



Gi-Fi Technology: A Review

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Abstract:

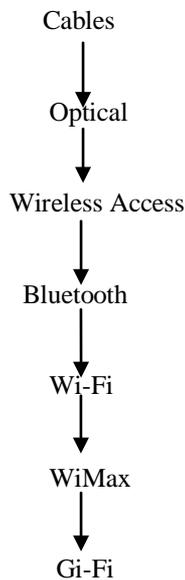
Now a day the technology has changed from wired connection to wireless connection. Since several queries raised regarding the present technology, the research platform has moved to the next level i.e. Gi-Fi. Gi-Fi is the emerging wireless technology which is ten times faster than other technologies. It uses short range gigabits for data transmission. The growth of this technology will help in the development of next generation devices. Also this paper consists of existing technologies, and provides comparison table of Gi-Fi with technologies in use. It also shows that Gi-Fi has an added advantages over other technology due to its high speed data transfer rate, low power consumption etc.

Keywords: Gi-Fi; Wimax; Wi-Fi; Bluetooth; Wireless Technology

I. INTRODUCTION

For the past few years cables governed the world. The next entrance of optical fibre played a dominant role because of its higher bit rates and faster transmission. Due to its drawback in installation caused a great difficulty that forced to step into the need for wireless. Bluetooth was the first invention in the wireless access which can cover 9-10 meter. Next Wi-Fi, having coverage area of 91meters, has brought a revolutionary solution to the problems faced by Bluetooth technology. To overcome all the present difficulties a new technology that transfers data and video information at a faster rate, we move on with a new technology namely Gi-Fi. Gi-Fi provides some advantages over wireless technologies such as fast information rate in Gbps, less power consumption and low cost for short range communication.

Evolution Chart of Network Technology



A. Bluetooth

Bluetooth is the first wireless technology designed to connect devices for transmission of data over short distances. It is based on IEEE802.15 standard. Bluetooth uses two types of network: Piconet and Scatter net. A piconet is formed by a primary and one or more secondary stations. All the secondary stations can synchronize their clocks and hopping sequence with the primary station. Piconet can have only one primary and maximum seven secondary stations. If there are more than seven secondary stations then eighth can be in parked state. When we talk about parked state, secondary station can synchronize with primary but can't communicate. As discussed above only eight stations can be active in piconet, and these stations must go to the parked state. More than one Piconet can be combined to form Scatternet, and secondary in one piconet can be the primary in another piconet. This technology has many applications such as communication of wireless mouse or keyboard with computer, home security devices to connect different sensors with main security controller, synchronization of computers at a conference etc. Wi-Fi or WiMAX provide a better solution in the wireless access infrastructure.

B. Wi-Fi

Wi-Fi is upgraded technology of Bluetooth. It follows IEEE802.11 standard that provides secure, reliable and fast wireless connectivity. IEEE802.11 standard includes three radio technologies to transmit and receive data at high speed: IEEE802.11a, IEEE802.11b and IEEE802.11g. 802.11b standard developed in 1999 that provides the speed of 11Mbps and operates at 2.4GHz radio spectrum. 802.11a standard was developed in 2001, which provides the speed of 54Mbps and operates at 5GHz. This standard is more expensive and it is not compatible with 802.11b. 802.11g combines the feature of both standards, providing the speed of 54Mbps. It operates at 2.4GHz radio frequencies and is compatible with 802.11b.

C. Wimax

WiMAX [6] [7] is the enhanced version of Wi-Fi technology. Worldwide Interoperability for Microwave Access (WiMAX) is based on IEEE802.16 standard designed to provide high speed wide area broadband wireless access. Also offers long range connectivity, high security, low power utilization and excellent quality of service (QoS). 802.16 standards have the better performance with bandwidth of 100 Mbps and low latency of 25-40ms than 802.11. It has maximum coverage area with 50kms than Wi-Fi supports only 100m. Flexibility is one of the main advantages of WiMAX technology. This technology can also operate in licensed and unlicensed spectrum. WiMAX specifies three techniques for radio link: SC-A, OFDM, OFDMA. WiMAX is used for portable broadband connectivity, peer to peer access, varieties VAS and enterprise data service. Also has the ability to maintain dedicated links, VOIP services at a reliable and high quality speed.

D. GI-FI

Gi-Fi or Gigabit Wireless Fidelity is the world's first transceiver integrated on a single chip operating at 60GHz on the Complementary Metal Oxide Semiconductor (CMOS) process; that allows wireless audio and video data transfer up-to 5Gbps within a range of 10 meters. To transmit data wirelessly over short distances, it utilizes 5mm square chip and 1mm wide antenna, and consumes only 2mW of power. Gi-Fi technology provides many features such as easy to deployment, small form factor, enabling the future of information management, high speed of data transfer, low power consumption etc. This technology is ten times faster than Wi-Fi and it is expected revolution Networking in offices and homes by implementing high speed wireless environments. Gi-Fi allows a full length high definition (HD) movie to be transferred between two systems in seconds. With high level of frequency reuse it can fulfil the communication needs of multiple customers within a small geographical region.

II. WORKING

In this technology Time division duplex (TDD) is used for transmitting and receiving. Data files are converted from IF range to RF60GHz range with the help of 2 mixers; the output is fed into a power amplifier, which feeds millimetre wave antenna. The incoming RF signal is first converted to an IF signal at 5GHz and then to normal data ranges. To avoid leakage due to direct conversion, heterodyne construction is used for this process. The total data is transfer within few second due to availability of 7GHz spectrum.

As mentioned above millimetre wave antenna is used for this technology, which operates at 60GHz frequency (Unlicensed band). Because of this band we achieve high data rates. In unlicensed band energy propagation has unique characteristics that provide additional benefits such as excellent immunity to co-channel interference, high security and frequency reuse.

III. APPLICATIONS

In Gi-Fi technology the Nitro chipset can be used to send and receive large amount of data in a variety of applications. It is intended for use in wide range of systems including personal computers, tablets and smart phones. The fast data synchronization rates of this technology enable the rapid transfer of video, bringing the wireless office closer to reality. Also have many attractive features that make it suitable for use in many places and devices. This technology can be effectively used in inter-vehicle communication system, ad-hoc information distribution with point to point network extension, MAC, wireless pan networks, imaging and many other applications.

Gi-Fi technology has ability to transfer gigabits of data within few seconds and therefore it can be used for huge amount of data transmission. It also can be used in broadcasting video signal and mm-Wave video signals transmission system.

A. Features

Gi-Fi has special features that solves the problems faced by the other existing technologies, and these features are discussed below:

High data transfer rate: data transfer rate in gigabit wireless is 5Gbps that is 10 times faster than other technologies. The main invention of Gi-Fi is to provide higher data rate. A High-Definition movie could be transmitted to a cell phone in a very less time, and phone could then upload the movie to the personal computer at the same speed. The availability of 7GHz spectrum results high data rate.

Low power consumption: Gi-Fi technology transmits data with low power consumption compared to the present technology, and power consumption of it is 2mW.

No interference: transmits the data with 60GHz millimetres wave spectrum; giving advantages over Wi-Fi.

High Security and cost effective: Gi-Fi technology follows IEEE 802.15.3C standard (Open, international standard). This standard provides optional security in the link level and service level, it provides more security. Also this technology utilizes low cost and mass productive chipsets.

Size and coverage: it uses 1mm wide antenna and 5mm square chip that is too small so it can be integrated in mobile devices. Also provides better coverage area. The main advantage is that this is highly portable and flexible.

B. Benefits

Eliminating cable: this technology eliminates the need for cables to connect electronics devices, and connects all the devices wirelessly in order to transmit the data. **Low cost chip:** The chip embedded into Gi-Fi costs about \$10 or less. Small devices would allow cell phones and other small devices to add the technology without significantly drive up the price. The use of low costs, mass adoption of the standard and mass produced chipsets drive costs down dramatically, which is less than existing technology.

Simplicity: one of the problems associate with wired connection involves complexity. To overcome this problem Gi-Fi technology is used to provide simple connectivity.

IV. COMPARISON BETWEEN GI-FI AND OTHER EXISTING TECHNOLOGIES

Gi-Fi technology can be an extremely fast replacement of other technologies in coming days.

Characteristics	Bluetooth	Wi-Fi	WiMAX	Gi-Fi
Full Form	-	Wireless Fidelity	Worldwide interoperability for Microwave access	Gigabit Wireless Fidelity
Data transfer rate	800kbps	11Mbps	1Gbps	5Gbps
Operating Range	10 meters	100 meters	50 Kilometers	10 meters
Operating Frequency	2.4GHz	2.4GHz	2.3-3.5GHz	57-64GHz
Power Consumption	5mW	10mW	~5mW	<2mW
IEEE Standard	IEEE 802.15	IEEE 802.11	IEEE 802.16	IEEE 802.15.3C

CONCLUSION

After comparing Gi-Fi with other wireless technology we have come to the conclusion that Gi-Fi solves the problem of low data transfer rate, high power consumption, cost efficient and low frequency range of earlier technology. It can provide better data transfer rate with low power consumption due to be integrated transceiver on a single chip technique.

References

- [1] Bluetooth (2009). [Online]. Available at: <http://www.bluetooth.com>,
- [2] Gi-Fi.[Online]. Available at: [https://www.nicta.com.au/ data/assets/pdf_file/0005/21200/GiFI.pdf](https://www.nicta.com.au/data/assets/pdf_file/0005/21200/GiFI.pdf)
- [3] Gi-Fi. Wikipedia, the free encyclopedia. Available at: <http://en.wikipedia.org/wiki/Gi-Fi>
- [4] Rakesh Kumar Jha, Upena D Dalal (2012). A Journey on WiMAX and its security issues. In International Journal of Computer Science and Information Technologies, 2012 (vol. 1, pp.256-263).