

# Computer Communication and Networks

(Lecture-04)



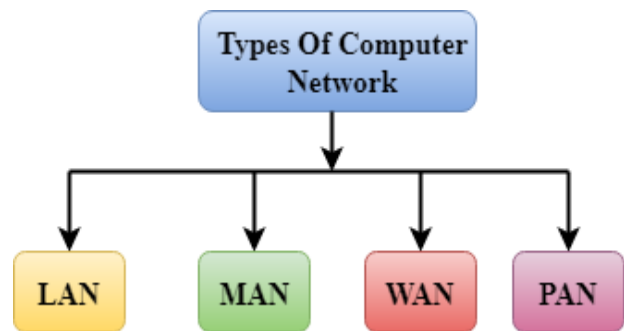
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# Computer Network Types

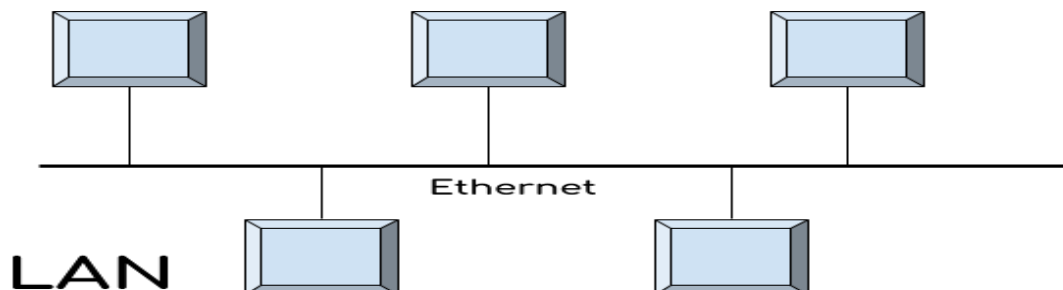
A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data, and applications. Initially, there were three main types of computer networks but now one more type is added with the family of computer network which is PAN (Personal Area Network).

1. LAN(Local Area Network)
2. PAN(Personal Area Network)
3. MAN(Metropolitan Area Network)
4. WAN(Wide Area Network)



## 1. LAN(Local Area Network)

- Local Area Network is a group of computers connected to each other in a small area such as building, office.
- LAN is used for connecting two or more personal computers through a communication medium such as twisted pair, coaxial cable, etc. LANs are not limited to wire connection, there is a new evolution to the LANs that allows local area network to work on a wireless connection.
- It is less costly as it is built with inexpensive hardware such as hubs, network adapters, and ethernet cables.
- The data is transferred at an extremely faster rate in Local Area Network. LAN due to their small size are considerably faster, their speed can range anywhere from 100 to 100Mbps.
- Local Area Network provides higher security. LAN is secure because there is no outside connection with the local area network thus the data which is shared is safe on the local area network and can't be accessed outside.



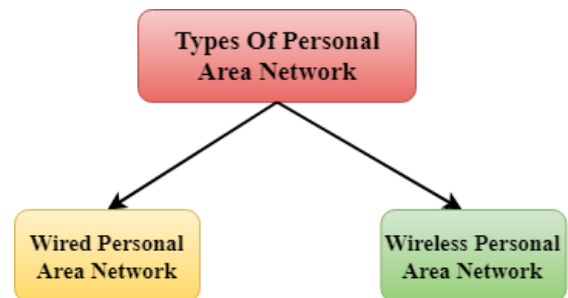
## 2. PAN (Personal Area Network)

- Personal Area Network is a network arranged within an individual person, typically within a range of 10 meters.
- Personal Area Network is used for connecting the computer devices of personal use is known as Personal Area Network.
- Personal Area Network covers an area of 30 feet.
- Personal computer devices that are used to develop the personal area network are the laptop, mobile phones, media player and play stations.



**There are three types of Personal Area Network:**

- Wired Personal Area Network
- Wireless Personal Area Network
- Body Area Network



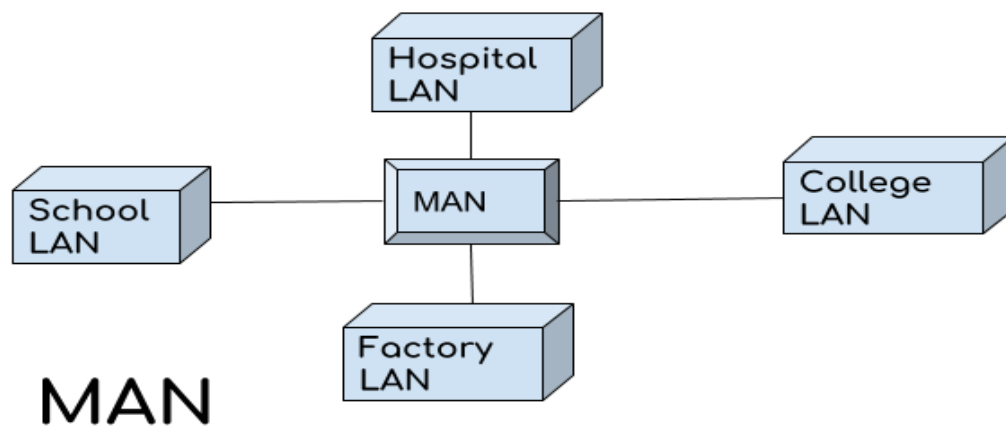
**Wireless Personal Area Network:** Wireless Personal Area Network is developed by simply using wireless technologies such as WiFi, Bluetooth. It is a low range network.

**Wired Personal Area Network:** Wired Personal Area Network is created by using the USB.

**Body Area Network:** Body Area Network is a network that moves with a person. For example, a mobile network moves with a person. Suppose a person establishes a network connection and then creates a connection with another device to share the information.

## MAN (Metropolitan Area Network)

- A metropolitan area network is a network that covers a larger geographic area by interconnecting a different LAN to form a larger network.
- Government agencies use MAN to connect to the citizens and private industries.
- In MAN, various LANs are connected to each other through a telephone exchange line.
- The most widely used protocols in MAN are RS-232, Frame Relay, ATM, ISDN, OC-3, ADSL, etc.
- It has a higher range than Local Area Network (LAN). The size of the Metropolitan area network is larger than LANs and smaller than WANs (wide area networks), a MANs covers the larger area of a city or town.

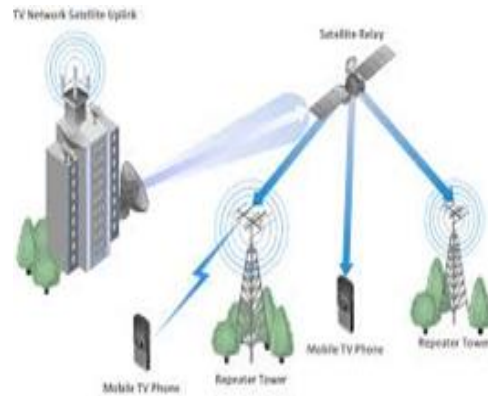


### Uses of Metropolitan Area Network:

- MAN is used in communication between the banks in a city.
- It can be used in an Airline Reservation.
- It can be used in a college within a city.
- It can also be used for communication in the military.

## WAN (Wide Area Network)

- A Wide Area Network is a network that extends over a large geographical area such as states or countries.
- A Wide Area Network is quite bigger network than the MAN & LAN.
- A Wide Area Network is not limited to a single location, but it spans over a large geographical area through a telephone line, fiber optic cable or satellite links.
- The internet is one of the biggest WAN in the world. Other examples of WAN are mobile broadband connections such as 3G, 4G etc.
- A Wide Area Network is widely used in the field of Business, government, and education.



### Advantages of Wide Area Network:

Following are the advantages of the Wide Area Network:

- **Geographical area:** A Wide Area Network provides a large geographical area. Suppose if the branch of our office is in a different city then we can connect with them through WAN. The internet provides a leased line through which we can connect with another branch.
- **Centralized data:** In case of WAN network, data is centralized. Therefore, we do not need to buy the emails, files or back up servers.
- **Get updated files:** Software companies work on the live server. Therefore, the programmers get the updated files within seconds.
- **Exchange messages:** In a WAN network, messages are transmitted fast. The web application like Facebook, WhatsApp, and Skype allows you to communicate with friends.
- **Sharing of software and resources:** In WAN network, we can share the software and other resources like a hard drive, RAM.
- **Global business:** We can do the business over the internet globally.
- **High bandwidth:** If we use the leased lines for our company then this gives the high bandwidth. The high bandwidth increases the data transfer rate which in turn increases the productivity of our company.

**Disadvantages of Wide Area Network:**

The following are the disadvantages of the Wide Area Network:

- **Security issue:** A WAN network has more security issues as compared to LAN and MAN network as all the technologies are combined together that creates the security problem.
- **Needs Firewall & antivirus software:** The data is transferred on the internet which can be changed or hacked by the hackers, so the firewall needs to be used. Some people can inject the virus in our system so antivirus is needed to protect from such a virus.
- **High Setup cost:** An installation cost of the WAN network is high as it involves the purchasing of routers, switches.
- **Troubleshooting problems:** It covers a large area so fixing the problem is difficult.

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