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ELEVATION FOR FASTER COMMUNICATION: GIFI

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ABSTRACT

Gi-Fi/Gigabit Wireless is the fastest communication technology overcoming the drawbacks of Wi-Fi and Bluetooth.It is a transceiver that is integrated on a single chip.It has the highest portability and mobility.It is a wireless platform that operates on 60ghz bandwidth on the cmosprocess.It is based on stanadardieee 802.15.3C.It is based on the technology of Wi-Fi PAN(personal area network).It is based on electromagnetic radiation or acoustic wave propagation which means waves which travel in a direct path from the source to the receiver that is nothing but line of sight propogation.It transfers media such as images,videoetc at a 10 meters length.

Keywords: Gi-Fi, Bluetooth, Wireless communication, Wi-Fi, line of sight, cmos process.

I. INTRODUCTION

Radio waves absorbed by the wireless technologies to transfer information without cables or wiring. Although wireless communications have been used, the technology is now being largely used to create wireless computer networks. There are many standards for wireless communications, including Bluetooth, DECT and WiMax but the currently running wireless technology Gi-Fi.It is developed to overcome the disadvantages of wifi and Bluetooth. The disadvantages of wireless fidelity (WiFi) are , the actual range of common 802.11g network with standard equipment is on the order of 10's of meters which is enough for a typical home, but it will be insufficient in a larger structure so to obtain additional range, repeaters or additional access points will have to be purchased. Costs for these items can add up quickly. The other disadvantage such as the speed on most wireless networks (typically 1-54 Mbps) is far slower than even the slowest common wired networks (100Mbps up to several Gbps). However, in specialized environments, the throughput of a wired network might be necessary. Although Bluetooth is an energy-efficient technology, it does slowly drain the battery of your cell phone or other mobile device. The network evolution f GiFi is as shown below Fig1.

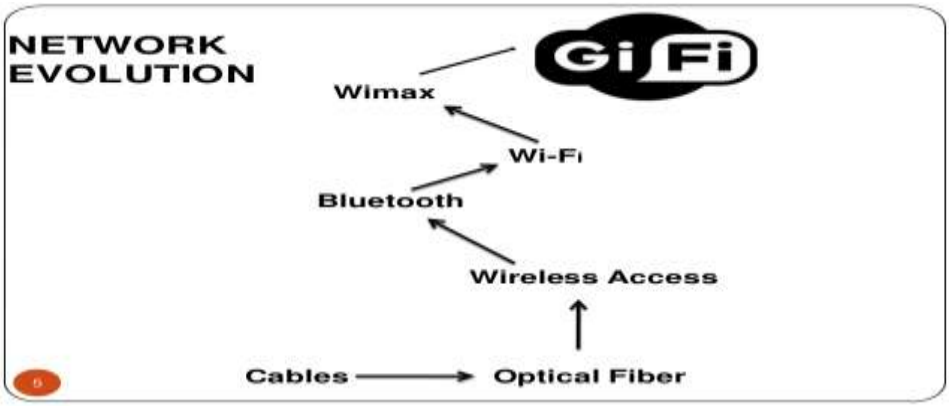


Fig 1.Evolution of Gi-Fi

When enabled, Bluetooth constantly scans for signals, searching for new devices to connect with, but using energy in the process. Check your device's settings and turn Bluetooth off when you're not using it. To overcome such disadvantages of wifi and bluetooth gifi came into picture. It will surely enable the future for information management. Gi-Fi allows the transfer of audio and video data upto 5gigabits per second. It was developed by NICTA (National Information & Technology Research center in Melbourne, Australia. The figure[1] below shows the evolution of Gi-Fi(Gigabits wireless).Initially there were wired media used such as cables and optical fibers. But as evolution took place wireless media came into picture. Now everyone is using Wi-Fi. Recently the research has started regarding Gi-Fi. I n this paper section [II] discusses about the need of GiFi.Section [III] discusses about the structure of GiFi, Section [IV] discusses about the characteristics of GiFi and Section[V] is the literature survey and then in Section[VI] the paper provides us with the applications of Gifi and lastly it provides the conclusion.

II. NEED OF GI-FI

The reasons for switching to Gi-Fi were listed below:

[1]Slow rate :

Bluetooth and Wifi provided data transfer rate about 8000kbps and 11mbps.While Gi-fi provided the data rate of 5ghz. [2]High power consumption:

[3] Low Frequency.

Whereas the Gi-FI provided following advantages:

- Removing cables:
  This technology removes need for cables to connect consumer electronics devices and all the devices can be connected so as to transmit the information wirelessly.
- Low cost:
  Low-cost chip allows technology to be easily incorporated into several devices. The chip in Gi-Fi would likely be cheap to create.
- Security and privacy: Encryption technology in Gi-Fi ensures security and privacy of content. About 70 per cent of companies have deployed their WLAN in a very secure firewall zone but are still using the previous WEP protocol, that doesn't protect the application layer effectively, thus better encryption is urgently required.
- Flexibility: One of the issues with wire connections and cables is complexity for connecting, but within the Gigabit wireless technology simplicity is one among the features. Easy connection improves the consumer experience. The usess related to the Gi-Fi technology that may be conquered by the deployment and consumption use of this technology.

III. STRUCTURE OF GI-FI

Thisfig[2] shows the block diagram of Gi-Fi.It also explains the working of Gi-fi.

Fig [2].Structure of Gi-fi

Gi-Fi uses time division multiplexing for both transmitter and receiver. It converts the data that is the incoming infrared signals i.e the electromagnetic waves around 800nm to 1mm.They are converted to radio frequency signals at 60 ghz. The incoming radio frequency signal is down converted to Infrared signal and then to normal data ranges. They use heterodyne for this process to avoid leakages and the data is transferred. It also uses Frequency Duplex Division, as the channels are divided by frequencies. As it is a transceiver device the signals from transmitter and receiver can transferred at the same time as the receiver is not adjusted to the same frequency. The advantage of a FDD system enables true simultaneous transmission and reception of signals. However, two channels are required and this may not always use the available spectrum with efficiency.

IV.CHARACTERISTICS OF GI-FI

The table below shows the comparison of Gi-Fi, Bluetooth and Wi-fi. Though Gi-fi started in 2004 it has not gained popularity as lot of work is going on for this technology. As we can see that though the Wi-Fi can serve larger bandwidth, it has limited data rate. Gi-Fi is supposed to be the fastest and requires less power. It is capable of fulfilling the needs for devices such as mobile phones, home devices and electronics. It is adequate up till 57-64 Ghz that is, it provides a carrier frequency for transfer of data very high.

Characteristics	Gi-Fi	Wi-Fi	Bluetooth
Development Start	2004	1990	1998
Specification Authority	NICTA	IEEE, WECA	Bluetooth SIG
Frequency	57-64GHz	2.4 GHz	2.4 GHz
Data Transfer Rate	5 Gbps	11 Mbps	800 Kbps
Range	10 Meters	100 Meters	10 Meters
Power Consumption	< 2 MW	10 MW	5MW
Primary Devices	Mobile phones, Home Devices, Electronics etc.	Notebooks, Computers, Desktop Computers, Servers etc.	Mobile phones, Home Devices, Electronics etc.

Table 3.1 Gi-Fi Comparison

(A) Features are:

- High speed data transfer: The main invention of Gi-Fi is to provide higher bit rate Because of this high speed data transfer, we can transfer large video, audio, data files within seconds. .As the name suggests data transfer rate is in Gbps it is 10 times faster than the present data transfer rate. The speed of Gi-Fi is 5 Gbps.

An entire High-Definition (HD) movie could be transmitted 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.

- ·Cost-effective: Gi-Fi technology is based on an open, international standard due to which the use of cheap, mass-produced chipsets, will bring down the price automatically. This also results in integrated wireless transceiver chip which transfers data at high speed and low power at low price of $10 only which is very less as compared to present systems. As time passes and development rises, the price of Gi-Fi will not be increased.
- Low Power Consumption: This is the best feature because although the large amount of information is transferred, it utilizes milliwatts of power only. Normally in the current ongoing technologies it takes 10mwatt power, which is very high but this technology consumes only 2mwatt power for data transfer of gigabits of information.
- Small Size: The chip, just 5mm per side, has a tiny 1mm antenna and uses the 60GHz mm-wave‟ spectrum.

V. LITERATURE SURVEY

1) India survey

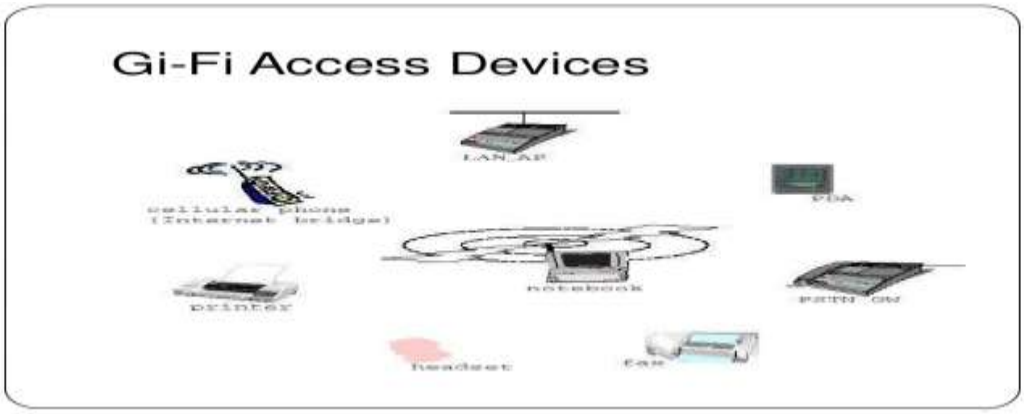
- S. Dheeraj and S. Gopichand in 2002 came out with a model in which they invented a technology which has acquired flexibility of infrastructure, reduction in capacity expenditure, gain advantages over competitors and to solve business problem.
- Goutam S Shetty in 2006 proposed that wireless dual band router and wireless dual band USB adapter are based on upcoming WI-FI technology, which is new wireless technology in 802.11ac family.
- Sachin abhyankar in 2009 proposed a model which show WI-FI which resolve all problems which occur in Bluetooth, limitation of data transfer rate and range.
- Ramiaz in 2011proposed that radio link can operate in indoor environment with considerably small power consumption. Rakesh Kumar and Pooja Kharga in 2015 proposed a model that MIMO (Multiple input Multiple output) rises the capacity 10 times and the system provides important reduction of latency on the radio interface using the less numbers.
- SonaliMaind, Pravin Khawse in 2015 proposed a model that the introduction ogGi-Fi wireless network has proved a solution to Bluetooh and Wi-Fi problem, the limitations for data exchange.

2) World survey:

- Australia is the initiator in the development of GI-FI technology. Melbourne University researchers have invented 5Gbps data transfer rates on a wireless chip. The pioneer GIFI technology wireless network chip developed at Australia's peak federal technology incubator has entered its commercialization phase. The NICTA (National ICT Australia Limited) GI-FI research team successfully invented 60GHz transmission technology.
- Ross and John in 2007 proposed a model that MIMO increased capacity 10 times or more and improves radiating energy efficiency of order of 100 times.

VI. APPLICATIONS OF GI-FI

1. Household Appliances as the Gi-Fi technology is used in vast number of household appliances such as in cellular communication and home theatre Televisions and the consumers can download their movies and video songs and many other applications of their use in a moment and save it anywhere whenever they want to use. It offers a high speed of internet and channel, higher downloading speed, wireless data and real time streaming as shown in .Fig. [6.1]2. Wireless PAN Networks With the current technologies, the use of Gi-Fi in wireless PAN networks can take a better perspective in today's technology as the data files are transferred to RF 60GHz range by making use of two mixers from an IF(Intermediate Frequency) . The output is then stored in a power amplifier, that stores a millimeter wave antenna within. Due to a higher availability of 7 GHz spectrum, it results in higher data rates in a number of networks.



Fig[6.1] Household Appliances

VII. CONCLUSION

So Gi-Fi is the latest wireless technology which is going to be dominant in the coming years. It overcomes the disadvantages of Bluetooth and WiFi. It also provides us with good frequency range, high speed and is fully efficient for longer bandwidth. So in this paper we have discussed about the evolution of GiFitechnology, its structure and working of GiFi. It also discusses about the comparisions of all the wireless technology, its features and the real world example where the GiFi is used in the fields of Household appliances, inter vehicle communication and wireless pan networks.

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