Response to TRAI CP 09/2010 on National Broadband Plan, July 2010

Q. What should be done to increase broadband demand?

Indepth research, studies and analysis needs to be done and data collected in all respects, directly by TRAI or by an agencies mandated by it, covering a wide spectrum of ground realities that are acting as barrier to the quicker, wider adoption and extensive usage of broadband internet. TRAI needs to stop depending upon secondary data received from operators themselves, upon which it largely bases many assumptions and statements which become the basis of status reports and CP papers. International Telecommunications Union has also made suggestions to the extent about the need for nationwide surveys to gather data and establish findings.

In the context of the current CP as well, TRAI must start with a series of time bound, focussed studies which need to establish and identify:

A. Covered Areas – Where BB/WiBB is available.
   a. Extensive research would throw up extremely relevant data, relating to Types of Technology and Services available, Costs and Prices, Utilisation Patterns amongst different demographic & economic strata sets of population, User perceptions of usability of connections, applications and services most used expectations and reality in terms of QoE, etc.
   b. Such indepth data if collected and published in the open by TRAI will only help in assessing, evaluating and then arriving at a reliable method of establishing the ingredients for a recipe to determine relevant factors that will lead to more perceptible and real answers to the question of steps that can lead to more widespread availability and utilisation of Brodband Internet.
   c. At an exoteric level, it is known and accepted that ease of access in terms of availability & applicability, price & affordability of services & devices, perception of economic and social benefits, are and will remain and continue to be the determinants of increase in demand.
   d. TRAI has, since 2004, created CPs and provided recommendations on improving broadband adoption. Three such papers and others on QoS, Speed, Bandwidth, for BB have been made already, with no significant improvement in the uptake of BB.

B. Non Coverage Areas ie. Identifying Dead Zones, where no coverage is available.

   a. TRAI must generate and publish regularly updated granular geographical database of areas, which are physically uncovered by any network, technology or any means of access to communication with assignment of specific reasons for lack of access, which could be due to many reasons, and could range from physical inaccessibility to non-availability of

adequate transportation means, to lack of availability of resources like fuel, manpower, electricity.

b. The database can then be assessed, evaluated for inclusion of specific factors such as nearest available service providers and type of network, signals, etc.
c. All such factors can then be used to determine and recommend specific set of solutions pertinent to that specific area, for encouraging and enabling access, and access (from the supply side vector) is the first and foremost step towards generating demand side vectors.
d. Local communities and Self help groups in uncovered areas should be encouraged to set up localised ISP centres, which can be hand holded to connect to nearest available networks, by whichever last mile technology suitable and run local internet access – without licensing and other such top driven regulations.
e. State and local level leadership for encouraging local Broadband policies and practices need to be encouraged. Centralised top down approach should be replaced with local political and administrative sponsorship of plans and programs to proliferate access and widespread use, much like the case with IT policies adoption during the 90's.

In essence having gone through the exercise of releasing study papers, generating CPs and responses from sections of society – invariably relying only on limited inputs from certain interests and reporting more or less the similar grounds, reasons and factors for non performance of the sector over the last 6 years – TRAI must move towards launching a nationwide Broadband Internet Census to find the real root causes and recommend actions accordingly.

Q. **What, according to you, will improve the perceived utility of Broadband among the masses?**

TRAI needs to critically concentrate on creating and chasing grounds for wider availability of access first as a matter of utmost priority. However, as mentioned earlier, simultaneously it must get first hand in-depth studies of utilisation factors amongst various strata of society – which can be either social or economic reasons – will best help to throw up leads and determine types of demand and usability factors depending upon the layers and strata of society that users come and will likely come from.

Q. What measures should be taken to enhance the availability of useful applications for broadband?

As mentioned, again, TRAI must concentrate on raising the accessibility levels of BB Internet, based on determinants which it has a mandate for like network reach, quality, price, etc.
Useful applications refer to various types of contents and applications, over which TRAI or for that matter, government has and rightly so, little control. Content and Applications are a result of complete market driven functions and hence TRAI can at best, but must, get studies done on what different sections of society find useful and

relevant for their respective needs leading them to adopt and use Internet not at all, sparsely, or extensively.

However, what TRAI can do is to:

a. Continue to pursue some of its own recommendations that have not been accepted and implemented by the Government, till date, such as Internet Telephony by ISPs. Continuation of restrictions on increasingly globally popular internet telephony may be ranking high in terms of non-performance of the vast majority of '103 ISPs' who supposedly provide BB services.
b. Investigate, create and maintain a database of how many central, state, district, public service, government or non government web-sites and applications are local population friendly in terms of usage by way of languages incorporated, accessible and friendly for those who are illiterate and or are physically handicapped. TRAI can then only move to recommend specific suggestions and measures to be adopted to enhance availability, popularity and high usage of 'useful applications'.
c. TRAI can also support a push to get all e-Gov applications IP V6 ready and also ready for mobile format as well. The later will enable availability and use of applications over mobile internet, which according to TRAI itself is available for nearly 150 million users.
d. Our sense is that where Broadband is available at reasonable quality and price, users themselves will determine usefulness of applications and developers will move in to fulfil desirable uses.

Q. **How can broadband be made more consumer friendly especially to those having limited knowledge of English and computer?**

Availability and accessibility first will determine whether sufficient curiosity and therefore demand is generated for BB Internet. Once connections are easily available or within reach, sections of society will come forward to understand what BB Internet can do for them.

a. Today many globally popular applications such as search, email, social networks are available with multilingual options. Hence, for those who may nil or limited knowledge of English can choose to use popular applications in a language they are comfortable with.
b. With the availability of IDNs in the near future, it'll become all the easier for non-English users to search, find and use non-English content.
c. There is a proliferation of computer institutes from metros to small towns, mainly catering to demand for computer learning. Civil society and NGOs working in remote areas can be encouraged to accelerate availability of computers in remote areas where people can be exposed to computers to facilitate understanding and learning.
d. Essentially, a digitally inclusive environment will need to be encouraged to foster a desire for using Broadband and IT for enhancing opportunities for welfare.

Q. Do you agree with projected broadband growth pattern and futuristic bandwidth requirements?

A. Broadband Projections:

a. TRAI first set of Recommendations for proliferation of Internet and Broadband in 2004 included a target for coverage of 20 million by 2010, with Broadband availability not to mention the additional 20 million with Dial up Internet – 40 million in all. We continue to languish with just having been able to touch 40% of the projections made 6 years back.

b. Most of the factors and determinants ascribed throughout have failed to help us meet set goals. Even subsequent attempts by TRAI to bolster growth, via improving QoS, Bandwidth, Tariff Orders, etc did not lead to any improvement in coverage of Indians with access to Broadband Internet.

c. Our suggestion and recommendation is that it is time for TRAI to re-think specific numbers and targets and not be fixated by under achievement or otherwise of specific number targets.

d. TRAI needs to recommend a general but realistic vision and mission statement envisaging an "aim to cover say 50% of Indians by 2014 with min 10 Mbps download speed and 75% with download speed of min 20 Mbps by 2016", with an overall availability of not less than 1600 Gbps of domestic bandwidth. Specific objectives can then be designed and implemented around this Vision.

e. Simultaneously, TRAI will do well to take into consideration 100s of thousands of small businesses in both organised, partially or wholly unorganised sectors, which are still unconnected. A thrust to get the huge number of MSME and SOHO establishments connected over the internet cloud should also be factored in along with households reap richer dividends for India's economic growth in the medium to long term.

Hence the targets for both numbers as well as bandwidth requirement could be made more inclusive and cater to higher benchmarks say 5Mbps per user, rather than just 3-4 mbps.

B. Contention Ratio

a. The approach to arriving at a generality of each household requiring 3 Mbps and defining Contention Ratio at 1-50 based only on the basis of household requirements is potentially misleading and does not take into account the various overlaps in different market segments. These segments will range from home users who can be individuals, to those running small businesses and then enterprises, with differing QoS parameters, including differentiated bandwidth requirements to fulfil their needs.

b. The needs and requirements of SoHo and SME segment is also largely determined by the costs attached to Service differentiation that may in turn deliver differing QoS parameters.

c. Home sub-segments may opt for low QoS, low bandwidth, high contention ratio services at Low prices, while another Home sub-segment may necessarily opt for High Quality, High bandwidth, Low

contention ratio Service, to service his business needs, at a premium, which may however still not be at the level of highest QoS, that can be met by dedicated Leased Line.

d. Hence, there is no reason to limit the services to a generalised contention ratio 1-50. Contention ratio would be determined by a mi
e. It is suggested that only in case of Dial-up, a maximum contention limit can be fixed at 50:1, where 1 physical port at ISP end is supported by minimum 2Mbps bandwidth.
f. For Broadband, the tendency to build in higher contention ratio such as 1-50 needs to be checked, through effective implementation of Network Availability, Bandwidth Utilization and Round Trip Latency parameters. Contention ratio should ideally have a range from min 5:1 going Up to max 50:1, in increments of 5:1

To the extent of the above, in general, we still are not sure on what basis and reasons for TRAI to have arrived at an expectation of 5%, 20% and 40% of broadband penetration and then gone on to pronounce a standardized 1-50 contention ratio for bandwidth requirements. To that extent we cannot be in position to accept the figures of overall bandwidth requirements as shown in the CP.

We can only agree in principle with TRAI that the bandwidth requirements and fulfilment thereof will need to be gigantic and availability of multi-terabit bandwidth capacities at the core and hundreds of gigabits in the access networks have to become the norm.

Q. **Do you agree that existing telecom infrastructure is inadequate to support broadband demand? If so what actions has to be taken to create an infrastructure capable to support futuristic broadband?**

A. From the background provided by the TRAI CP, it seems to be evident that the current state of telecom infrastructure is certainly inadequate to fulfil the huge expectations of coverage and numbers. 6 years into a Broadband Policy and still Broadband penetration remains below 1% in India.

a. There are nearly 12-14 Telecom Service Providers, nearly 15-20 NLD operators, similar number of ILD operators and hundreds of ISPs, who were and should reasonably have been expected to provide adequate nationwide backbone network in terms of physical reach along with extensive last mile access.

b. On the face of it, there is stiff competition, considerable investments in networks leading to huge surge in MoM wireless growth. However, due to several constraints which is mostly a result of inadequate to poor economic potential, any agenda for providing ubiquitous broadband access has met with failure till now. The growth has been one-dimensional. Fixed networks have been declining which in turn threatens even DSL growth despite it being the most successful and acceptable technology to deliver broadband.

B. Actions for Creating Enhanced Infrastructure: This is true not only for India but globally as well, that even developed countries have been highly concerned about - the lack of major chunk of population being bereft of Broadband Access.

a. We must treat universal Broadband Internet access a public service on the lines of other infrastructure services such as highways and roads, railways, water and electricity supply, etc, where commercial models of enterprise alone will not achieve the desired results of ubiquitous availability.

b. We have to seriously consider to develop a model of delivering Universal Internet Access through a publicly accountable but autonomous organisation, which can design and implement a nationwide network with control and access to all aspects of delivery of universal service, ranging from local to national bandwidth channels, either fixed or wireless, appropriate technology for network infrastructure and all resources with a mandate to cover all the current Dead Zones, where internet access is not yet available. This organisation should be capable of involving civil society, local grass roots leadership, NGO's and such for development and implementation of BB Internet coverage, irrespective of commercial considerations.

c. TRAI must give priority to evaluation of declining trend in fixed line connections and work towards reversing the trend. The task should be to clearly enhance fixed line connections at a certain rate and speed (using any means including fibre, copper, etc) with the sole aim of improving the scope to enhance DSL base Broadband access which clearly has been the leading technology for broadband penetration in India.

d. TRAI must also pursue vigorously the acceptance and implementation of Local Loop Unbundling, which it had recommended for opening up in 2004 as well as in 2007. Opening 36 million copper lines to competition will certainly result in re-evaluation of the quality of these lines, and may lead garnering of fresh investments to replace or improve the ability of these lines to deliver DSL based Broadband access.

e. It is incorrect to say that DSL speeds can only be a maximum of 2 Mbps and hence will not meet a benchmark of 3-4 Mbps per household. Wikipedia states that "Older ADSL standards deliver 8 Mbps to the customer over about 2 km (1·25 miles) of unshielded twisted-pair copper wire. As of 2009, the latest standard, ADSL2+, can deliver up to 24 Mbit/s, depending on the distance from the DSLAM. Distances greater than 2 km (1.25 miles) significantly reduce the bandwidth usable on the wires, thus reducing the data rate. ADSL loop extenders increase these distances substantially. Many countries, the downstream speeds offered by ISPs using ADSL2+ is between 8-20 Mbps and upstream capped at 1Mbps. Hence TRAI must work towards proposals to reverse the declining fixed line trend.

Q. What network topology do you perceive to support high speed Broadband using evolving wireless technologies?

A. While Licence holding Telcos and other Service providers like ISPs will logically invest in networks enhances delivery of services while minimizing the commercial risks, there is no single network topology that'll offer a universal solution for maximum geographical coverage to support high speed, and/or ultra high speed internet access. Whether the topology is a Star, Line, Ring, Mesh or a Tree will depend on many local factors irrespective of whether the network is wireline or wireless or a Hybrid structure thereof.
B. Our suggestion is for TRAI is in principle not to consider, suggest or recommend any specific topology with reference to the subject at hand. Once an independent agency and/or organisation is set up to deliver universal broadband access, that organisation should be left to decide the most suitable topology to fulfil the mandate in the shortest possible time.

Q. What actions are required to ensure optimal utilization of existing copper network used to provide wireline telephone connections?

A. Targets given to owners of existing copper lines have been largely unmet, since 2006. TRAI must pursue opening up of these lines to competition. It must chase the government to mandate Local Loop Unbundling in all forms.
B. Secondly, TRAI must evaluate and recommend ways and means to reverse the declining fixed line trends. There is a sense of inevitability to it that needs to be reversed. Efforts must be put in to enhance fixed line connections and for that policy initiatives should be initiated.
C. Measures to encourage investments in improving the quality of existing copper lines should be looked into and most likely LLU and opening of unrestricted Internet telephony will provide that required momentum.

Q. Do you see prominent role for fibre based technologies in access network in providing high speed broadband in next 5 years? What should be done to encourage such optical fibre to facilitate high speed broadband penetration?

Since we believe that TRAI must look into reversing the declining trend in fixed line connections, and if certain steps are taken which will likely lead to improvement of quality of existing copper lines, we do believe that new investments in fixed lines if encouraged will result in use of Fibre in the access network. FTTC and FTTH would be logical progressions but only if policy initiatives are geared towards encouraging fixed line connectivity rather than being focussed towards wireless as it currently is.

In terms of quality of services, dependable access networks and future proofing of incremental bandwidth requirements and ability of number of subscribers to be added seamlessly, without pressuring the networks, Fibre would be the logical way forward. Considering that many countries are planning for provision of up to 100 mbps and 1Gbps services to the customer, wireless in the last mile may not be suitable media for future requirements when India tries to catch up to such high bandwidth demands at individual subscriber levels.

Q. What changes do you perceive in existing licensing and regulatory framework to encourage Cable TV operators to upgrade their networks to provide broadband?

Cable TV operators have been allowed to take ISP licenses or become franchises of ISPs to provide Internet Access to subscribers. We do not see many onerous regulatory reasons in their having been unsuccessful in delivering Internet to a large number of population using Cable Modem technology which has also found favour in many countries with high penetration.
The failure here is mostly ascribed to failure in making suitable investments to upgrade the quality of their cable networks. This is the cable industries own internal structural and systemic problem.

A national autonomous agency that we are advocating for delivering Universal Broadband Access will certainly be able to consider using Cable technology and deploy it should it found useful in meeting service delivery norms in the current Dead Zones.

Q. Is non-availability of optical fibre from districts/cities to villages one of the bottlenecks for effective backhaul connectivity and impacts roll out of broadband services in rural areas?

Yes, definitely. For many years the government has maintained that OFC is available up to 14 kms from the nearest village. However, even a decade of having achieved such a widespread OFC network, we have failed to connect villages with any viable communications link. Despite wireless communication having reached many outlying and remote villages, there will likely be a bandwidth deficit resulting in non-availability of Internet/broadband.

There is no data in the public domain, about the actual status of reach and usage of various SWAN projects, which were meant to create backhaul connectivity in conjunction with national networks and backbones, so as to enable bandwidth availability for various purposes including provision of ubiquitous connectivity right up to Block and village level.

Q. If so, is there a need to create national optical fibre network extending up to villages?

Yes, definitely we need this objective as a thrust area and in line with our Millennium Development Goals.

Q. In order to create National optical fibre core network extending upto villages, do you think a specialized agency can leverage on various government schemes as discussed in para B?

We highly recommend a specialised agency/ organisation which is:

a. Autonomous and Empowered by Central authority so as to overcome state or local municipal limitations
b. Mandated to map all Dead Zones and provide broadband coverage and access to all uncovered areas.
c. It should be able to set up its own independent network irrespective of topology and technology that it desires to deploy, and also capable of appropriate required and readily available resources such as bandwidth and interconnection facilities with other networks.
d. It should be able to work with state and local leadership, civil society and NGOs to facilitate the plans and programs suitable to reach each area for providing access.
e. The local Universal broadband access program leaders should be able to function as local level ISPs, without any regulatory or bureaucratic hurdles.

Q. Among the various options discussed in Para 3.35 to 3.37, what framework do you suggest for National Fibre Agency for creating optical fibre network extending upto village level and why?

The target should be to provide universal broadband access to all uncovered areas. Fibre or Wireless or any other communications means is only a means to reach the coverage and service objectives.

Hence, a National Fibre Agency will only have a limited scope and not very different from many public sector organisations like Railways, PGCIL, etc in terms of a mandate to make available national fibre backbone, extending up to the village.

A Universal broadband Access Agency with the right mandate and financial support will therefore serve the need which is to meet the objective of providing universal broadband access and services. This agency should be able to design a self sufficient network with a combination of appropriating available international, national and local links, create new links wherever required or necessary, create local hosting centres for various services and enabling the provisioning and servicing of Broadband services to the uncovered section of the population.

Q. What precautions should be taken while planning and executing such optical fibre network extending upto villages so that such networks can be used as national resource in future? What is suitable time frame to rollout such project?

The Universal broadband Service agency should ideally an independent Board managed entity, independent both financially and administratively, but accountable to public in terms of operational transparency, fund collection and usage, etc. We would recommend that this agency be kept independent of current resource structures such as USO, etc. since its past performance and fund availability and utilisation for the purpose has been clearly unremarkable.

Any agency that is created for this purpose as suggested above should be able to allowed to set its own practical time frames, once it has a clear mandate, authority, structure and financial resources available to it. It could generally be in line with our suggestion that 50% of Universal Broadband coverage should be achieved by 2014 and 70% by 2016.

Q. Is there a need to define fixed and mobile broadband separately? If yes, what should be important considerations for finalizing new definitions?

Even though most countries have not yet adopted the practice of fixing Broadband definition and speed separately for Fixed and Mobile, we support a move for India to have a separation of the definitions. We also need to simplify the current Broadband definition as could be as under:

For fixed always on broadband internet connection minimum data download throughput will be 2Mbps with upstream throughput of a minimum 1 Mbps to the subscriber from the nearest POP of subscribers Internet Access Provider.

For Mobile Internet, the minimum speed will be 256K/bits in one or both directions between the subscribers device to the POP of the nearest MSC.

Q. Is present broadband definition too conservative to support bandwidth intensive applications? If so, what should be the minimum speed of broadband connection?

We recommend that the Broadband definition should be as under:

a. For Fixed Line Connections Data transmission rate of min 2 Mpbs downstream and 1 Mbps for upstream for fixed line connections.
b. For Mobile Internet Data transmission rate of min 256 Kbps in one or both directions.

Q. What specific steps do you feel will ease grant of speedy ROW permission and ensure availability of ROW at affordable cost?

Many directions, over the years, have been provided by the Department of Communications, drawing from the powers of the central authority of the Ministry of Communications to seek appropriate consideration from the state and local municipal authorities. However, ROW of way being a state level matter; it remains a bottleneck issue which is unresolved.

It is difficult to understand why local authorities will forego an opportunity to add to the revenues while granting ROW rights.

There are two methods that can mitigate the problems associated with seeking ROW permissions.

a. Issue a Central Government Ordinance, fixing the terms and conditions for grant of ROW while also imposing the rights and obligations of all partners with suitable and appropriate penalties for failures on all parties concerned.
b. A national Universal broadband Access Agency formed with under the authority of Central government should include in its mandate a vested right of way, much in the way that Power transmission companies and Highway Authorities, or the Metro Rail corporations have.

Q. Does the broadband sector lack competition? If so, how can competition be enhanced in broadband sector?

While there are sufficient number of license Service Providers, along with a regulatory framework that follows forbearance in tariff matters, indicating presence of competition, real market experience indicates otherwise, in terms of market dominance statistics, consumer service pricing methods and other such indicators.

While we have effective competition in the mobile sector, in the Broadband Internet segment we lack really 'effective competition' in so much as that only a handful of Service providers control most of the market and traffic.

TRAI must look, even if belatedly, into the reasons of such SMP of a few Service providers, who are largely integrated telecom players and pursue corrective methods to enable other 90+ ISPs to make more significant contribution to market growth and penetration.

Q. Do you think high broadband usage charge is hindrance in growth of broadband? If yes, what steps do you suggest to make it more affordable?

Over the years TRAI has provided us with pricing data which is as under:

a. 2004 – It noted that rentals being charged were at the level of Rs. 1500 pm

b. 2007 – It noted that rentals being charged were in the range of Rs. 200 to Rs. 600 pm with data download prices being Rs. 0.70 to Rs. 1.50 per Mb)
There were also Rs. 0.0 pm rentals with data download prices being Rs. 1.5 to Rs. 2.0 per Mb.

c. 2010 – It is noted that rentals are in the range of Rs. 250 pm, mostly charging Rs. 200 to Rs. 1600 pm rental with data download prices being Rs. 0.20 to Rs. 1.0 per Mb
With Rs. 0.0 rental schemes data download charges are Rs1.0 to Rs. 2.0 per Mb)
And there are Rs.125 and some Rs. 49 pm rental schemes for 2 Mbps but with download caps of 150/200 Mb.

Going by TRAI's own findings, the rental charges came down in 2007 from 2004 levels significantly, but introduced data download charges (resulting in net increase in bills for consumers – authors own experience).
However, between 2007 and 2010, both lower and upper rental charge range seem to have gone up, except that data download charges seem to be lower. (However, again, with increased multi-media experiences, data download consumptions have only increased thereby increasing the monthly billings in terms of units consumed – again from authors own experiences).

TRAI must look into the facts again, as presented above and

a. Evaluate the reasons for increase in prices –rentals
b. There are a multitude of schemes and offers, which make it difficult for consumers to make appropriately affordable choices. There is a need to simplify the offers.
c. Billing seems to be non-transparent, with consumers not able to understand unit wise consumption for which they are billed, hence are unable to question large bill amounts.

Q. Do you think simple and flat monthly broadband tariff plans will enhance broadband acceptability and usage?

As noted above, confusing choices, non-transparent billing methods, high usage costs are definitely a hindrance to intensive utilisation for majority of the Indian consumers. Hence it will be highly appropriate an market friendly approach if TRAI uses a regulatory mechanism to get Service Providers to provide flat and simple usage schemes.

Q. Should broadband tariff be regulated in view of low competition in this sector as present?

Experiences and indicators above point to the need for TRAI to evaluate the multitude of schemes and plans and encourage operators to offer consumer friendly prices such as flat rate options and transparency in billings.

Q. What should be the basis for calculation of tariff for broadband, if it is to be regulated?

Can be suggested only if granular and reliable data on costs apportioned to each fixed and variable costs are made available.

Q. How can utilization of International Internet bandwidth be made more efficient in present situation?

Please see other comments.

Q. How can use of domestic and international internet bandwidth be segregated? Will it have direct impact on broadband affordability? If so, quantify the likely impact.

We understand from ISP Provider industry that domestic IP transit charges are higher as compared to International bandwidth pricing (which are probably getting more aligned to international/transcontinental pricing).

A deeper assessment of this issue may lead us to understand why most Service Providers still prefer not to distinguish between domestic and international traffic thus undermining the efforts of NIXI.

TRAI must reopen the International & Domestic bandwidth pricing issue. The last TTO were notified wef from April and September 2005 setting the ceiling prices. TRAI needs to consider reassessment of the same after a gap of over 5 years now.

If TRAI findings lead to downward restructuring of domestic bandwidth prices, it will certainly lead to a beneficial impact on consumer side pricing and therefore increase affordability.

Q. What steps should be taken to bring down the cost of international internet bandwidth in India?
Q. How can competition be enhanced in the International bandwidth sector?

Indian owned companies now have control over major chunks of international cable links and therefore international internet bandwidth. But the availability of the same for domestic Indian companies is still comes at a higher cost as compared to international pricing standards.

There are nearly 20 odd ILD operators in the market, but prices do not reflect existence of such competition. The reason may lie in the fact that the cable systems, landing stations and gateways are still controlled by a only 3 (not counting BSNL) operators and bulk capacity is brought from them by other ILD operators at a certain cost who find it difficult to lower prices except in some specific cases.

India still lacks mechanisms for dynamic pricing, through structures such as Bandwidth exchanges, where live pricing of available bandwidth is subscribed to and

sold by interested parties, much like in the case of commodity markets. It is in such structures that real market prices come into play and competitive transparency is built in.

Q. QoS of broadband, availability of bandwidth, adherence to given contention ratio, affordability, availability and spread are some intricately linked parameters. In your opinion what should be done to ensure good quality broadband to subscribers?

We suggest that TRAI enforces a separate QoS compliance standard for Leased Line circuits provided by the Facility based operators to ISPs.

There is a need for floating a model SLA agreement between Bandwidth Providers and the ISP (whether at an arms length to it's own operations or with standalone ISPs), incorporating the QoS benchmarks, monitoring and corrective measures and their adherence schedules, with built-in provision for penalties for failure to meet the stated benchmarks.

However, an ISP could be free to offer in the market, stating transparently, 2 types of Services, One that meets the set QoS benchmarks and Second that does not meet the QoS norms. End Customers can choose either type depending upon their capacity and willingness to pay.

Recommended QoS Standards for Broadband Services, for compliance by Service Providers for Residential, SOHO & SME Segments

1. Network Availability Should be 95% or more

Where Network Availability =

$$\frac{\text{(Total Operational Minutes – Total Minutes of Service Downtime) x 100}}{\text{Total Operational Minutes}}$$

a. Total Minutes of downtime should include downtime caused by upstream service provider, but exclude periodic/notified maintenance & upgrade related downtimes.
b. This measurement should be mandated, as it reflects the degree of access network operability and its connectivity uptime to the Internet backbone. Network design is an important factor and this measurement can help the Service Providers to log the total downtime of the various elements within the network, ie. Switches, routers, multiplexers, etc. as well and take measures to improve the uptime.

2. Roundtrip Network Latency for Local network should be less than or Equal to 85 ms and for international links - less than or Equal to 300 ms

Network operators can monitor and record values by doing the following:

a. trace calls at 10 minute intervals, during 3 busiest hours per week (as per MRTG chart), compiled over a month.
b. ping from test point to the furthest router in the domestic network at local access provider
c. ping from a test point to the furthest router in the domestic network of the long distance provider
d. ping from a test point to the router at the first point of the international point of presence, say in US.
e. A weighted average latency figure can be used in case there is more than one network in any segment.

TRAI on its part will have to compile this data and monitor the same and it must be understood that:

1. ISPs are only a part of the link in the overall chain-link, in provision and ultimate delivery of Broadband, High Speed or Dialup Internet services.
2. Several factors, effect the uptake and utilisation of Bandwidth (despite being the most visible resource, apart from Latency, Jitter, Contention, etc), by the Service Providers, towards improvement or deterioration of Internet Services Quality. Some of these are; location of content, types of content, hosting and caching techniques, number of hops/links from Servers to End Customers, Protocols, Routing & Transit methods, etc.
3. The Upstream Links/bandwidth norms have to be well established, and thereafter Technology, Quality and Standards of last Mile will determine the final Service QoS.

Q. Do you think that bad quality of broadband connection is impacting the performance of bandwidth hungry applications and hence crippling the broadband growth? If so, please suggest remedial actions.

Perhaps, perceptions of Quality and High costs for usage may have some impact on the consumers ability to intensely utilise the Broadband connections and limit hi/her ability to gain beneficially in terms of desired outputs from the connection.

Q. Is there a need to define new/redefine existing quality of service parameters considering future bandwidth hungry applications, time sensitivity of applications and user expectation? What should be such parameters including their suggestive value and should such parameters be mandated?

Please see answer above. A detailed submission on the lines were made in Feb 2009, by us which can be re-submitted if the Authority so desires.

Q. What measures do you propose to make Customer Premises Equipment affordable for common masses? Elaborate your reply giving various options?

CPE availability is a common market function and does not seem to be in any need of regulatory intervention. They are widely available, but arguably the range and prices of broadband internet enabling and enabling devices are available in a wide variety of form factors and price ranges.

Q. What measures are required to encourage development of content in Indian vernacular languages?

Various application developers have already been making their content (examples are of Google, Microsoft, CDACs Indic language software) available in many local languages.

TRAI can create a database of government web-sites and assess their user friendliness in terms of local language incorporation and disabled friendly functionalities. It can consult and provide recommendations to state authorities to take appropriate steps in this direction.

Once TRAI manages to get the government to agree to let local communities set up their own local internet access services, say in conjunction with a proposed national universal broadband service agency, access will get a local boost and help create demand for vernacular and locally relevant content.

Widely available access has to come first and demand and creation of vernacular and local content will follow thereafter.

Q. Do you perceive need for any regulatory or licensing change to boost broadband penetration?

In 2007, TRAI and the government did away with the need for 'C' category license for ISPs.
We had suggested that local entrepreneurs should be encouraged to develop local internet access, without any need licensing and regulatory burdens.

We are re-iterating this plan, so that local programs and plans for generating demand for Broadband access can be given a Philip.

Q. Are there any specific competition and market related issues that are hindering growth of broadband?

a. 60% market share of ISP business appropriated by only 2 service providers and 86% amongst 5 Service providers' points towards market failure, which TRAI must investigate to find out if there are significant anti-competitive practices that exist or are practiced to the detriment of majority of other ISPs.
b. Globally, it is an acknowledged fact that bandwidth prices, both domestic and international, remain much higher compared to internationally prevailing norms and this certainly has a negative bearing on demand and growth of broadband amongst a large section of society which is admittedly very price sensitive.
c. French experience suggested that allowing Internet telephony had a positive impact upon the demand for fixed lines, which in turn led to an increase in investment and growth of fixed line network. TRAI must keep pursuing this matter as one of the means to encourage fixed line growth and reverse the declining trend.
d. Absence of LLU mandate also limits the ability of majority of service providers to compete effectively and the matter becomes worse when fixed line network continues to grow negatively without check.

Q. What other fiscal/non-fiscal measures should be considered to boost broadband penetration?

Many fiscal incentives in terms of reducing duties and taxes have been recommended by TRAI to the government over the years. Except for seeking reductions in Service Tax, TRAI can keep pursuing other fiscal incentives such as reduction in local taxes, rationalisation of conflicting tax regimes between Centre and State.

A concrete measure would be to pursue deduction of an amount equivalent to monthly payment of broadband services, subject to a yearly limit of Rs. 20,000, from personal and professional tax. This will help boost demand from the grass root level.

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