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Wi-Fi Technology

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Abstract: ***Technology is making rapid progress and is making many things easier. As the innovative thinking of persons is increasing day-by-day, new methods for wireless networking has been evolved of which our Wi-Fi, (Wireless Fidelity) is a trademark that belongs to the Wi-Fi Alliance. It is name commonly used for the standard of wireless (radio) connection that integrates several protocols and is based on a family of IEEE 802.11 standards (Institute of Electrical and Electronic Engineers is an international organization dedicated to the development of standards in electronic technology). The most famous and the most common today is IEEE 802.11g protocol, which determines the operation of wireless networks. Install Wireless LAN was recommended where the deployment of cable system was Wi-Fi, an acronym for Wireless-Fidelity which is the wireless way to handle networking. The main aim of this paper is wireless networking achieved by Wi-Fi. This paper introduces Wi-Fi technology and states the history of this technology in brief. We then deal with the different ways of wireless networking, connecting wi-fi and with wi-fi security. This paper concludes with the pros and cons of this technology and it's future.***
Keywords: LAN, Wi-Fi technology.

I. INTRODUCTION

Impossible or economically impractical. Today, many organizations use Wi-Fi, since under certain conditions, the speed of networks now exceeds 100 Mbit / s. Users can still be connected to a Wi-Fi network, while moving between wireless access points (WAP). Mobile devices (PDAs, smart phones, PSP, laptops), equipped with Wi-Fi client transceiver devices, can be connected to the local network and access the Internet through a WAP or hotspot. Small bandwidth, no roaming and authentication capabilities do not allow Wi- Fi devices to press on the mobile market. However, such company as ZyXEL, SocketIP, and iSymbol Technologies offers solutions for Wi-Fi telephony.The history of Wi-Fi starts from mid-1990s. The technology of information transmission by radio has been developed and applied mainly in local networks of large corporations and firms in Silicon Valley, USA. Contact with a mobile subscriber (usually it was a company employee with a laptop equipped with a wireless network adapter) was organized through WAPs that were connected to a wired infrastructure. Thus, in the reach radius of each such point (a few tens of meters) could be up to 20 subscribers using the network resources simultaneously. Originally, the term «Wi-Fi» only used to refer to technology, which provides communication in the 2.4 GHz and runs on the IEEE 802.11b standard (baud rate– up to 11 Mbit / s). Currently, however, the term is increasingly used for other wireless LAN technologies. The most significant among them are the IEEE 802.11a and 802.11g (speed is up to 54 Mbit / s, frequency ranges, respectively, 5 GHz and 2.4 GHz).

Students, preparing their research proposal on the Wi-Fi, should use free example research topics on wifi security, which allow them to understand that 802.11b standard was developed in the late 90s and finally approved in early 1999. In 2000, there began to appear the first devices to transfer data based on it. Wi-Fi devices were intended for corporate users to replace traditional cable networks. For wired networks need careful design of network topology and manually laying many hundreds of meters of cable, sometimes in unexpected places. To organize the same wireless network, you only need to install one or more office base stations (central transceiver with an antenna connected to the external network or server) and insert a network adapter with antenna into every computer. Then computers can be moved arbitrarily, and even moving to a new office becomes possible keeping once created network.

Wi-Fi provides services in private homes, businesses, as well as in public spaces. Wi- Fi hotspots may be set up either free-of-charge or commercially, often using a captive portal webpage for access. Organizations, enthusiasts, authorities and businesses, such as airports, hotels, and restaurants, often provide free or paid-use hotspots to attract customers, to provide services to promote business in selected areas. Routers often incorporate a digital subscriber line modem or a cable modem and a Wi-Fi access point, are frequently set up in homes and other buildings, to provide Internet access and internetworking for the structure. Similarly, battery-powered routers may include a cellular Internet radio modem and a Wi-Fi access point. When subscribed to a cellular data carrier, they allow nearby Wi- Fi stations to access the Internet over 2G, 3G, or 4G networks using the tethering technique An Extended Service Set may be formed by deploying multiple access points that are configured with the same SSID and security settings.

Wi-Fi client devices typically connect to the access point that can provide the strongest signal within that service set.[83] Increasing the number of Wi-Fi access points for a network provides redundancy, better range, support for fast roaming, and increased overall network-capacity by using more channels or by defining smaller cells. Except for the smallest implementations (such as home or small office networks), Wi-Fi implementations have moved toward "thin" access points, with more of the network intelligence housed in a centralized network appliance, relegating individual access points to the role of "dumb" transceivers. Outdoor applications may use mesh topologies..

II. WIRELESS NETWORK: WI-FI WALKIE- TALKIE NETWORK

To understand the wireless technology let us consider a pair of Walkie- Talkies.These are small radios that can transmit and receive radio signals. When we talk into a Walkie-Talkie, our voice is picked up by a microphone, encoded onto a radio frequency and transmitted with the antenna. Another Walkie-Talkie can receive the transmission with its antenna, decode our voice from the radio signal and drive a speaker. Simple Walkie-Talkies like this transmit at a signal strength of about 0.25 watts, and they can transmit about 500 to 1,000 feet. If we want to connect two computers together in a network using Walkie-Talkie technology:

1) Equip each computer with a Walkie-Talkie.
2) Give each computer a way to set whether it wants to transmit or receive.
3) Give the computer a way to turn its binary 1s and 0s into two different beeps that the walkie-talkie could transmit and receive and convert back and forth between beeps and 1s/0s.

This would actually work. The only problem would be that the data rate would be very slow. Walkie-talkie is designed to handle the human voice. So it is not being able to send very much data in this way(may be 1,000 bits per second).on any of three bands, or they can split the available radio bandwidth into dozens of channels Any products tested and rapidly between approved as "WiFi Certified" by the WiFi Alliance are certified as interoperable with each other, even if they are from different manufacturers. A user with a "Wi-Fi Certified" product can use any brand of access point with any other brand of client hardware that also is certified. Typically, however, any Wi-Fi product using the same radio frequency (for example, 2.4GHz for 802.11b or 11g, 5GHz for 802.11a) will work with any other, even if not "Wi-Fi Certified."

III. WI-FI RADIO TECHNOLOGY

The radios used in Wi-Fi are not so different from the radios used in walkie- talkies. There are three big differences between Wi-Fi radios and Walkie-talkies.

1) WiFi radios that work with the 802.11b and 802.11g standards transmit at 2.4 GHz, while those that comply with the 802.11a standard transmit at 5 GHz. Normal walkie- talkies normally operate at 49 MHz. The higher frequency allows higher data rates.
2) WiFi radios use much more efficient coding techniques that also contribute to the much higher data rates. For 802.11a and 802.11g, the technique is known as orthogonal frequency-division multiplexing (OFDM). For 802.11b, it is called Complementary Code Keying (CCK).
3) The radios used for WiFi have the ability to change frequencies. 802.11b cards can transmit directly them. The advantage of frequency hopping is that it is much more immune to interference and can allow dozens of WiFi cards to talk simultaneously without interfering with each other.

IV. CONCLUSIONS

As Wi-Fi is now shipped in millions of products and deployed in millions of homes, business and hotspots worldwide, the technology has moved beyond the realm of a computer feature. Wi-Fi has fast become a cultural phenomenon.

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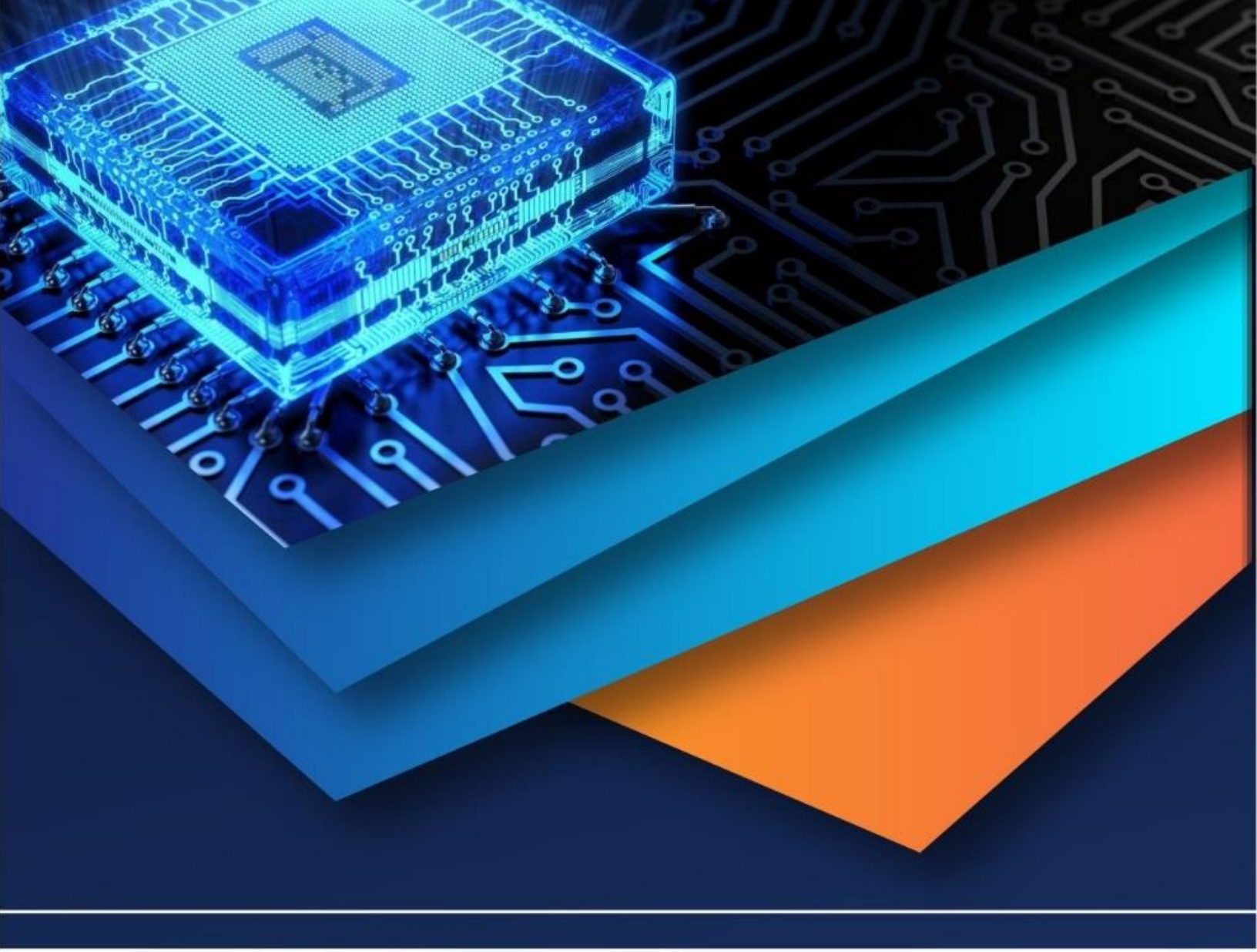

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