Network Models: Peer to Peer and Client Server

What is a Network?
Network means linking two or more computers, and various peripheral devices for resource sharing such as files, internet sharing, etc. The best example is the internet which connects millions of people all over the world.

What is a Computer Network?
Computer Network links two or more computing devices and the computing hardware through various communication channels (i.e. cables, telephone lines, radio waves, wifi, etc.) for data and resource sharing. For example, Bluetooth connection to transfer files, a hotspot for sharing the internet, etc.

Need for Computer Network
File Sharing which enables users to share data between users;
Resource Sharing which enables users to share multiple devices, such as copiers and printers;
Communication which enables users to send and receive messages and data in real time from multiple devices;
Convenience in that data is accessible through an internet connection;
Cost in that there are reduced hardware costs since networked devices can share resources; and
Storage which enables users to access data that's stored remotely or on other network devices.

Types of Computer Networks
There are various types of computer networks categorized by their size.
- Personal Area Network(PAN)
- Local Area Network (LAN)
- Wide Area Network (WAN)
- Metropolitan Area Network (MAN)

Local Area Network (LAN)
LAN can be defined as a cluster of computers connected at a single physical location such as an office, building, etc. It is the most common type of network used. A LAN can also be formed with two computers connected over a network. Hub, Switches, Cables, and Optical fibers are used to connect various computers and devices to a network.
Examples of LAN are networking in a home, school, college, office, etc.

Advantages of LAN are-
- High data transfer rate
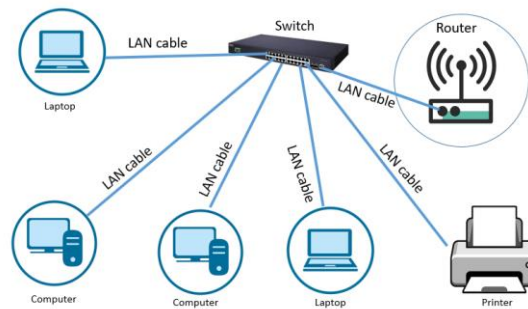- Ease of setup
- Centralized Data
- Low Cost

Disadvantages of LAN are-
- Covers small area
- The cables and connectors get damaged easily
- Requires administrative time

Local Area Network
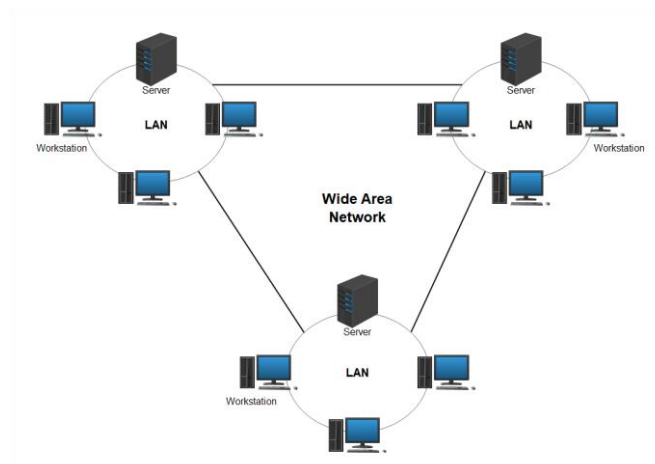
Wide Area Network (WAN)

A WAN is a type of computer network that covers a large geographical area. WAN is also defined as the connection of several LANs linked together to cover an entire city or country. The WAN network is provided via several methods such as telephone lines, fiber optics cable, and also through satellite links.

Advantages of WAN are-
- Covers vast area
- Multiple users can share and access the internet at the same time
- High Bandwidth

Disadvantages of WAN are-
- High initial investment cost
- Hard to handle as the network is vast and complex.
- Less secure

Metropolitan Area Network (MAN)

This type of network is created by linking existing LAN networks to cover a large geographical area. MAN is smaller than LAN but larger than WAN.
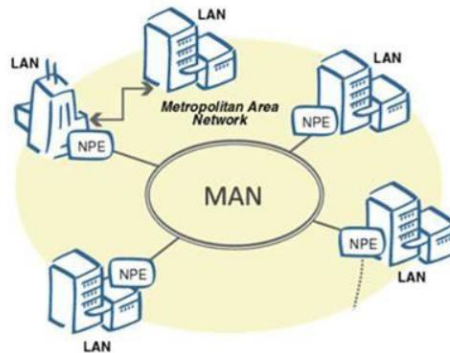
Examples of MAN are networking in government agencies, airports, libraries, etc.

Advantages of MAN are-

- Offers Centralized data management
- Quick transfer of files
- Provides higher speed of internet as it uses fiber optics

Disadvantages of MAN are-

- Difficult to handle due to large network size
- Risk of hacking
- High installation cost as it requires fiber optics

Campus Area Network (CAN) is also called a corporate area network and it helps to like LAN with small geographical space. The main objective is offering the best accessibility of campus residential regions like schools, colleges, university, small institutes (Campus), and corporate area (building). It is larger than LAN but small than WAN and MAN networks.

It can cover many buildings in an area. Here all computers are connected together and have some relationship to each other.

For example − Different buildings in a campus are connected using Campus Area Network (CAN) they help to interconnect departments, library and computer laboratories.

Given below is the diagram representing how CAN connects different buildings in Campus −
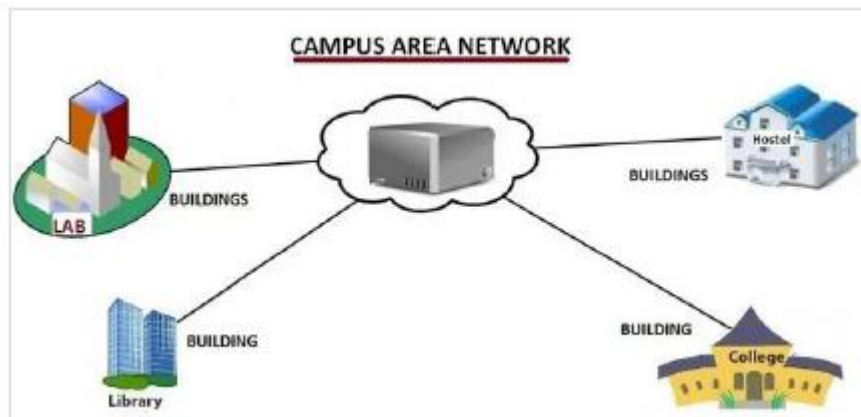
Advantages

The advantages of CAN are as follows −

- **Affordability** − To construct CAN networks we use hardware devices like hub, routers, switches, cables which are affordable.
- **Easy accessibility of data** − We can easily access the data that are present in different departments with the help of CAN.
- **Wireless medium** − With the help of wireless connection we are able to link offices which are present in different buildings.
- **Higher speed** − CAN is supported to transfer large files or data with high speed over a network with the help of the internet.
- **Protection** − CAN networks have firewalls and proxy servers which are used for security purposes.
- **Share internet connection** − CAN network will share internet connection.

Disadvantages

The disadvantages of CAN are as follows −

- It does not support a maximum number of nodes.
- It can connect only up to 64 nodes because of electrical loading.
- CAN maintenance is costly when compared to other networks like LAN WAN etc.
- It can support up to 40-meter length.
- There are undesirable interactions in between all nodes.

Personal Area Network(PAN)

It is the smallest and most basic type of computer network. The size of PAN varies from centimeters to 30 meters. PAN network can be classified into two types
- Wired PAN Network
- Wireless PAN Network

Examples of PAN are – USB, Computer, Bluetooth, etc.

Advantages of PAN are-
- Less Expensive
- Confined to a small space area
- Links to multiple devices concurrently

Disadvantages of PAN are-
- Limited area
- Slow Data Transmission

Interference with radio signal

Computer networks can be described based on their sizes and purpose. The most widely used computer networks are LAN, WAN, MAN, and PAN. We have covered here various types of networks with their advantages and disadvantages.