## Networking:

In the world of computers, Networking is the practice of linking two or more computing devices together for the purpose of sharing data. Networks are built with a mix of computer hardware and computer software.

Networks can be categorized in several different ways.

OSI (Open Systems Interconnection) Mode:

A model for understanding and developing computer-to-computer communication developed in the 1980s be ISO. It divides networking functions among seven layers: Physical, Data, Network, Transport, Session, Presentation and Application.
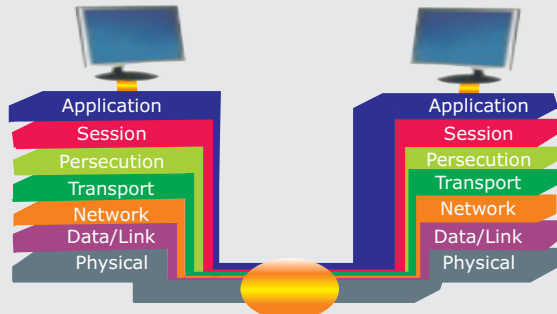
Application layer: The seventh layer of the OSI Model. Application layer protocols enable software programs to negotiate formatting procedural. Security, synchronization, and other requirements with the network.

Presentation Layer: The sixth layer of the OSI Model. Protocols in the Presentation layer translate between the application and the network. Here, data are formatted in a schema that the network can understand, with the format varying according to the type of network used. The Presentation layer also manages data encryption and decryption, such as the scrambling or system passwords.

Transport layer: The fourth layer of the OSI Model. In the transport layer, protocols ensure that data are transferred from point A to point B reliably and without errors. Transport layer services include flow control, acknowledgment, error correction segmentation, reassembly and sequencing.

Network layer: The third layer in the OSI Model. Protocols in the Network layer translate network addresses into their physical counterparts and decide how to route data from the sender to the receiver.

Data Link layer: The second layer in the OSI Model. The Data link layer bridges the networking from the Network layer into frames that can then be transmitted by the Physical layer.

Physical layer: The lowest or first layer of the OSI Model. Protocols in the physical layer generate and detect voltage so as to transmit and receive signals carrying data over a network medium. These protocols also set the data transmission rate and monitor data error rates, but do not provide error correction.

Peer-to Peer Networking:

The simplest form of a network is a peer-to peer network. In a peer-to-peer network, every computer can communicate directly with every other computer, By default, no computer on a peer-to-peer network has more authority than another. However, each computer can be configured to share only some of its resources and keep other resources inaccessible to the network, Traditional peer-to-perr networks typically consist or two or more general purpose personal computers, with modest processing capabilities. Every computer is capable or sending and receiving information to and from every other computer.
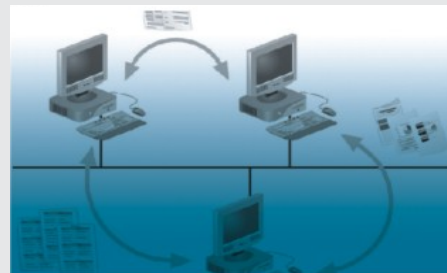
Client/Server networking

Another way of designing a network is to use a central computer, known as a server, to facilitate communication and resource sharing between other computers on the network, which are known as clients. Clients. Clients usually take the form of personal computers, also known as workstations.

A network that uses a server to enable clients to share data, data storage space, and devices is known as client/server network. (The term client/server architecture is sometimes used to refer) to the design of a network in which clients rely on servers for resource sharing and procession) In terms or resource sharing and control, you can compare the client/server network to a public library. Just as a librarian manages the use of books and other media by patrons, a server manages the use of shared resources by clients. For example, if a patron does not have credentials to check out books, the librarian prevents him from doing so. Similarly, a server allows only authorized clients to access its resources.
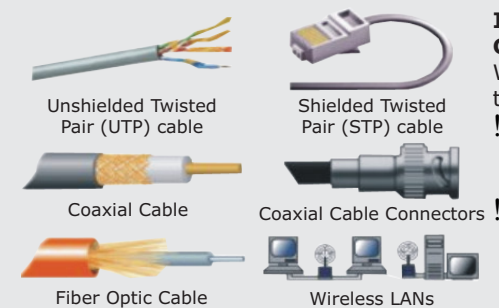

File Server
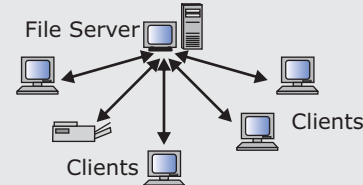
Clients

Clients

Renounces are controlled by the file server in a client server network

Number	Topic
802.1	Overview and architecture of LANs
802.2 ↓	Logical Link control
802.3 *	Ethernet
802.4 ↓	Token bus (was briefly used in manufacturing plants)
802.5	Token ring (IBM's entry into the LAN world)
802.6 ↓	Dual queue dual bus (early metropolitan area network)
802.7 ↓	Technical advisory group on broadband technologies
802.8 ↑	Technical advisory group on fiber on fiber optic technologies
802.9 ↓	Isochronous LANs (for real-time applications)
802.10 ↓	Virtual LANs and security
802.11 *	Wireless LANs
802.12 ↓	Demand priority (Hewlett-Packard;s Any LAN)
802.13	Unlucky number. Nobody wanted it
802.14 ↓	Cable modems (defunct: an industry consortium got there first)
802.15 *	Personal area networks (Blue tooth)
802.16 *	Broadband wireless
802.17	Resilient packet ring

Network Cabling:

Cable is the medium through which information usually moves from one network device to another. There are several types of cable which one commonly used with LANs.

Unshielded Twisted Pair (UTP) cable

Shielded Twisted Pair (STP) cable

Coaxial Cable

Coaxial Cable Connectors

Fiber Optic Cable

Wireless LANs

Installing Cable-Some Guidelines:

When running cable, it is beast to follow a few simple rules:

! Always use more cable than you need. Leave plenty of slack.

! Test every part of a network as you install it. Even if it is brand new, it may have problems that will be difficult to isolate later.

! Stay at least feet away from fluorescent light boxes and other sources of electrical interference.

! If it is necessary to run cable across the floor, cover the cable with cable protectors.

! Level both ends of each cable.

! Use cable ties (not tape) to keep cables in the same location together

Network Performance:

The performance or "speed" pf a cp,[uter network is normally measured in units of bits per seconds (bps). This quantity can represent either an actual data rate

Types of Topologies

Bus Topology:

All devices are connected to a central cable, called the bus or backbone. Bus networks are relatively inexpensive and easy to install for small networks, Ethernet systems use a bus topology.
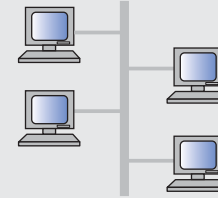

Ring Topology:

All devices are connected to one another in the shape of closed loop, so that each devices is connected directly to two other device, one on either side of it. Ring topologies are relatively expensive and difficult to install, but they offer high bandwidth and can span large distances.
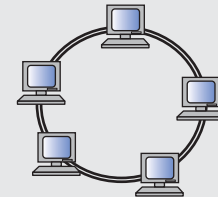

Star Topology:

All devices are connected to a central hub. Star networks are relatively easy to install and manage, but bottlenecks can occur because all data must pass through the hub.
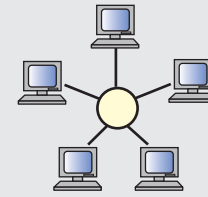
Tree Topology

A tree topology combines characteristics of linear bus and star topologies. It consists of groups of star-configured workstations connected to a linear bus back bone cable.
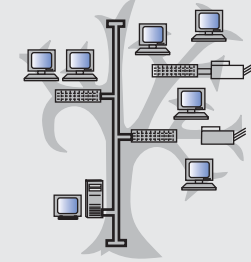
Wireless LANs

Not all networks are connected with cabling; some networks are wireless LANs use high frequency radio signals.

What's Wi-Fi ?

Short for 'Wireless Fidelity' A term for certain types of wireless local area network (WLAN) that use specifications conforming to IEEE 802.11 or a limited range wireless networking protocol based on the 802.11 family of standards, uses spectrum in the 2.4 GHz range to exchange data at broadband speeds. Wi Fi has gained acceptance in many environments as an alternative to a wired LAN, Many airports, hotels and other services offer public access to WIFi networks so people can log onto the Internet and receive Email on the move. These locations are known as hot spots.

Wireless Standard	802.11b	802.11g	802.11a
Max Speed	11 MBPS	54 MBPS	54 MBPS
Max Encryption	128 Bit WEP	128 Bit WEP	152 Bit WEP
			256 Bit AES
Discrete Channels	3	3	8
Max Range @ full	~30ft	~20 ft	~10 ft
Throughput			
Natively Compatible	802.11b, 802.11g	802.11b, 802.11g	802.11a
Operating frequency	2.4GHz	2.4 GHz	5 GHz

Networking Lab

Local Area Network (LAN) Trainer Order Code-40556

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Local Area Network (LAN) Trainer Order Code-40556 provides the understanding of all the fundamentals of networking. It helps the user to gain knowledge regarding all network layers, cable designing and building of complete network of computers. The user can understand and actually implement various topologies using different standards given by IEEE. Actual connections can be made in different topologies and data can be transferred. The user will understand the protocols, topologies used in networking measurement of error rate, throughput and effect of errors on protocols. The versatile software provided with order code-40556 will assist the user to observe the various effects and configurations on network along with the graphical representation.

Features: PC to PC communication with IEEE 802.3, Peer to Peer network, Client server network, Design of Star topology using 100 Base-Tx, Design of Bus topology using 10 Base-2, Design of Ring topology using Db9, Creation of cables for network connections, Network design using Rj45, BNC & DB9 connectors, Socket programming and processing Data Encryption and Decryption, Various LAN Protocols, Data rate up to 100 Mbps, Variable packet size, Variable packet delay, Error generation (Manul and Auto), Real time graphical representation of entire transmission & reception, user friendly software. Switch faults in both hardware & software, Exhaustive course material & references.

Data Communication Trainer

Data Communications and Networking are one of the fastest growing segments Today. The major reason for the growth is the dramatic increase in Networked offices, PC based products and internet user. More Students are taking courses to learn about them. Order Code-40554 is designed to assist students and practitioners to understand the various methods of exchange of data between two devices.

Features: Pin to pin study of serial and parallel port, Different methods of serial communication, Different methods of parallel communication, Wireless communication (IR/RF), Full duplex fiber optics communication, FSK modem communication, Software & hardware based data Flow controls, Protocols of parallel port, Protocols of serial port, High Speed data transmission, Visual indication by LED's for displaying data, status & control pins of port, Printer interface, Windows based o9perating software, Switch faults in both hardware & software, Exhaustive course material & references, Student friendly, software, Optional application boards for serial and parallel port.

NT sim:

NT sim is a discrete event simulator developed using an object based modeling approach. The simulation module provides number of network experiments across various LAN and WAN protocols. Create Scenarios and study the performance.

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Features: Aloha, Slotted Aloha, Token Bus, Token Ring, Ethernet hub, Ethernet Switch, Wireless LAN, TCP, UDP, Router and many more...
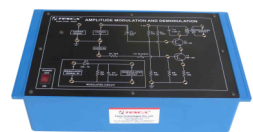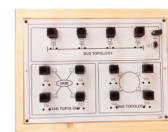

40501 Amplitude Modulation & Demodulation

40502 Frequency Modulation & Demodulation

40554 Data Communication Trainer

40555A Local Area Network Trainer

40555A.1 LAN Network Trainer

40555B LAN Network Trainer

40557 Advanced Communication System

40626 MSK Modulation/Demodulation