

ABSTRACT

Gi-Fi will help to push wireless communications to faster drive. For many years cables ruled the world. Optical fibers played a dominant role for its higher bit rates and faster transmission. But the installation of cables caused a greater difficulty and thus led to wireless access. The foremost of this is Bluetooth which can cover 9-10mts. Wi-Fi followed it having coverage area of 91mts. No doubt, introduction of Wi-Fi wireless networks has proved a revolutionary solution to “last mile” problem. However, the standard's original limitations for data exchange rate and range, number of channels, high cost of the infrastructure have not yet made it possible for Wi-Fi to become a total threat to cellular networks on the one hand, and hard-wire networks, on the other. But the man's continuous quest for even better technology despite the substantial advantages of present technologies led to the introduction of new, more up-to-date standards for data exchange rate i.e., Gi-Fi.

Gi-Fi or Gigabit Wireless is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS 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 2 watts of power to transmit data wirelessly over short distances, much like Bluetooth.

The development will enable the truly wireless office and home of the future. As the integrated transceiver is extremely small, it can be embedded into devices. The breakthrough will mean the networking of office and home equipment without wires will finally become a reality.

In this paper we present a low cost, low power and high broadband chip, which will be vital in enabling the digital economy of the future.

INTRODUCTION

Wi-Fi (ieee-802.11b) and WiMax (ieee-802.16e) have captured our attention. As there is no recent developments which transfer data at faster rate. As video information transfer taking lot of time. This leads to introduction of Gi-Fi technology.it offers some advantages over Wi-Fi, a similar wireless technology.In that it offers faster information rate(Gbps),less power consumption and low cost for short range transmissions.

Gi-Fi which is developed on a integrated wireless trnsceiver chip.In which a small antenna used and both transmitter- receiver integrated on a single chip.which is fabricated using the complementary metal oxide semiconductor (CMOS)process. Because of Gi-Fi transfer of large videos, files will be within seconds.

WHY Gi-Fi?

The reason for pushing into Gi-Fi technology is because of slow rate,high power consumption,low range of frequency operations of earlier technologies i.e.,Bluetooth and Wi-Fi. see the comparisons and features of those two technologies.

Bluetooth verses Wi-Fi

Gi-Fi

Characteristic	Bluetooth	Wi-Fi
Frequency	2.4 GHz	2.4 GHz
Range	10 meters	100 meters
Primary application	WPAN: cable replacement	WLAN: Ethernet
Data transfer rate	800 Kbps	11 Mbps
Power consumption	Low	Medium
Primary devices	Mobile phones, PDAs, consumer electronics, office and industrial automation devices	Notebook computers, desktop computers, servers
Primary users	Traveling employees, electronics consumers, office and industrial workers	Corporate campus users
Usage location	Anywhere at least two Bluetooth devices exist — ideal for roaming outside buildings	Within range of WLAN infrastructure, usually inside a building
Development start date	1996	1999
Specifications authority	Bluetooth SIG	IEEE, WECA

DISADVANTAGES OF BLUETOOTH AND Wi-Fi:

From above table we can conclude that the bit rates of Bluetooth is 800Kbps and Wi-Fi has 11Mbps. Both are having power consumptions 5mw and 10mw. And lower frequency of operation 2.4GHz. For transferring large amount of videos, audios, data files take hours of time. So to have higher data transfer rate at lower power consumption we move onto Gi-Fi technology

WHAT IS Gi-Fi?

Gi-Fi or gigabit wireless is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS process. It will allow 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 the cost. NICTA researchers have chosen to develop this technology in the 57-64GHz unlicensed frequency band as the millimetre-wave range of the spectrum makes possible high component on-chip integration as well as allowing for the integration of very small high gain arrays. The available 7GHz of spectrum results in very high data rates, up to 5 gigabits per second to users within an indoor environment, usually within a range of 10 metres. It satisfies the standards of IEEE 802.15.3C

ARCHITECTURE OF GI-FI:

The core components of a GI-FI system is the subscriber station which is available to several access points. It supports standard of IEEE 802.15.3C supports millimeter-wave wireless pan networks. The wirelesspan is computer network used for communication among computer devices (including telephones and personal digital assistants) close to one person. An 802.15.3c based system often uses small antenna at the subscriber station. The antenna is mounted on the roof. It supports line of sight operation.

FUNDAMENTAL TECHNOLOGIES IN 802.15.3C:

It is fundamental technology in digital TV. It transmits multiple signals simultaneously across the wireless transmission paths within separate frequencies to avoid interference. It is also supported in the WPAN standard. TG3c is

Gi-Fi

developing a millimeter-wave-based alternative physical layer (PHY) for the existing 802.15.3C. The millimeter-wave WPAN will allow high coexistence (close physical spacing) with all other microwave systems in the 802.15 family of WPANs.

GIGABIT WIRELESS PAN NETWORKS



ULTRA WIDE BAND FREQUENCY USAGE:

UWB, a technology with high bit rate, high security and faster data transmission. It is a zero carrier technique with low coverage area. So we have low power consumption. These features are Ultra-Wideband (UWB) is a technology for transmitting information spread over a large bandwidth (>500 MHz) that should, be able to share spectrum with other users. Regulatory settings of FCC are intended to provide an efficient use of scarce radio bandwidth while enabling both high data rate personal-area network (PAN) wireless connectivity and longer-range, low data rate applications as well as radar and imaging systems.

Features of GI-FI

The Gi-Fi standard has been developed with many objectives in mind. These are summarized below:

1. High speed of data transfer:

The main invention of Gi-Fi to provide higher bit rate. As the name itself indicates data transfer rate is in Giga bits per second. Speed of Gi-Fi is 5 gbps, which is 10 times the present data transfer. Because of this high speed data

transfer we can swap large video, audio, data files within seconds. Which takes normally hours with our present technologies. Because of wider availability of 7 GHz spectrum results in high data rates.

2. Low Power Consumption:

As the large amount of information transfer it utilises milli-watts of power only. It consumes only 2 mWatt power for data transfer of gigabits of information. Whereas in present technologies it takes 10 mWatt power, which is very high.

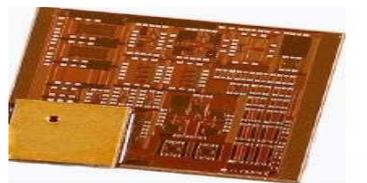
3. High Security:

As the IEEE 802.15.3C provides more security, it provides link level and service level security, where these features are optional.

4. Cost-effective:

Gi-Fi is based on an open, international standard. Mass adoption of the standard, and the use of low-cost, mass-produced chipsets, will drive costs down dramatically, and the resultant integrated wireless transceiver chip which transfers data at high speed, low power at low price \$10 only, which is very less. As compared to present systems. As development progresses the price will be decreased.

5. Small Size:



Gigabit wireless: The Gi-Fi integrated wireless transceiver chip developed at the National ICT Research Centre, Australia. — The chip, just 5 mm per side, has a tiny 1 mm antenna and uses the 60 GHz ‘millimetre-wave’ spectrum

6. Quick Deployment:

Compared with the deployment of wired solutions, WiMAX requires little or no

Gi-Fi

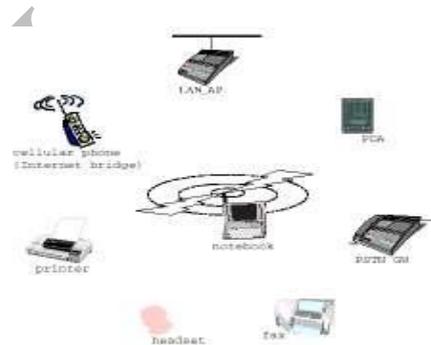
external plant construction. For example Compared with the deployment of wired solutions, Gi-Fi requires little or no external plant construction. For example, excavation to support the trenching of cables is not required. Operators that have obtained licenses to use one of the licensed bands, or that plan to use one of the unlicensed bands, do not need to submit further applications to the Government. Once the antenna and equipment are installed and powered, Gi-Fi is ready for service. In most cases, deployment of Gi-Fi can be completed in a matter of minutes, compared with hours for other solutions.

Other features:

It is also highly portable,high mobility. It deploys line of sight operation having only shorter coverage area,it has more flexible architecture.

Gi-Fi ACCESS DEVICES:

This figure shows some of the different types of Gi-Fi access devices. This diagram shows that access devices include network termination units, internal radio modules, network interface cards,printers,pc's, all house hold electronic appliances on communication devices.



APPLICATIONS:

There are many usage scenarios that can be addressed by Gi-Fi. The following are some mobility usage applications of Gi-Fi.

House hold appliances:

Gi-Fi

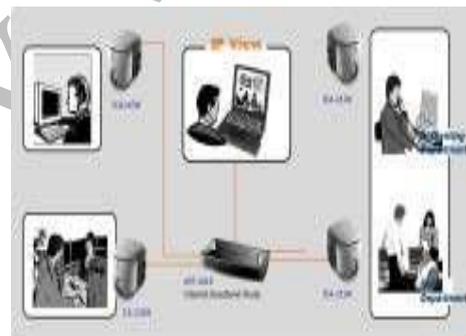
Consumers could typically download a high definition movie from a kiosk in a matter of seconds to a music player or smart phone and having got home



could play it on a home theatre system or store it on a home server for future viewing, again within a few seconds. high speed internet access, streaming content download (video on demand, HDTV, home theater, etc.), real time streaming and wireless data bus for cable replacement It makes the WIRELESS HOME AND OFFICE OF THE FUTURE.

Office appliances:

As it transfers data at high speeds which made work very easy .its also provides high quality of information from internet.



Video information transfer:

By using present technologies video swapping takes hours of time ,where as by this we can transfer at a speed of gbps.

Gi-Fi



Data transfer rate is same for transfer of information from a PC to a cell or a cell to a pc. It can enable wireless monitors, the efficient transfer of data from digital camcorders, wireless printing of digital pictures from a camera without the need for an intervening personal computer and the transfer of files among cell phone handsets and other handheld devices like personal digital audio and video players.

Media access control(MAC) and imaging and others:



In future:

As the range is limited to shorter distances only we can expect the broad band with same speed and low power consumption.

Technology Considerations:

The Gi-Fi integrated transceiver chip is may be launched by starting of next year by NICTA,Australia will be first .Due to less cost of chip so many companies are forward to launch with lower cost. The potential of mw-WPAN for ultra fast data exchange has prompted companies like Intel, LG, Matsushita (Panasonic), NEC, Samsung, SiBEAM, Sony and Toshiba to form WirelessHD, an industry-led effort to define a specification for the next generation consumer electronics products. Specifically, WirelessHD has a stated goal of enabling wireless connectivity for streaming high- definition content between source devices and high-definition displays.

CONCLUSION

Within five years, we expect Gi-Fi to be the dominant technology for wireless networking. By that time it will be fully mobile, as well as providing low-cost, high broadband access, with very high speed large files swapped within seconds which will develop wireless home and office of future. If the success of Wi-Fi and the imminent wide usage of WiMAX is any indication, Gi-Fi potentially can bring wireless broadband to the enterprise in an entirely new way.

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