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In this chapter

- What is a Computer Network?
- Types of Networks
- Network Hardware
- Advantages and Disadvantages of a Network
- Network Topology



Rewind



We have already learnt in our previous classes that a computer network is a group of computer systems and other computing hardware devices, which are linked together through communication channels to facilitate communication and resource-sharing among a wide range of users.

One of the earliest examples of a computer network was a network of computers that functioned as part of the U.S. military's Semi-Automatic Ground Environment (SAGE) radar system. In 1969, the University of California at Los Angeles, the Stanford Research Institute, the University of California at Santa Barbara and the University of Utah were connected as part of the Advanced Research Projects Agency Network (ARPANET) project. It is this network that evolved to become what we now call the Internet.

Let us answer the following questions to recall what we have learnt so far:

1. Which of the following best describes the Internet?

a. A network of interlinked computers	b. Communications network
c. An information network	d. All of the above
2. When was the first Internet network started?

a. 1969	b. 1983	c. 1987	d. 1996
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3. Where are the files kept on the Internet?
 - a. On your computer
 - b. On one massive computer-the www
 - c. On individual computers, often known as servers
 - d. On a network of routers

4. Who writes the rules for the Internet?
- a. No one
 - b. The government of the country in which the Internet is being used
 - c. The Internet Society
 - d. Your parents



A computer port is a connection point or interface between a computer and an external or internal device.



..... port connects special types of music instruments to sound cards.

- a. BUS
- b. CPU
- c. USB
- d. MIDI

Computer Network

A computer network is a telecommunications network which allows different computers to exchange data. In a network, the computing devices pass data to each other along network links or data connections and help in efficient communication. This data is transferred in the form of packets. There are a wide variety of networks and their advantages and disadvantages mainly depend on the type of network.

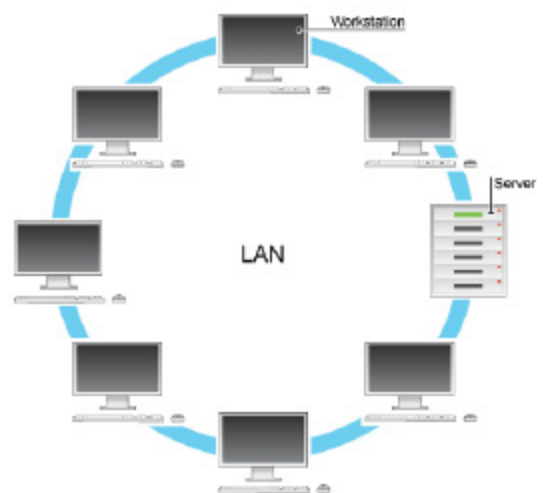
Let us read about the different types of networks that are available for data transfer.

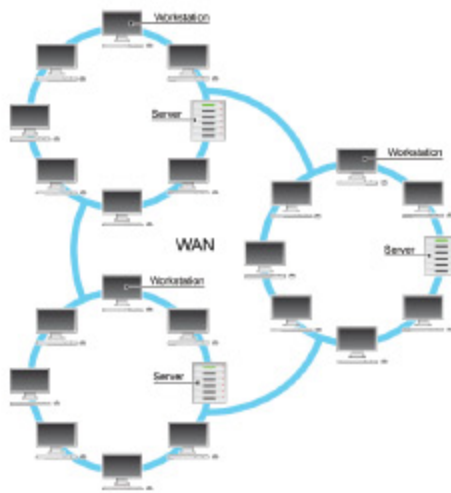
Types of Networks

There are several different types of computer networks. Computer networks can be characterized by their size as well as their purpose. The size of a network can be expressed by the geographical area that they occupy and the number of computers that are part of the network. Networks can cover anything from a handful of devices within a single room to millions of devices spread across the entire globe.

Local Area Network (LAN)

Local Area Network or LAN consists of a computer network at a single site, typically an individual office building. LAN is very useful for sharing resources, such as data storage and printers. LANs can be built with relatively inexpensive hardware, such as hubs, network adapters and cables.





Wide Area Network (WAN)

Wide Area Network or WAN, occupies a very large area, such as an entire country or the entire world. WAN can contain multiple smaller networks, such as LANs or Metropolitan Area Network (MAN). Internet is the best-known example of a public WAN.

Metropolitan Area Network (MAN)

Metropolitan Area Network or MAN consists of a computer network across an entire city, college campus or small region. MAN is larger than a LAN, which is typically limited to a single building or site. Depending on the configuration, this type of network can cover an area from several miles to tens of miles. MAN is often used to connect several LANs together to form a bigger network. When this type of network is specifically designed for a college campus, it is sometimes referred to as a Campus Area Network or CAN.

Metropolitan Area Network Application



MAN is larger than a LAN, which is typically limited to a single building or site. Depending on the configuration, this type of network can cover an area from several miles to tens of miles. MAN is often used to connect several LANs together to form a bigger network. When this type of network is specifically designed for a college campus, it is sometimes referred to as a Campus Area Network or CAN.



Personal Area Network (PAN)

Personal Area Network or PAN is a computer network organized around an individual person within a single building. This could be inside a small office or a residence. A typical PAN would include one or more computers, telephones, peripheral devices, video game consoles and other personal entertainment devices.

If multiple individuals use the same network within a residence, the network is sometimes referred to as a Home Area Network or HAN.

Wireless Local Area Network (WLAN)

Wireless Local Area Networks (WLANs) are the same as the traditional LAN but they have a wireless interface. With the introduction of small portable devices such as Personal Digital Assistants (PDAs), the WLAN technology is becoming very popular. WLANs provide high speed data communication in small areas such as a building or an office.



Name the type of network:

1. Computer network at a single site.
2. Computer network across an entire city.
3. Computer network that contains multiple smaller networks.
4. Network specially designed for a college campus.
5. Networks which have a wireless interface.



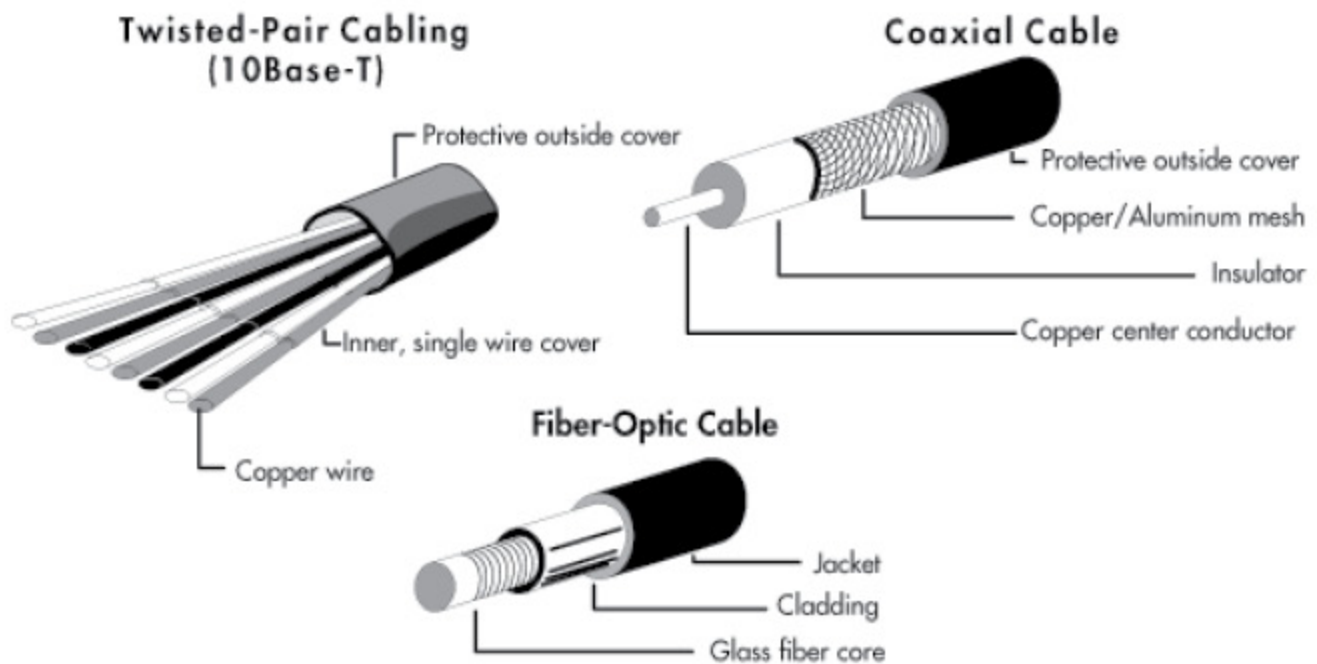
Find out what kind of networking is used in your school and how many computers are connected in it.

Network Hardware

Building a computer network requires specialized hardware. Let us now learn about the variety of hardware devices needed for a computer network.

Cables

Cables are used to connect a device to another device while setting up a network. Different kinds of cables can be used, depending on the type and size of the network. The type of cable used determines the speed of the network. The different cables that are available are as given below:



- **Twisted-Pair Cables:** Twisted-pair cable consists of two insulated strands of copper wire twisted around each other.
- **Fiber-Optic Cables:** A fiber-optic cable consists of an extremely thin cylinder of glass, surrounded by a concentric layer of glass. The fibers are sometimes made up of plastic.
- **Coaxial Cables:** Coaxial cable consists of a core of copper wire surrounded by insulation, a braided metal shielding and an outer cover.

Connectors

Connectors, normally called "input-output connectors" (or I/O), are interfaces for linking devices by using cables.



Network Interface Card

A computer uses a Network Interface Card (NIC) to become



part of a network. The NIC contains the electronic circuit required to communicate using a wired connection (e.g., Ethernet) or a wireless connection (e.g., Wi-Fi). A Network Interface Card is also known as a Network Interface Controller, Network Adapter or a Local Area Network (LAN) Adapter.

Ethernet Hub

In computer networking, a hub is a small, simple, inexpensive device that joins multiple computers together. To network a group of computers we use an Ethernet hub.



Modem

Modem stands for Modulator-demodulator. It is an electronic device that allows computers to communicate over telephone wires or TV cable. One computer's modem converts its digital signals into analog signals. The other computer's modem reconverts the analog signals into digital signals. Conversion of one type of signal to another is called modulation; their reconversion to the original type is called demodulation.



Wireless Network Interface Card (WNIC)

Wireless NIC is a network card which is used to connect devices without the use of cables or wires. Wireless NIC uses an antenna to communicate through microwaves.

Router

Routers are small physical devices that join multiple networks together. Technically, a router is a Layer-3 gateway device, meaning that it connects two or more networks. It acts as a traffic controller for Internet.



Progress Bar

Mark True or False:

1. WNIC uses an antenna to communicate through microwaves. T F
2. NIC acts as a traffic controller for the Internet. T F
3. Connectors are interfaces for linking devices by using cables. T F
4. A computer network enables file sharing across the world. T F



Do you have an Internet connection in school or at home? If yes, find out the type of cable, modem and router that is used to connect.

Update



Transmission Control Protocol and Internet Protocol are together called TCP/IP.

Progress Bar

Write the full forms of the following:

1. WNIC
2. Modem
3. CAN
4. SAGE
5. WLAN



Take the students to the computer lab and show them the various hardware devices and the ports that connect each other.