

GI-FI Technology

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Abstract— Gi-Fi can helps to push wireless communications to quicker drive. For many years cables dominated the globe. Optical fibers compete a dominant role for its higher bit rates and quicker transmission. However the installation of cables caused a larger issue and so led to wireless access. The foremost of this can be Bluetooth which might cover 9-10mts. Wi-Fi followed it having coverage space of 91mts. No doubt, introduction of Wi-Fi wireless networks has established a revolutionary solution to “last mile” drawback. However, the standard’s original limitations for knowledge rate of exchange and vary, range of changes, high value of the infrastructure have not yet created it attainable for Wi-Fi to become a complete threat to cellular networks on the one hand, and hard-wire networks, on the opposite. However the man’s continuous look for even higher technology despite the substantial benefits of gift technologies led to the introduction of recent, a lot of up-to-date standards for knowledge rate of exchange i.e., Gi-Fi.

Index Terms—Bluetooth, GI-FI, Gigabit Wireless, WI-FI, Wireless, .

I. INTRODUCTION

MIND MAP:

The Fig 1 represents a mind map which supplies the summary of the paper. The branches represent the Categories and therefore the sub branches represent the classes within the main



Fig 1 : Mind Map

branch
 Wi-Fi (IEEE-802.11b) and WiMax (IEEE-802.16e) have captured our attention. As there's no recent development that transfer knowledge at quicker rate, as video info transfer taking heap of your time. This ends up in introduction of Gi-Fi technology. It offers some benefits over Wi-Fi, an identical wireless technology. In this it offers quicker info rate in Gbps, less power consumption and low value for brief vary transmissions. Gi-Fi that is developed on a integrated wireless transceiver chip. In that within which a little

antenna used and each transmitter- receiver integrated on one chip which is unreal mistreatment the Complementary Metal Oxide Semiconductor (CMOS) method. Owing to Gi-Fi transfer of enormous videos, files are in seconds.

In theory this technology would transfer GB's of our favorite high definition movies in seconds. So Gi-Fi is thought of as a competitor to Bluetooth instead of Wi-Fi and will notice application starting from new mobile phones to shopper natural philosophy. Gi-Fi permits a full-length high definition movies to be transferred between 2 devices in seconds to the upper megapixel forecast our cameras, the multiplied bit rate on our music files, the upper resolution of our video files, and so on. We demand quite ever, however we have a tendency to conjointly wish this content to be transferred within the most expedient manner attainable. 802.11g and 802.11n area unit fine and every one, however some individuals wish to push the envelope even any further. This chip is 5mm per aspect and it will operate at a frequency of 60GHz whereas Wi-Fi chip will operate solely at a pair of 2.4GHz. This has low power conception of two watt comes and comes with 1mm antenna.



Fig 3: High Speed indoor knowledge transmission

The Gi-Fi chip is nice news for private space networking as a result of there's no net infrastructure on the market to cop it with. It will have a span of ten meters. The usable paradigm is also but a year away. With the assistance of Gi-Fi chips the video sharing are often attainable with none hurdles. The Gi-Fi chip is one among Australia's most remunerative technology. This chip is 5mm per aspect and it will operate at a frequency of 6 whereas GHz while wireless local area network chip can operate solely at a pair of 2.4GHz.

This have low power conception of two watt comes with 1mm antenna. The whole GI-FI index is contained within the CRA's Guide to the final Index of monetary data (GIFI) for companies that you'll be able to transfer or get during a paper or magnetic disc version from your nearest tax services workplace. You'll realize links to each the Guide To The General Index of Financial Information (GIFI) For Corporation and therefore the GIFI.



Fig 2: Use of Spectrum in Gi-Fi

The Cost of Gi-Fi chip is just \$10. The aim of the Gi-Fi is to permit the CRA to gather and method money data a lot of expeditiously, as an example, the Gi-Fi lets the CRA validate tax data electronically instead of manually. Short-range wireless technology could be a heatedly contested space, with analysis groups round the world athletics to be the primary to launch such a product. Professor Skafidas same his team is that the 1st to demonstrate an operating transceiver-on-a-chip that uses CMOS (Complementary Metal-Oxide-Semiconductor) technology the chip, omnipresent technique that prints semiconducting material chips.

The breakthrough can mean the networking of workplace and residential instrumentality while not wires can finally become a reality. Researchers from NICTA's Gigabit Wireless Project, that relies out of NICTA's Victoria Research laboratory, are the primary within the world to own developed an integrated transceiver, an entire transmitter and receiver, on one cut 60GHz on CMOS.

NICTA's analysis concerned a detailed collaboration with leaders within the international semiconductor trade. The technology was developed victimisation the IBM 130nm R F CMOS method. "Our collaborators IBM, Synopsys, Cadence, Anritsu, Agilent, Asoft and SUSS Micro Tech are vital to our success and that we are grateful to own had their valuable support".

II. HISTORY OF GI-FI

Melbourne University researchers have achieved up to 5 Gbps knowledge transfer rates on a wireless chip. This can be plenty quicker than any current Wi-Fi speeds. Dubbed Gi-Fi, for obvious reasons, it will deliver the affiliation speed up to 10 meters. To totally comprehend how briskly Gi-Fi is, one of the researchers speak that a full-length high-definition motion picture are often transferred from one device to a different in a matter of seconds.

The Gi-Fi chips is barely 5mm in size and use current CMOS technology. Value is barely \$10. I say, let's begin mass manufacturing it. Professor Stan Skafidas of "Melbourne University, Australia" is that the discoverer of Gi-Fi chip. The Gi-Fi chip uses solely a little one-millimeter-wide antenna and fewer than 2 watts of power, and therefore the Gi-Fi chip would value but \$10 to manufacture it. "But the millimetre wave spectrum (30 to 300GHz) is sort of unoccupied, and therefore the new chip is probably many times quicker than the typical home Wi-Fi unit". The simplest half regarding this new technology Gi-Fi is its value effectiveness and power consumption, it solely consumes two watts of power for its operation with antenna

(1mm) enclosed and therefore the development of Gi-Fi chip prices some \$10 (Rs. 380) to manufacture. In theory this technology would transfers GB's of our favorite high definition movies in seconds. The Gi-Fi uses the short-range wireless technology would doubtless be a challenger or quite probably a replacement for Wi-Fi, and things like Bluetooth would possibly wish to seem out furthermore. The transfer speeds combined with the perpetually exaggerated storage capacities of little hand-held devices might very take media down some new avenues furthermore. The Age newspaper uses Associate in Nursing example of transferring a high-definition picture from a stall at a store to your itinerant in seconds.

"It's not up to Pine Tree State to announce it. It's up to the corporate that has fashioned, however there's Associate in Nursing activity happening to protract a corporation from Nicta which will take that technology to plug," Dr Skellem same. The Gi-Fi chip might become one amongst Australia's most profitable technology. The Nicta gigabit wireless chip is a 100 times quicker than current Wi-Fi chips and may be designed for a tenth of their value. The team behind it picked up a gong at the international Innovic's Next Big factor Award for Innovation Excellence last July

"There'll be a sort of party between all the protagonists for all the various approaches and one can find yourself being a winner. We'll be in there proposing our solutions." The Australian contacted the CSIRO for discuss whether or not Nicta would want its co-operation to develop the chip or use its patents, however neither of the CSIRO's lead Wi-Fi spokesmen, Tom Mc Guinness and Nigel Poole, were offered. A CSIRO spokesperson same the organization had not been told Nicta was designing a Gi-Fi start-up.

III. NEED FOR GI-FI

The reason for pushing into Gi-Fi technology is due to slow rate, high power consumption, low vary of frequency operation of earlier technologies i.e. Bluetooth and Wi-Fi, see the comparisons and options of these 2 technologies.

Comparison of Bluetooth and Wi-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	1998	1990
Specifications authority	Bluetooth SIG	IEEE, WECA

C. Demerits of Bluetooth and Wi-Fi

1. From the table we will conclude that the bit rate of Bluetooth is 80Kbps and Wi-Fi has 11 Mbps.
2. Each are having power consumptions 5mw and 10mw. And lower frequency of operation two.4GHz.
3. For transferring great deal of videos, audios, information files take hours of your time. thus

to own higher information transfer rate at lower power consumption we tend to move onto Gi-Fi technology

IV. GI-FI

Gi-Fi or gigabit wireless is that the world's initial transceiver integrated on one chip that operates at 60 GHz on the CMOS method. It'll enable wireless transfer of audio and video information at up to five gigabits per second, 10 times the present most wireless transfer rate, at simple fraction the price. NICTA researchers have chosen to develop this technology within the 57-64 GHz unaccredited waveband because the millimeter-wave vary of the spectrum makes possible high part on-chip integration additionally as leaving the combination of terribly tiny high gain arrays.

The offered 7GHz of spectrum ends up in terribly high information rates , up to five gigabits per second to users among an internal surroundings, typically among a variety of ten meters. It satisfies the standards of IEEE 802.15.3C

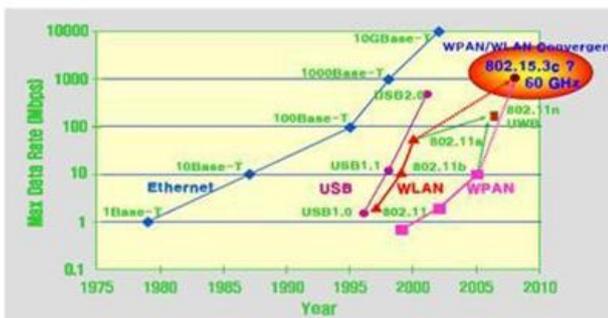


Fig 4 : Showing seven gigacycle Spectrum

A. Architecture of Gi-Fi

The core parts of a Gi-Fi system is that the subscriber station that offered to many access points. It supports customary of IEEE 802.15.3C supports millimeter-wave wireless pan network used for communication among laptop devices near one person. An 802.15.3C based mostly system usually uses tiny antenna at the subscriber station. The antenna is mounted on the roof. It supports line of sight operation.

Fundamental technologies in 802.15.3c

This millimeter-Wave WPAN can operate within the new and clear band together with 57-64 GHz unaccredited band outlined by FCC 47 CFR 15.255. The millimeter-wave WPAN can enable high existence (close physical spacing) with all different microwave systems in the 802.15 family of WPANs.



Fig 5: Gigabit wireless pan network

B. Operating in Gi-Fi and its options

Here we'll be use a time division duplex for each transmission and receiving. The info files are up born-again from If vary to RF 60 GHz vary by victimization a pair of mixers. We are going to feed this to an influence electronic equipment, that feeds millimeter-wave antenna. The incoming RF signal is initial down born-again to associate IF signal focused at five GHz and so to traditional knowledge ranges, here we are going to use heterodyne construction for this method to avoid leakages as a result of direct conversion. As a result of convenience of seven GHz spectrum the full knowledge are going to be transferred inside seconds.

1. Time-Division Duplex

Time-Division Duplex (TDD) is that the application of time-division multiplexing to separate outward and come back signals. It emulates full duplex communication over a half-duplex communication link. Time division duplex features a sturdy advantage within the case wherever the imbalance of the transmission and downlink knowledge speed is variable. As transmission traffic will increase, a lot of data rate will dynamically be allotted to it, and because it shrinks it will be detached. Another advantage is that the transmission and downlink radio.

2. 60 GHZ

Here we are going to use metric linear unit wave antenna which can operate at 60 GHz frequency that is unlined band. Due to this band we have a tendency to square measure achieving high knowledge rates energy propagation. In the 60 GHz band has distinctive characteristics that modify several different edges like wonderful immunity to co-channel interference, high security, and frequency re-use. Point-to-point wireless systems in operation at 60 GHz are used for several years for satellite-to-satellite communications. This is often due to high oxygen absorption at 60 GHz (10-15 dB/Km). This absorption attenuates 60 GHz signals over distance, in order that signals cannot travel way on the far side their meant recipient. For this reason, 60GHz is a superb selection for covert communications.

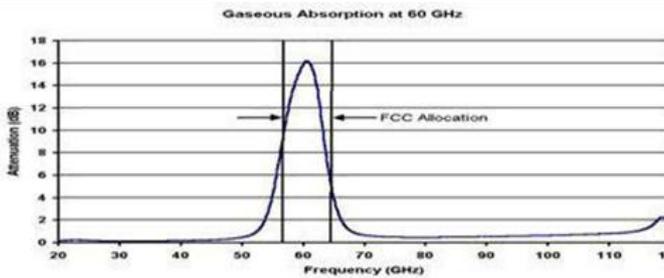


Fig 6: Oxygen Attenuation vs. Frequency

Most important aspect is Point-to-point wireless systems in operation at 60 GHz are used for several years by the IC for prime security communications and by the military for satellite-to-satellite communications. Their interest during this band stems from a development of nature: the O₂ molecule (O₂) absorbs magnetic force energy at sixty GHz sort of a piece of food in a very kitchen appliance (see Fig half-dozen). This absorption happens to a far higher degree at sixty GHz than at lower frequencies generally used for wireless communications. This absorption weakens (attenuates) sixty GHz signals over distance, in order that signals cannot travel way on the far side their meant recipient.

The main invention of Gi-Fi is to produce higher bit rate. Because the name itself indicates knowledge transfer rate is in Giga bits per second. Speed of Gi-Fi is 5 Gbps, which is ten times the current knowledge transfer. Because to this high speed knowledge transfer, we are able to swap giant video, audio, knowledge files inside seconds. Attributable to wider accessibility of continuous seven gigacycle spectrum ends up in high knowledge rates.

3.Low Power Consumption

As the great amount of data transfer it utilizes mili-watts of power solely. It consumes solely 2mwatt power for knowledge transfer of gigabits of data, wherever as in gift technologies it takes 10mwatt power, that is incredibly high.

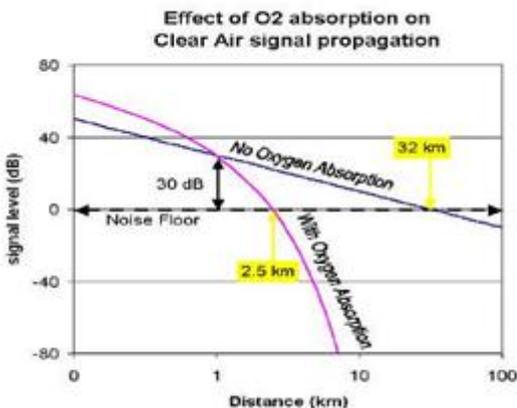


Fig 7: Radiation Limiting by O₂ Absorption

4. High Security

As the IEEE 802.15.3C provides a lot of security, it provides link level and repair level security, wherever these options are elective. Point-to-point wireless systems operative at 60 GHz are used for several years by the intelligence for top

security communications and by the military for satellite-to-satellite communications. The combined effects of O₂ absorption and slim beam unfold lead to high security and low interference.

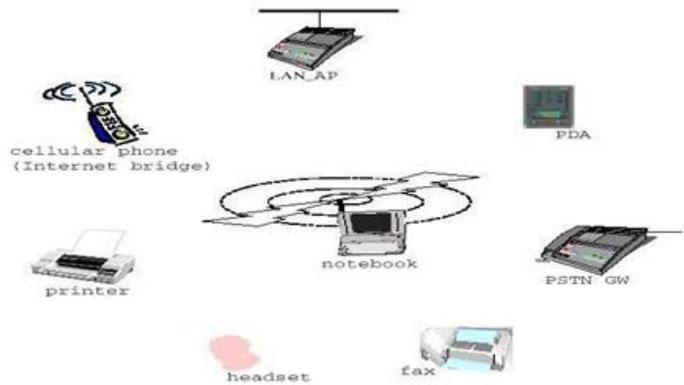


Fig 9: Gi-Fi Access Devices

The fig nine shows a number of the various forms of Gi-Fi access devices. This diagram shows that access devices embody network termination units, internal radio modules, network interface cards, printers, PC's, all house hold electronic appliances on communication devices.

V. APPLICATION

There square measure several usage eventualities which will be addressed by Gi-Fi. The subsequent square measure some quality usage applications of Gi-Fi.

I. House Hold Appliances

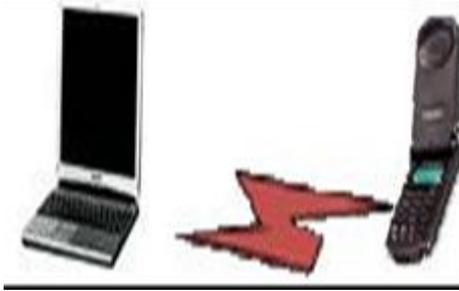


Consumers may usually transfer a high definition motion-picture show from a closet in a very matter of seconds to music player or good phone and having got home may play it on a house system or store it on a home server for future viewing, once more at intervals a couple of seconds, high speed net access, streaming content transfer (video on demand, HDTV, house, etc.), real time streaming and wireless knowledge bus for cable replacement. It makes the wireless home and workplace of the longer term.

II. Workplace Appliances

As it transfers knowledge at high speeds that created work terribly straightforward, it additionally provides top quality of knowledge from net.

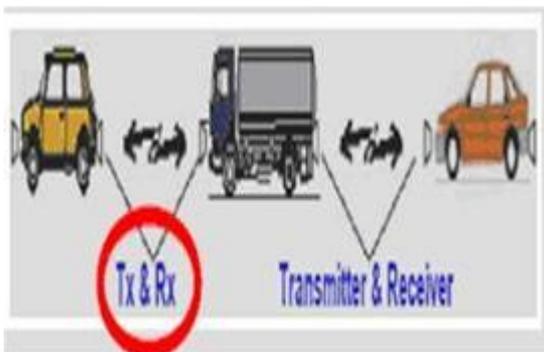
III. Video info transfer



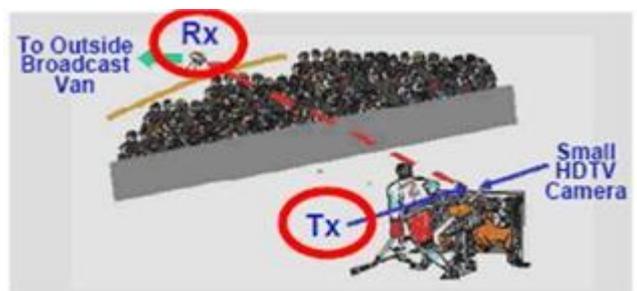
By victimization gift technologies video swapping takes hours of your time, whereas by this we are able to transfer at a speed of Gbps.

Data transfer rate is same for transfer of data from a laptop to a cell or a cell to a laptop. It will alter wireless monitors, the economical transfer of information from digital camcorders, wireless printing of digital footage from a camera while not the necessity for associate intervening laptop computer and therefore the transfer of files among telephone handsets and different hand-held devices like personal digital audio and video players.

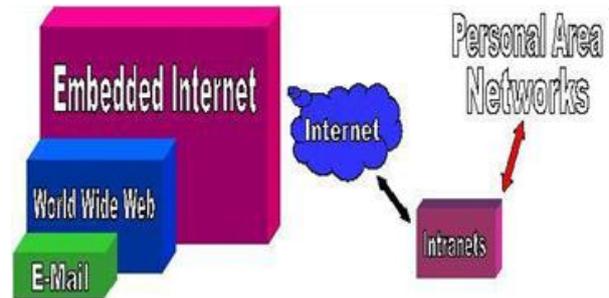
IV. Inter-Vehicle Communication System



V. BROADCASTING VIDEO SIGNAL GEAR IN BOWL



VI. Media access management (MAC) and imaging et al.



VII. Future sweetening

As the vary is proscribed to shorter distances solely we are able to expect the broad band with same speed and low power consumption.

A. Technology issues

The Gi-Fi integrated transceiver chip is could also be launched by beginning of next year by NICTA, Australia are going to be initial. owing to less value of chip numerous corporations square measure forward to launch with lower value. The potential of mw-WPAN for ultra-fast knowledge exchange has prompted corporations like Intel, LG, Matsushita (Panasonic), NEC, Samsung, SiBEAM, Sony and Toshiba to create Wireless HD, associate industry-led effort to outline a specification for future generation client physical science product. Specifically, Wireless HD incorporates a declared goal of sanctioning wireless property for streaming high-definition content between supply devices and high-definition displays.

VI. CONCLUSION

Within 5 years, we have a tendency to expect Gi-Fi to be the dominant technology for wireless networking. By that point it'll be absolutely mobile, yet as providing affordable, high broadband access, with terribly high speed giant files swapped at intervals seconds which is able to develop wireless home and workplace of future.

Two vital characteristics of CMOS devices that's utilized in this technology is square measure high noise immunity and low static power consumption. an equivalent Gi-Fi system is presently wont to print Si chips. The GiFi Chip developed by the Australian researchers. Gi-Fi permits a full-length high definition moving picture to be transferred between 2 devices in seconds.



If the success of Wi-Fi and therefore the close at hand wide usage of WiMax is any indication, Gi-Fi doubtless will bring wireless broadband to the enterprise in a completely new manner.

VII. ACKNOWLEDGMENT

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VIII. REFERENCES

- [1] J. N. Tsitsiklis, "Decentralized detection," in *Advances in Signal process*, H.V.Poor and J. B. Thomas, Eds. JAI Press, 1993, vol. 2, pp. 297–344.
- [2] R. R. Tenney and J. Sandell, N. R., "Detection with distributed sensors," *IEEE Transactions on region and Electronic S ystems*, vol. 17, pp. 501–510, Aug 1981.
- [3] J.-F. Chamberland and V. Veeravalli, "Asymptotic results for decentralised detection in power strained wireless sensing element networks," *IEEE Journal on designated Areas in Communications*, vol. 22, no. 6, pp. 1007 – 1015, 2004.
- [4] S. Jayaweera, "Large sensing element system performance of decentralised detection in creaking, bandlimited channels," in *Proc. Vehicular Technology Conference*, 2005, vol. 2, May 2005, pp. 1096– 1100.
- [5] T. Quek, M. Win, and M. Chiani, "Distributed diversity in ultrawide information measure wireless sensing element networks," in *Proc. Vehicular Technology Conference*, 2005, vol. 2, May 2005, pp. 1355– 1359.
- [6] S. Wei, "Spreading sequence-based non-coherent sensing element fusion and its ensuing giant deviation exponents," in *Proc. Acoustics, Speech and Signal process*, 2007, vol. 3, 2007, pp. III–177–III–180.
- [7] M. Gastpar and M. Vetterli, "Source-channel communication in sensing element networks,"