Computer Network

Q1 What is computer network? [2004]

Ans: – A computer network is a group of computer systems and other computing hardware devices that are linked together through communication channels to facilitate communication and resource–sharing among a wide range of users.

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Q2 Why we use computer network?

Or

Write the advantages of computer network. [2017]

Ans: – Main benefits of networks include –

1) **File sharing** – We can easily share data between different users, or access it remotely if we keep it on other connected devices.
2) **Resource sharing** – Using network-connected peripheral devices like printers, scanners and copiers or sharing software between multiple users, saves money.
3) **Sharing a single internet connection** – It is cost-efficient and can help protect our systems if we properly secure the network.
4) **Increasing storage capacity** – We can access files and multimedia, such as images and music, which you store remotely on other machines or network-attached storage devices.
5) **Reduce costs** – Storing information in one centralized database can also help us to reduce costs and drive efficiency.

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Q3 Write the disadvantages of computer network.

Ans: – Main disadvantage of networks include –

1) Buying the computer cable and servers can be very expensive.
2) Viruses can spread to other computers throughout a computer network.
3) Hackers can hack our computer.
4) It encourages people to become dependent on computers.
5) It comes with the risk of security issues.

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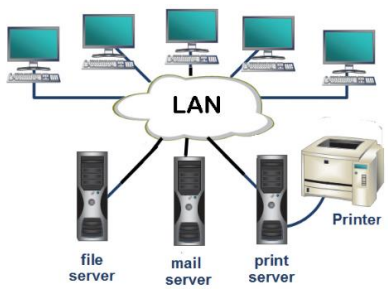
Q4 Explain the different types of computer network. [2004, 2018]

Ans: – There are three types of networks –

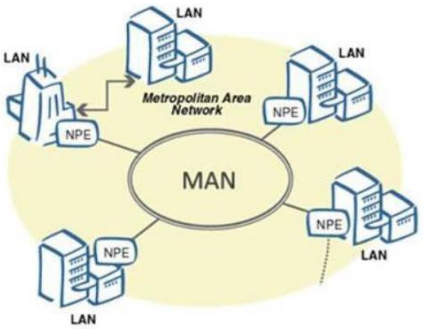
1) **Local Area Networks (LAN) –** A **local area network** or **LAN**, consist of a computer network at a single site, typically an individual office building. A LAN is very useful for sharing resources, such as data storage and printers. LANs can be built with relatively inexpensive hardware, such as hubs, network adapters and Ethernet cables.

   The smallest LAN may only use two computers, while larger LANs can accommodate thousands of computers. Ex: - Intranet, Ethernet

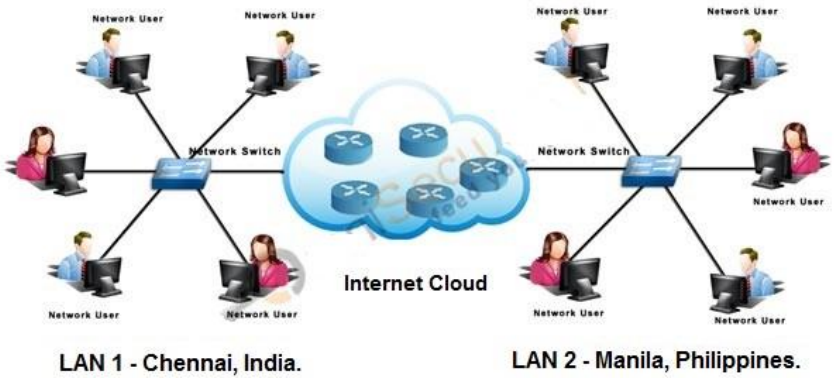


2) **Metropolitan Area Network Or Middle Area Network (MAN) –** This is a larger network that connects computer users in a particular geographic area or region. For example, a large university may have a network so large that it may be classified as a MAN. The MAN network usually exists to provide connectivity to local ISPs, cable TV or large corporations.

It is far larger than a LAN and smaller than a WAN. Also, large cities like Delhi and Bombay, Chennai, have metropolitan area networks. Ex: - Cable TV Network



3) **<u>Wide Area Networks (WAN)</u> –** This is the largest network and can inter-connect networks throughout the world because it is not restricted to a geographical location. The Internet is an example of a worldwide public WAN. Most WANs exist to connect LANs that are not in the same geographical area. This technology is high speed and very expensive to setup. Ex: - Internet



LAN 1 - Chennai, India. **LAN 2 - Manila, Philippines.**

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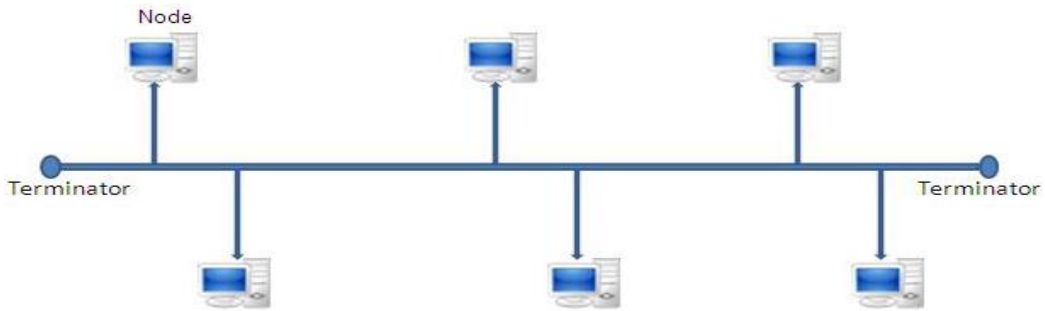
Q5 What is Topology in Computer Network? Explain their different types. [2007, 2012, 2019]

Ans: – Geometric representation of how the computers are connected to each other is known as topology. Topology is derived from two Greek words <u>topo</u> and <u>logy</u>, where topo means 'place' and logy means 'study'.

In computer networks, a topology is used to explain how a network is physically connected and the logical flow of information in the network. A topology mainly describes how devices are connected and interact with each other using communication links.

Network topologies are of following types –

1) **<u>BUS or Linear Topology</u> –** Bus topology is a network type in which every computer and network device is connected to single cable. When it has exactly two endpoints, then it is called Linear Bus topology.



<u>Features of Bus Topology</u> –

i) It transmits data only in one direction.

ii) Every device is connected to a single cable.

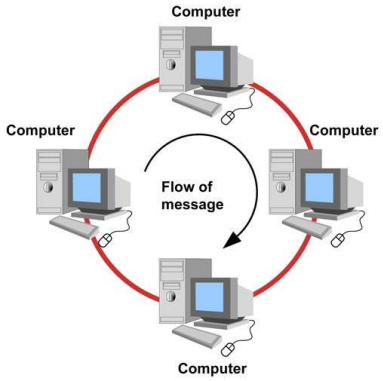
Advantage of Bus Topology –

i) It is cost effective.
ii) Cable required is least compared to other network topology.
iii) Used in small networks.
iv) It is easy to understand.
v) Easy to expand joining two cables together.

Disadvantage of Bus Topology –

i) Cables fails then whole network fails.
ii) If network traffic is heavy or nodes are more the performance of the network decreases.
iii) Cable has a limited length.
iv) It is slower than the ring topology.

2) RING Topology – It is called ring topology because it connects one host (computer) to the next and the last host (computer) to the first. This creates a physical ring of cable.



Features of Ring Topology –

i) A number of repeaters are used for Ring topology with large number of nodes, because if someone wants to send some data to the last node in the ring topology with 100 nodes, then the data will have to pass through 99 nodes to reach the 100th node. Hence to prevent data loss repeaters are used in the network.
ii) Data is transferred in a sequential manner that is bit by bit. Data transmitted, has to pass through each node of the network, till the destination node.
iii) The transmission is unidirectional, but it can be made bidirectional by having 2 connections between each Network Node, it is called Dual Ring Topology.

Advantage of Ring Topology –

i) Cheap to install and expand.
ii) Transmitting network is not affected by high traffic or by adding more nodes.

Disadvantage of Ring Topology –

i) Troubleshooting is difficult in ring topology.
ii) Adding or deleting the computers disturbs the network activity.
iii) Failure of one computer disturbs the whole network.

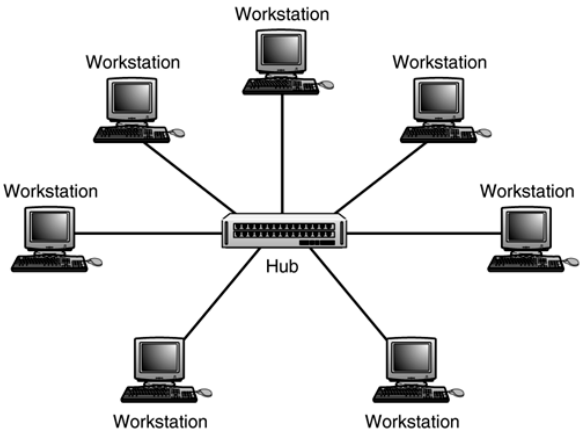
3) STAR Topology – In this type of topology all the computers are connected to a single hub through a cable. This hub is the central node and all others nodes are connected to the central node.

Features of Star Topology –

i) Every node has its own dedicated connection to the hub.
ii) Hub acts as a repeater for data flow.
iii) Can be used with twisted pair, Optical Fibre or coaxial cable.

Advantage of Star Topology –

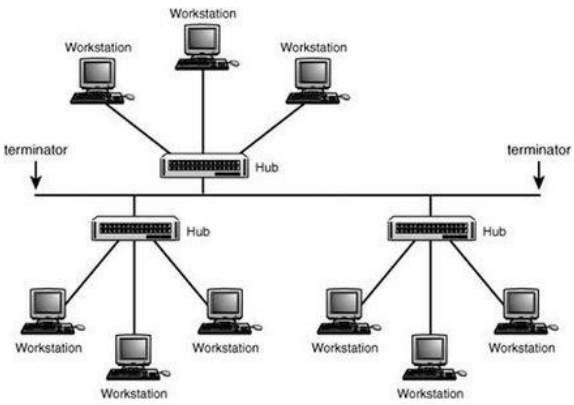
i) Fast performance with few nodes and low network traffic.
ii) Hub can be upgraded easily.
iii) Easy to setup and modify
iv) Easy to troubleshoot
v) Only that node is affected which has failed, rest of the nodes can work smoothly.



Disadvantage of Star Topology –

i) Cost of installation is high.
ii) Expensive to use.
iii) If the hub fails then the whole network is stopped because all the nodes depend on the hub.
iv) Performance is based on the hub that is it depends on its capacity.

4) TREE Topology – In this network all computers are connected like a Tree structure. It is the combination of Bus and Star Topology. It is also called hierarchical topology.



Features of Tree Topology –

i) Ideal if workstations are located in groups.
ii) Used in Wide Area Network.

Advantage of Tree Topology –

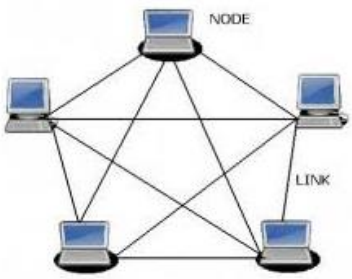
i) Extension of bus and star topologies.

ii) Expansion of nodes is possible and easy.
iii) Easily managed and maintained.
iv) Error detection is easily done.

Disadvantage of Tree Topology –

i) Heavily cabled.
ii) Expensive to use.
iii) If more nodes are added maintenance is difficult.
iv) Central hub fails, network fails.

5) MESH Topology – It is a point-to-point connection to other nodes or devices. All the network nodes are connected to each other. Mesh has **n(n-1)/2** physical channels to link **n** devices.



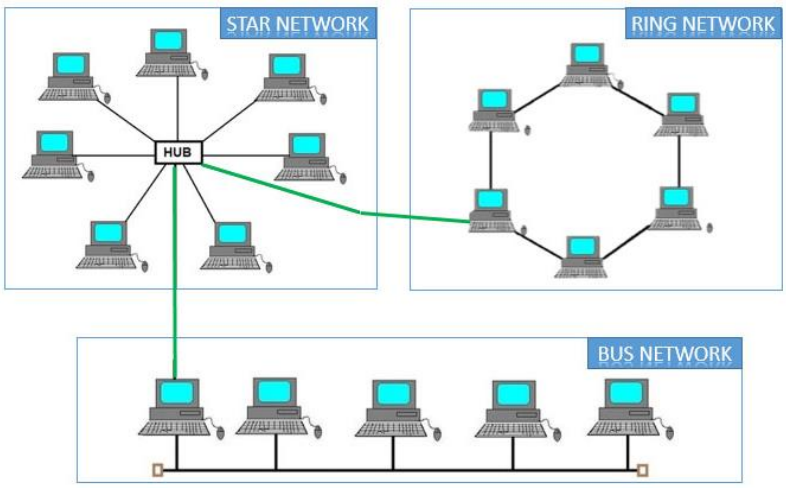
Advantage of Mesh Topology –

i) Can handle high amounts of traffic, because multiple devices can transmit data simultaneously.
ii) A failure of one device does not cause a break in the network or transmission of data.
iii) Adding additional devices does not disrupt data transmission between other devices.

Disadvantage of Mesh Topology –

i) The cost to implement is higher than other network topologies, making it a less desirable option.
ii) Building and maintaining the topology is difficult and time consuming.
iii) The chance of redundant connections is high, which adds to the high costs and potential for reduced efficiency.

6) HYBRID Topology – It is two different types of topologies which is a mixture of two or more topologies. For example if in an office in one department ring topology is used and in another star topology is used, connecting these topologies will result in Hybrid Topology (ring topology and star topology).



Features of Hybrid Topology –

i) It is a combination of two or topologies.
ii) Inherits the advantages and disadvantages of the topologies included.

Advantage of Hybrid Topology –

i) Reliable as Error detecting and trouble shooting is easy.
ii) Effective.
iii) Flexible.

Disadvantage of Hybrid Topology –

i) Complex in design.
ii) Costly.

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Q6 What is Protocol? Name some commonly used protocols in Internet. [2008]

Or

What are Protocols? Why they are used in Network? Explain. [2011]

Ans: – When computers communicate with each other, there needs to be a common set of rules and instructions that each computer follows. A specific set of communication rules is called a protocol.

Protocols are some common set of rules and regulations which are used to control or govern the whole communication system in network. Different types of protocols are –

1) HTTP Hyper Text Transfer Protocol
2) FTP File Transfer Protocol
3) SLIP Serial Line Internet Protocol
4) PPP Point to Point Protocol
5) TCP/IP Transmission Control Protocol/Internet Protocol
6) NTP Network Time Protocol
7) SMTP Simple Mail Transfer Protocol
8) POP Post Office Protocol
9) IMAP Internet Mail Access Protocol

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Q7 Define Web Browser.

Ans: – A Web Browser is software which used for displaying the content on web page(s). It is used by client to view web sites. Example of Web browsers– Google Chrome, Mozilla Firefox, Internet Explorer, Safari, Opera etc.

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Q8 Compare LAN and WAN. [2007]

Or

Compare advantages and drawback of LAN and WAN. [2012]

Ans: **–**

	LAN	**WAN**
1	LAN stands for Local Area Network.	WAN stands for Wide Area Network.
2	LANs have a high data transfer rate.	WANs have a lower data transfer rate compared to LANs.
3	Less congestion	More congestion
4	High bandwidth is available for transmission.	Low bandwidth is available for transmission.
5	It covers a relatively small geographical area.	It covers a relatively large geographical area.
	Ex: – Intranet, Ethernet	Ex: – Internet

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Q9 Name any 2 Network Protocol and compare them. [2015]

Ans: – Two computer protocols are –

1) **TCP –** TCP stands for Transmission Control Protocol. It is one of the main protocol in TCP/IP networks. The IP protocol deals only with packets whereas TCP enables two hosts (Client & Server) to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

   TCP is a Connection Oriented Protocol means it verify connection before data transfer. In this technique Client and Server establishes an end to end connection between each other before transferring the data. This technique is known as Hand Shaking.

2) **UDP –** UDP stands for User Datagram Protocol. It is a Connection Less Protocol means it does not verify connection before data transfer and also transfer data without connection establishment. UDP divides messages into packets called datagrams. UDP do not guarantees delivery of data.

	TCP	UDP
1	TCP stands for Transmission Control Protocol.	UDP stands for User Datagram Protocol.
2	TCP is a Connection Oriented Protocol.	UDP is a Connection Less Protocol.
3	Less data transfer speed.	High data transfer speed.
4	Establish connection before data transfer.	Do not establish connection before data transfer.
5	It is a highly reliable protocol.	It is unreliable protocol.
6	It takes acknowledgement of data and has the ability to retransmit if the user requests.	It neither takes acknowledgement, nor it retransmits the lost data.
	Ex: – Phone Calling	Ex: – Playing Video Games

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Q10 Mention the names of various Network Devices and their applications (uses). [2020]

Or

Name the different components of Computer Network. [2019]

Or

Name the different elements of Computer Network and explain all in brief. [2012]

Ans: – Computer Network devices are also known as network equipment or Networking hardware. These devices are required for communication and interaction between devices on a computer network.

The following devices can be used in a computer network –

1) **Hub –** In computer networking, a hub is a small, simple, low cost device that joins multiple computers or other network devices together. Most hubs can detect basic network errors such as collisions. USB hub is an example which allows multiple USB devices to be connected to one computer.

2) **Switch –** A Switch is a small hardware device that joins multiple computers together within one local area network (LAN).

   A switch prevents collisions by providing a circuit between the source and destination ports. Each port is allocated with a separate bandwidth; these separate circuits allow many conversations to take place at the same time, without collisions occurring.

3) **Repeater –** A Repeater (also called a signal booster or range extender) is a network device that amplify transmission signals when these signal become weaker due to long distance transmission.

4) **Bridge –** A bridge is a device that connects a local area network (LAN) to another local area network that uses the same protocol. The purpose of a bridge is to filter traffic on a LAN.

5) **Router –** A router connects networks. It acts as a dispatcher as it decides which way to send each information packet.

Network router can receive, analyze, perform the traffic directing functions and forwards data packet from one network to its destination node. A router is a device that forwards packets between networks.

6) **MODEM –** MODEM stands for MOdulation DEModulation. MODEMS are of two types –
   i) Internal Modem (Fixed with computer)
   ii) External Modem (Connect externally to computer)

MODEM is an Input–Output device. It is used in computer network. It is a device that converts Digital Signal into Analog Signal and Analog Signal into Digital Signal.

7) **Network Interface Card (NIC) –** A network interface controller is a computer hardware component that connects a computer to a computer network.

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Q11 Write difference between Protocol and Topology. [2014]

Ans: – When computers communicate with each other, there needs to be a common set of rules and instructions that each computer follows. A specific set of communication rules is called a protocol.

In computer networks, a topology is used to explain how a network is physically connected and the logical flow of information in the network. A topology mainly describes how devices are connected and interact with each other using communication links.

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Q12 What is File Transfer Protocol? Explain its importance. [2012]

Ans: – FTP stands for File Transfer Protocol. It is one of the oldest protocol. It is used to transfer files between Client and Server. Using FTP we can transfer files with high speed compare to other available techniques.

FTP is a protocol used to upload files from a Workstation (Client) to a FTP Server or download files from a FTP Server to a Workstation (Client).

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Q13 What is a spam mail?

Ans: – Spam Emails are email messages that are sent in bulk to internet users. The main motive behind sending a spam email is to advertise a product or service, or to distribute malicious content across the web.

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