

**A Comparative Analysis On Wired Vs. Wireless Technology For
Communication Networks In Utility Markets**

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Abstract: Next is Ethernet cable, which is used for Internet cable for type of medium. You can use to data transfer from one place to another place. Again, you can call this cable as a CAT 5 cable. These are complete look like darken telephone cables or modern cables you can use. This wire device again you can connect to a local network for sharing your files and Internet access. The wireless communication medium is another important factor for our new generation technology. It is divided into two groups i.e., long-range and short ranges. In a short range you can go for the infrared, Bluetooth, Wi-Fi. In the long-range communication, you are having various examples like radio link, Microwave link, satellite link, CDMA, GSM, GSM.

Keywords: Artificial intelligence, Internet of Things, Smart sensors, Automation,

Introduction:

The communication technology means that data transmission is the broadcast of any kind of information from one place to another place. The data transmission are generally classified into two categories. (i) Wired technology and (ii) Wireless technology. Wireless technology provides the ability to communicate between two entities over a distance without the use of cables. In the wire communications, the way of transmission in which the data is sent from one place to another place through wires such as coaxial cable, Ethernet cable, fibre optic cables, etc. The wireless communication, which absence of wire [1].

First, we will be discussed physical or wired communication medium. There are three types of wires connections i.e. Coaxial cable, Ethernet cable and fibre optic cable. The physical communication medium are used to transfer the data from one place to another place. First, we will discuss coaxial cable, which is used in TV signal from antenna TV [2]. You can set up a network in your room. You can simply

use the cable TV cable modem. So, what you are using here you are using a coaxial cable which is simply called coax. It is nothing but a thin cable which is usually a cable TV companies install in their different houses in their infrastructures. Inside the coaxial cable copper wire is there. Copper wire is surrounded by an insulating material. Which is, in turn surrounded by an outer conductor. The outside plastic isolation is there. Which is not going to give you the shock and plus it minimizes the electrical disturbance to the radio frequency interferences [3].

Next is Ethernet cable, which is used for Internet cable for type of medium. You can use to data transfer from one place to another place. Again, you can call this cable as a CAT 5 cable. These are complete look like darken telephone cables or modern cable you can use. This wire device again you can connect to a local network for sharing your files and Internet access [4].

The fibre optic cable or you can simply call a fibre is it is a just a transparent like fibre. Usually made up of glass and plastic. The transmitting of the light and these fibres consist of a plastic cladding layer. It is made up of glass is there for means it is made up of silica. We use these medium for a telecommunication and networking and they are easily movable and they are flexible also and very important you can bundle them as a cables. These are very important network of cable. These kind of cable can be used as a cable television in the world's Internet and the telephone system for longer distances. They are having a low cost, which is important for technology [5].

The wireless communication medium is another important factor for our new generation technology. It is divided into two groups i.e., long range and short ranges. In a short range you can go for the infrared, Bluetooth, Wi-Fi. In the long range communication you are having various examples like radio link, Microwave link, satellite link, CDMA, GSM, GSM [6].

Literature review:

The wireless technology was started with the invention of Marconi in the history. This technology is very important as like all the technologies dependant on wireless technology such as IoT, industries 4.0. The Infrared technology nonvisible light to communicate between two devices like our regular TV homes that we are having

television remote control. So remote control to a television or DVD player is nothing but the example of IR technology [7]. You can also use LAN without connecting them physically through wire through this. Bluetooth is a wireless technology that connecting devices everyone in today's world. So it again contains a radio frequencies which we are using for a very shorter distance like say if you want to communicate in one room or between a 10 metres generally 33 feet only. Your device can communicate with a closer devices to transmit data and your text, images. This Bluetooth technology is now embedded comes along with the cell phone headset. Your earpiece says your cameras so you can communicate with them. The Bluetooth technology is overcoming the limitations due to the infrared technology by using the radio waves. The radio wave communications can cause a travel or long distances and they can pass easily through wall building and even you can go outdoor communication also indoor plus outdoor. By using your FM radios at home because of this radio link only. So depending upon the frequencies you can go from few metre to the hundreds of kilometres no matter. At the low frequency they can travel in the any direction, they pass through any obstruction in the path [8].

The microwave communication is again a long distance telephonic communication. Generally. If you want to set a tower of microwave tower, you can require placing on a small plot like every 50-50 kilometre. Means you can go on the other hand suppose setting up 50 kilometre optical fibre like places like mountains a very hard some situation. So in that case for the mountainous region for the communication you can go for the microwave where it is inexpensive also. You can easily communicate in the economical way too. You are using a mobile phone in your pocket. Because of the GSM only global system for mobile communication. You know that it is a very important digital cellular technology for transmitting of mobile and services. Subscriber identity module (SIM) [9]. Even you can make a call even you can send a SMS short messaging service. The GSM provider globally accepted communication services for your calling and data services. The CDMA that is code division multiple access, it is a wireless technology. The information contained in a particular signal over a greater bandwidth means you can get up better capacity of voice and data communication. Each device is sensitive. But here it is not like that carrier sense. Here they are going to sensor signal device senses.

Wire and Wireless Technology

Wire technology uses three types of technologies available. (i) Twisted pair wire is the most widely used medium for telecommunication. Twisted pair wires are ordinary telephone wires, which consist of two insulated copper wires. The twisted wire in two pairs and they are used for data transmission. The use of two wires twisted together helps to reduce crosstalk and electromagnetic induction. The transmission speed range from 2,000,000 bits per second to 100 million bits per second. (ii) R.F. cables are widely used for cable television systems, office buildings and other work sites for local area networks. The cables consist of a central conductor, movement, and they are coated with an insulating layer, typically flexible material with a high dielectric constant, all of which are surrounded by a conductive layer. The layers of insulation help minimize interference and distortion [10]. Transmission speed range from 200 million to more than 500 million bytes per second. (iii) Fibre optics cables consist of one or more thin filaments of glass fibre wrapped in a protective layer. It transmits light. Long distance and higher bandwidths. fibre optic cables are not affected by electromagnetic radiation. Transmission speed could go up to as high as trillions of bits per second. The speed of fibre optics is hundreds of times faster than twisted pair cables in thousands of times faster than twisted pair. The Wireless LAN means, we are going to connect the network into our home offices or in the campus environments. This wireless network gives you portability so that you can sit anywhere. You do not have to sit at particular position, you can just take your laptop and go in cafeteria. Coffee, come back to your seat, chat with your friends, work with your clients and go again back to the cafeteria. So, this gives you more portability. when we talk about wireless technologies, Bluetooth is also one of the wireless technology, but it is on the distance of up to 100 metres where this is a technology WiMAX, which can go up to 50 kilometre of the wireless range. So additional wireless technologies in the market is like cellular broadband, like mobile 3G, 4G, 5G, these are called cellular broadband. So we are using GSM, CDMA and all these technologies for in cellular broadband. But now a days 4G, 5G is more popular, but now a days we have also satellite Broadband in the market, but it is not for the urban location. Mostly it is for rural locations because the speed and all things

are not that great. whenever we talk about wireless the standard comes 802.11. It means it is a wireless standard [11]. Standard means the radio frequency all the signals of Wi-Fi radio. You are all these frequencies are called radio frequencies. Nowadays we are using 802.11. This is the latest which is called the Wi-Fi 6 also.

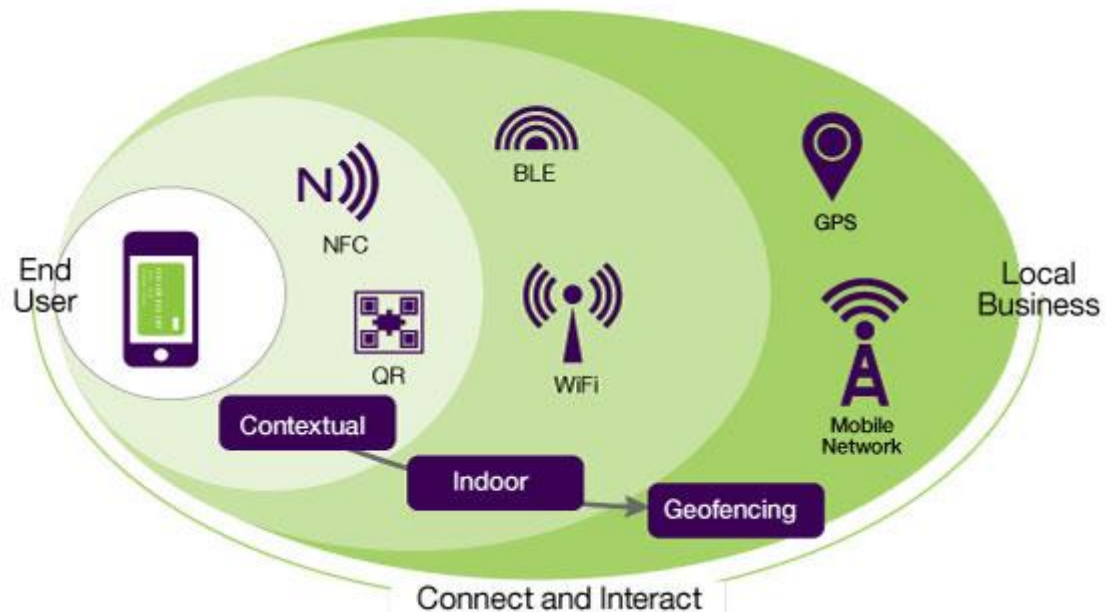


Fig.1. Types of wireless Technology (ref_12).

Types of wireless Technology [13]:

1. Satellite Communication:

Satellite communication is one of the important communication technologies. Because it does not require any local connectivity instruments. Through satellites, people all over the earth can communicate with each other.

2. Infrared Communication:

The Infrared communication used for local communications between two devices. Generally, it is used to connect remote to TV. IR transmitter transmits information in the form of invisible ray. The sensors on the others side uses this invisible ray to decode and take action on the basis.

3. Broadcast Radio:

All the wireless communication broadcast their signals in the form of electromagnetic wave over radio link. The radio transmitter send their data signal through transmitting antenna. The receiving antenna receives these radio signal and demodulates the information and give it to the users.

4. Microwave Communication [15]:

Microwave technology is a very important wireless communication system. This communication system is accepted globally. This wireless technology categories in two groups:

(i) Satellite Microwave Communication [16]:

Satellite Microwave Communication is used to transmit signal to world. The microwave used sine of sight protocols. If any disturbance in line of sight, communication will be broken. In this wireless technology, the problem will start when a line of sight disturbs when cloudy weather is blocked this signal.

(ii) Terrestrial Microwave Communication

In this microwave technology a signal needs to be transmitted for locally or short distance. This system have two antenna, one for transmitting the signal and another for receiving the signal, which is connecting microwave connectivity through line of sight.

5. Wi-Fi:

This wireless technology is most popular though out all the wireless communication technology. Because all the devices have this type of connectivity. It is a very low powered devices for wireless network. It establishes a very well localized and low power wireless network.

6. Mobile Communication Systems [17]:

This wireless communication system changes the human life style. We have use our mobile phone through mobile communications system. The GSM, CDMA, WCDMA and 4G and 5G technology of the communication system.

7. Bluetooth Technology

The Bluetooth is widely use for the send and receive the message or file transfer one device to another one. It is mostly used for short distance file transfer.

Wireless Technology used in the Utility market:

The wireless technology is used to improve the data transmission for industry 4.0. The automation for medical devices as well as health care system. The utilities for industries to improve the distribution of smart grid. The wireless technology enables to the distribution of electricity through smart grid. The electricity can be re-routed. The wireless technology, the automating distribution of automation can enhance overall smart grid operation [18].

Conclusion:

when we talk about wireless technologies, Bluetooth is also one of the wireless technology, but it is on the distance of up to 100 metres where this is a technology WiMAX, which can go up to 50 kilometres of the wireless range. So additional wireless technologies in the market is like cellular broadband, like mobile 3G, 4G, 5G, these are called cellular broadband. So we are using GSM, CDMA and all these technologies for in cellular broadband. But now a days 4G, 5G is more popular, but now a days we have also satellite Broadband in the market, but it is not for the urban location. Mostly it is for rural locations because the speed and everything are not that great. Whenever we talk about wireless, the standard comes 802.11.

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