Alcatel·Lucent

Consultation Paper
National Broadband Plan
from Alcatel-Lucent

Alcatel-Lucent India

We, Alcatel-Lucent, take this opportunity to welcome the initiative taken by TRAI for promoting digitalization through the country and the role of TRAI to judiciously balance the competing interests of the stakeholders. We also appreciate the issues floated for consultation in relation to **National Broadband Plan**, aimed at creating a supportive environment for the cross country digitalization.

We have tried to answer the paper so that we can provide our views on the following:

A. To identify infrastructural bottlenecks impeding growth of broadband in urban & rural areas and suggest corrective measures
B. To identify opportunities to develop synergy to boost broadband penetration including financial support for broadband development
C. To identify the need for "National Optical Fibre Network"

Chapter 2: Broadband – Demand & Supply

5.1 What should be done to increase broadband demand?

Multi-pronged strategy needs to be followed to increase broadband demand

Customers:

- Accessibility: Cover more locations (expand networks and services to the densely populated areas in the shortest time possible)
- Affordability: Cheaper services and cheaper equipment (like computers, connecting devices, etc.)
- Awareness: Advertising benefits, digital literacy programs, kiosks, etc.
- Quality of Service: Regulate uplink and downlink speed so that Quality of Experience does not degrade and minimal break-down of service

Service Providers:

- Public-Private Partnerships in low density areas
- Manufacturing promotion or tax rebate for equipment used (at least for rural broadband)
- Innovative and appropriate business models for services
- Wireline telephone lines can be migrated to MSAN with broadband enabled for 80% of users

Content Providers:

- Content development programs targeting e-education, entertainment, gaming and video-phony
- Making appropriate content available like on training, improved agriculture/cultivation trends, health care, baby care, and family planning
- Automating government services thereby promoting more content providers in the market

Government:

Government intervention is necessary as it impacts elasticity of supply and demand. Government has to help or support service providers to reach low density areas. The

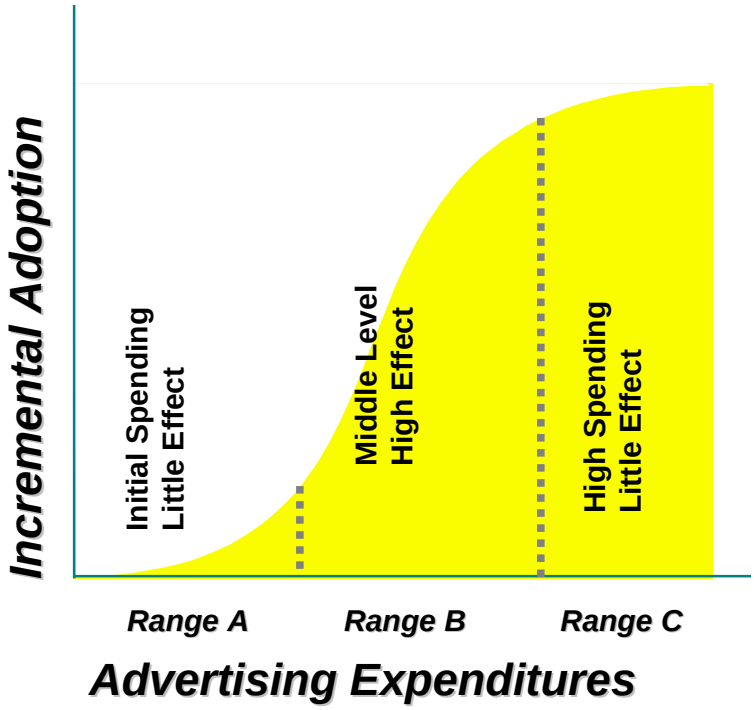
support could be in terms of partnerships, rebates, or other incentives. The idea is to generate an economic value through this initiative.

Without government investment in infrastructure, certain areas of the country may be un-served or underserved because lack of good infrastructure makes the cost of providing broadband service prohibitively high. Government investment will encourage private internet service providers to enter these areas and offer broadband services to homes and businesses.

5.2 What, according to you, will improve the perceived utility of broadband among the masses?

Broadband adoption can improve among the masses if the following areas are targeted:

1. **To Provide Information:** Information about government policies and public services like e-health, e-governance (land registration).
2. **To Provide Services:** Triple play services - voice, video and data with easy control and usability shall help improve the perceived utility of Broadband.
3. **To Create Awareness and Communicate Benefits:**
    - Helping raise literacy rate/awareness
    - Have kiosks in schools, panchayats, etc.
    - Create new business opportunities through support organizations and showcase success stories
    - Obtain information about market prices
    - Potential reduction of wastage. Helps us being green
    - Advertise benefits – advertising has a correlation to adoption. Following curve illustrates a typical correlation



4. **To Improve QoS/Customer Service**
    - o Provide specified upload and download speed (a minimum mandate set by the government)

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

- Automate government applications
- Support collaboration initiatives through universities, University Grants Commission (UGC), Ministry of Human Resource Development (HRD), etc.
- Help create a conducive environment to host applications (provide entrepreneurship opportunities by creating a conducive environment)
- Web-enable government functions (/departments) and connect them via broadband

- Operators to encourage and support developer programs for application enablement
- Promote gaming and video-phony
- Network should be available as a service to service-providers: In some cases the maximization of the extraction of social value from networks requires careful financial planning. Making a network available as a service to service providers could be a very useful way to assure connectivity in zones without coverage were a challenging business case is the blocking factor to network deployments. In these cases, a network that is deployed, managed, and owned by an organization that assures open access to all players at reasonable prices, may be a solution to assure that currently uncovered areas benefit from the convenience that connectivity can provide. In these areas, competition would be driven by commercialization and application strategies. A number of social inclusion services can also be provided by such a network in order to enhance healthcare services, education and government activities.

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

- Develop content in local languages
- Have training programs
- Have operators provide customized information, pre loaded features and inbuilt applications to users
- Setup kiosks with touch screen capability
- Provide capability to schools and at gram-panchayats
- Provide IVR option in local languages

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

Yes, with the mix of right applications, services and appropriate network backbone.

5.6 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?

Yes, the current telecom infrastructure is inadequate.

Action plan:

1. Get a mandate for a National Plan. The plan could have a separate mention for:
    a. Middle-mile (reaching the taluks or gram-panchayats)
    b. Last mile (reaching the villages)
2. Provide incentives or collaborate with service providers to lay cable/fibre
3. Network should be available as a service to service providers

5.7 What network topology do you perceive to support high speed broadband using evolving wireless technologies?

For National Broadband Network, the preferred network topology should follow hierarchical structure i.e. State Level PoPs (in respective metro/non-metro cities), district level PoPs redundantly homing to their respective State PoPs & Village Gram Panchayat level PoPs homing to district level PoPs.

Access network should be connected to core using optical fibre to provide for future bandwidth needs but in some locations cost effective option of microwave links or low cost solar powered broadband using Wireless Regional Area Network could be deployed. Government should consider opening up TV spectrum for broadband data in rural areas, since this could allow for high penetration in rural areas at low cost. BH option should be multi technology capable supporting service aware flat IP architecture.

The three most promising technologies which are all standards based and are therefore expected to meet the price targets required for India. These technologies are:

- IEEE 802.16 m (WiMAX) – peak data rates of 100 Mbps
- 3GPP – LTE: Downlink peak date rate of 100 Mbps; uplink peak data rate of 50 Mbps.The users are expected to get high performance with mobility as high as 120 km / hr.
- 3GPP2 – UMB - forward direction peak data rate is expected to be as high as 500 Mbps; reverse direction peak data rate is expected to be as high as 150 Mbps

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

DSL (Digital Subscriber Line) remains the most widely used technology to deliver broadband internet services. Our aim should be to enable at least 80% of wire line lines with broadband. As operators are upgrading networks they should plan with vision of transforming if not all but atleast 80% with broadband.

To overcome the dependency of DSL performance on distance (satisfactory within 3 Km radius of exchange), RT (Remote Terminal) can be used to extend the distance and increase the channel capacity of DSL connection to provide internet service to distant and low density locations where it's impractical to place the DSLAM closer.

5.9 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?

Fibre will play a major role for wireline access network. Based on 5 year projections of customer growth and bandwidth hungry applications it is imperative (at least in highly dense urban region) to have fibre based technologies in access network to meet customers' triple play services traffic.

Fixed line broadband network (fibre) is capable of much more than 100Mbps.

However, due to high cost associated with laying fibre, it does not seem to be viable business model for low-density population areas. For these locations, other options need explored like low cost solar powered broadband using Wireless Regional Area Network.

The government should work to remove hindrances to this initiative. A few being:

- Cost of laying fibre i.e. ROW (Right of Way) should be service provider friendly. Obtaining right of way clearances has proven to be major hurdle in creating new telecom infrastructure including laying of optical fibre cables. Telecom infrastructure/services should be given the 'basic need' status and all the terms/conditions/charges related to ROW should be revisited.

- There is a need to provide a single-window clearance for laying telecom infrastructure and work towards lowering the taxes for towers and digging.
- All green field and high-rise building areas to be fibre connected.
- To connect the last mile in rural areas, Government should consider opening up TV spectrum for broadband data in rural areas, since this could allow for high penetration in rural areas at low cost.

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

- GPON with IPTV and RF overlay option shall be promoted.

5.11 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

5.12 If so, is there a need to create national optical fibre network extending upto villages?

Wire line infrastructure availability in India is lagging both at the backhaul as well last mile levels. Their needs to be an acceleration towards the creation of high capacity symmetric, ubiquitous and secure broadband infrastructure across the country using appropriate technologies – including but not limited to optical fibre, wireless, radio, satellite etc., depending on the terrain involved.

In some cases, the high cost of using fibre to transmit information/services to reach districts/villages is not justified for transporting these services. In these cases, the objective of National Broadband Network can be partially achieved by exploiting LTE/WiMax BWA technologies or low cost solar powered broadband using Wireless Regional Area Network or other options. Government should also consider opening up TV spectrum for broadband data in rural areas, since this could allow for high penetration in rural areas at low cost. The optical fibre to these regions should be considered a long-

term approach. A national network does seem to be a logical progression but not tied to just fibre.

5.13 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?

Yes

5.14 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 three options:

1. Agency Owned
2. Public-Private Partnership (PPP)
3. Consortium of Service Providers

We would recommend PPP. There is a need to have a public-private partnership as it will help pool resources and expertise from businesses, local governments, and non-profits organizations. This is a partnership with a wider scope so there is an opportunity to have a larger pool of resources available than just the service providers. To prevent a monopolistic market, the broadband infrastructure needs to be made sharable among players.

5.15 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?

- If the network is PPP created then the network should be available for interconnection with other networks. This specification will enable internet service providers to enter the market and connect homes and businesses by building out connections from PPP funded middle-network.
- Being valuable and expensive infrastructure, the optical fibre laying activity should be well-planned i.e. planned route/future requirement consideration
- Laid optical fibre should not be prone to environmental attacks as well as unauthorized access/theft.

Chapter 4: Regulatory Challenges and Future Approach

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

Yes. Today wireline broadband is dominated by government held service providers. Competition can be enhanced through:

- Public Private Partnerships
- Providing a level playing field for all operators
- Review of peering policies
- Provide incentive to service providers to achieve penetration targets

5.20 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?

At present, pricing focus should be to gain customer adoption. Customer willingness to pay should drive pricing. If the government needs to intervene to increase the range of customers then it will be a decision that the concerned agency should take based on research and pricing waterfall.

In addition, there is a need to review international & domestic peering.

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

No. Our current goal is to gain acceptance of broadband and making service available to everyone in the pricing spectrum is the way ahead.

A flat price if it is above the floor price can disengage the people at the lower end of the spectrum. A tiered plan, helps operators articulate a better value proposition, provide pricing transparency assurance to users and also gives users a real sense of where their usage profile sits.

For rural/low-density areas, however flat monthly plan (subsidized) may help give the initial boost.

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

This will be a decision that can be taken after extensive research is undertaken to gauge customer willingness to pay and the cost of setting up operations. There seems to be a case to have a subsidized flat plan for rural areas.

For operators offering subsidized plans, the government can pick up part of the rebate offering or offer a cost sharing model to make it attractive.

5.26 What steps should be taken to bring down the cost of international internet bandwidth in India?

One option is to have Content Delivery Networks (CDN). CDNs can provide faster response time while maintaining Quality of Service (QoS) & Quality of Experience (QoE) at competitive cost.

5.28 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?

- Networks should support E2E QoS parameters and network initiated QoS modifications for multiple best effort type flows (typical Internet traffic) as well for guaranteed bit rate type flows for real time applications such as VoIP, real time video and interactive gaming.
- Networks to provide QoE metrics and various techniques to take action to maintain expected QoS.
- Have a consortium monitor quality based on pre-defined standards
- To ensure satisfactory QoE, contention ratio should be within reasonable limit

- Network QoS should be applied for prioritization traffic
- Introduction of IMS is required

5.29 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.

Yes. We do believe that bandwidth hungry applications certainly need end to end network accessibility, capacity and reliability. When it is bad quality of broadband connection (error-prone, unreliable link) then packet drops arising due to unreliable link impact the performance of bandwidth hungry applications.

Another reason for bad quality of broadband connection could be not having sufficient bandwidth then it is obvious that latency factor (due to lesser bandwidth) can impact the performance of bandwidth hungry applications. This could further slowdown the development of such applications (having revenue potential) due to non-feasibility of bandwidth.

Remedial Actions:

- Setting up QoS and periodic governance
- Network analyzers and field support systems
- Key performance metrics to report network performance and application bandwidth needs

5.30 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?

Yes.

A few parameters that need to be included are:

- Availability of Service
- Availability of CIR
- Guaranteed Bit Rates
- Latency
- Delay characteristics

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

- Incentives through fiscal policies - reduction in taxes and levies for Customer Premises Equipments (CPEs)
- Financial incentive in terms of rebate in income tax to encourage affordability of CPEs
- Easy upgradability of software
- Cheaper thin client PCs/Laptops
- Bundling with subscriptions and payment through instalment
- Low cost designs with minimum features yet meeting international standards

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

- Web-sites for governmental agencies should be in English, Hindi, and the local dialect
- Targets should be set for government agencies to have at least a minimum specified traffic through internet. This will force these agencies to cater to people using the web by providing information through that medium
- Universities (through UGC and Ministry of Human Resource Development) should be asked to have content in atleast two languages and their accreditation should have it as a mandatory criterion
- For private sector, in the initial phase the government can incentivize to drive content development

References

1. Building broadband: Strategies and policies for the developing world – World Bank Report
2. Recovery Act Investments in broadband: Leveraging Federal Dollars to create jobs and connect America