Bharti Airtel's Response to TRAI's Consultation Paper on "Migration to IP Networks"

The evolution of technology is a constant phenomenon and it is difficult to predict the advancement in the forthcoming technologies and the rate/ time for obsolescence of the existing technologies. The choice of a technology depends upon the prevailing technology ecosystem which is changing very dynamically. Worldover the regulators have moved towards technology neutrality. Such an encouragement has been provided to the operators by way of technology neutrality enshrined in the NTP-2012 and the existing UAS/ CMTS/ UL Licenses.

In the above backdrop, our primary submissions on the consultation paper are as below:

1) Mandating IP interconnection is against the very principle of "Technology Neutrality" enshrined in the NTP-2012 and the UAS/ CMTS/ UL License agreements. Therefore IP interconnection should not be mandated and should be left to the mutual choice/ decision of the operators

2) Mandating IP interconnection would entail writing off all the non-IP based existing investments made by the operators and would require substantial investments for deploying new IP based network equipment.

3) Like in case of any other technological evolution, both TDM and IP interconnection should co-exist.

4) The existing regulation i.e. 'Reference Interconnection Offer dated 12th July 2002' is quite comprehensive and addresses the requirements of IP interconnection in 'Article 6- Technical Specifications and Standards'

5) Direct peering, both for TDM as well as for IP technology, is the only economical option at the high volumes being handled by the present networks. Operators have already established their direct interconnections; connectivity through interconnect exchange will be an unnecessary cost burden on them. Therefore we believe that having an interconnect exchange is neither technically nor commercially viable option.

6) The wholesale interconnection costs and usage charges include the cost of an entire range of elements and costs of which IP based interconnection links are only a very miniscule element. The issue of measuring traffic in terms of data capacity instead of minutes is premature at this stage Therefore, the existing interconnection usage charge (IUC) regime measured in terms of voice minutes/no text messages should continue.

7) Since the content/application providers are not the licensed TSP, therefore are not eligible for interconnection. Hence the IP interconnection for application & content services is not required. The present revenue sharing arrangement and direct connectivity between the TSP's and the application/ content provider should continue.

8) The Authority has already put in place the regulations which specifies the QoS parameters while providing the access services to the customers. The customer facing network quality parameters have to be same for any access technology irrespective of the technology used in core network. Therefore, we do not envisage any change in QoS parameter on account of any change in interconnection technology from TDM to IP.

9) There are several technical challenges and other implications as regards ENUM and emergency number dialling that need to be addressed through a proper technical consultation, with inputs from TEC.

10) It is assumed that this consultation paper is only for use of IP technology for interconnection and not interconnection with "Internet". The interconnection of PSTN/PLMN with "Internet" have various challenges including the issue of level playing field, network routing, Security, Monitoring etc, the issues which are not part of this consultation paper.

Our detailed response to the issues raised in the Consultation Paper is as follows:-

A. <u>Interconnection Issues:</u>

Q1. Is there a need to mandate IP interconnection? If so, what should be the time frame for implementation of the same? Please comment with justifications.

Bharti Airtel's Response:

The evolution of technology is a constant phenomenon. The choice of a technology by an operator depends upon the prevailing technology ecosystem which is changing very dynamically. Worldover the regulators have moved towards technology neutrality. In India, the technology neutrality is enshrined in the NTP-2012/NTP-99 and the existing UAS/ CMTS/ UL Licenses. Mandatory deployment of a particular technology would be **contrary to the principles enshrined in the National Telecom Policy and license agreements**. Therefore, IP interconnection should not be mandated and be left to the mutual agreement between operators.

A majority of the present interconnecting links are on TDM technology where huge investments have been made. With practically no growth in voice traffic there are very few new links which are being added. Therefore migration to IP would mean only scrapping the presently deployed networks which have a considerable residual life ranging from 5-10 years. Hence, any regulation towards compulsory IP interconnection will result only in **writing off the existing assets without any techno-economic benefit to the existing operators**.

Mandatory migration to IP interconnection will result in **very huge cost burden for the operators** for deploying network elements such as Media Gateways, signalling gateways/soft switches, Session Border Controllers (SBC) and supporting transport network etc.

The present environment in telecom is characterized by fall in operating margins, uncertain policy and regulatory environment. The operators are also faced with high costs in acquiring spectrum in the recent and the upcoming auctions to ensure continuity of services to the millions of subscribers. The cost of migration of existing interconnections to IP technology will only add to the misery of the operators.

The prevailing technology ecosystem is changing very dynamically and it is difficult to predict the emergence of new advanced technologies. The investments in building IP networks may become redundant in future in case of emergence of new network technology. Any mandated migration **will put restriction on the flexibility of the operator to choose the most suitable technology** and may not result sub optimal usage of the infrastructure.

Telecom Service Providers in India are at various stages of migration to IP based networks depending upon the aging of the existing networks and requirement for new deployments. We therefore believe that **both TDM & IP interconnection needs to co-exist at this stage** and the choice & time of migration to IP based network interconnection should be left to the operators. The high competitiveness among the operators will naturally drive the migration to the IP based network, if it is techno economically prudent. Historically, such coexistence between SS7 and R2MF based Point of Interconnection co-existed for many years before the techno-economic benefit of SS7 motivated all TSPs to migrate to complete SS7.

In light of above submissions, we are of the view that it should be left to the operators to plan their migration to IP based interconnection on the basis of network rollout plans, techno-commercial feasibility and development of echo system such as transport and switches. Further, we believe that the existing interconnection regime and the rules governing interconnection should continue, irrespective of the interconnecting technology, to be the basis for all network roll outs.

Q2. Whether both TDM and IP interconnection should be allowed to coexist? If so, whether the existing regulation i.e. 'Reference Interconnection Offer dated 12th July 2002' addresses the requirements of IP interconnection also? Please comment with justifications.

Bharti Airtel's Response:

Different operators in India are at various stages of deployment of IP based networks depending upon the aging of the existing networks and requirement for new deployments. Further, the network architectures based on IP technologies (e.g. ETSI-TISPAN, IMS, 3GPP Rel x etc.) have due provisions for interconnection with the circuit switched networks. The co-existence of different technologies has been the basic features of the networks evolutions and should be allowed to continue.

Therefore, both TDM & IP interconnection should be allowed to co-exist and the choice & any migration from one technology to other should be left to mutual decision between the operators based on techno-economic considerations and the realm of present RIO

regulation. The existing regulation i.e. 'Reference Interconnection Offer dated 12th July 2002' is quite comprehensive and addresses the requirements of IP interconnection in 'Article 6- Technical Specifications and Standards'. The relevant paras from Article 6 of the RIO are reproduced below:

> ***"6.1 National Standards***
> *Interconnection of Networks and Systems shall conform to National Standards as set by the Telecom Engineering Centre and Regulations applicable to Telecommunications Services in India. In the absence of National Standards set by the TEC and Regulations, they shall conform to the relevant Recommendations of the ITU. References to typical standards have been indicated in Schedule 4 of this Agreement."*
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> ***"6.4.5 PSTN/ VOIP Interoperability Standards:***
> *For Interoperability between Circuit based switching and IP based networks, the interface will conform to relevant national standards or guidelines of Licensor/ Regulator. Media gateway, Signaling Gateway and Gatekeeper shall conform to relevant ITU-T Recommendations and Internet Engineering Task Force (IETF) standards, as applicable."*

Q3. In case IP interconnection is mandated in India, whether the enforcement of interconnection agreements should rely on
(i) Bilateral agreements and dispute resolution; or
(ii) Mandatory reference offer

Bharti Airtel's Response:

As indicated in response to questions 1 & 2, we again reiterate that IP interconnection should not be mandated in India and be left to mutual agreements between the operators concerned. We are of the view that there should be demand based IP connectivity under the existing bilateral interconnect agreements under the realm of present RIO regulation which prescribs the cost of technological changes required in the provider's network to be borne by seeker. Further, migration of interconnection with any technology have to confirm to the time tested interconnection regime set under the RIO regulation. A change in the interconnection technology does not warrant any change in RIO regime.

Q4. In an IP based network scenario, which mode of interconnection is preferable to carry traffic:- peer-to-peer, Interconnect Exchange or combination of both? Please comment with justifications.

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Q5. In case an Interconnect Exchange is required, should such Exchange be placed within each licensed service area or a single Interconnect Exchange will be adequate for the entire country? Please comment with justifications.

Bharti Airtel's Response:

We are of the firm view that there **is no need to set up an Interconnect exchange for** interconnectivity of various operators for the reasons listed below:

- Direct peering, both for TDM as well as for IP technology, is the only economical option at the high volume being handled by the present Point of Interconnections. This is quite evident from the fact that not only for TDM connectivity but even for IP connectivity operators have established peer to peer connectivity instead of using any kind of transit/interconnecting points. Therefore, option of exchanging traffic only through interconnection exchange is ruled at the very outset.

- Presently, operators are connected via POIs in several cities/towns. POI Locations are presently based on low cost routing. For example Airtel's MSC and Vodafone's MSC are both located in Kanpur, than the direct local POIs will be established between the two operators instead of interconnecting at some other POI location say Lucknow or Delhi. This saves on bandwidth cost which are a major portion of overall interconnection costs.

- Introduction of interconnect exchange will also mean redesigning the transmission network for the POI traffic which again means additional cost and huge write-offs.

- The interconnect exchange will bring additional transit point thereby introducing another element of cost in providing service. Failure of interconnect exchange will pull down entire telecom network.

- Operators have already established their interconnection; connectivity through interconnect exchange will be cost burden on them. Thus at this stage because of well spread networks in India we do not consider it technically & commercially a viable option to have an interconnect exchange. It would only lead to additional costs of switching/transiting.

- Failure of such additional switching/transit point can be seen from the fact that despite of BSNL providing an indirect path/transit facility to terminate calls to their mobile network via their L1 TAX acting as an interconnection exchange/transit switch, almost all private operators have stopped using that facility due to additional cost of switching. The fate of the interconnect exchange on a voluntary basis if establish by any operator is therefore known to us in advance. A mandatory interconnect exchange would only lead to additional cost for whole industry and hence to the customers.

For the aforesaid reasons, we believe there is no need of IP Interconnect exchange.

Q6. Whether any regulatory intervention is required to mandate the locations and structure of points of interconnection (POI) for IP based network architecture? Please comment with justifications.

Bharti Airtel's Response:

As stated in response to Q5, direct peering is the only economical option at such high volumes presently being handled by direct Point of Interconnection be it TDM/ IP. Further, the present interconnection and licensing regime provides due flexibility to the TSPs to interconnect at any place within a service area and the same may be continued.

There is, therefore, no need to mandate the locations and structure of point of interconnect (POI) for IP based network architecture.

Q7. What are your views on the migration from the existing interconnection regime-measured in terms of minutes of traffic to an IP interconnection regime replaced by measures of communication capacity? Please comment with justifications.

Bharti Airtel's Response:

The wholesale interconnect costs and Interconnection Usage charges include cost of an entire range of elements and costs of which IP based interconnection is only a very miniscule element. The IUC charges for voice, such as termination charge, carriage charge etc. are based upon the cost of all elements and are not based upon just the cost of the interconnecting links.

Majority mobile and fixed line network elements deployed are circuit switches (TDM) where all costing is done on the basis of Minutes and cannot be done in terms of bandwidth. Further, voice is sold to the customers on the basis of minutes for voice and counts for SMS and the same is likely to continue for many years to come.

It is therefore imperative that the IUC regime, which is primarily the revenue sharing regime for voice calls/SMS, has to be on the same basis and cannot be changed just due to any change of technology at the interconnecting points.

We therefore believe that **the issue of measuring traffic in terms of data capacity instead of minutes is premature at this stage and the IUC (termination and carriage) should continue as per existing basis i.e. Minutes of Usage**

Further, we are of the view that there is need to clearly differentiate between Internet, which is a public switched packet data network (PSPDN) and PSTN/PLMN. The wholesale interconnect usage charges (IUC) for voice are for PSTN/PLMN connectivity and not for internet connectivity

Q8. In an IP interconnection between networks, comment on the type of charging principles that should be in place
(a) Capacity based in terms of Mbps.
(b) Volume based in terms of Mbps.
(c) QoS based.
(d) a combination of the above three.

Bharti Airtel's Response:

As highlighted in above question, we are of the view that the issue is premature at this stage and the minute based charging should continue. It is also worthwhile to mention that the minute based charging is followed all over the world for international call transits, even for IP based interconnects.
The charging principles for IP interconnection to be followed should be such as; port charges basis bandwidth allocated in Mbps; POI establishment & passive infrastructure charges as per the existing interconnect agreements; and IUC charging basis minutes of usage as being followed presently.

Q9. What should be the criteria to estimate the traffic minutes in IP environment if interconnection charges continue to be minute based? Please provide justification in support of your answer.

Bharti Airtel's Response:

The interconnection usage charges for voice are computed and billed using the voice CDRs generated by the switches irrespective of technology of interconnection e.g. TDM or IP. The widely available commercial platforms for MSS/ MGW and SBCs used for routing of IP traffic (which would be deployed for IP interconnection) are capable of generating the minute based CDR which are used for interconnect billing. Therefore, **no change is required for estimating the traffic on any other basis in an IP interconnection environment and the existing framework for IUC should continue**.

Q10. In addition to the above, any other modifications or components of IUC which are required to be reviewed in the IP based network scenario? Please provide all relevant details?

Bharti Airtel's Response:

The IUC charges for voice, such as termination charge, carriage charge etc., involves determination of cost of all elements in the network and is not based upon just the cost of the interconnecting links which is a miniscule amount as compared to the entire network cost. Therefore, any change in technology at interconnecting points/links will have a miniscule effect on the IUC costing.

For the aforesaid reasons, IP interconnection will not have any significant impact on any IUC.

Q11. Do you envisage any interconnection requirement for application & content service providers? If so, what should be the charging mechanism? Please provide all relevant details justifying your comments.

Bharti Airtel's Response:

We do not envisage any interconnection requirement for application & content service providers. Interconnect regulation is between two Telecom Service Providers. The same cannot be mandated on the content and application providers who are not licensees under ITA-1885.

The content and application providers work in alignment with the TSPs. The services provided by the application and content providers is a value addition to the core services provided by the TSPs and the revenue share arrangement accordingly is dependent upon a number of factors such as the level of value addition/ innovation, utility/ acceptability/ popularity of particular content/ services, pricing etc.

Therefore, interconnection for application/content providers with the PSTN/PLMN is neither required not envisaged under the license conditions.

B. <u>Quality of Service Issues:</u>

Q12. Whether the existing regulatory framework for measuring and reporting quality of service parameters as defined for PSTN/PLMN/Internet may continue to apply for IP based network services? Please comment with justifications.

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Q13. In the context of IP based network Migration, if the parameters in the existing QoS regulation are required to be reviewed immediately then please provide specific inputs as to what changes, if any, are required in the existing QoS regulations issued by the Authority. Please comment with justification.

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Q14. In case new QoS framework is desirable for IP based network, do you believe that the QoS be mandatory for all IP based network services. If yes, what should be QoS parameter and their benchmarks?

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Q15. What should be the mechanism for monitoring the parameters for end to end QoS in IP based network environment? What should be the reporting requirement in this regard? Please comment with justification.

Bharti Airtel's Response:

It is submitted that IP/ TDM is only an underlying technology on the basis of which an end service is delivered. The end service remains same irrespective of the whether it is provisioned using IP or TDM.

The Authority has already put in place the QoS regulations and the existing regulatory framework for measuring quality of service parameters is sufficient. No change is required in the QoS parameters on the basis of technology of interconnections.

We therefore believe that the existing framework should be allowed to continue and if at any future stage, any review is required, this may be done after due consultation

Moreover, with 6-7 operators per service area, there is already high level of competition among the operators and every operator endeavors to provide best quality seamless services to the subscribers to ensure their continuity in the network. Hence, Quality of Service (QoS) in a competitive environment is driven by market forces rather than by regulatory intervention. Worldover, regulators move towards a regime of forbearance when the level of competition increases and the markets evolve. They either stop regulating when there is enough competition or they just monitor QoS parameter.

In light of the above, we are of the view that with respect to both the IP and TDM network, TRAI should not specify any QoS benchmarks and the same may be left to operators to monitor.

C. <u>Operational Issues:</u>

Q16. Should sharing of the IP based core and Access network element by different telecom service providers be allowed in IP based network scenario? What are the challenges, opportunities and problems of such sharing? Please comment with justifications.

Bharti Airtel's Response:

Network sharing promotes cost effective delivery of services and is therefore a welcome step. Further, it is submitted that DoT vide its 2008 Guidelines on Infrastructure Sharing had stated the following:

> *"Sharing of active infrastructure amongst Service Providers based on the mutual agreements entered amongst them is permitted. Active infrastructure sharing will be limited to antenna, feeder cable, Node B, Radio Access Network (RAN) and transmission system only. Sharing of the allocated spectrum will not be permitted. The licensing conditions of UASL/CMSP will be suitably amended wherever necessary to permit such sharing."*

We believe that such sharing be permitted per se and not only for the IP based networks. We urge the Authority to request DoT to permit the same by amending the UAS/CMSP/ UL licenses.

Q17. Do you see any issues concerning the national numbering plan with regard to the migration towards IP based networks?

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Q18. Do you believe that ENUM has to be considered when devising the regulatory policy for IP based networks as it will provide essential translation between legacy E.164 numbers and IP/SIP (Session Initiation Protocol) addresses.

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Q19. Which type of the ENUM concept should be implemented in India? What should be the mechanism for inter-relationship between number and IP addressing, and how it will be managed?

Bharti Airtel's Response:

The issue of ENUM is related to interconnection of "Internet" with "PSTN/PLMN" which is completely unrelated issues from the use of IP technology for interconnection in PSTN/PLMN. TRAI has already made recommendation dated 18th August, 2008 on interconnection between internet and PSTN which has not been accepted by government. Therefore, we would request the Authority that the issue may be addressed at a later date when the need arises through a detailed technical consultation paper at the appropriate time.

Q20. Is there a need to mandate Emergency number dialling facilities to access emergency numbers using telephone over IP based networks platform? Please give your suggestions with justifications.

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Q21. How will the issues, of Caller location delivery and priority routing of calls to the emergency centre in IP based networks environment, be handled? Please comment with justifications.

Bharti Airtel's Response:

There are several technical challenges and other implications as regards emergency number dialling, Lawful interception etc. TRAI is requested to address this issue through a proper technical consultation and no link it with IP interconnection.

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