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Comparative Study of Change in transmission rate Over Wireless Network with change in generations

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Abstract

Wireless technology is playing a vital role for transmission a data from source to destination. In wireless rate of transmission is impacted by some factors such as noise, pollution, frequency etc. Transmission rate become fast and faster with change in generations. For instance, security and surveillance systems employ serial to Wi-Fi modules to stream surveillance video from remotely mounted security cameras to wired network systems [1].

Now we are using 3G mobile system with IP addresses for transmission services. Wireless Technology plays a vital role .IEEE provides various standards for wireless communication.

IEEE 802.11 used to communicate with different frequencies bands with MAC and Physical Layer. 3G transmission increases the rate of speed as compare to 2G. 4G provide higher bandwidth, data rate, lower authentication over head and ensure that service is constantly provided to the user without any disruption. [11]

4G telecommunication wireless services is define by ITU and ITU-R. Mobile Wi-MAX and Long Term Evolution(LTE) standard is used .4G is forward Technology which is running with higher bit rates, frequency bands .4G dynamically share resources over networks. 5G is coming with some higher features such as high bandwidth and less collision.

Introduction

Change in Technology refers to change in transmission. Transmission become increases with rates of peak download and peak upload.

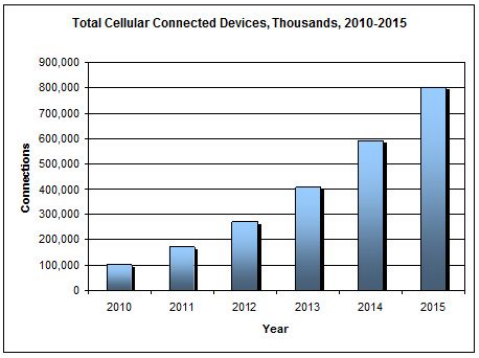
These rates are different in every network. In 4G this rate is 100mbit/s and peak upload is 50mbit/s.Every time we are creating a new alternative for technology . A new technology is always design to improve the performance and increase the rate of transmission. In 1G radio signal is transmitted in analogue form, 2G is based on narrow band digital signal. In 3G networks the rate of transmission becomes increase from 384kb/s to 2mb/s. in 4G network transmission fixes speed up to 100mb/s and for fix region 1 gigabit per second. Over time and time mobile systems migrating from analogue to digital. [6]

Wireless Technology

Wireless mobile - communications systems are introduced in the early 1980s, first - generation (1G) systems were marked by analog - frequency modulation and used primarily for voice communications as time passes these technology becomes advance and advanced. In 1990, the Institute of Electrical and Electronics Engineers IEEE is formed for defining standards of wireless such as 802.3(Ethernet) .After that IEEE provides 802.11, which is used in WLAN for communication over 2.4 GHz frequency and 20Mhz Bandwidth. In wireless there are so many standards with different bandwidth and frequency over data for transmission.

Technologies with different transmission:-

As time becomes change, there is rapid change in technology as well. 1G mobile phones were based on the analogue system. To improve transmission quality a concept of 2G comes. A technology with GPRS comes. The GPRS systems can support peak network speeds of wireless data transmissions up to 115KB/second, with actual data rates of 30-50 kbps kbps in practice. [5] In GPRS adds packet switching to existing GSM and TDMA networks.3G network generate a trend of video calling, i.e. streaming or rate of transmission of packet becomes high.



Comparison in Technology

Technology can only be compared with its performance; performance

can be shown with various factors. These factors are as below:-
Mobile Phones start as a simple two-way analogue communication system using modulation of frequency for voice and frequency. This concept is comes under 1G.
After some time switching techniques are used for data transmission.
The network always calculate rate with the network topology [1].
In **Packet** Switching packets are routed between the nodes from one side to another with routers .Each Packet has its header and trailer .Packet Contain SA (Source address) and DA (Destination Address) in the form of IP.[9]

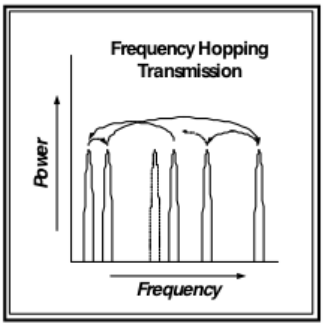
Circuit switching is define the a type of fix connection between nodes.. The delay of bits is very low or we can say constant. Circuit is established once and can be used for the same connection every time over the same network.
In **Message Switching** we use the concept of store and forward mechanism. [9]

In 2G network radio access pattern become changed. EDGE concept applies to both circuit-mode and packet-mode data and is sufficiently generic for applications to other digital cellular systems. It works in the 200kHz bandwidth with one or more high-level modulation schemes. EDGE supports peak theoretical network data rates of 474 kbps, with average throughput of 70 to 130 kbps on both the downlink and the uplink.

Spread Spectrum
Important aspects of reducing collision and provide high bandwidth, we use spectrum. the most common modern methods for reducing the effects of interference is an approach broadly termed spread spectrum (SS). Before spread spectrum, radio broadcasts were tightly focused transmissions centered at a particular frequency.

a)Frequency-hopping Spread Spectrum (FHSS

The transmitter 'spreads' the signal originally in the narrowband, across a number of frequency band channels on a wider electromagnetic spectrum.



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FHSS has its disadvantages, though. It has a relatively low transfer limit.
b) Direct Sequence Spread Spectrum (DSSS)

DHSS spreads the signal over a larger bandwidth than needed, sacrificing bandwidth efficiency for transmission speed and redundancy.

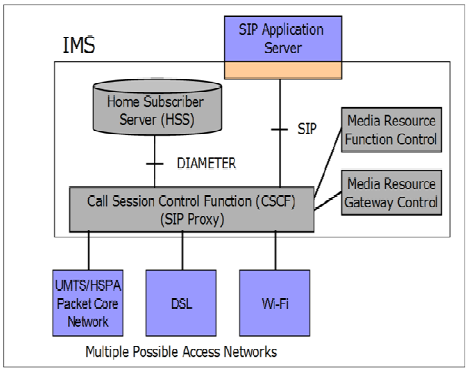
In 2.5G we introduce high speed data rate with High Speed Circuit Switched Data(HSCSD) .Octal Phase Shifting Key Become generate with digital modulation format .
GPRS is designed to provide a high data rate packet-switched bearer service in a GSM network [2].
EDGE does not require operators to acquire additional spectrum. Instead, it can be deployed in today's most widely used bands. The ability to deploy EDGE in its existing spectrum means that an operator can launch 3G services quickly, in more markets and at a lower cost than technologies that require new spectrum.

In 3G system a new radio spectrum being introduced with data rate up to 2mbps. IMT-2000-based 3G systems generally provide peak data rates of around 1–5 Mbps.[8] High Speed Packet Access (HSPA) is a collection of mobile telephony protocols that extend and improve the performance of existing UMTS protocols. Two standards, HSDPA and HSUPA, have been established and a further standard, HSPA+, is soon to be released. [7]

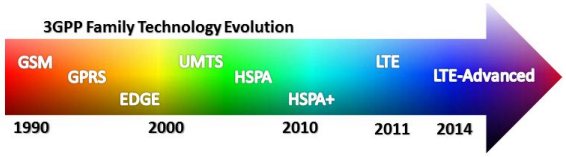
The number of commercial 3.5G networks--also known as High-Speed Downlink Packet Access, or HSDPA, networks--Almost two-thirds (62 percent) of existing commercial HSDPA networks support downlink speeds of 3.6 Mbit/s or more, while more than a fifth (21 percent) support the peak downlink speed of 7.2 Mbit/s.

Many HSPA rollouts can be achieved by a software upgrade to existing 3G networks, giving 3.5G a head start over WiMax, which requires dedicated network infrastructure. Rising sales of HSPA-enabled mobiles--aided by more-generous-than-expected operator subsidies of the hardware--are helping to drive the 3.5G market

IMS is a Framework for Multimedia Transmission in Internet Protocol. In this technology includes the collection of signaling and bearer related network.



LTE is a technology which provide user to higher band width in HSPA+ with high Throughput in high spectrum band width. . The first release of LTE does not meet the requirement for 4G such as peak data rates up to 1 Gb/s. [3]



LTE-Advanced is the next generation advanced wireless technology which supports 100MHZ.[7]
LTE supports data rates of 100Mbps on the downlink and 50 Mbps in Uplink when using 20MHz channel bandwidth.[10]

Mobile Wi-MAX

Worldwide Interoperability for Microwave Access (WiMAX) is currently one of the best technologies in wireless .IEEE 802.16 was introduced in 2004. WiMAX worked over 2.5GHz, 3.5GHz and 5.8 GHz frequency bandwidth. WiMAX provides a service of VOIP (Voice over internet).WiMAX is telegeoprocessing, which is a combination of geographical information systems and Global Positioning System (GPS) working in concert over high capacity wireless mobile system. [4]

Conclusion

Technology has no end. At every time Technology becomes wide and wider. Increase in bandwidth results increased in performance. Wireless services provide a wide range of scalability, security, privacy and transmission. Rapid change shows that rate of transmission become fast but still there is some collision takes place. Collision in wireless cannot be avoided completely. Rate of transmission impacted by noise, pollution and medium etc, that's why rate of transmission over long range is become less. Future wireless will need to support diverse Ip multimedia applications to process sharing of resources among multiple users.

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