A REVIEW OF WIRELESS BROADBAND TRANSMISSION AS IT AFFECTS INTERNET CONNECTIVITY IN NIGERIA

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Abstract

Broadband, no matter how it is implemented (by telephone, cable television, satellite or wireless transmission) has come to stay as one of the easiest and fastest means of accessing the Internet worldwide. This paper therefore, examined the concept of broadband communication, and in particular, wireless broadband as it affects Internet connectivity. Some of the issues discussed include types of broadband transmission, benefits, challenges, security concerns, mode of operations and bandwidth. From the discussions and findings made, it was obvious that there is a difference between "broadband" and "wireless broadband" and that broadband is not all about internet connectivity alone as is often being misconstrued by people. Besides, Internet connectivity in the country via broadband is not yet in commonplace, especially in Anambra State. This is because people still access the Internet through dial-up connection, which is charged by how much time one spends on the Net as against broadband where the user subscribes to a data plan that is based on how much data he/she uploads and downloads.

Key terms: broadband, bandwidth, wireless broadband, satellite, DSL, ADSL.

Introduction

The term broadband has been seen by many as a faster and better means of accessing the Internet. In other words, broadband is used synonymously as Internet connectivity. This is not far from the truth, but that is not all about broadband. In this paper, the exact meaning of broadband and its types will be put into lime light to put it into proper perspective. Internet access using broadband is of course one of, and is also becoming the greatest application of broadband in recent times all over the world. Much of the discussions made in this paper are devoted to the satellite and wireless types of broadband, which people often refer to as broadband. Really, broadband is a better way to connect to the Internet because it offers a lot of improved functionality when compared with dial-up means of Internet access. For instance, one does not need to re-connect to the Internet each time you power on the computer, as is the case with dial-up connection. Once you start the computer, you are automatically connected, provided you are within the broadband coverage. A major challenge of the broadband usage is computer security. With broadband, computers are very much exposed to so many threats such as viruses, malwares, spywares, hackers and other threats on the Internet. Many a time, people tend to use the term broadband in place of wireless

broadband when making reference to Internet connectivity. After going through this paper, one will understand and know the difference that really exists between the two terms.

What is broadband?

Broadband, according to ñWhatis.comò website refers to telecommunication in which a wide band of frequencies is available to transmit information. Because a wide band of frequencies is available, information can be multiplexed and sent on many different frequencies or channels within the band concurrently, allowing more information to be transmitted in a given amount of time (much as more lanes on a highway allow more cars to travel on it at the same time).

Broadband is again defined as ña telecommunications signal with a broader bandwidthò (source: http://www.broadband-expert.co.uk).

Based on these two definitions, it means that broadband is not synonymous with wireless broadband, even though people often misconstrue both to mean the same thing. Broadband ordinarily is a telecommunication technology in which a wide range of frequencies is available for signal transmission.

Broadband can be provided in about four different ways, via: telephone, cable television, satellite and wireless. With broadband, large volumes of information, such as websites, texts, graphics, music and videos can be carried at very high speeds to a personal computer.

Types of broadband

There are many types of broadband. These are:

- Digital Subscriber Line (DSL) Broadband

Digital Subscriber Line (DSL) is a technology that delivers broadband materials (voice, data, music and video) over phone line into the home or office. With DSL technology, large volumes of information are sent over a copper cable at rapid speeds. DSL allows one to download web pages, text, graphics, music and video in real time.

- Asymmetric Digital Subscriber Line (ADSL) Broadband

Asymmetric Digital Subscriber Line (ADSL) is a technology similar to the DSL technology. However, with ADSL, information is downloaded more rapidly than it is uploaded. It is particularly useful for homes and businesses as it can download web pages and files at fast speeds.

ADSL2 and ADSL2+ are two new technologies offered by some providers that offers speed up to 24Mbps and speeds greater than what obtains with ADSL.

- Symmetric Digital Subscriber Line Broadband (SDSL)

SDSL technology is similar to ADSL broadband, except that it downloads information at the same speed as it uploads it while ADSL broadband downloads the information faster than it uploads it. This type of broadband requires an extra telephone line. It is particularly suitable for businesses that send large volumes of information.

- Local Loop Unbundling (LLU)

Local Loop Unbundling (LLU) is a situation whereby ADSL or SDSL broadband technologies are provided without using the countryôs national telecommunicationsô exchange system. This

means that LLU providers can offer broadband features at a competitive price for them to remain in business.

- Cable Broadband

This type of broadband is delivered through a cable to a PC or television by cable companies. The Cable companies also offer telephone packages as well as broadband Internet services. One can only get a cable broadband if a company providing it has cabled his or her street.

- Satellite Broadband

This type of broadband is delivered through a satellite. To a receive satellite broadband there must be a dish antenna. Satellite transmission may be affected by weather conditions and temperature. The cost of installing and running a satellite broadband can be quite expensive compared with other types of broadband. There are 2 types of satellite services:

  - One-way satellite services download information via satellite and upload information via a telephone or (Integrated Services Digital Network (ISDN) line.
  - Two-way satellite services download and upload information via satellite. This provides an even higher bandwidth and a faster speed.

- Wireless Broadband

Wireless broadband is a technology that allows broadband (voice, data and video) to be delivered to a laptop or pc (whether at home or business office) via the use of electromagnetic waves (i.e. radio frequency) rather than by transmission sent through telephone, fibre optic cable or other cables. Wireless broadband is also defined as high-speed Internet service via wireless technology. Wireless broadband requires an antenna (or broadband modem) to be installed (either internally or externally to the device) to enable the device receive broadband signal.

Broadband is the prevailing method of delivering Internet services into homes and businesses. Wireless broadband, though not yet in commonplace in the country, is available in Internet cafés, local ñhot spotsò within some cities, private businesses, tertiary institutions and some homes. The advantage of wireless broadband is that the computer receiving the Internet signal need not be tethered by an Ethernet or network cable to the broadband modem or router. Wireless broadband is particularly suitable for distributing information between buildings and for homes where access to ADSL or cable broadband is unavailable.

How Wireless Broadband Operates

Wireless signal is transmitted either from land based stations or from satellites to the receiving device. Satellite broadband involves signal bouncing from the Earth to a geostationary satellite in the orbit and then back to the Earth again. The broadband wireless provider receives broadband transmission from either the satellite system, high-speed Internet connection or land based station, and then transmits to one or more local transmission antennas (i.e. land-based station). The base station receives the broadband service and then retransmits it via radio waves to the immediate surrounding area, and any computer (or mobile phone) equipped with wireless capacity (modem or data card) within the receiving distance can pick up the signal. Most broadband access services are fall within the range of 50km from the tower.

Similarly, (a) for broadband at home using the phone, a broadband modem that connects to a phone jack is needed. The PC is then plugged to the modem device. The modem changes the computerôs Internet and email information to and from the broadband format (b) for broadband transmissions from a satellite; the transmission is received using a receiver dish, which converts the signals into appropriate forms for computer or computer network usag

Devices That Can Receive Wireless Broadband

The following devices are capable of receiving broadband information:

ÅLaptops with in-built wireless modem. Brands such as Dell, HP, Acer and Toshiba all have built ï in wireless receivers (i.e. for modern ones).

ÅUSB sticks or USB modems designed to pick up wireless broadband.

ÅPC wireless cards

ÅPhones with data modems (i.e. WiFi) can also receive wireless broadband

Wireless Broadband Considerations or Challenges

The following poses major considerations and challenges for wireless broadband:

1. Wireless can be more expensive than cable based broadband even though it is a good means of covering the rural areas where cable or DSL communication is not possible or available.
2. Receiving wireless consistently can depend on where you live, and where the signal is being sent from as land features such as buildings and trees can interfere with reception
3. Equally, satellite broadband is slightly more expensive than the land based options and is also affected by land features, weather, and other terrestrial factors.

Security Issues in Wireless Broadband Transmission

Since wireless broadband is transmitted via radio waves, and once the computer is powered on, it is instantly connected to the Internet, the computer is very vulnerable to the activities of hackers, viruses, malwares and spywares. Malicious programs that steal information can be installed on the PC without the owners knowledge. Because a broadband user has an ñalways-onò Internet connection, hackers can hide under the userôs home computer to perpetrate crime. In order to protect your computer:

1. Use email filters, secure passwords and firewalls on your private networks to ensure unauthorized persons cannot connect to the network and enjoy the broadband services. Unwanted users can slow network traffic by using up valuable bandwidth resources, and may create other more serious problems.
2. Home users with wireless broadband are also well advised to install security measures, such as the use of secure anti-virus, password and personal firewalls. Unknown users who can connect through your personal wireless broadband service might download illegal materials or commit other online crimes that, if investigated, would point back to you. Taking proper precautions will ensure that only you and those you authorize are able to use your wireless broadband connection.
3. For a home broadband user, do not keep anything on your hard drive that will be of any possible value to anybody else.
4. Apply end to end data encryption and decryption to protect your information during transmission from intruders.
5. Use gateway box controls to control and regulate access to the broadband network.

Broadband Speeds and Bandwidth

Broadband speed simply refers to how much digital information that can be received over a communication line in the form of binary digits. In other words, it is a measure of how much data that can be transferred in a second. Speed and bandwidth are measured in kilobits per second (Kbps) and megabits per second (Mbps) respectively. The higher the speed or bandwidth, the faster the Internet connection.

There are many different broadband packages available and each offers a particular speed. Thus, it is important for one to understand which broadband speed best meets his/her requirements before purchasing the broadband package because different speeds suit different purposes. For example, video and music streaming requires a greater bandwidth compared with viewing a website.

The different speeds that are available with broadband are:

Å256Kbps ï This speed is appropriate for viewing most websites, taking about 3 seconds for the website to load. The speed is about 5 times faster than the speed given with a 56Kbps dial-up Internet connection.

Å512Kbps ï This is the most common speed used in homes and small businesses. It takes 1.6 seconds for a website to load and about 1.5 minutes to download a 5 minute music file at maximum speed. This speed is suitable for video and music streaming and for viewing most websites.

Å1Mbps ï This speed is also commonly used amongst homes and small businesses. It is appropriate for website viewing, streaming and online gaming. It takes 0.8 seconds to load a web page and about 40 seconds to download a 5 minute music file at maximum speed.

Å2Mbps ï This faster speed is more suitable for people who play a lot of demanding online games. It is also suitable for people who share one Internet connection between many PCs. It takes 0.4 seconds to load a website and about 20 seconds to download a 5 minute music file at maximum speed.

Å8Mbps (ADSL Max) ï Many providers are now offering this option. It is a variable speed product where the provider gives the user the maximum speed that his/her line can support (up to 8mbps) and the upload speeds are also increased.

Å24Mbps (ADSL2+) ï Ultra fast broadband offered by some providers (Cable up to 10mbps). The speed of this broadband will depend on how close one is to the exchange, the quality of the copper and whether there is any interference from other devices or users. If one is very close to the exchange, there is no line noise, and the quality of copper is good, then you will receive 24Mbps, otherwise you will receive the best speed close to this. These high speed services are particularly good for watching real-time DVD quality films.

Benefits/Advantages of Broadband

Broadband has many key features that can make the use of the Internet more relaxing, enjoyable and useful whether at home or in the workplace. These key features include:

1. Fast speeds. With broadband, accessing the Internet is much faster and better than using the conventional dial-up connection. The broadband speed is measured by how much data it can transfer in a second. For example, a 1Mb Internet access (speed) can send and receive information up to 20 times faster than a dial-up connection.
2. Large volumes of data can be transferred. With the high bandwidths offered by broadband, large amounts of data can be sent and received by a PC at a faster rate.
3. Your Internet is always on, this means that you do not have to hassle, dial up or log on every time you want to access the Internet.
4. Your telephone line is unaffected. With broadband, one can make phone calls using the landline whilst the Internet is running. There is no need to disconnect the internet when you want to make a telephone call. Therefore you can surf the Internet and talk on the phone at the same time.
5. No surprise charges. Broadband providers often charge a standard monthly fee depending on what package one subscribes to. This means that it is possible to pay for unlimited Internet access, and one cannot be charged for any amount of time spent on the Internet.
6. Instant download of websites. Complex web pages with detailed graphics can easily be downloaded without having to wait too long for them to load.
7. Download music and videos. With broadband, one can watch and play music and film clips, as well as buy them online, without having to leave your house or wait for long queues at video shops.
8. Interact with others in real time. Through instant messaging or online interactive games, one can communicate with friends and family around the world.
9. Running your business. The fast speeds that broadband has to offer and increased volume of data transfer can be used to help a business run more rapidly, efficiently and productively.
10. Working from home, broadband has led to much faster, easier and efficient communication. This has opened up the opportunity for many people to work from home.
11. Free phone calls. One can make free phone calls to other online users using services such as Skype.
12. Uninterrupted real time services such s Internet radio, streaming video and voice over Internet protocol (voip).

Some differences between broadband and dial-up Internet connection

1. Browsing using broadband is measured by the amount of data or information downloaded and uploaded (downstream and upstream), usually given in megabytes and gigabytes; while dial-up in measured by the amount of time one spends on the Internet (i.e. how many minutes spent on the net).
2. For broadband, your broadband data allowance can only be used on your broadband connection. This implies that you cannot use your username and password on someone elseôs broadband connection to use your broadband data allowance, unlike in the dial-up plan.

3. With broadband, web pages loads faster and one can watch videos and listen to audios online. In dial-up, to do these things is generally very slow.
4. With dial-up, you need to dial-in each time you want to connect to the Internet, but in broadband there is no need to dial-in to connect. Just plug-in your broadband modem and you are immediately connected.
5. With broadband, you can use your phone to surf the Internet and talk at the same time, but in dial-up you cannot do both at the same time.
6. With a wireless broadband modem, up to four computers can be connected to the Internet at the same time.

Summary and Conclusion

This paper is all about broadband and wireless broadband transmission. From the issues discussed in this paper, it is now obvious that broadband is not all about wireless broadband, as broadband can still take place with cables. Wireless broadband is just one of the types of broadband. Again, the broadband is a recent invention that is yet to gain grounds in data communications worldwide. For instance, in Nigeria, there is no company that is offering broadband package for Internet connection yet. This is not to say that broadband transmission is not practiced in the country, because ICT providers like AfriHub uses broadband in most of its ICT centers across the country, especially in the tertiary institutions. It is however expected that by year 2015, broadband transmission will be everywhere in the country as arrangements for its implementation is in top gear.

Recommendation

Having seen that broadband has huge benefits in the information and data communications network of any country, I therefore solicit for the speedy implementation of both cabled and wireless broadband deployment in this country to facilitate ICT development. Major stakeholders involved in this scheme include (a) the Federal Government through its communications agencies responsible for the issuance of operating licenses and regulation, (b) network or communications operators and Internet Service Providers (ISP), and (c) would-be Wireless Internet Service Providers (WISP).

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