

Wireless Gi-Fi Technology

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Abstract

One of the greatest improvements made on wireless technology Gi-Fi technology. Gi-Fi or Gigabit Wireless is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS process. Gi-Fi is a wireless transmission system which is ten times faster than Wi-Fi and it's chip delivers short-range multi-gigabit data transfer in an indoor environment. It will allow wireless transfer of audio and video data up to 5 gigabits per second, low power consumption, usually within a range of 10 meters.

Keywords: Gi-Fi, CMOS, Bluetooth, Wi-Fi

1. Introduction

Communication is one of the integral parts of science that has always been a focus point for exchanging information among parties at locations physically apart. Wireless operation Techniques permit services-such as long-range communications. Long range communication is impossible or impractical to implement with the use of wires. That's why this term is commonly used in the telecommunications industry to refer to telecommunications systems. The first [1] Wi-Fi-enabled devices were introduced in 1997. For the first time, we were liberated from a physical Internet connection and free to move about the room, while maintaining connectivity. With this new found freedom came an extraordinary expansion of uses. Over the years, Wi-Fi has become ubiquitous on laptop computers, tablets, televisions, video game consoles, and smart phones. Worldwide Interoperability for Microwave Access (Wi-MAX) is a wireless communications technology aiming to provide wireless data over long distances in a variety of ways as an alternative to cable and DSL, from point-to-point links to full mobile cellular type access. In some cases, Short-range wireless technologies have long been seen as a solution, but today's consumer-level home wireless networks cannot deliver these sorts of transmission rates.

Gi-Fi or Gigabit Wireless [2, 3] is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS (complementary metal-oxide-semiconductor) process. It will allow wireless transfer of audio and video data up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at one-tenth of the cost, usually within a range of 10 meters. It utilizes a 5mm square chip and a 1mm wide antenna burning less than 2milli watts of power to transmit data wirelessly over short distances. Gi-Fi technology provides many features such as ease of deployment, small form factor, enabling the future of information management, high speed of data transfer, low power consumption etc. With growing consumer adoption of High-Definition (HD) television, low cost chip and other interesting features and benefits of this new technology it can be predicted that the anticipated worldwide market for this technology is vast.

The paper is organized as follows: In section 2, Network evolution is defined. In section 3, Why Gi fi technology is used is explained in detail. In section 4, comparison of the Gi Fi technology with other technology is explained. Section 5, describes advantages of the Gi-fi technology. Section 6 describes applications of the Gi Fi technology and finally, conclusions are presented in Section 7.

2. Network Evolution:



Fig. 1: Network Evolution

The wireless technology evolution [4] is explained as follows.

2.1 Cables

Cables are used in electronic devices for long-distance communication which takes place over undersea cables. Power cables and electrical cables are used for bulk transmission of alternating and direct current power, especially using high-voltage cable and used in building wiring for lighting, power and control circuits permanently installed in buildings resp. But the installation cost becomes more in wired communication. Wireless communication is more effective than wired communication.



Fig. 2: Cables

2.2 Optical fibers

Optical fibers are used to transmit light between the two ends of the fiber and find wide usage in fiber-optic communications, where they permit transmission over longer distances and at higher bandwidths than wire cables. Fibers are used instead of metal wires because signals travel along them with lesser amounts of loss; in addition, fibers are also immune to electromagnetic interference, a problem which metal wires suffer from excessively.



Fig. 3: Cables

2.3 Wireless Access

Wireless communication is the transfer of information between two or more points that are not connected by an electrical conductor. In computer networking, a wireless access point (AP) is a device that allows wireless devices to connect to a wired network using Wi-Fi, or related standards. The AP usually connects

to a router (via a wired network) as a standalone device, but it can also be an integral component of the router itself.



Fig. 4: Wireless access

2.4 Bluetooth

Bluetooth is a wireless technology standard for exchanging data over short distances using short-wavelength UHF radio waves. Bluetooth invented by telecom vendor Ericsson in 1994. It was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization.



Fig. 5: Wireless access

2.5 Wi-fi

Wi-Fi is a local area wireless computer networking technology that allows electronic devices to network, mainly using the 2.4 gigahertz UHF and 5 gigahertz SHF ISM radio bands for the transmission of high speed data. The Wi-Fi Alliance defines Wi-Fi as any "wireless local area network" (WLAN) product based on the Institute of Electrical and Electronics Engineers' (IEEE) standards. However, the term "Wi-Fi" is used in general English as a synonym for "WLAN" since most modern WLANs are based on these standards.



Fig. 6: Wi-Fi

2.6 WiMax

WiMAX (Worldwide Interoperability for Microwave Access) is a family of wireless communications standards initially designed to provide 30 to 40 megabit-per-second data rates. WiMAX is a standards-based technology enabling the delivery of last mile wireless broadband access as an alternative to cable and DSL. IEEE 802.16m or Wireless MAN-Advanced is a candidate for the 4G, in competition with the LTE Advanced standard.

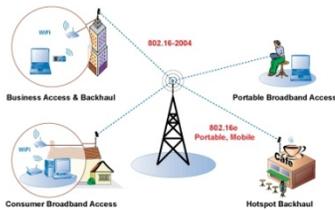


Fig. 7: Wi-MAX

2.7 Gi-Fi technology

Gigabit wireless refers to a wireless communication at a data rate of more than one billion bits (gigabit) per second. By 2004 some trade press used the term "Gi-Fi" to refer to faster versions of the IEEE 802.11 standards marketed under the trademark Wi-Fi. In 2008 researchers at the University of Melbourne demonstrated a transceiver integrated on a single integrated circuit (chip) that operated at 60 GHz on the CMOS process. It allows wireless transfer of audio and video data at up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at one-tenth of the cost.

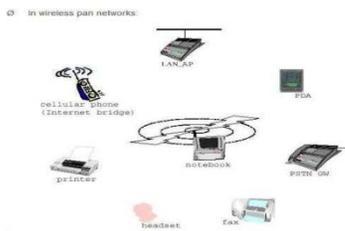


Fig. 8: Gi-Fi

3. Why Gi-Fi technology?

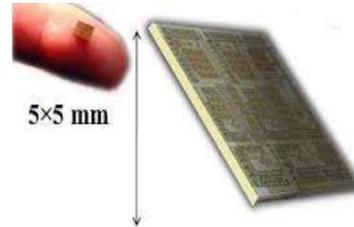


Fig. 8: CMOS chip of Gi-Fi

Following are the good reasons to move to the Gi- Fi technology:

1. Gi-Fi technology uses a chip that transmits signals at an extremely high 60GHz frequency versus the 5GHz used for the fastest forms of Wi-Fi .Also it utilizes a 5mm square chip and a 1mm wide antenna burning less than 2milli watts of power to transmit data wirelessly over short distances.
2. Mixing and signal filtering used in Gi-Fi technology would keep the signal strong versus the longer- ranged but slower and more drop-prone Wi-Fi technology.
3. The GiFi uses the short-range wireless technology would potentially be a competitor or more than likely a replacement for WiFi, and things like Bluetooth might want to look out as well.

4. Comparison Of Gi- Fi, Wi-Fi, Bluetooth

Following table shows the comparison of three different wireless technologies

Characteristics	Gi-Fi	Wi-Fi	Bluetooth
Data Transfer rate	5Gbps	11Mbps	800Kbps
Range	10 Meters	100 Meters	10 Meters
Specification Authority	NICTA	IEEE,WECA	Bluetooth SIG
Development start Date	2004	1990	1998
Power consumption	<2 mW	5mW	10mW
Frequency	57-64 GHz	2.4 GHz	2.4GHz
Primary Devices	Mobile phones, Home devices, PDAs, Consumer electronic office, Industrial automation devices	Notebook computers, Desktop computers, servers	Mobile phones PDAs, Consumer electronic office, Industrial automation devices

5. Advantages

The valuable advantages of the Gi-Fi technology are as follows:

1. Profitable Chip for the transmission of the signal
2. Small in size for the installation
3. Faster Data Transmission of the signals
4. Low Power Consumption of the battery
5. Security of the signal

6. Applications

Gi-Fi technology used by intelligence community for the high security communications. We can easily connect smart phone to the PC, laptop, HD television. Also this technology is used to connect the household things.

7. Conclusion

Gi-Fi wireless technology is the best solution for the high speed data transmission over short ranges compared to the existing technology. This technology provides valuable features that improve both the overall functionality as well as specific security functions. By providing low-cost, high broadband access, with very high speed large files swapped within seconds it could develop wireless home and office of future.

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