service.
- Amendment 236 states that "Providers of internet access, of electronic communications to the public and providers of content, applications and services shall be free to offer specialised services to end-users. Such services shall only be offered if the network capacity is sufficient to provide them in addition to internet access services and they are not to the detriment of the availability or quality of internet access services. Providers of internet access to end-users shall not discriminate between functionally equivalent services and applications."

[9] Digital Europe, "Digital Europe Position on Net Neutrality," 2015, http://www.digitaleurope.org/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=721&PortalId=0&TabId=353.

11. Appendix 2 - Comparison of International Regimes

Feature	Netherlands	France	South Korea	Chile	Brazil	United States
Fixed/ Mobile	Both	Both	Both	Both	Both	Fixed
Legal Instrument	Law	Soft Law	Law	Law	Plan	Law
Are OTTs licensed?						No
Non-discrimination	No differential pricing	Non-discrimination between Internet traffic streams	No unreasonable discrimination	No discrimination	No differential pricing	No unreasonable discrimination
Transparency			Transparency			Yes
Throttling	No throttling					No throttling
Blocking	No blocking		No blocking (Blocks VoIP)	No blocking	No	No blocking
Paid Prioritisation	No paid prioritisation			Ban on paid prioritisation		No paid prioritisation
Zero Rating	Not allowed			Not allowed		No ban
Measures at user request					User specific request	

Feature	Netherlands	France	South Korea	Chile	Brazil	United States
UCC	Blocked at users request					
Network Management	Yes		Reasonable traffic management			Yes
Category of Specialised Services	yes (but no preferential treatment)	Yes (best-effort safeguard)	yes (best-effort safeguard)	No		
Emergency Calling	No	No	No	No	No	No

12. Appendix 3 - Actors in Net Neutrality Regime

Actors that need to comply with net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
Only Last-mile Networks (Not Transit Networks)	-	• Only last-mile networks are gatekeepers. • If a transit network throttles or blocks a service, then the routing algorithm will automatically di-	• The competition in transit networks is often lower than that in last-mile networks. • There are allegations of substantial cartelisation in	• net neutrality obligations should only be enforced against those actors that are licensees of the Central Government under Sec-

Actors that need to comply with net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
		vert traffic to another transit network. • It may not be possible to enforce net neutrality regulations against an transit network that is not a licensee of the Indian Government.	transit networks.	tion 4 of the Telegraph Act.
Premise Operators (such as coffee shops, bookstores, airlines)	• FCC open order 2010 states that "we decline to apply our rules directly to coffee shops, bookstores, airlines, and other entities when they acquire Internet service from a broad-	• Premise operators are private intermediaries and should not be put in a position to decide what content, application or service is permissible.	• Premise operators often provide these services free of cost to their patrons and should be able to decide what content they want to offer. The patrons can use a direct internet con-	• TEL-SPs providing public shared wifi services (at airports etc) should be excluded from net neutrality obligations. • Coffee shops, bookstores etc, including any other

Actors that need to comply with net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	band provider to enable their patrons to access the Internet from their establishments (we refer to these entities as "premise operators"). These services are typically offered by the premise operator as an ancillary benefit to patrons. However, to protect end users, we include within our rules broadband Internet access services provided to		nection with a network provider if they want unhindered access. • Premise operators are not licensees of the Central Government and it may be difficult to enforce net neutrality obligations against them.	premise that is not a licensee of the Central Government, should not required to follow net neutrality obligations. • net neutrality obligations should only be applicable to licensed TEL-SPs.

Actors that need to comply with net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	premise operators for purposes of making service available to their patrons. Although broadband providers that offer such services are subject to open Internet rules, we note that addressing traffic unwanted by a premise operator is a legitimate network management purpose."			
Both Fixed and Mobile services	• The US open internet order of 2010 was only applicable to fixed line	• The move to unified access services has removed the distinction between	• Network management requirements are higher for wireless ser-	• In India, it is strongly suggested that the same rules apply to both wireline and

Actors that need to comply with net neutrality	Experiences from International Regimes	Arguments For	Arguments Against	Recommended Framework
	broadband; the open order of 2015 is applicable to both fixed and mobile services.	fixed, mobile, wireless and wireline. • Any intervention should be technology neutral.	vices due to spectrum constraints.	wireless access services. India has already moved to a unified access regime, and new artificial distinction between fixed, mobile, wireless and wireline would be detrimental.

References

Digital Europe. "Digital Europe Position on Net Neutrality," 2015. http://www.digitaleurope.org/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=721&PortalId=0&TabId=353.