

# Gi-Fi Technology: A Technology with Standard Features

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## ABSTRACT

Now a day the technology has changed from wired connection to wireless connection. Despite the advantages of present technologies, continuous quest led to the new technology i.e. Gi-Fi. Gi-Fi is emerging wireless technology which is ten times faster than other technologies and it delivers short range multi gigabits data transfer. The features of this technology can be helpful for use in development of next generation of devices. Also this paper presents the other existing technologies, and provides the table in which comparison of Gi-Fi with some of the existing technologies has been outlined; it shows that Gi-Fi has advantages over other technology due to its high speed data transfer rate, low power consumption etc.

## Keywords

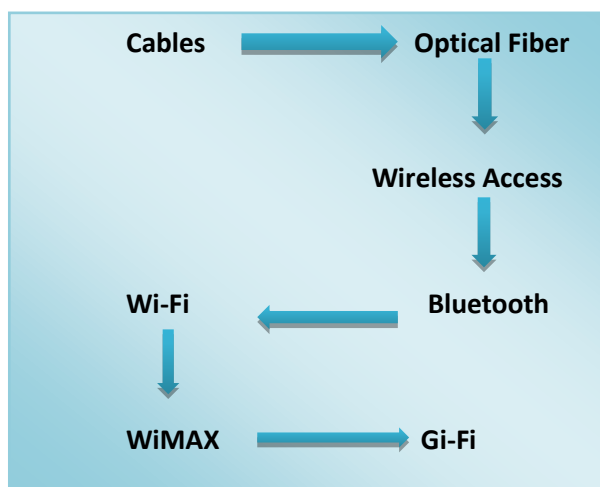
Gi-Fi; WiMAX; Wi-Fi; Bluetooth; Wireless technology

## 1. INTRODUCTION

For many years cables governed the world. After that optical fiber played a dominant role because of its higher bit rates and faster transmission but its installation caused a great difficulty thus we led to wireless access [10]. First of all Bluetooth has been used as wireless access which can cover 9-10 meter. Next Wi-Fi, having coverage area of 91meters, has brought a revolutionary solution to the problems appeared in last technology.

These days there are no recent development in Wireless technologies [4]. To transfer data and video information at the faster rate, we come up 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 is shown below.



The Paper [11] by Jyoti Tewari, Swati Arya discuss a basic idea about New Technology, “Gi-Fi” that is based on integrated wireless transceiver chip. Within five years, this technology would be able to replace the other existing wireless technologies based on some parameters. The GiFi chip has brought good news for personal area networking because there is no internet infrastructure available to cope with it. The Paper [12] by Desai Vaishali J., Ramani Shruti K.2 focus on advantages of Gi-Fi technology over other technologies. Gi-Fi technology is able to remove need for cables to connect consumer electronics devices and all the devices can be connected in order to transmit the data wirelessly. Moreover, it ensures privacy and security of content. Gi-Fi has many features that make it suitable for the use in many places and devices.

The rest of the paper is organized as follows: In chapter 2, 3 and 4 other existing wireless technologies are described. Chapter 5 presents the Gi-Fi technology with its working, feature, benefits and applications. In chapter 6 comparisons between existing technologies and Gi-Fi is outlined with the help of table. Finally chapter 7 concludes the whole paper.

## 2. BLUETOOTH

Bluetooth [1] 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 Scatternet. A piconet is formed by a primary and one or more secondary stations. All the secondary stations can synchronize their clocks and hoping 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.

## 3. WI-FI

Wi-Fi [9] is upgraded technology of Bluetooth. It follows IEEE802.11 standard that provides secure, reliable and fast wireless connectivity [8]. 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.

#### **4. WIMAX**

WiMAX [6] [7] is the enhance 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, OFDM-A.

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.

#### **5. GI-FI**

Gi-Fi or Gigabit Wireless Fidelity [2][3] is the world's first transceiver integrated on a single chip operating at 60GHz on the CMOS process; allowing wireless transfer of audio and video data at 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 [5].

#### **5.1 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 millimeter 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 millimeter 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.

#### **5.2 Features**

Gi-Fi has special features to solve the problems present in other existing technologies, and these features are discussed below:

**High data transfer rate:** data transfer rate of 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 millimeters 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.

Other features:

This technology is highly portable and more flexible.

#### **5.3 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 design 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. Thus we can say that simplicity is one of the main features of this technology.

#### **5.4 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 systems.

## 6. COMPARISON BETWEEN EXISTING TECHNOLOGIES AND GI-FI

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

Table 1 demonstrates the advantages of Gi-Fi over other wireless technologies like Bluetooth, Wi-Fi and WiMAX.

**Table 1. Comparison of Gi-Fi with other wireless technologies**

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

## 7. CONCLUSIONS

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 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.

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