

Fiber to the Home: A Revolutionary Technology

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Abstract: Fiber to the home (FTTH) broadband connections, refer to fiber optic cable connections for individual home, offices and residences. It is based on optical fiber communication and can deliver a multitude of digital information such as telephone, video and data more efficiently than conventional copper coaxial cable. A key benefit of FTTH is that it provides far faster connection speeds and more carrying capacity than twisted pair conductors, DSL or coaxial cable. Fiber to the home is the only technology with enough bandwidth that fulfils the demands of the customers, present as well as in future. In India, Fiber to the Home (FTTH) is deployed by BSNL. In this paper we have presented the concept of FTTH as well as its future prospects in infrastructure development of India.

Keywords: FTTH, Optical Fiber Communication, DSL, Coaxial Cable, BSNL

1. INTRODUCTION

A fiber optic communication system consists of three components: an optical transmitter, a fiber optic cable, and an optical receiver. The optical transmitter converts electrical signal to optical signal; the fiber cable carries the optical signal from the transmitter to the receiver; and the optical receiver reconverts the optical signal to electrical signal. Most optical fibers are made of silica or sand, raw material abundant compared with copper. With just a few pounds of glass, approximately 43km of optical fiber can be produced. Optical fibers can be used as a medium for telecommunication and networking because it is flexible and can be bundled as cables. It is especially advantageous for long-distance communications, because light propagates through the fiber with little attenuation compared to electrical cables.

The fiber optics is superior to metallic conductors as a T/N line for signals because of its high bandwidth, low attenuation, interference, low costs and light in weight. Due to these advantages the fiber optic is used in field of telecommunication. The goal of the fiber optic industry is to install fiber optics all the way to the home. From an economic point of view, fiber was immediately cost effective in the long-distance networks. Compared to copper or digital radio, fiber's high bandwidth and low attenuation easily offset its higher cost. Compared to copper wire used in telephony, fiber could carry thousands of times more phone conversations as compare to copper wire and DSL.

2. IMPLEMENTATION

There are two important types of systems to make fiber-to-the-home broadband connections. These are active optical networks and passive optical networks. Each offers different ways to distinguish and route data to the destination. An active optical system uses electrically powered switching equipment, such as a router or a switch aggregator, to manage signal distribution and direct signals to specific customers. This switch opens and closes in various ways to direct the incoming and outgoing signals to the proper place. A passive optical network uses optical splitters to separate and collect optical signals as they move through the network. In some cases, FTTH systems may combine elements of both passive and active architectures to form a hybrid system. Passive optical networks are more efficient, in that each fiber optic strand can serve up to 32 users. Active optical networks reliance on Ethernet technology makes interoperability among vendors easy. A passive optical network, on the other hand, does not include electrically powered switching equipment and instead uses optical splitters to separate and collect optical signals as they move through the network. A passive optical network shares fiber optic strands for portions of the network. Powered equipment is required only at the source and receiving ends of the signal.

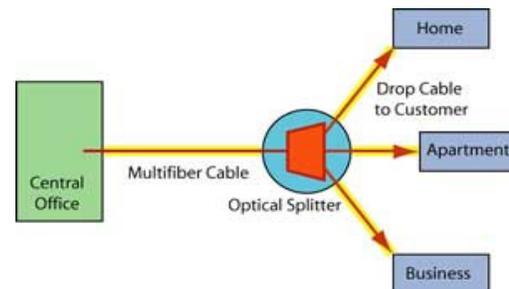


Fig. 1 Connection diagram

3. SERVICES OVER FTTH

According to BSNL services provided over fiber to the home in India are:

- Basic internet Access Service controlled and uncontrolled from 256Kbps to 1000mbps

- TV over IP Service (MPEG2).
- Video on Demand (VoD)(MPEG4) play like VCR
- Audio on Demand Service
- Bandwidth on Demand (User and or service configurable)
- Remote Education
- Point to Point and Point to Multi Point Video Conferencing, virtual classroom
- Voice and Video Telephony over IP
- Interactive Gaming
- VPN on broadband
- Dial up VPN Service
- Virtual Private LAN Service (VPLS)

4. NEED OF FIBER TO THE HOME IN INDIA

As per study carried by Cisco, in 2017 India IP traffic will be 6 times what it is in 2012. Within this growth of internet traffic, 65 billion minutes of video content will cross the Internet each month in year 2017, up from 22 billion in 2012. 65 billion minutes of video content means 24,857 minutes of video streamed or downloaded every second. So a high speed technology is needed to deal with this. No doubt fiber to the home is that technology that can efficiently deal with this. The recently formed new government understood the need of time and framed new policies that intend to provide high speed and high quality broadband access to 100,000 village panchayats through Optical Fiber by the year 2014 and progressively to 250,000 villages in coming years. Applications such as e-medicine, video conferencing, e-Learning, security surveillance, etc that require large bandwidth can also be implemented using optical fibers. Clear government policies and approvals can help improve the development of FTTH deployment in India. Policies should be framed in such a manner that Optical Fiber deployment should be made compulsory in the green field projects and broadband service may be treated as an important utility like water, electricity and gas.

5. PRESENT POSITION OF FTTH IN INDIA

In India, Fiber to the Home (FTTH) is first deployed by BSNL (Bharat Sanchar Nigam Limited). Currently BSNL has deployed fibers to 95 cities of 18 states of India. Also Ministry of Telecom under Government of India is planning to provide high speed and high quality broadband access to 100,000 village panchayats through Optical Fiber by the year 2014 and progressively to 250,000 villages in coming years. To cope up the need of large bandwidth required applications such as e-medicine, video conferencing etc, and deployment of fiber to the home is indispensable. BSNL plans for FTTH for customers in India are mentioned below.

6. CONCLUSION

There are number of essential points about fiber to the home technology that have been mentioned throughout this paper. Basic concept and implementation of fiber to the home has been also studied and summarized. Fiber to the home is a revolutionary technology and plays vital role in economic growth of India. Last but not the least we want to conclude by words of great scientist late Dr. C. V. Raman that, 'There is only one solution to economic problems of poor nations, that is science, more science and still more science'. No doubt, science alone cannot develop a nation but no nation can develop without science. There is not a single nation which has come out of underdevelopment without putting big emphasis on investing in science and technology

BSNL Broadband Plans for FTTH (w.e.f. 01/09/2013)

S.N.	Particulars	FiBro ULD 3999	FiBro ULD 5999	FiBro ULD 9999	FiBro ULD 16999
1	Bandwidth (Download Speed)	upto 10 Mbps till 50GB, 512 kbps beyond	upto 20 Mbps till 100GB, 512 kbps beyond	upto 50 Mbps till 150GB, 1 Mbps beyond	upto 100 Mbps till 200GB, 2 Mbps beyond
2	Applicability	All Users	All Users	All Users	All Users
3	Fixed Monthly charges (Rs)	3999	5999	9999	16999
4	Annual payment option (Rs) [11XFMC]	43989	65989	109989	186989
5	Two Years payment option (Rs) [21XFMC]	83979	125979	209979	356979
6	Three Years payment option (Rs) [30XFMC]	119970	179970	299970	509970
7	Download/Upload limit (GB/month)	Unlimited	Unlimited	Unlimited	Unlimited
8	Free E mail IDs/Space (per E-mail ID)	4/5MB	4/5MB	4/5MB	4/5MB
9	Static IP address (on request)	One Free	One Free	One Free	One Free
10	Security deposit (Rs.)	One month FMC	One month FMC	One month FMC	One month FMC
11	Minimum hire period	One month	One month	One month	One month

Source : www.Bsnl.co.in

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