

Name of Course : E1-E2 CFA

Chapter 3

Topic : Broadband and Multiplay

Date of Creation : 19.03.2011

BROADBAND & MULTIPLAY

Broadband and broadband services

Introduction:

In today's globally networked society through internet, there is always increasing demand for higher capacity systems and more bandwidth for new services & networking. Hence new types of access technologies for broadband have to be found for this exponential growth. Prior to broadband service, PSTN dialup (including ISDN) was the main technique to get Internet access. For high speed, only alternative was lease line bandwidth. Even today, PSTN dialup service is prevalent. BSNL offers many options for dialup Internet account such as Sancharnet (pre-paid) and Netone (CLI based) service. Sancharnet is an all India roaming account i.e. user can use it from any landline in India. The dialup charges are payable on landline whereas, Internet usage gets deducted from Sancharnet account. The download speed depends on quality of PSTN line and goes up to 56Kbps limited by capacity of modem used. For Internet access, BSNL also offers Unlimited plan on postpaid CDMA and usage based for prepaid CDMA service.

What is Broadband?

TRAI has defined Broadband as an always on data connection that is able to support interactive services including internet access and has the capability of minimum download speed of 256 kbps to an individual subscriber from the point of presence (POP) of the service provider intending to provide broadband service where multiple such individual broadband connection are aggregated and the subscriber is able to access these interactive services including the internet through this POP. The interactive services will exclude any service for which separate license is specifically required, for example, real time voice transmission, except to the extent that it is presently permitted under ISP license with Internet telephony.

Advantages of Broadband

- Always on (Not on shared media)
- Fast (speed ranging from 256 kbps to 2 Mbps)
- No disconnection
- No additional access charge
- Telephone and Data simultaneously
- Fat pipe has to be continuously supplemented with value added applications to enjoy the advantage.

Wired Broadband Technologies:

There are many different types of broadband access technologies. Each of these technologies can compete to provide similar services to consumers and businesses.

- Digital Subscriber Line (DSL, given over copper loop of Telecom operators)
- Cable Modem (CM, Given over cable TV operators coaxial cable network)
- Power Line Broadband (BPL, Over Power lines)
- Fiber technology

Digital Subscriber Line (DSL)

Digital Subscriber line (DSL) is a wire line transmission technology that brings data and information faster over copper telephone lines already installed in homes and business. Traditional phone service connects your home or business to a telephone company office via copper wires. A DSL modem accesses the local telephone company's central office where a DSL Access DSLAM then transmits the signal from the copper telephone line onto a network backbone, and eventually to the Internet. With high speed Internet access that uses DSL transmission technology, there is no need to "dial in" to a traditional modem. This service allows consumers and business to have an "always-on" dedicated connection to the Internet. The following are types of DSL transmission technologies that may be used to provide high-speed Internet access.

Symmetrical Digital Subscriber Line (SDSL)

It is used typically for business applications such as video conferencing. The traffic from the user to the network is upstream traffic, and from the network to the user is downstream traffic. When the data rate in both directions is equal, it is called a symmetric service.

Asymmetrical Digital Subscriber Line (ADSL)

It is used primarily by residential users who receive a lot of data but do not send much such as Internet surfers. ADSL provides faster speed in a downstream direction (from the telephone central office to the customer's premises) than upstream (from customer's premise to the telephone central office). When the upstream data rate is lower than the downstream rate, it is called an asymmetric service.

High-data-rate Digital Subscriber Line (HDSL)

It provides fixed symmetrical high-speed access at T1 rate (1.5 mbps), and is designed for business purposes.

Very high-data-rate Digital Subscriber Line (VDSL)

It provides both symmetrical and asymmetrical access with very high bit rate over the copper line. Deployment is very limited at this time.

ISDN Digital Subscriber Line (IDSL)

It provides symmetrical connection with Integrated Services Digital Network (ISDN), and is designed to extend DSL to locations with a long distance to a telephone central office.

DSLAM

DSLAM is the equipment located at a phone company's central office (CO) that links many customer DSL connections over existing copper telephone lines to a single high-speed ATM line. When the phone company receives a DSL signal, an ADSL modem with a POTS splitter detects voice calls and data. The DSLAM intermixes voice frequency signals and high-speed DSL data traffic into a customer's DSL line. It also separates incoming phone and data signals and directs them onto the appropriate carrier's network. Voice calls are sent to the PSTN, and data are sent to the DSLAM. DSLAM is connected to Internet Backbone for access to World Wide Web and other applications. More DSLAM channels a phone company has, the more customers it can support.

BSNL'S Broadband Access Technology

BSNL Broadband service is built on a world class, multi-gigabit, multi-protocol, convergent IP infrastructure through National Internet Backbone-II (NIB-II) that provides convergent services through the same backbone and broadband access network. In BSNL Asymmetric Digital Subscriber Line (ADSL) Technology is used for giving the Broadband connection where greater download is required in comparison to upload

Effect of copper pair quality

Data speed capability depends on the thickness of wire used in cable network. Higher the gauge, higher the data carrying speed. Data speed deteriorates if copper loop quality is bad i.e. more joints, loose joints, low insulation etc.

For BSNL Broadband connection, Customer Needs:

- BSNL's Landline connection
- Computer with 10/100 Mbps Ethernet Card
- DSL Modem + Splitter (CPE)
- PPPoE software to be loaded in the Client

➤ Broadband Account (Username and Password)

How BSNL Broadband is better than Cable Modem Service

High-speed Internet access that uses Cable Modem (internet service given by Cable TV operators) offers shared bandwidth or speed among neighbors on the same cable system. Speed is asymmetric and will vary depending on the number of people on the network. With high-speed Internet access that uses DSL service, one gets a dedicated connection to the home. In most cases, however, the performance of DSL based service depends on the distance between end user and phone company's central office.

Getting BSNL Broadband

For booking of BSNL broadband service of BSNL there is online register form available on website www.bsnl.co.in, otherwise contact directly to BSNL franchisee or nearest customer service center. Local toll free number for broadband booking & complaints is 1504, all India toll free is 1800 424 1600.

Family	Up stream Rate	Down stream Rate	Maximum range
ADSL	640 KBps	8 MBps	5.5 Km
ADSL Lite	384 KBps	2 MBps	6Km
ADSL2	1-1.5 MBps	12-16 MBps	5.7 Km
ADSL2 +	1 MBps	26 MBps	5.7 Km
ADSL2 RE	1MBps	12 MBps	7Km

Services offered to BSNL Broadband customers

- Basic Internet Access Service controlled and uncontrolled (256Kbps to 1000Mbps). BSNL has various tariff plans for home and business customers.
- Content Based services: [Video on Demand (VoD), Education, Audio on Demand (AoD) etc.] BSNL has tied up with franchisees to offer this service. A set top box (STB) is provided which acts as the interface between ADSL modem and TV.
- Web conferencing: BSNL has tied up with a franchisee to offer this service. Toll free number for knowing details is 1800-111-233. BSNL Web Conferencing Service enables to conduct virtual meetings with business partners, suppliers, employers etc. It has the innovative feature such as Persistent meeting rooms, which simulates physical room environment wherein authorized users can enter their designated rooms the way they do in physical meetings.

- The users can access the rich features, apart from multi-point, multi-media (Audio, Video & Data) conferencing service, BSNL web Conferencing service provides very powerful data conferencing tools to enhance collaboration among users such as sharing of PowerPoint Presentation, Whiteboard, Documents, & Chat facility amongst the conference participants, which will significantly aid in increasing the effectiveness of your business meetings. BSNL Web Conferencing Service does not require expensive end points; all that you require are a PC, Web-cam and an ADSL Connection.
 - It is ideally suited for users at all levels in large corporate houses, Small and medium businesses, SOHOs & quality conscious individuals to enhance collaboration, increase productivity and save costs.
 - Interactive Gaming: This service is offered in association with a franchisee Broadband customers can visit <http://bsnl.indiagames.com/> and subscribe this service. Various monthly plans are available. BSNL toll free number is 1800 425 0500.
- Multiplay (A term meaning offer of multiple services such as Voice, Data, Video, Games etc. as listed above).
 - VPN on broadband.
 - Dial up VPN Service.
 - Virtual Private LAN Service (VPLS).
 - Bandwidth on Demand (User and or service configurable)

How BSNL VOD is better than DTH (e.g. Dish TV / Tata sky)

In DTH, as it is broadcasting, the request for VOD has to be registered through some other mean than the Set top Box (may be through phone call, SMS or Internet) Limited say four to five movies are broadcasted and the viewers have to choose among them only and that too at predefined timings. In true VOD, as offered by BSNL, the set-top box behaves just like a DVD player and viewer can select a movie from the boutique, view it, at his / her desired time and day, pause it, rewind it, forward it or can have the exactly same experience as viewing from a personalized DVD player. This is only possible because of the two-way communication between the set-top box and the server. In BSNL one has a choice of selecting from hundreds of movies while VOD offered by DTH providers may have only few movies to offer.

WiFi Enabled ADSL modem

BSNL provides WiFi enabled ADSL modem on rental basis. Customer can purchase it from the market also. This type of modem allows the customer to use broadband service through out the coverage area of WiFi modem i.e. wireless link between PC and the ADSL modem.

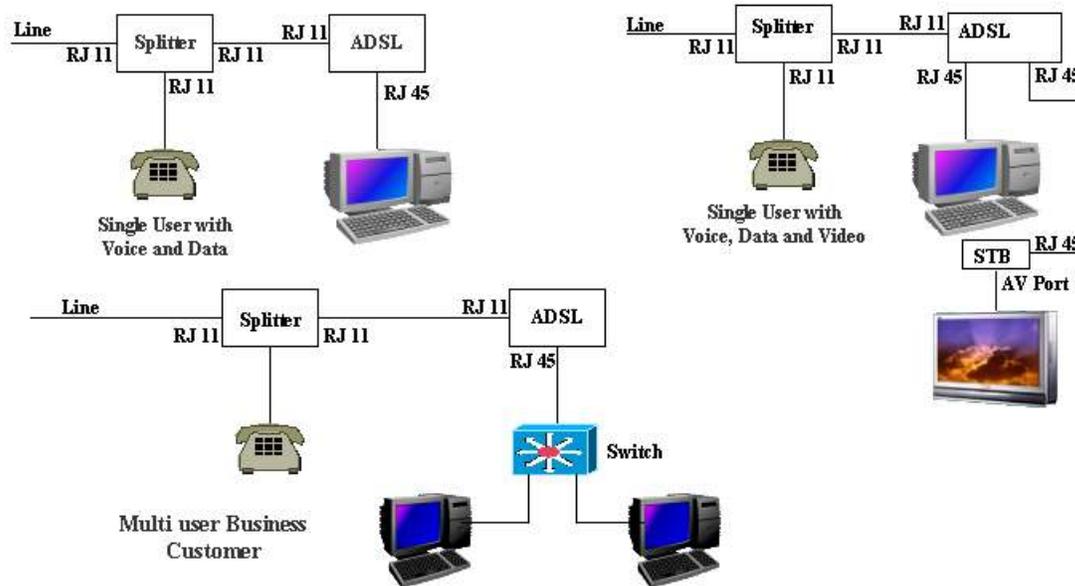
Important Do's and Don'ts for BSNL Broadband customers**Do's**

1. No phone/Fax should be connected before splitter.
2. Change your password regularly
3. Please remember or write down your password after every change of password.
4. Check your usages detail regularly. You can see usages of current month and last 12 months in system.
5. Please note that the Surfing, Listening Live Music, Chatting, Online Gaming, Internet Telephony, E-mail, Anti-virus and any other software updates through Internet etc. are part of download/upload.
6. Please keep automatic updates disabled on your computer software (e.g. Windows update, Anti-virus update, different Driver update) to avoid unanticipated high usage.
7. Please clean your computer virus regularly.
8. Please log off from broadband connection and switch off modem when not in use.

Don'ts:

9. Please do not disclose your broadband User ID and Password to anybody.

Customer Premises Installation



Some concepts:

Single User (SU): Only one PC can be connected to BSNL Broadband connection.

Multi User (MU): Customer is allowed to share one BSNL broadband connection among multiple PCs (Often a need of Cyber Cafes, Business setups)

Static IP address: For many services such as video conferencing, VPN etc. a fixed IP known as Static IP is required.

Dynamic IP: For normal Internet browsing, the customer does not require static IP. In such cases, BSNL allocates temporary IP address to the customer when a session is initiated.

Speed Check: Customer is assured of promised speed. They can check it for their connection at link <http://www.dataone.in/>. The check is performed by measuring the speed of a file transfer. The file transfer is counted towards download limit.

Data Usage: This is aggregate of data uploaded and downloaded through broadband connection. When a customer subscribes to Games on Broadband, the data usage is normally not charged separately i.e. it becomes part of monthly rent for Games service or is on per download basis). The Data Usage is accounted in GB (Giga Bytes). **One GB (Giga Bytes)** is 1024 Megabytes.

- An average web page is about 50 kilobytes in size, i.e. approx. 20,000 web pages for 1GB
- An hour of surfing the web would be around 10 megabytes (200 pages) so you could surf non-stop for about 100 hours for 1 gigabyte
- An hour of streamed radio would use about 15-20 megabytes An hour of streamed video uses around 100-150 megabytes
- Playing an online game typically uses about 10-15 megabytes per hour BSNL broadband customer can check usage details at - www.dataone.in

BSNL BB Plans

http://bsnl.co.in/service/dataone_tariff.htm

FAQ'S Regarding Broadband

<http://bsnl.co.in/faq/faqans.php?paramCategory=Broadband>

BROADBAND MULTIPLAY

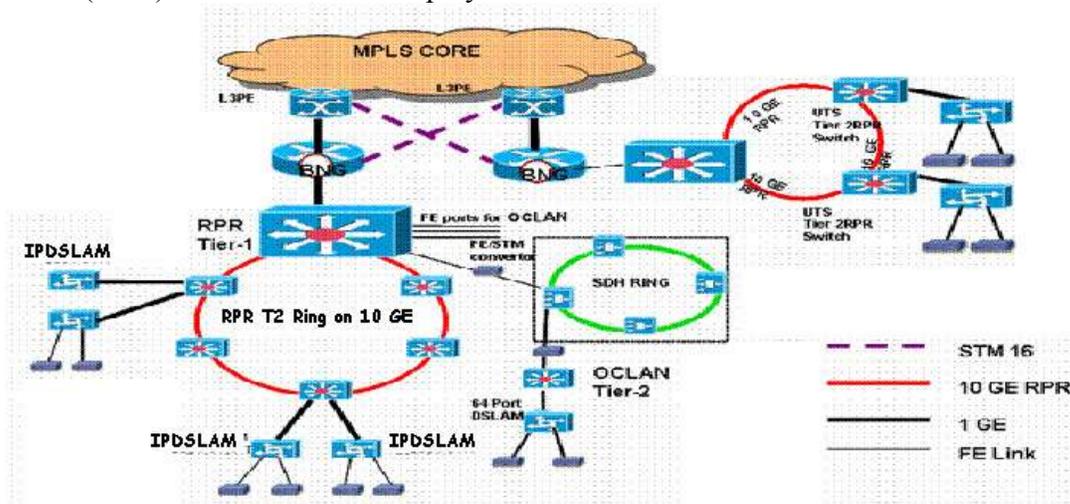
Objective

- 1) What is broadband Triple Play / Multiplay
- 2) Service offered in Broadband Triple play
- 3) Components of broadband triple play
- 4) What is IPTV?
- 5) What is VoIP?

What is BB Multiplay?

The triple play service means providing the following service to the customer: -

- 1) Data (Internet)
- 2) Voice (VoIP and not the PSTN which is already provided on broadband also)
- 3) Video (IPTV, VoD or in general live broadcast and stored broadcasting using video streaming protocols)



N/W Architecture Broadband Multiplay

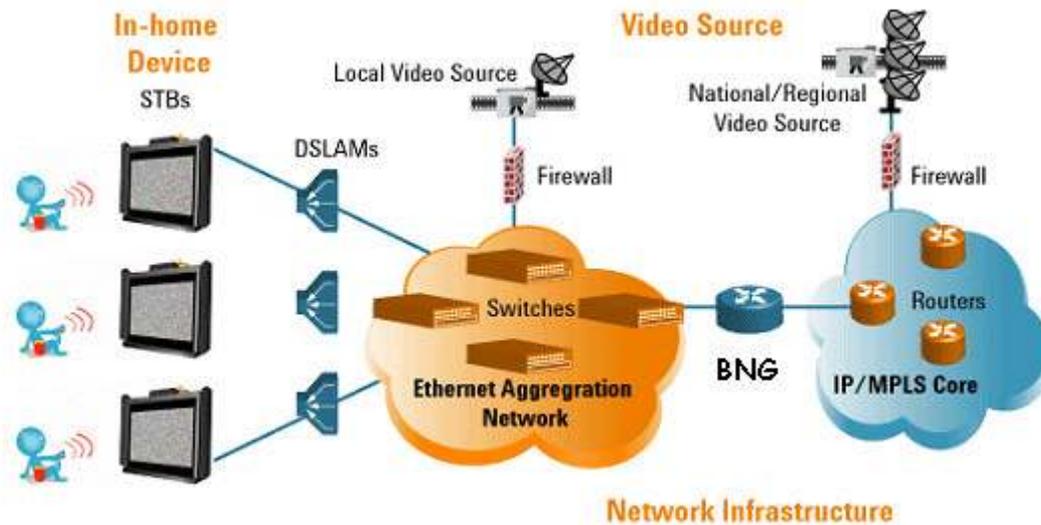
Components of Broadband Multiplay

The BSNL's Broadband multiplay network consists of the following components: -

- L3PE (MCR / PE Router of NIB-2 Project 1 – Supplied by HCL).
- BNG – Broadband Network Gateway (Connects Multiplay Network to NIB2 Backbone Project 1, through L3PE).
- RPR (Tier-1 Switch and Tier-2 switches in the ring Provides connectivity to BNG & vice versa).
- OC LAN Tier-2 Switch.
- DSLAM.
- ADSL CPE.
- DSL Tester.

Changes in Broadband Multiplay after Broadband

1. T1 & T2 changed from star topology to RPR ring topology – High reliability
2. IP-DSLAM connected on GE interface as compared to FE interface.
3. BNG behaves as customer edge router whereas BRAS was a PE Router.
4. BRAS were present at 23 “A” locations only whereas BNG is present upto “B” type cities.



Services

- IPTV/ TVoIP
- Video on Demand (VoD)
- Games on Demand (GoD)

IPTV or TVoIP delivers television programming to households via broadband connection using Internet protocols. It requires a subscription and IPTV set-top box (**STB**); this box will connect to the home DSL line and is responsible for reassembling the packets into a video stream and then decoding the contents. IPTV is typically bundled with other services like Video on Demand (**VOD**), Voice Over IP (**VOIP**) or digital Phone, and Web access. IPTV viewers will have full control over functionality such as rewind, fast-forward, pause, and so on.

If you've ever watched a video clip on your computer, you've used an IPTV system in its broadest sense. The video stream is broken up into IP packets and dumped into the core network, which is a massive IP network that handles all sorts of other traffic (data, voice, etc.). VOD (Video on Demand) service allows the user the luxury of watching the movie of his / her choice at his / her convenience.

Difference between VOD on BB & VOD on DTH

In DTH, as it is broadcasting and not communication so the request for VOD has to be registered through some other mean than the Set top Box say can be through phone call, SMS or Internet and the same four to five movies are broadcasted and the viewers have to choose among them only and at predefined timings.

In true VOD, as offered by BSNL, the set-top box behaves just like a DVD player and viewer can select a movie from the boutique, view it at his / her desired time and day, pause it, rewind it, forward it or can have the exactly same experience has viewing from a personalized DVD player. This is only possible because of the two-way communication between the set-top box and the server. In BSNL one has a choice of selecting from hundreds of movies while VOD offered by DTH providers may have only few movies to offer.

Set-top-Box

The set-top box is a smart solid-state device that acts as the gateway to a host of services offered on the BSNL Multiplay network. On one side the set-top box interfaces with the television using the 3-RCA or the S-Video ports, and on the other side it is connected to broadband ADSL modem via the Ethernet port. BSNL franchisee in Pune has named the set-top box as WICE Box (**W**indow for **I**nformation, **C**ommunication and **E**ntertainment) and supports all sorts of inputs like audio, video, tablet data, text data, pointer devices etc. it has a USB port and a microphone and headphone jack in addition to essential ports. In future, it will be possible to connect keyboard, mouse, web cams, pen-drives and other such devices for various applications that will be provided on the box. The WICE box is fully upgradeable through the network. This means, any new application launched will be directly uploaded into WICE box without getting the box to service center. All software upgrade will be handled this way.

VOIP

1. The technology used to transmit voice conversations over a data network using the Internet Protocol.
2. A category of hardware and software that enables people to use the Internet as the transmission medium for telephone calls.
3. VoIP works through sending voice information in digital form in packets,
4. VoIP also is referred to as Internet telephony, IP telephony, or Voice over the Internet (VOI)

Benefits of VOIP

1. Cost reduction

- Toll by-pass
- WAN Cost Reduction

2. Operational Improvement

- Common network infrastructure
- Simplification of Routing Administration

3. Business Tool Integration

- Voice mail, email and fax mail integration
- Web + Call
- Mobility using IP

BSNL's Plan

BSNL has planned to roll out this service in 898 cities progressively. The service is being provided at Pune, Chennai, Bangalore, Kolkata, Hyderabad and Ahmedabad. This service is being provided through franchisees. Many cities already have franchisees for broadband content and they can offer this service. A pool of private IP addresses will be allotted by BSNL to the said franchisee, which will be used for allotting IP address to the IPTV customer.

XXXX

Practice Questions

1. The device used in customer premises for separating the voice and data is _____
 - a. Splitter
 - b. ADSL modem
 - c. CPE
 - d. PC
2. In India, the minimum download speed of Broadband to an individual subscriber is.
 - a. 2Mbps
 - b. 256kbps
 - c. 8Mbps
 - d. 64kbps
3. Toll free number for booking Broadband Complaints
 - a. 5500
 - b. 1625
 - c. 12000
 - d. 1504
4. What for WiFi enabled ADSL modem is used.
 - a. Wireless link between PC & modem
 - b. IPTV
 - c. VPN
 - d. ISDN
5. What for Set Top Box is used.
 - a. VOIP
 - b. IPTV
 - c. VPN
 - d. ISDN
6. Speed of ADSL line is not affected by
 - a. Guage of cable
 - b. Length of cable
 - c. No.of joints
 - d. OS of computer
7. In which of the following x DSL technology the upstream and down stream BW remains the same.
 - a. HDSL
 - b. SDSL
 - c. ADSL
 - d. Both a & b
8. Equipment located in the phone company's central office that aggregates many customers DSL connections.
 - a. STB
 - b. CPE
 - c. DSLAM
 - d. BRAS
9. BNG in Multiplay Network is connected to .
 - a. Core Router
 - b. PE Router
 - c. DSLAM
 - d. BRAS
10. Triple Play Service through Broadband means
 - a. Data, Games and Audio simultaneously
 - b. Data, Voice and Games simultaneously
 - c. Data, Voice and Video simultaneously
 - d. Voice, Video and Audio simultaneously