



Wireless Networks in Day Today Life

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ABSTRACT:

Wireless networking has very important features as it offers firm and user's flexibility, and portability with in the budget. It allows the users to get access to the network without the physical wired tied between them. It uses high frequency radio waves to communicate between devices. Technology is no longer judged by its technical brilliance, but by the return on investment. Wireless Networks fit into this because the technology has been around long enough and can provide enough benefits to be seriously considered for deployment. Mobility is another feature by wireless. This leads to other provision of wireless, that of scalability. It really helps in extending your network. It also becomes important if an enterprise has a rented office and needs to shift to a new place. Wi-Fi, or wireless fidelity, is freedom: it allows you to connect to the internet from your couch at home, a bed in a hotel room, or a conference room at work without wires. It is a wireless technology like cell phones, Wi-Fi enabled computers send and receive data indoors and outdoors; anywhere within the range of the base station. And the best thing of all, Wi-Fi is fast. In fact, it's several times faster than the fastest cable modem connection. Wireless networks have seen unprecedented rise in their size and number of users in recent years. This unprecedented rise is attributed to the rise in the number of mobile computing devices. More over the amount of data that is handled by these wireless networks has increased in recent years. This increase in the flow of data over these wireless networks is due to increase in popularity of cloud computing, which is built on the concept of Software as a Service, where in all the data processing happens on the cloud.

KEYWORDS: Wireless network , wi-fi , technology

1.Introduction:

A whole new industry has been developed by wireless networking for voice telephony. adding mobile access to the telephony mix had profound influences on the voice calls market because callers could be connected to individuals, not computers. we are at the height of an equally profound shift in networking for computers. Wireless telephony has been popular because it allows people to communicate with each other regardless of venue. for internet access, modern technology aimed at computer networks promise to do the same. thus far, 802.11 has become the most popular wireless data networking technology. Wireless connectivity for voice telephony has created a whole new industry. Wireless networking is a method by which homes, telecommunications networks and business installations avoid the costly process of introducing cables into a building, or as a connection between various equipment locations.[1] Adding mobile connectivity into the mix for telephony has had profound influences on the business of delivering voice calls because callers could be connected to people, not devices. We are on the cusp of an equally profound change in computer networking. Wireless telephony has been successful because it enables people to connect with each other regardless of location. New technologies targeted at computer networks promise to do the same for Internet connectivity.



2. History of wireless networks:

The history of WiFi is long and interesting. In 1971, ALOHA net connected the Hawaiian Islands with a UHF wireless packet network. ALOHA net and the ALOHA protocol were early forerunners to Ethernet, and later the IEEE 802.11 protocols, respectively. Vic Hayes is often regarded as the “father of Wi-Fi.” He started such work in 1974 when he joined NCR Corp., now part of semiconductor components maker Agere Systems. A 1985 ruling by the U.S. Federal Communications Commission released the ISM band for unlicensed use – these are frequencies in the 2.4GHz band. These frequency bands are the same ones used by equipment such as microwave ovens and are subject to interference. In 1991, NCR Corporation with AT&T Corporation invented the precursor to 802.11, intended for use in cashier systems. The first wireless products were under the name Wave LAN. They are the ones credited with inventing Wi-Fi. The Australian radio-astronomer John O’Sullivan with his colleagues Terence Percival, Graham Daniels, Dietostry, John Deane developed a key patent used in Wi-Fi as a by-product of a Commonwealth Scientific and Industrial Research Organisation (CSIRO) research project, “a failed experiment to detect exploding mini black holes the size of an atomic particle”. In 1992 and 1996, CSIRO obtained patents for a method later used in Wi-Fi to “unsmear” the signal. The first version of the 802.11 protocol was released in 1997, and provided up to 2 Mbit/s link speeds. This was updated in 1999 with 802.11b to permit 11 Mbit/s link speeds, and this proved to be popular. Most of the essential elements of wireless networks are built from MOSFETs, including the mobile transceivers, base station modules, routers, RF power amplifiers.[2]

3. WIRELESS NETWORKS AND ITS TYPES:

Computer networks that are not linked or connected by any cable are known as wireless networks. Wireless networks comprise a wireless connection among different parts like the receiver and transmitter of a wireless system. The wireless network does not involve the use of optical cables, twisted pair cables, or any wires. For carrying information, electromagnetic waves are used. The waves carry information using various modulation techniques. The information is carried between the transmitter and the receiver. For transmission of electromagnetic waves to the air or receiving electromagnetic waves from the air, antennas are used. Here are four main types of wireless networks.

***Wireless Personal Area Networks (WPAN)** are short-range networks that connect devices within a relatively small area. A WPAN generally connects devices within a person's reach, though the range can extend up to about 30 feet. Using Bluetooth technology, a WPAN can interconnect compatible devices near a central location, such as interconnecting a headset to a laptop on your desk.

***Wireless Local Area Networks (WLAN)** are wireless networks that use radio waves, not Bluetooth technology like WPANs. There is usually at least one cable that is the access point for internet access, such as a wired internet connection going into a router, which then broadcasts the wireless signal to other devices. WLANs are used for connecting to local resources and to the internet. The range can be confined to a single room or home or spread across an entire building or campus with the use of spread-spectrum or OFDM technologies.

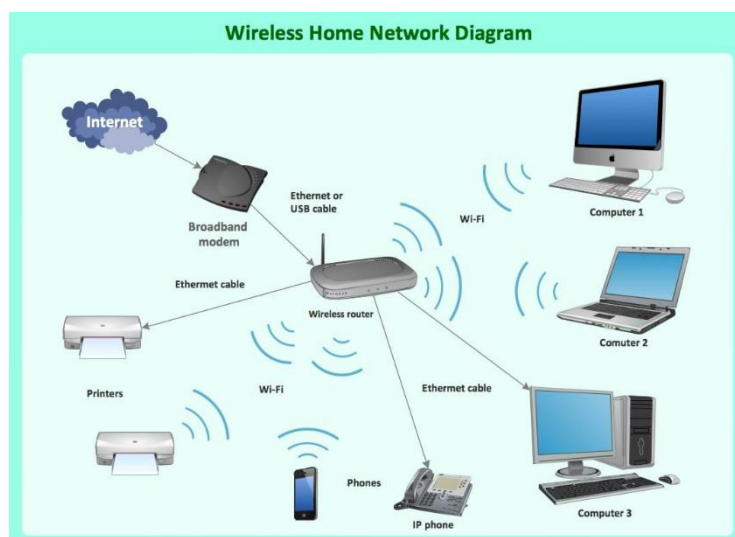
***Wireless Wide Area Networks (WWAN)** can be maintained over large areas, such as cities or countries, via multiple satellite systems, antenna sites or mobile phone signals. With a wide coverage area, WWANs provide a way to stay connected when other forms of network access are unavailable.

***Wireless Metropolitan Area Networks (WMAN)** connect several different WLANs in a metropolitan area, such as different buildings in a city.

***A cellular network or mobile network** is a radio network distributed over land areas called cells, each served by at least one fixed-location transceiver, known as a cell site or base station. In a cellular network, each cell characteristically uses a different set of radio frequencies from all their immediate neighbouring cells to avoid any interference.

***A global area network (GAN)** is a network used for supporting mobile across an arbitrary number of wireless LANs, satellite coverage areas, etc. The key challenge in mobile communications is handing off user communications from one local coverage area to the next. In IEEE Project 802, this involves a succession of terrestrial wireless LANs.[3]

***Space networks** are networks used for communication between spacecraft, usually in the vicinity of the Earth. The example of this is NASA's Space Network.



4. Wireless Links:

*Terrestrial microwave – Terrestrial microwave communication uses Earth-based transmitters and receivers resembling satellite dishes. Terrestrial microwaves are in the low gigahertz range, which limits all communications to line-of-sight. Relay stations are spaced approximately 48 km (30 mi) apart.

*Communications satellites – Satellites communicate via microwave radio waves, which are not deflected by the Earth's atmosphere. The satellites are stationed in space, typically in geosynchronous orbit 35,400 km (22,000 mi) above the equator. These Earth-orbiting systems are capable of receiving and relaying voice, data, and TV signals.

*Cellular and PCS systems use several radio communications technologies. The systems divide the region covered into multiple geographic areas. Each area has a low-power transmitter or radio relay antenna device to relay calls from one area to the next area.

*Radio and spread spectrum technologies – Wireless local area networks use a high-frequency radio technology similar to digital cellular and a low-frequency radio technology. Wireless LANs use spread spectrum technology to enable communication between multiple devices in a limited area. IEEE 802.11 defines a common flavour of open-standards wireless radio-wave technology known as Wi-Fi.

*Free-space optical communication uses visible or invisible light for communications. In most cases, line-of-sight propagation is used, which limits the physical positioning of communicating devices.

5. THE COMPONENT OF A WIRELESS NETWORK:

Several components make up a wireless network's topology:

Clients: What we tend to think of as the end user devices are typically called 'clients'. As the reach of Wi-Fi has expanded, a variety of devices may be using Wi-Fi to connect the network, including phones, tablets, laptops, desktops, and more. This gives users the ability to move about the area without sacrificing their bridge to the network. In some instances, mobility within an office, warehouse, or other work area is necessary. For example, if employees have to use scanners to register packages due to be shipped, a wireless network provides the flexibility they need to freely move about the warehouse. Wireless networks are simple and require as few as one single wireless access point connected directly to the Internet via a router.[4]

Access Point (AP): An access point (AP) consists of a Wi-Fi that is advertising a network name (known as a Service Set Identifier, or SSID). Users who connect to this network will typically find their traffic bridged to a local-area network (LAN) wired network (like Ethernet) for communication to the larger network or even the internet.

6. HOW DOES WI-FI WORKS ? :

A Wi-Fi based wireless network sends signals using radio waves (cellular phones and radios also transmit over radio waves, but at different frequencies and modulation).

In a typical Wi-Fi network, the AP (Access Point) will advertise the specific network that it offers connectivity to. This is called a Service Set Identifier (SSID) and it is what users see when they look at the list of available networks on their phone or laptops. The AP advertises this by way of transmissions called beacons. The beacon can be thought of as an announcement saying "Hello, I have a network here, if it's the network you're looking for, you can join".

A client device receives the beacon transmitted by the AP and converts the RF signal into digital data, then that data is passed along to the device for interpretation. If the user wants to connect to the network, it can send messages to the AP trying to join and (when security is enabled) providing the proper credentials to prove they have the right to join. These processes are known as Association & Authentication. If either of these fail, the device will not successfully join the network and will be unable to further communicate with the AP.

Assuming all goes well, we come to the part that is the end user's ultimate goal: passing data. Data from the client (or from the AP to the client) is converted from digital data into an RF modulated signal and transmitted over the air. When received, this is de-modulated, converted back to digital data, and then forwarded along to its destination (often the internet or a resource on the larger internal network). In 2016, the CSIRO wireless local area network (WLAN) Prototype Test Bed was chosen as Australia's contribution to the exhibition A History of the World in 100 Objects held in the National Museum of Australia.[5] Wi-Fi communication is only approved to transmit on specific frequencies, in most parts of the world these are the 2.4 GHz and 5 GHz frequency bands, although many countries are now adding 6GHz frequencies as well. These frequency bands are not the same that cellular networks use, so cell phones and Wi-Fi are not in competition for use of the same frequencies. However that does not mean that there are not other technologies that can operate in these bands. In the 2.4GHz band in particular there are many products, including Bluetooth, ZigBee, cordless keyboards, and A/V equipment just to name a small subset that does use the same frequencies and can cause interference. In 1999, the Wi-Fi Alliance formed as a trade association to hold the Wi-Fi trademark under which most products are sold.[6]

7.CONCLUSION:

Wireless communications globally is something that people can expect as technology advances. Wireless communications has a lot of benefits and can make the world a lot more efficient. It does have concerns though as with every other new advancement that is made in today's world. The issues with security regarding access to a person's personal information or the negative impact that it may seem to have on society are a few things that are holding back the progress that wireless technology could be making. In some offices (notably Cisco offices in New York) the employees do not have assigned desks but can work from any office connecting their laptop to Wi-Fi hotspot.[7] With more research and experiments conducted, the problems associated with wireless communications can be reduced and make it a more significant part of the world. Wireless technology will be very important in the near future where the need for wires connecting individual devices seems to be coming to an end.

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