

New generation Gi-Fi (Gigabit Wireless)

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Abstract — Gi-Fi or gigabit-wireless refers to communication at data rate of more than 1 billion bits (gigabit) per second. The term GI-FI refer to faster versions of the IEEE 802.11 standards marketed under the trademark Wi-Fi. A transceiver integrated on a single integrated chip that operated at 60GHz on the CMOS process. It allows wireless transmission of video and audio data upto 5 Gbps, 10 times the present maximum wireless transfer rate, at 1/10th the cost. Researchers selected the 57–64 GHz unlicensed frequency band as the millimetre-wave range of the spectrum allowed high constituent on-chip integration as well as the incorporation of very small high gain arrays. The existing 7 GHz of band results in very high data rates, up to 5Gbps to users at indoor environment, typically within a range of 10 metres.

Keywords:- Gi fi, Cmos, bluetooth, wifi

I. INTRODUCTION

Gigabit Fidelity is the world's first transceiver integrated on a single chip which functions at 60GHz on the complementary metal-oxide-semiconductor (CMOS) process. It will allow wireless transmission of video and audio data upto 5Gbps, ten times the current transfer rate, at one-tenth the cost, typically within a range of 10 meters.[1] GiFi is a wireless communication system which is faster than Wi-Fi and it is expected revolution networking in offices and homes by implementing high-speed wireless environments. It uses a 5mm square chip and a 1mm wide antenna burning less than 2mW of power to transfer data wirelessly over short distances, almost similar to Bluetooth. This technology offers many features such as small form factor, ease of deployment, enabling the future of information management, low power consumption, high speed of data transfer etc. The new technology is expected to change the way household Gi-Fi can be considered as a contender to Bluetooth rather than Wi-Fi. It allows a full-length HD movie to be transferred between two devices in seconds. [2] Within 5years, we expect Gi-Fi to be the overriding technology for wireless networking. By that time it will be fully mobile, high broadband access, as well as providing low-cost, with very high speed large files exchanged within seconds which will develop wireless home and office of future. Developments to next generation gaming technology is one of the few benefits of this technology.

II. GIGABIT WIRELESS FEATURES

This technology allows wireless uncompressed HD content and operates over a range of 10 meters without interference. Gi-fi chip has flexible design. Entire transmission system can be built on a cost effective single silicon chip that operates in the unlicensed, 57-64GHz spectrum band. It is highly portable and can be constructed in everywhere. Gi-Fi technology also permits the future of information management, it's easy to deployment with the small form factor.

2.1. Capacity of High Speed Data Transfer

The data transfer rate of Gigabit wireless technology is in Gbps, providing higher data transmission rate is the main invention of Gi-Fi. [3] An entire High-Definition movie could be transferred to a mobile phone in a few seconds, and the phone could then upload the movie to a home computer or screen at the same speed.

2.2. Interference in Data Transfer

It uses 60GHz mm wave band to transmit the data, which gives it an advantage over Wi-Fi. Wi-Fi's part of the spectrum is increasingly crowded, sharing the waves with devices such as cordless phones, which leads to interference and slower speeds. [3] But the milli-meter wave spectrum is almost unused, and the new chip is potentially hundreds of times faster than the average home Wi-Fi technology.

2.3. Power Consumption

Power consumption of the current technologies like Wi-Fi and Bluetooth are 5mW and 10mW but chip of Gi-Fi uses a tiny one-mm-wide antenna and it has less than 2mW of power consumption that in compare to the existing technologies is very less. [4]

2.4. Provides High Security

Gi-Fi technology is based on IEEE 802.15.3C standard and this standard provides more security since it offers optional security in the link level and service level. Point-to-point wireless systems functioning at 60 GHz have been used for many years by the intelligence community for high security communications and by the military for satellite to satellite communications. [4]

III. NETWORK EVOLUTION

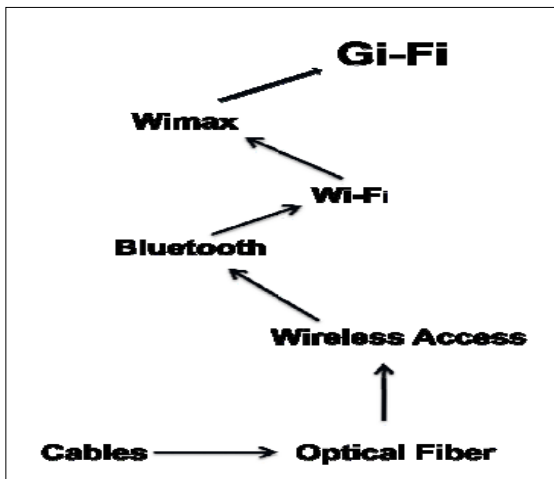


Fig.1. Evolution of Gi-fi

The setting up of cables caused a greater difficulty and thus led to wireless access, the foremost of this is Bluetooth which covers 9-10 meters. Wi-Fi followed coverage area of 91 meters. The evolution of wireless networks is shown in figure1.

3.1. Optical Fiber

Fiber optic cable has the capacity to transfer signals over much longer distances than coaxial and twisted pair. It also has the ability to carry information at enormously greater speeds. The cost of fiber optic cabling is comparable to copper cabling; however, it is more difficult to install and modify. [5] The centre core of fiber cables is made from glass or plastic fiber as shown in figure 3. Communication over an optical fiber cable requires repeaters at distance intervals.

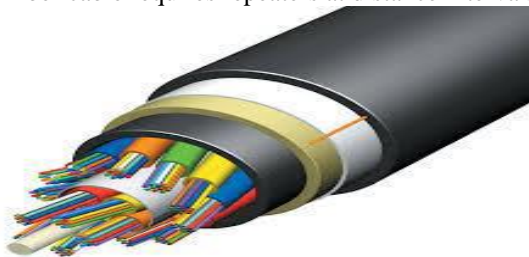


Fig. 2. Optical fiber

3.2. Wireless Access

Wireless access points are special-purpose communication devices on WLANs. Access points act as a central transmitter and receiver of wireless radio signals. It is enable so-called Wi-Fi infrastructure mode networking. [5]

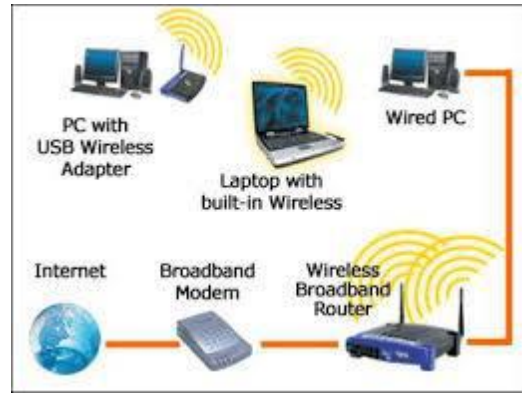


Fig.3.Wireless

3.3. Bluetooth

Bluetooth is a wire-replacement communication protocol primarily designed for low power consumption, with a short range based on low cost transceiver. [5] It functions in the range of 2400–2483.5 MHz and uses a radio technology called FHSS (frequency-hopping spread spectrum).

3.4. Wi-Fi

Wi-Fi is based on the IEEE 802.11 wireless local area network specification. Ideally, it was considered to be used indoors at close range for example office environment and home user. The key goal of Wi-Fi technology is to provide service for mobile computing device like laptop. [6]

3.5. Gi-Fi

Gi-Fi is the world’s first transceiver integrated on a single chip that operates at 60GHz on the CMOS. [1] Gi-Fi is 10 times faster than Wi-Fi and allows the wireless transmission of video and audio data up to 5Gbps at low power consumption within range of 10 meters[8]. This technology provides a high broadband access, high speed transfer of data within seconds and a low cost one.



Fig. 4. Projection

IV. COMPARISON BETWEEN DIFFERENT WIRELESS TECHNOLOGIES

TABLE 1 : Comparison Between Wireless Technologies

CHARACTERISTICS	BLUETOOTH	WI-FI	GI-FI
Specification Authority	Bluetooth SIG	IEEE, WECA	NICTA
Development Start date	1998	1990	2004
Primary device	Mobile phones, PDAs, Consumer, Electronics office Industrial Automation Devices	Notebook, Computers, Desktop, Computer servers	Mobile phones, Home devices, PDAs, Consumer, Electronics office Industrial Automation Devices
Power consumption	5mw	10mw	< 2mw
Data transfer rate	800Kbps	11Mbps	5 Gbps
Range	10 meters	100 meters	10 meters
Frequency	2.4GHz	2.4GHz	57-64GHz

V. FEATURES OF GI-FI

5.1 Capacity of High Speed Data Transfer

The data transmission rate of Gi-Fi technology is in Gbps. Speed of Gi-Fi is 5 Gigabits per second; which is 10 times the data transmission of the present technologies. Providing higher data transfer rate is the main innovation of Gi-Fi. An entire HD movie could be transferred to a mobile phone in a few seconds, and the phone could then upload the movie to a home computer or screen at the same speed. [3]

5.2 Small in size

The size of the Gigabit Fidelity chip is 5x5 millimetre and can be placed in different devices such as mobile phones. The chip has a tiny 1mm antenna and uses the 60GHz “millimetre-wave” spectrum. [6]

5.3 Low Power Consumption

As the enormous amount of information is transmitted it utilizes milliWatts of power only. Power consumption of the current technologies such as Wi-Fi and Bluetooth are 5mili watts and 10mili watts but chip of Gi-Fi uses a tiny one millimetre-wide antenna and it has less than 2mili watts of power consumption that in compare to the current technologies is very less. [2]

5.4 Cost-effective

Gi-Fi is based on an open, international standard. Mass adoption of the standard, and mass-produced chipsets, the use of low-cost, will drive costs down intensely, and the resulting integrated wireless transceiver chip which transfers data at low power at low price \$10 only, high speed, which is very less As compare to present systems. As development goes on, the price will be reduced. [7]

VI. CONCLUSION

Gigabit Fidelity has given and it is noticeable that more research should be done in this new wireless technology and its applications. No doubt introduction of wireless fidelity has proved an innovator solution to bluetooth problem. The standards original limitations for data interchange rate and range, high cost of infrastructure, number of chances, have not yet been possible for wi-fi to become a power network, then towards this problem the better technology despite the advantages of rate present technologies led to the introduction of new, more up to date for data exchange that is GI-FI.[8]

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