

Third World Telecommunication Policy Forum on Voice over IP

1.0 Introduction: Internet has evolved to the point where it combines elements of telecommunications, computing, broadcasting, publishing, commerce and information services into a revolutionary new model for global communications. Unlike the PSTN, which is circuit-switched, the Internet network is packet-switched; communication on the Internet is accomplished by sending small packets of “data” back and forth. In addition to the data itself, each packet contains an address to ensure that it is routed to the correct destination. The exact format of these packets is defined by the Internet Protocol (IP). The “data” can be anything, including encoded, digitized “Voice”.

1.1 "IP Telephony" is a generic term used for different ways of transmitting voice, fax and related services over packet switched IP based networks. IP Telephony can be divided into two major groups: Internet Telephony and Voice over IP (VoIP). The difference being the nature of the underlying IP network: the Internet telephony uses primarily the public Internet while the VoIP utilizes managed, dedicated IP based networks, even though both of them are based primarily on the Internet Protocol Technology.

1.2 In a Public Internet, the individual packets can take different routes across the Internet and arrive at different times creating various issues like packet loss, delay and jitter as Quality of Service (QoS) is not assured on Internet. Unlike a text message (i.e., e-mail) which can eventually be reconstructed once all the packetized “pieces” have arrived, real time voice communication requires timely delivery to avoid significant pauses which would render it virtually unusable, or at least not nearly comparable to traditional telephone communication. The situation is much simpler with respect to managed IP networks like VoIP where more bandwidth, faster transmission and engineered quality of service parameters can ensure near circuit-based switched quality for IP telephone calls.

1.2 While VoIP is a challenge in the technical sense, the trend to technological convergence has created quite a challenge in the regulatory sense.

2.0 Observations on the points for ITU forum: ITU -T has decided to convene the third World Telecommunication policy forum to discuss the strategies and policies in the changing telecommunication environment and has circulated an agenda with reference to document DM-1167. A draft document report of Secretary General on the IP Telephony was collected from the ITU web site (reference document DM-1177 dated 2nd Nov 2000). The comments on the draft document are as follows:

2.1 Para (1) of Agenda: - 1st Bullet - "Telecommunication policies and regulation of ITU member states".

2.1.1 Present status of Telecom Policy in India: India announced its Telecom Policy in 1994. The Government of India recognizes that provision of world class telecommunications infrastructure and information as the key to rapid economic and social development of the country. It is critical not only for the development of the

Information Technology industry, but also has widespread ramifications on the entire economy of the country. Hence, New Telecom Policy 1999 was framed.

2.1.2 Objectives and targets of the New Telecom policy 1999

- Make available telephone on demand by the year 2002 and sustain it thereafter so as to achieve a tele-density of 7 by the year 2005 and 15 by the year 2010
- Encourage development of telecom in rural areas making it more affordable by suitable tariff structure and making rural communication mandatory for all fixed service providers
- Increase rural tele-density from the current level of 0.4 to 4 by the year 2010 and provide reliable transmission media in all rural areas
- Achieve telecom coverage of all villages in the country and provide reliable media to all exchanges by the year 2002
- Provide Internet access to all district head quarters by the year 2000
- Provide high-speed data and multimedia capability.
- Providing equal opportunities and level playing field for all players;
- Achieve efficiency and transparency in spectrum management
- Protect the defence & security interests of the country

2.1.3 New Policy Framework

The New Policy Framework would look at the telecom service sector as follows:

- Cellular Mobile Service Providers(CMSP), Fixed Service Providers(FSP) and Cable Service Providers(CSP) collectively referred to as 'Access Providers'
- Radio Paging Service Providers(RPSP). Public Mobile Radio Trunking Service Providers (PMRTSP).
- National Long Distance Operators. National long distance service beyond service area to the private operators has been opened from Aug,2000. All access providers shall be mandatorily required to provide interconnection to the NLDOs resulting in choice for subscribers to make long distance calls through any operator. Similarly GMPCS and VSAT based service has been opened for private operators.
- International Long Distance Operators. It has been decided to open the International Long distance by 2002.

2.1.4 Internet Telephony

The National Telecom Policy 1999 states that "Internet telephony shall not be permitted at this stage. However, Government will continue to monitor the technological innovations and their impact on national development and review this issue at an appropriate time".

As per the policy, the operators can choose any technology either "circuit switched or packet switched" for their switches as well as for the long distance connectivity.

2.1.5 Internet Service Provider Policy

Taking into consideration the worldwide explosion in the use of Internet the government has liberalized the ISP provisioning. For a token license fee, the service providers could obtain the license. The license can be taken for three categories of areas, namely Category- A for the whole country, Category-B for the a region or big metro cities and Category-C for Secondary Switching Areas. Any one including the Internet service providers have been allowed to set up their own international Gateways.

2.2 Regulatory Frame work of India.

The Regulatory framework consists of two bodies viz., Telecom Regulatory Authority of India (TRAI) and Telecom Dispute Settlement and Appellants Tribunal (TDSAT).

2.2.1 The role of TRAI is to make recommendations, either suo motu or on a request from the licensor, on the following matters, namely:-

- (i) Need and timing for introduction of new service provider;
- (ii) Terms and conditions of license to a service provider;
- (iii) Revocation of license for non-compliance of terms and conditions of license:
- (iv) Measures to facilitate competition and promote efficiency in the operation of telecommunication services so as to facilitate growth in such services.
- (v) Technological improvements in the services provided by the service providers.
- (vi) Type of equipment to be used by the service providers after inspection of equipment used in the network.
- (vii) Measures for the development of telecommunication technology and any other matter relatable to telecommunication industry in general;
- (viii) Efficient management of available spectrum;

2.2.2 The role of the tribunal (TDSAT) shall be as follows:

- (a) Adjudicate any dispute -
 - (i) Between a licensor and a licensee;
 - (ii) Between two or more service providers;
 - (iii) Between a service provider and a group of consumers:
- (b) Hear and dispose of appeal against any direction, decision or order of the Authority under this Act.

2.2.3 Licensing:

The functions of licensor and policy maker would continue to be discharged by Government in its sovereign capacity.

3.0 Observations on Para (1) - Bullet 2 "Implications of IP Telephony for developing countries particularly with respect to the policies and regulatory frameworks, as well as technical and economical aspects "

and

"the impact of IP telephony on the operations of sector Members, notably in terms of the financial challenges and commercial opportunities it presents"

3.1 Implication of IP telephony with respect to policies: The developing countries like India have a different spectrum as compared to developed countries. The telephone density with respect to the population is about , and the rate of circuit switched telephone growth is about 20%, which is in contrast to the world average of around 11-15%. The dilemma one has whether to continue to invest on the circuit switched telephony, which is the need of hour, and if so, for how long. The uncertainty to the above is further driven by the need of Quality of Service, lack of full proof standardization, lack of inter-operability between different products, etc.

3.1.1 After the technology for implementing QOS in IP telephony is firmed up the IP Telephony can be introduced in the present telecommunication network in two phases.

- i) The first phase is to introduce the Voice over IP technology for carrying traffic between long distance switching centers, and subsequently pre-paid type of services also can also be provided.
- ii) The second phase uses the IP network for carrying voice services from the subscriber premises to the long distance carrier's network where the long distance carrier's network is also IP network, thus making the entire network as IP network. This phase is expected to gain significance when the IP Telephony becomes a significant part of voice traffic. At present, the technology for deployment of this scenario is still in a primitive stage.

3.1.2 As per the NTP-1999 all Fixed Service Provider (FSP) are free to provide all types of services utilizing any type of network equipment, including circuit switching and or packet switching that meet the relevant TEC / ITU-T standards. Similarly all National Long Distance Operators (NLDO) are also free to utilize any type of network equipment, including circuit switching and or packet switching. The usage of IP technology is permitted like any other new technology.

3.1.3 As per the new Telecom Policy –1999 of the ministry of communications, Govt. of India, Internet telephony is not permitted. However the Govt. will continue to monitor the technological innovations and their impact on national development and review this issue at an appropriate time. This means that Govt. of India has not permitted Voice over Internet Cloud i. e. Internet Telephony because this bypasses the PSTN and the International circuits and thus avoids the international rate accounting system which may be substantially higher as compared to internet telephony.

3.1.4 With ITU- T recognizing the importance of IP Telephony and its significant role in the present telecommunication structure, the strategies of the developing countries have to be reassessed and the Government and telecom bodies are to be geared up to meet the realities and challenges of VoIP. The significant steps of ITU-T and IETF are the standardization of relevant standards viz., H.323 Ver 4 and H.248 / MEGACO. Related issues relevant are study of voice over IP, Investment, technical issues like quality of service and Inter-operability, training and Human Resource Development.

3.1.5 With this background the department has planned to use IP technology for real-time services for transit traffic between Long Distance Switching Centers and bypassing Long Distance Switching Network on experimental basis at six locations in the country.

This network will use separate IP network. Presently it is not envisaged to connect to public Internet. The network will cover the six major cities in India. During this experiment, it is proposed to study various issues highlighted in para 3.1.4 and evolve a strategy for long term migration.

3.2 Implications with respect to regulatory issues:

3.2.1 As per NTP 1999, packetized network for carrying voice are permitted. It is suggested that IP voice traffic has to be regulated like any other voice traffic, so that the certain QOS could be provided to the customers. After the QOS for VoIP issues have been suitably addressed vis-à-vis circuit switching, the decision regarding tariff would be driven by the market forces Since the customer would not like a service with low Quality of Service (QOS) at the same time they would not like to pay exorbitant price for a service offering high QOS.

3.2.2 The regulatory mechanism for Internet Telephony can be a far more complex issue, which needs to be properly addressed. Issues like revenue sharing between different service providers, settlement across different networks, ensuring a common QoS for the entire network, carrying of emergency calls, etc., are to be properly addressed.

3.2.3 In a developing country like India all these operators are required to contribute towards Universal Service Obligation (USO) because the USO shall be used by the govt. for funding the rural telecom sector.

3.3 Implications with respect to Technical Aspects:

3.3.1 IP is a connectionless network protocol that provides datagram service on a best-effort basis without consideration of loss, latency or jitter. Voice, as an application is inherently intolerant to any delay or loss.

3.3.2 However, without careful control of the Quality of Service (QoS), the IP voice quality will suffer when mixed with non-delay sensitive applications such as FTP, e-mail and Web browsing. The wide implementation of technologies like Multi Protocol Label Switching (MPLS), Resource Reservation Protocol (RSVP), Real Time Protocol (RTP) and Differentiated Services (Diffserv) across multi vendor platform is essential for ensuring Quality of Service in a global network.

3.3.3 If IP technology has to be a viable option to circuit switching, all the features available on circuit switches are to be supported on the IP switches.

3.3.4 Due to lack of availability of networks implemented on standardized protocols viz., H.248 and H.323 Ver 4, all the VoIP technologies available today are proprietary and vendor specific. Largely in most of the places, the equipment from a single vendor has been deployed. If VoIP technology has to contribute in a bigger way, the technological solution shall have to be based on common standards.

3.3.5 A clear document for the numbering plan for inter-working of E.164 based telephone number system to IP address / Domain Name based system is required to ensure easy interconnectivity between IP and PSTN world.

3.3.6 A clear migration path is required to be defined so that the developing countries can plan their migration strategy from their dominant circuit switching based network to a mixed network (in the intermediately stage) and finally to packet network.

3.4 Implications with respect to Economical Aspects: Liberalization of Telecom sector in developing countries is going to bring down the tariff of the long distance calls. Consumers in the developing countries will be benefited immensely because of long distance calls become cheaper. With the strong middle class base in India, it is expected that this will fuel a demand, which may far exceed the fall in revenue. This phenomenon has been observed already in the cellular market, where reduction in tariff has resulted in an explosive demand growth.

IP Telephony can be used by operators to take advantage of the above fact, because implementation of this technology is easy and at a lower cost.

3.5 Impact of IP Telephony on the operations of Sector members - Financial challenges and commercial opportunities:

3.5.1 Financial Challenges: VoIP is likely to increase the competition by reducing barriers to entry in the long distance voice market, as well as decreasing bandwidth cost. The vigorous and active competition is expected to drive all the operators to resort to cost based pricing, thus eliminating the cross-subsidization which has been prevalent in most of the developing countries.

3.5.2 Incumbent operators will face a financial challenge to see that the service offered remains competitive. The new service providers are likely to deploy low cost infrastructure of VoIP for providing services at low costs. The incumbent operator can also deploy Voice over IP to effectively use the existing infrastructure in a more optimum and efficient way to carry more traffic and generate more revenue. A convergent media, which ensures a single media for all the multi media services including voice also enables to reduce the infrastructure cost including the staff, to a great extent.

3.5.3 Commercial Challenge: The commercial challenge to the basic telephone service providers arising out due to use of VoIP in the long distance sector could be met by offering value added services to the customers. More penetration of Internet along with these new value added services will in turn create more demand and lead to increase in the telephone penetration. The introduction of VoIP creates many new opportunities which a service provider can exploit and use it to sustain itself in the competitive market. The new services, which can be introduced with the VoIP are:

- Closed user group services.
- Multicast services.
- Multimedia conferencing.
- IT enabled services like call centers.
- Message Unification.
- IP call waiting facility.

4.0 Para 2 - "Action to assist Member states and sector members in adapting to the changes in the telecommunication environment due to the emergence of IP Telephony, including analyzing the current situation (e.g., by case studies) and formulating possible co-operative actions involving (ITU Member "States and Sector Members to facilitate adaptation to the new environment:

4.1 It is suggested that the following action plan may be adapted by the member states for the evolving a new architecture for VoIP:

- Introduction of the VoIP network as a pilot project (as being tried out in India)
- Funding of pilot projects on VoIP by ITU.
- Sharing the experiences of such pilot project amongst the member countries.
- Development of vendor base in the Member States to ensure development and availability of technology locally.
- Trying out pilot project across member states for their mutual traffic requirements for studying inter-operability.
- Evolving a common strategy for migration from circuit switching network to packet based network.
- Creation of a common forum for the emergence of new technology.

5.0 Para (3) - "Actions to assist member states and Sector Members in meeting the human resource development challenges presented by new telecommunication technologies such as IP Telephony, in particular, skills shortages and the need for education and technology transfer".

5.1 It is suggested that the following action plan may be adapted by the Member States for meeting the human resource development challenges:

- Upgrading of technical skills for the staff by training, seminars, workshops and tutorials amongst the member countries.
- Sharing of pilot project and developmental activities amongst member countries.
- Deputation of skilled man power amongst member States.
- Setting up of a separate fund for HRD development.