Foreword: Speedc (www.speedc.net) is an Indian Content Delivery Network company. The following response is provided by Mr. Prashanth Angani and Mr. Devashish Ghosh of Speedc. You can contact them for further information by writing to (contact [at] speedc.net).

5.1 What should be done to increase broadband demand? (Reference Para 2.23)

Speedc estimates that future broadband demand drivers will primarily be Entertainment, Connectivity and News. While overall broadband requirements are expected to increase across all other drivers as well, the 'Pull' for broadband will predominantly arise from these three domains. E-commerce, E-Governance, online Matrimonial and Gaming will also experience growth in demand, but the infrequent nature of transactions will significantly dwarf their real growth in overall % terms.
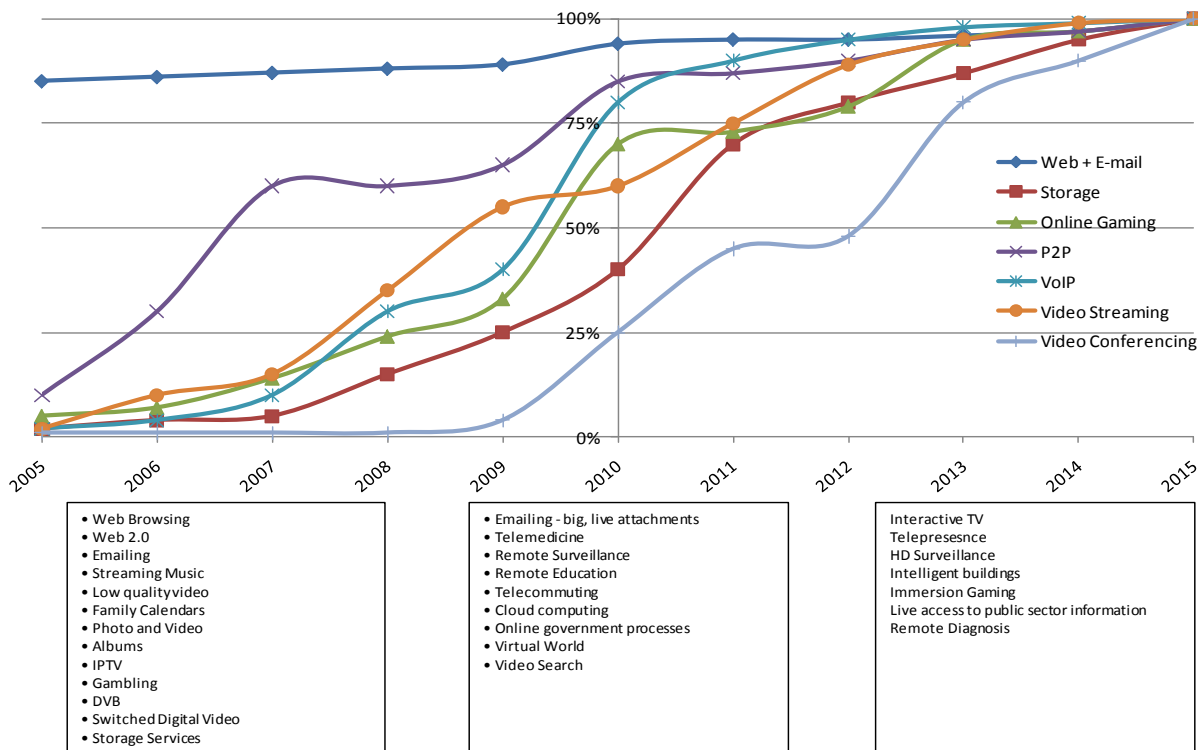

Based on the above observation, Speedc believes that significant increase in broadband demand can be achieved by fuelling growth in online entertainment, connectivity and news. This can be achieved by:

a) improving the quality of service offering
b) providing video as an alternate to text based content
c) providing content in multiple Indian vernacular languages
d) improving the breadth of coverage and frequency of updates, and
e) simplifying user-interface for content access from various CPEs

5.2 What, according to you, will improve the perceived utility of broadband among the masses? (Reference Para 2.23)

The Oxford Team study on Broadband Quality Score identified the following application categories as global broadband growth drivers until 2015.

| • Web Browsing
• Web 2.0
• Emailing
• Streaming Music
• Low quality video
• Family Calendars
• Photo and Video
• Albums
• IPTV
• Gambling
• DVB
• Switched Digital Video
• Storage Services | • Emailing - big, live attachments
• Telemedicine
• Remote Surveillance
• Remote Education
• Telecommuting
• Cloud computing
• Online government processes
• Virtual World
• Video Search | Interactive TV
Telepresesnce
HD Surveillance
Intelligent buildings
Immersion Gaming
Live access to public sector information
Remote Diagnosis |

Indian demand can be expected to lag overall demand by 2 years. There is also, a clear distinction in the perceived utility of broadband in urban vs rural India. According to Speedc the perceived utility can be improved in both regions in the following manner:

Perceived utility of BB in Urban India:

a)   E-mail and other connectivity applications such as IM and chat

b)   IPTV, including time-shifting and VoD

c)   E-commerce (banking, ticketing, bill-payment, e-governance, etc.)

d)   Infotainment when mobile

Perceived utility of BB in rural India:

a)   IPTV, including e-governance initiatives

b)   Enhance the quality of functionality of CSCs with services such as video/ voice mailbox

5.3 What measures should be taken to enhance the availability of useful applications for broadband? (Reference Para 2.23)

No comments.

5.4 How can broadband be made more consumer friendly especially to those having limited knowledge of English and computer? (Reference Para 2.23)

Usage of number based primary interface combined with vernacular language secondary interface can enhance usability. In addition content delivery in video format will encourage consumer demand.

5.5 Do you agree with projected broadband growth pattern and futuristic bandwidth requirements? (Reference Para 2.35)

No, we do not believe that 1:50 is an acceptable contention ratio for good quality service delivery in 2014 as it increases the likelihood of simultaneous connections significantly. In such an environment a user provided with 1Mbps connectivity might only experience 625Kbps bandwidth on average.

Speedc believes that 1:20 is an appropriate higher limit for urban users and 1:30 is an appropriate limit for rural users, indicating a weighted average contention ratio of 1:24 across the country.

Speedc also believes that 3-4 Mbps estimate for 2010 is significantly high and that a more realistic estimate might be 1Mbps for 2010, 2Mbps for 2012 and 4Mbps for 2014.
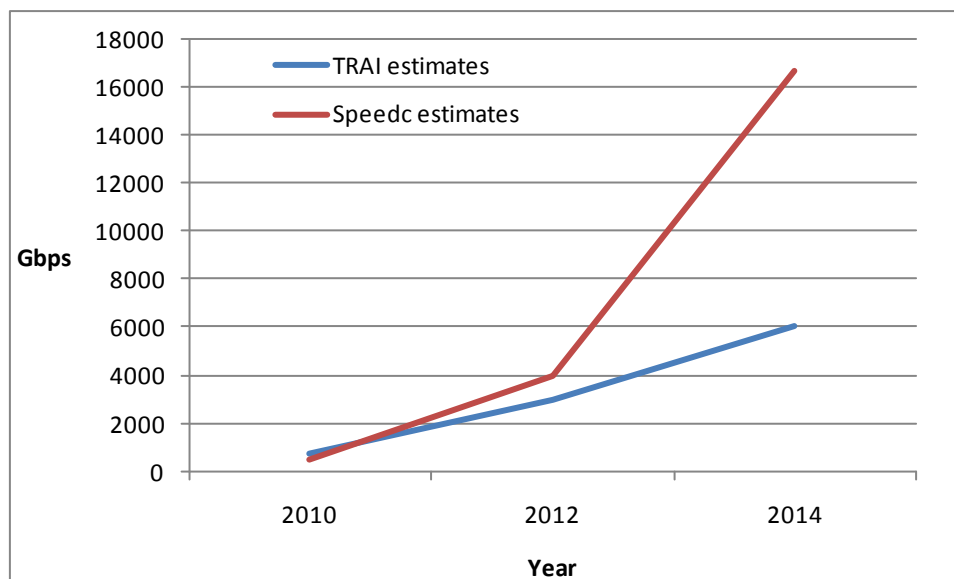
The above graph indicates TRAI and Speedc bandwidth estimates for the suggested subscriber base of 11.5M in 2010, 48M in 2012 and 100M in 2014.

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? (Reference Para 2.35)

Existing infrastructure is clearly inadequate to support futuristic broadband demand estimates. Speedc agrees with the various suggestions made in the national broadband plan to meet futuristic support through a nation-wide optical fiber network. However, encouraging the use of content

delivery network technology can significantly reduce the planned cost for nation wide broadband plan.

The Speedc Content Distribution and Management System (CDMS) technology is a collection of servers spread geographically at strategic locations across India. The servers cache and deliver user desired data and are placed at various points in ISPs' network to improve throughput and availability.

The capacity sum with strategically placed servers can be higher than the network backbone capacity. This results in an impressive increase in throughput. For instance, when there is a 10 Gbps network backbone and 100 Gbps central server capacity, only 10 Gbps can be delivered. But when 10 servers are moved to 10 access network locations, total capacity can be 10×10 (100) Gbps to consumers, while also reducing 100Gbps load on the core network.
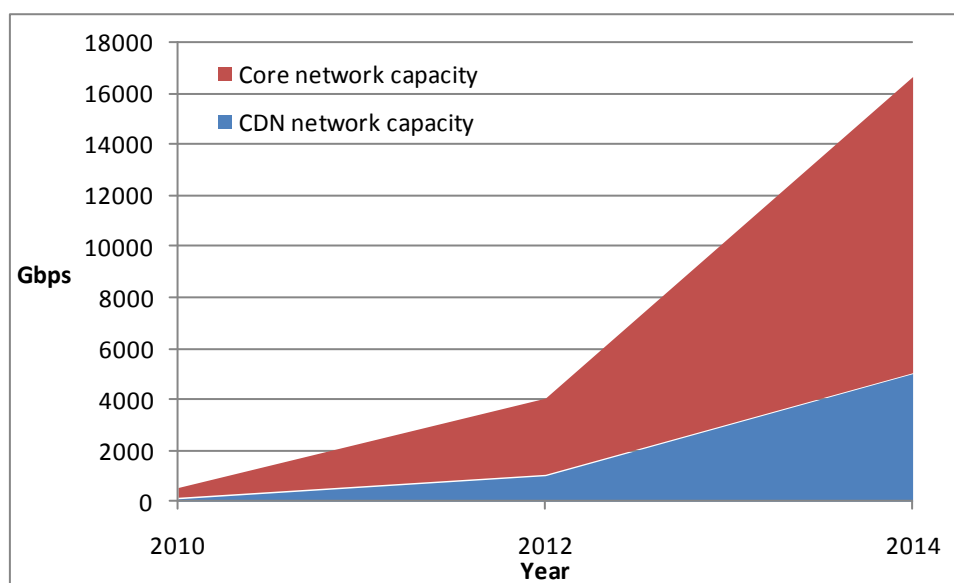
The above chart indicates how a CDN can reduce core network bandwidth requirement by delivering some high bandwidth content in the access network. i.e: Indian consumers can consume 16,667Gbps with a core network capacity of only 11,667Gbps. Other benefits of a domestic Indian CDN are:

a) Reduction in ISP cost due to cheap availability of bandwidth locally
b) Saving on Forex outflow paid out in terms of international bandwidth cost
c) Enforceability of Indian regulation on content delivery

The CDMS technology is a reverse caching technology which is performed with explicit assistance from the content owner, and can thus be regulated unlike forward caching technology (such as web proxy) which lead to the following issues:

a) Content owner may challenge unsolicited storage of their copyright content
b) Cache owner is unaware of the legality of content being cached on their servers
c) Cache infestation by malicious viruses can lead to catastrophic spread of virus in ISP networks

The actions we suggest are:

a) incentivize domestic CDNs that significantly reduce cost of bandwidth, core network and FOREX outflow
b) create sufficient co-location space in key cities and towns for caching servers
c) expand NIXI infrastructure from current 9 locations to 50+ locations by 2014
d) allow non-ISPs such as CDNs to provide bandwidth by co-locating and peering at NIXI
e) allow any bandwidth provider to collect X-Y charges via NIXI infrastructure irrespective of the 5:1 rule

5.7 What network topology do you perceive to support high speed broadband using evolving wireless technologies? (Reference Para 3.22)

No comments.

5.8 What actions are required to ensure optimal utilization of existing copper network used to provide wireline telephone connections? (Reference Para 3.22)

No comments.

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? (Reference Para 3.22)

No comments.

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? (Reference Para 3.22)

No comments.

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? (Reference Para 3.39)

AND

5.12 If so, is there a need to create national optical fibre network extending upto villages? (Reference Para 3.39)

Yes.

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? (Reference Para 3.39)

No comments.

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? (Reference Para 3.39)

No comments.

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? What is suitable time frame to rollout such project? (Reference Para 3.39)

In addition to various aspects considered in the National broadband Plan, Speedc suggests creating co-location space and peering facility at various cities and towns across the country to enable the deployment of smart and intelligent network technologies such as CDNs.

5.16 Is there a need to define fixed and mobile broadband separately? If yes, what should be important considerations for finalizing new definitions? (Reference Para 4.18)

No comments.

5.17 Is present broadband definition too conservative to support bandwidth intensive applications? If so, what should be the minimum speed of broadband connection? (Reference Para 4.18)

The current broadband definition is too conservative. In continuation to our response in questions 5.2 and 5.5, Speedc would further like to emphasis on a variable broadband definition as follows:

1) Download speed of 1Mbps by 2010, 2Mbps by 2012 and 4Mbps by 2014
2) Upload speed of 512Mbps by 2010, 1Mbps by 2012 and 4Mbps by 2014
3) Broadband terminology should only be applicable if the minimum broadband threshold is provided or exceeded on any connection made during the entire period of service.

5.18 What specific steps do you feel will ease grant of speedy ROW permission and ensure availability of ROW at affordable cost? (Reference Para 4.30)

No comments.

5.19 Does the broadband sector lack competition? If so, how can competition be enhanced in broadband sector? (Reference Para 4.42)

No comments.

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? (Reference Para 4.42)

Yes, high cost of broadband is a major hindrance to growth of broadband. We suggest incentivizing domestic CDNs that reduce cost of bandwidth for ISPs.

5.21 Do you think simple and flat monthly broadband tariff plans will enhance broadband acceptability and usage? (Reference Para 4.42)

No comments.

5.22 Should broadband tariff be regulated in view of low competition in this sector as present? (Reference Para 4.42)

No comments.

5.23 What should be the basis for calculation of tariff for broadband, if it is to be regulated? (Reference Para 4.42)

No comments.

5.24 How can utilization of International Internet bandwidth be made more efficient in present situation? (Reference Para 4.42)

A domestic Indian content delivery network would download the current popular content once from (internationally located) origin server and deliver to all subsequent requests for the same content locally within India. This exponentially improves utilization of international internet bandwidth as depicted in the following diagram.
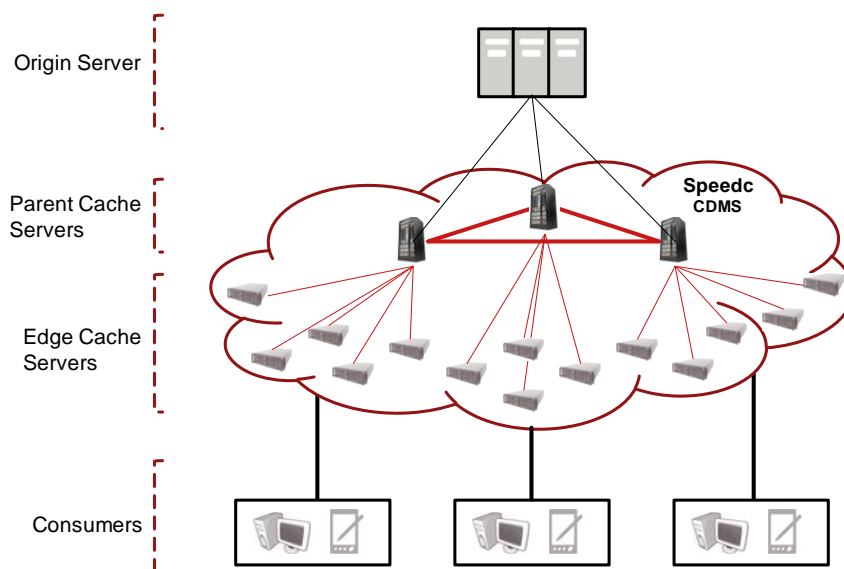
5.25 How can use of domestic and international internet bandwidth be segregated? Will it have direct impact on broadband affordability? If so, quantify the likely impact. (Reference Para 4.42)

We support TRAI's suggestion of routing domestic traffic through NIXI. In addition NIXI must expand its presence and capacity while also allowing non-ISPs to provide bandwidth locally as detailed in our response to question 5.6.

5.26 What steps should be taken to bring down the cost of international internet bandwidth in India? (Reference Para 4.48)

We agree with the TRAI suggestions made towards reducing international bandwidth cost. However, we believe that these might still not be able to bring prices down to the level that one might expect through local content delivery. In the long horizon, significant growth and sustainability of Indian broadband ecosystem can be ensured only by bringing content closer to the consumer (within India).

A clear example is the significant growth in Indian mobile subscriptions, which was achieved only when a significant reduction in cost base of Telcos was experienced.

In this regard, Speedc suggests TRAI to encourage and incentivize Indian CDN companies that achieve the goal of bringing content closer to the consumer (in India).

5.27 How can competition be enhanced in the International bandwidth sector? (Reference Para 4.48)

No comments.

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? (Reference Para 4.59)

AND

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. (Reference Para 4.59)

AND

5.30 Is there a need to define new/redefine exsting 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? (Reference Para 4.59)

Good quality of broadband is key to a good consumer experience. It is therefore important for consumers to be able to measure and demand the quality of broadband that they are paying for.

Speedc suggests the creation of a transparent website that enables consumers to benchmark the quality of service received by them in real-time. The benchmark index must constitute of the following parameters:

a) Download speed
b) Upload speed, and
c) Latency

By providing a single Index, similar to the Broadband Quality Score, TRAI will be able to easily indicate the quality of received bandwidth by consumers.

5.31 What measures do you propose to make Customer Premises Equipment affordable for common masses? Elaborate your reply giving various options. (Reference Para 4.64)

No comments.

5.32 What measures are required to encourage development of content in Indian vernacular languages? (Reference Para 4.68)

No comments.

5.33 Do you perceive need for any regulatory or licensing change to boost broadband penetration? (Reference Para 4.71)

No comments.

5.34 Are there any specific competition and market related issues that are hindering growth of broadband? (Reference Para 4.71)

Majority of the content demanded by Indian consumers is fetched from overseas. This is primarily because international content hosting is significantly cheaper than Indian hosting. IDCs provide for computing and storage but are not ideal for content delivery due to their centralized nature. CDNs can significantly enhance consumer experience through content delivery in the access network. CDNs also lower the cost of international and core bandwidth while reducing FOREX outflow.

Existing international CDNs in India do not address the broader Indian market spectrum and have therefore been ineffective in reducing international bandwidth demand significantly. There is a strong need for a low cost Indian CDN service.

Speedc believes NIXI must allow non-ISPs such as CDNs to connect and collect bandwidth peering charges in the same manner as other ISPs (or IDCs with and ISP license). In addition NIXI must also expand its presence and capacity to enable CDNs to co-locate in a manner similar to international internet exchanges.

5.35 What other fiscal/non-fiscal measures should be considered to boost broadband penetration? (Reference Para 4.71)

As a domestic Indian CDN, Speedc faces various challenges:

a) Delivering the right price point - affordable by Indian customers.
b) Constantly protecting tens of thousands of caching servers from attack traffic.
c) Developing predictive algorithms that ensure that the most popular content is cached locally.
d) Ensuring 100% performance even at high server failure rate.
e) Educating Indian customers on the benefits of a CDN.
f) Ensuring uniform capacity utilization and not have too many high peak loads.
g) Longer timeframe to achieving profitability, as seen in the case of most international CDNs.

The current broadband ecosystem in India is not conducive to the creation of a low-cost Indian CDN service. This is particularly as the 47% of Indian broadband consumers are located outside of Tier-1 cities. Hence, Speedc would like to make the following recommendations:

a) Domestic Indian pure-play CDNs need financial support through the USOF fund
b) Tax incentives and holidays
c) Enabling CDNs to co-locate and connect at NIXI without an ISP license
d) Enhancement and expansion of NIXI infrastructure to more than 50 locations