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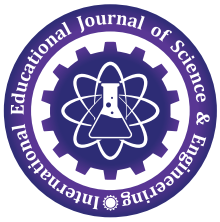

BROADBAND TECHNOLOGY AND ITS APPLICATION: A REVIEW

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ABSTRACT

This paper discusses the different Broadband Technology and its applications. It is a high data rate connection to the internet – typically contrasted with dial-up access using a 56kbit/s modern. Dial-up modems are limited to a bit rate of about 60kbit/s and require the dedicated use of a telephone line-whereas broadband technologies supply more than this rate and generally without disrupting telephone use. The standard broadband technologies needed in this paper are Asymmetries Digital Subscriber Line (ADSL) and Cable Internet. The newest technology being deployed for mobile and stationary broadband access is WiMAX. WiMAX is a standards-based wireless technology that provides high-throughput broadband connections over long distances.

KEYWORDS: Satellite Broadband, Cellular Broadband, Cable Broadband, Internet Access

1. INTRODUCTION

Broadband is known as 'high –speed' access to the internet, because it usually has a high rate of data transmission.

In general, any connection to the customer of 256kbit/s or greater is more concisely considered broadband internet access. The standard broadband technologies in most areas are ADSL and cable internet. Newer technologies in use include VDSL and pushing optical fibre connections closer to the subscriber in both telephone and cable plants. Fibre-optic communication, while only recently being used in fibre to the premises and fibre to the curb schemes, has played a crucial role in enabling Broadband Internet access by making transmission of information over larger distances much more cost-effective than copper wire technology.

As of 2006, broadband mobile Internet access has become available at the customer level in some countries, using the HSDPA and ED-Do technologies. The newest technology being deployed for mobile and stationary broadband is WiMAX.

Broadband service is usually compared to ISDN – BRI because this was the standard broadband access technology that formed a baseline for the challenge faced by the early broadband providers. These providers sought to complete against ISDN by offering faster and cheaper services to consumers.

Primary rate ISDN, known as ISDN-PRI, is an ISDN line with 23 DSO channels and total bandwidth of 1,544kbit/s (US standard).

2. SATELLITE BROADBAND

Satellites in geostationary orbits are able to relay broadband data from the satellite company to each customer. Satellite Internet is usually among the most expensive ways of gaining broadband Internet access, but in rural areas it may be only choice other than cellular broadband.

However, costs have been coming down in recent years to the point that it is becoming more competitive with other broadband options.
Broadband satellite internet also has a high latency problem is due to the signal having to travel to an attitude of 35,786km (22,23ml) above sea level (from the equator) out into space to a satellite in geostationary orbit and back to Earth again.

Advantages of Broadband Satellite

1. True global broadband internet access availability
2. Mobile connection to the Internet (with some providers)

Disadvantages

1. Unreliable: Drop-outs are common during travel, inclement weather, and during sunspot activity.
2. High latency compared to other broadband services, especially two-way satellite service.
3. The narrow-beam highly directional antenna must be accurately pointed to the satellite orbiting overhead.
4. Satellite dishes are very large. Although,

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most of them employ plastic to reduce weight, they are typically between 80 and 120cm (30 to 48 inches) in diameter.

3. CELLULAR BROADBAND

Cellular phone towers are very widespread, and as cellular networks move to third generation (3G) networks, they can support fast data, using technologies such as EVDO, HSDPA and UMTs.

These can give broadband access to the Internet, with a cell phone, with card bus, Express Card, or USB cellular modems, or with cellular broadband routers, which allow more than one computer to be connected to the internet using one cellular connection.

According to the International Organization for Economic Co-operation and Development (OECD), "Wireless broadband subscriptions in OECD countries had exceeded a billion by the end of 2017, an increase of more than 20% in June 2017, according to new OECD statistics". In contrast, fixed broadband subscriptions reached 500million in 2017.

4. CABLE BROADBAND

By fibre-optic cables connected directly to buildings will deliver broadband speeds up to 100 megabits per second. Australia has already begun rolling out the network over the country using fibre-optic cables to 90 percent of Australian homes, schools and business.

5. INTERNET ACCESS

Broadband internet access, often shortened to just "broadband" is a high data rate connection to the internet typically contrasted with dial-up access using a 56bit/s modem.

Dial-up modems are limited to a bit rate of about 60kbit/s and required the dedicated use of a telephone line-whereas broadband technologies supply more than this rate and generally without disrupting telephone use.

Although various minimum bandwidths have been used in definitions of broadband, ranging from 64kbit/s up to 4.0Mbit/s, the 2006 OECD report defined broadband as having download data transfer rates equal to or faster than 256kbits, while the United States (US) Federal Communications Commission (FCC) as of 2010, defines "Basic Broadband" as data transmission speeds of at least 4 megabits per second, downstream (from the Internet to the computer) and 1Mbit/s upstream (from the user's computer to the Internet). The trend is to raise the threshold of the broadband definition as the market place rolls out faster services.

Broadband is often called "High Speed" access to the Internet, because it usually has a high rate of data transmission. In general, any connection to the customer of 256kbit/s or greater is more concisely considered broadband Internet access. The International Telecommunication Union Standardization Sector (ITU-T) recommendation 1.113 has defined broadband as a transmission capacity that is faster than primary rate ISDN, at 1-5-2Mbit/s.

6. RURAL BROADBAND PROVISION

One of the great challenges of broadband is to provide service to potential customers in areas of low population density such as to farmers, ranchers, and small towns. In cities where the population density is high, it is easier for a service provider to recover equipment costs, but each rural customer may require expensive equipment to get connected. While 63% of Americans had an internet connection in 2009, that figure was only 46% in rural areas, according to the pew internet and American Life Project.

Wireless Internet Service Providers (WISPs) are rapidly becoming a popular broadband option for rural areas. The technology's line-of-sight requirements may hamper connectivity in some areas with hilly and heavily foliated terrain. However, the tegola project, a successful pilot in remote Scotland, demonstrates that wireless can be a viable option.

Future Broadband Implementations

- Bonded DSL Rings a ring topology at the remote end that enables 400Mbit/s over existing DSL
- White Spaces Coalition a group of technology companies aiming to deliver broadband Internet access via unused analog television on frequencies.
- High-Speed Downlink Packet Access

Broadband Applications

- Voice over IP
- Broadband radio
- Online shopping
- Internet television
- IPTV
- Software as a service

The US Federal Communications Commission definition of broadband is 4.0Mbit/s the Organization for Economic Co-operation and Development (OECD) has defined broadband as 256kbit/s in at least one direction and this bit rate is the most common baseline that a marketed as "broadband" around the world. There is no specific bitrate defined by the industry, however, and "broadband" can mean lower bitrate transmission method. Some Internet Service Providers (ISPs) use this to their advantage in marketing lower – bitrate connections as broadband.

The data rates on most broadband services still do net suffice to provide good quality video, as 2Mbit/s, at the low end of cable modem and ADSL performance. At the turn of the century most residential access was by dial-up while access from businesses was usually by broadband internet access connections. In subsequent years, dial-up has declined. In rural areas where DSL and Cable are not available, satellite Internet is a good solution.

7. SUMMARY

There are many different technologies that enable broadband connection speeds. The most mainstream of these include

fibre, cable, DSL, mobile broadband, WiMax, and satellite. The competition among these technologies to offer broadband Internet Service exists primarily in providing "last mile" service because the major long distance wires that comprise the internet backbone around the world are primarily made out of optical fibre – some of these "last mile" technologies are poised to grow in adoption while others won't be able to complete in the long run primarily due to speed barriers. The ultimate goal for broadband providers today is to be able to offer voice, data, and video over one network which is known as a "triple play".

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