



INTRODUCTION TO WI FI TECHNOLOGIES

Nuraliyev Ulugbek Sheraliyevich

Karshi Engineering Economics Institute

3rd year student of finance

<https://doi.org/10.5281/zenodo.6480979>

ARTICLE INFO

Received: 15th April 2022

Accepted: 20th April 2022

Online: 23th April 2022

KEY WORDS

Wi-Fi, Wi-MAX, Wi-Brova

ABSTRACT

At present, with the rapid development of information technologies, communication and information exchange are developing at a very rapid pace.

Introduction

At present, with the rapid development of information technologies, communication and information exchange are developing at a very rapid pace.

The role of communication is also invaluable in improving the convenience of communication. Because the quality of communication depends on the means of communication. Initially, connections were made only through wire connectors. These wires are connected to each other through user contact centers, thus establishing communication between cities and countries. Today, such wires are used in modern vision products. An example of this is fiber optic wires. It has a number of advantages. But even such fiber-optic connections do not meet modern requirements. Because there are some inconveniences associated with this wire connection. For example, there are inconveniences in transporting the wires to some communication centers, as well as in

the placement of wires. In order to avoid such inconveniences and financial losses, a new modern wireless connection has been developed. For example, it is primarily a wireless communication system, which is one of the most convenient and mobile communications. Wireless connectivity includes a number of communication technologies such as Wi-Fi, Wi-MAX, Wi-Brova.

WIRELESS LOCAL NETWORK TECHNOLOGIES: THE PAST AND KELAJAK

The history of wireless data transmission technology began in the late 19th century with the first radio signal transmission, and the emergence of amplitude-modulated radio receivers in the 1920s had a major impact on the development of these technologies. The first wireless radiotelephones were created in the 1970s to transmit sound over radio waves. While the originals worked on analog networks, the GSM standard was developed in the



early 1980s, which meant that the transition to digital standards began, providing better spectrum distribution, better signal quality, and better security.

Strengthening the state of wireless networks in the 1990s

Today, wireless technologies are firmly entrenched in our daily lives, providing high-speed, new devices and services. New CDMA (Code Division Multiple Access), GSM (Global Systems for Mobile Communications (TDMA), 802.11, WAP (Wireless Application Protocol), 3G and 4G (third and fourth generation technologies), GPRS (General Packet Radio Service), Bluetooth (medium and short distance network), EDGE (Enhanced Data Rates for GSM Evolution, advanced GSM network) and the diversity of these cable technologies mean that a radical change is beginning in this area.

The development of wireless local area networks (WLAN) and medium and short distance networks (Bluetooth) is very promising. Wireless LANs are widely used in airports, universities and institutes, hotels, restaurants, businesses and organizations. The development of wireless networking standards began in 1990 with the establishment of the 802.11 Committee by the global IEEE (Institute of Electrical and Electronics Engineers). The idea of a World Wide Web and the use of wireless devices in this network will be an important impetus for the development of wireless technology. By the end of the 90s, users were provided with WAP-service. It should be noted that in the beginning, this service did not attract much interest. The WAP service provided a set of basic information services - news, weather, daily and other services.

Bluetooth and WLAN were also used sparingly due to the high cost of these means of communication. However, falling prices have led to an increase in demand and interest in these tools. By the middle of the first decade of the 21st century, the number of wireless Internet users reached several tens of millions. With the advent of wireless Internet access, security issues have come to the forefront.

Among the main problems that arise when using wireless networks are: interception of remittances from special services, commercial organizations and private entrepreneurs, retention of credit card numbers, delay in payment for the connection. disruption of communication centers. These problems are being addressed by improving communication standards. An important aspect of the development of wireless technologies is that these technologies can be conveniently used by home users. As the number of home network devices increases, many of the wires that connect these devices to each other are becoming a major problem in this network. This, in turn, is leading to the transition to wireless technology. While the number of individual users of wireless technology is significant, the fastest growing segment is its corporate users. Wireless data transmission is an important strategic tool to increase productivity in the enterprise (employees have constant and fast access to corporate information, they are quickly aware of the news), improves the quality of customer service (at the same time their accept complaints and wishes and feel at the same time), create an advantage over competitors (increase the speed of information exchange and decision-

making). In short, we can say that wireless technology is the technology of the future.

Wi-Fi technology

Wi-Fi technology is one of the most promising computer networks in the computer world today. Wi-Fi (Wireless Fidelity) is an English word meaning "wireless connection". Wi-Fi technology is a type of digital data transmission via radio channels. The technology was originally designed for corporate users and was predicted to replace the cable network. We know that to create a computer network with a wired network, you need to manually set up several thousand cable networks and install a special network topology.

At reduced control frequencies of Wi-Fi radio frequencies standardized wireless data exchange technology. A WLAN (Wireless Local Area Network) is usually created over a Wi-Fi network. In this network you can see the

communication and exchange of information via high-frequency radio waves. This system is used to expand a cable network or, alternatively, in a single office, an entire building or a single area. While Wi-Fi technology saves you money on a costly process such as unloading thousands of cable networks, the simplicity of installation saves time on complex technical installation processes, making this network superior to other networks. Because wireless networks use radio frequencies, radio waves can also pass through walls or similar barriers in a building or office in general, and nothing can interfere with it at all (except remotely, of course!). Wireless networks are more reliable than wired networks on their own. Most WLANs have a range or coverage area of 160 meters, which of course depends on the size of the barriers in its path. The speed of this network can be equal to the cable network and several times higher. It depends on which standard you use.



Figure 1. Wi-Fi communication network

Data on a WLAN network, just like a normal network bandwidth depends on its topology, load, load point distance, and similar parameters. One of the advantages of this network is that it is easy to set up, and the

second is that there are no problems with the expansion of the Wi-Fi network, or in other words, this network is the simplest network that is easy to expand. need To expand this WLAN, from a practical point

of view, it is enough to create new access points.

A user who buys a Wi-Fi device or connector can easily consider the following options:

1. Optional with multifunctional multiservice wireless connection a special device that works with devices
2. Ability to exchange data over long distances at high speeds you will have

3. There is almost no need to do anything to expand the network: it is enough for a new user to know the network connection password to connect to the network.

4. This user will be using the latest advances in Internet technology and telecommunications.

The following image shows devices connected to a Wi-Fi network.

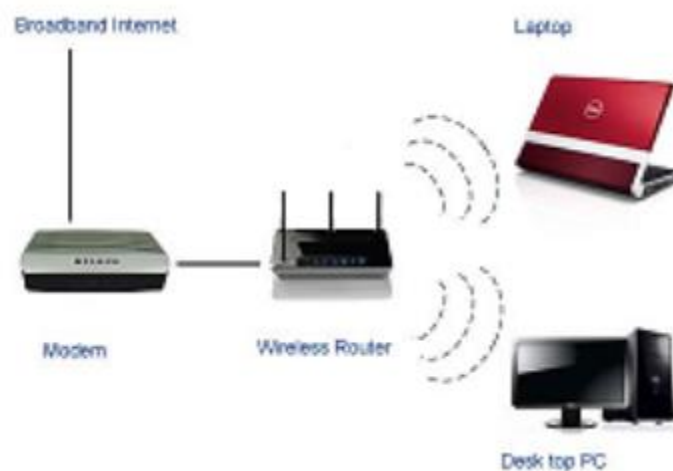


Figure 2. Wi-Fi network devices

The next generation of Wi-Fi wireless network is called Li-Fi.

Scientists have recently begun work on a completely new technology for data transmission. It is a wireless interface that allows you to easily and quickly transfer data without breaking the rhythm of radiation using simple lighting devices. This is done using technology that can quickly and accurately change the intensity of light-emitting diodes, which have very little effect on the human eye. This analogue of Wi-Fi technology is called Li-Fi (from the English word light).

The idea of using light to transmit data has not been around for a long time, as it was a century ago. The first person to make a wireless phone call was Alexander Bell,

who died in 1880. Bell did this with his invention called the Photophone.

The scientific and commercial interest in using light to transmit data has intensified, especially in recent years. Admittedly, today Wi-Fi technology has become so popular that it can now be used even on airplanes, buses, refrigerators and freezers, in general, in almost all types of electronics. However, the operation of access points and wireless devices connected to it for data transmission through this technology may interfere with each other. This reduces the bandwidth of the wireless network, resulting in the need for people to develop alternative data transfer options. Garald Haas, a professor at the University of Edinburgh, unveiled the first Li-Fi emblem. In his experiment, the data transfer rate



reached 10 Mbit / s. However, Professor Haas plans to increase the speed of the interface to 100 Mbit / s. In addition, the use of radio waves on oil platforms, underwater, and aircraft with navigation devices often has a negative impact on performance.

WI-MAX TECHNOLOGY: GLOBAL NETWORK

EVOLUTION OF EXIT

The development of network technology in recent years is personnel increased the ability of computers to connect to a single network, as well as access to the World Wide Web. Today, almost all types of computers have the ability to connect to the network or access the Internet. Let's take a look at some of the ways to connect to the network that are currently available to almost all users.

1. Dial-Up. Switched connection via telephone line. This technology has been used since its inception due to the simplicity of the connection. The two modems communicate with each other using a telephone line. Normally, the connection is one-to-one and uses all available audio band frequencies to transmit data. But there are many disadvantages to this technology. For example, low data rates, the possibility of losing some of the packets sent due to external influences, the possibility of disconnection, and the fact that the telephone line is completely busy during the connection.

2. Broadband data transmission technology xDSL. This technology is very suitable for stationary facilities. It is possible to get high speed with this technology using an existing telephone network, but what if

there are no lines? It is clear that transporting the new line to the user's address will be very expensive. In addition, in order to install this technology on each new user, certain installations and fixes must be made on both the user and the transmission line side.

3. Ethernet technology. It is the most common type of local area network technology, capable of connecting at speeds of up to 10 Mbit / s, 100 Mbit / s (Fast Ethernet), 1 Gbit / s and even 10 Gbit / s. The advantage of Ethernet is the ease with which the network structure can be selected. But the disadvantage of this technology is that it can only work at a certain distance. If we take a vita para cable, then the network distance will not exceed 100 meters. To extend it, you need to install a device every 100 meters or use fiber optics. But it can be very difficult and expensive to bring neighboring buildings together in one network.

4. Data transmission via Wi-Fi technology. This technology works on Wi-Fi (802.11a / b / g / n standard) and allows you to easily connect to a stable network at a high speed at a distance of 45 meters inside the building, 100 meters in the open. But in order to provide quality speed in a large area, you will need to install a lot of Wi-Fi hotspots. This will increase the cost of technology. Another problem is that when a subscriber moves from one point to another, there are interruptions in data exchange and connection. While the network technologies discussed above may reflect the high levels of bandwidth, reliability, and mobility that are being set today, they do not fit today's operators in terms of price. The IEEE 802.16 Wi-MAX (Worldwide Interoperability for



Microwave Access) technology, a new generation of wireless technology, can solve this problem.

In order to expand and develop Wi-MAX technology, the Wi-MAX forum was opened in 1999 and the following requirements were set for Wi-MAX technology:

1. Districts, including remote areas, have access to communication and information services based on Wi-MAX technology, 1.5 million people in developing countries, including 100 people who are not connected to ATS and large to create access to communication and information services for the population who do not have the conditions for information exchange through wired communication with cities.

2. Half of the world's population through Wi-MAX technology access to communication and information services. One of the main goals of Wi-MAX technology was to create conditions for reliable, high-quality communication and information services in large areas through universal wireless communication. With this, Wi-MAX technology has the following differences:

1. Solve the cost-effectiveness of service providers in wired and satellite communication systems, thereby not only reaching potential subscribers, but also increasing the number of single, (stationary) subscribers, as well as providing them with quality access to communication and information services put

2. Flexibility of wireless communication systems with other wired technologies.

This allows you to expand the scope of your wireless connection.

3. The simple architecture of the installation reduces the cost to it.

4. Communication coverage in radio communication systems

Wi-MAX technology options:

Wi-MAX technology allows you to work in any environment, including dense urban buildings, providing high quality communication and high data transfer speeds. Wi-MAX technology can be used to create "endpoint" broadband connections by setting up wireless access points, networking between company departments, and solving other issues that were previously not possible due to traditional technologies. Wi-MAX technology is high allows you to connect to the Internet at speeds, cover wider areas than Wi-Fi networks, and provide reliability.

Wi-MAX technology is a broadband wireless network that is established throughout the city, and the distance from the receiver to the base station is measured in kilometers. Wi-MAX provides recorded, mobile and mobile connection scenarios. Communication distance - 60 km, connection speed - up to 60 Mbit / s. Principles of Wi-MAX technology: The Wi-MAX system consists of two main parts.

1. Wi-MAX base station (on high-rise buildings or on a special surface can be installed).

2. Wi-MAX receiver (receiver antenna, PC card or external cards based on form factor). A very high frequency band (UHF) is used to connect the base station and the

receiving subscriber antenna. 2-11 GHz. If this connection is ideal, then the data transfer rate will be up to 20 Mbit / s. This connection does not require a direct view between the subscriber and the server. Keep in mind that Wi-MAX technology can be used not only to connect the "endpoint" ("last mile"), but also to connect regional networks (offices and districts).

Permanent communication with neighboring base stations is carried out in

the mode of direct radio communication with OCH (ultra-high frequency 10-66 GHz). Such connections allow data exchange at speeds of up to 120 Mbps. Of course, the downside of Wi-MAX is that the base stations exchange information with each other only through direct viewing. However, the base stations located in high-rise buildings could not be prevented from connecting to each other.

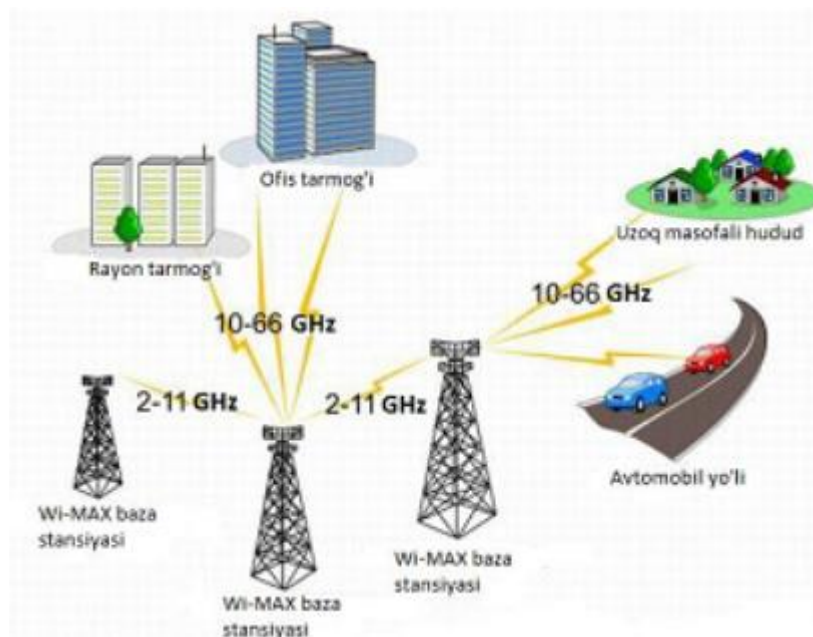


Figure 3. Wi-MAX inter-station communication network

Wi-MAX operating modes:

Fixed Wi-MAX - Fixed access.

Nomadic Wi-MAX - session access.

Portable Wi-MAX - access in reset mode.

Mobile Wi-MAX - mobile access.

Fixed Wi-MAX. Fixed communication frequency range 10-66 GHz uses. Due to the strong attenuation of this frequency range, the transmitter and receiver require a signal transmission by looking directly at each other. On the other hand, this frequency range prevents the multi-signal transmission of the signal, which is the main problem in radio

communication, and leads to an increase in signal transmission speed up to 120 Mbit / s.

Nomadic Wi-MAX. With a session connection, the user can easily move from place to place, and connect from the point of disconnection and continue to use.

Portable Wi-MAX. In Portable mode, the user can connect automatically without interrupting the connection between base stations. However, in this mode, the user's movement speed should not exceed 40 km / h. True, this mode can be used in the city, but using it in cars is a bit of a problem.



Mobile Wi-MAX. Developed to the standard 802.16e-2005, it can provide quality communication when the user's mobile speed is up to a maximum of 120 km / h. The achievements of the mobile mode can be listed below.

- Reliable protection against multi-beam radiation.
- High throughput.
- Equipped with TDD (Time Division Duplex) technology, it uses technology to process asymmetric traffic and normalize channels where antennas are difficult to operate.
- Equipped with H-ARQ (Hybrid-Automatic Repeat Request) technology, which ensures the reliability of the subscriber without losing communication during the transition from one server to another.
- Equipped with HHO (Network-Optimized Hard Handoff) technology, which provides reliable and integrated communication between the subscriber and the server within 50 ms, and is equipped with other technologies.

In short, this regime has a reliable and robust clear connection. Nowadays, the simplicity of construction technology of

wireless communication and ease of inter-system data exchange, uniformity of communication transmission in any weather conditions and increase of efficiency through wired communication technologies (connected) increase. The creation of additional services via Wi-MAX technology (ease of Internet connection and high-speed data exchange) and their reliable use show the priority of the technology.

CONCLUSION

In conclusion, it should be noted that the development of wireless communication technology can lead to cost-effective use of expensive wired and satellite communication systems. By using such technologies, the user can effectively use communication and other communication services, both mobile and stationary, in any geographical environment, and save time and money. The study of the edges, finding measures to apply them, optimizing the parameters and designing new-look network topologies is a topical and important task.

References:

1. Kasimov SS "Information Technology" for technical universities methodical manual. Tashkent .: "Aloqachi" 2006
2. Internet information.
3. Sites www.forum.uz, www.evo.uz, google.co.uz, www.tuit.uz.