# ASSIGNMENT 1

**COMPUTER NETWORKS**

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Q1. Discuss the concept of Networking, advantages, disadvantages and applications.

Ans.

**Computer Network:   
An interconnection of multiple devices, also known as hosts, that are connected using multiple paths for the purpose of sending/receiving data or media. It results in better performance with a high speed of processing.**

**ADVANTAGES OF NETWORK**

**1.Central Storage of Data –**   
Files can be stored on a central node (the file server) that can be shared and made available to each and every user in an organization.

2. **Faster Problem-solving –**   
Since an extensive procedure is disintegrated into a few littler procedures and each is taken care of by all the associated gadgets, an explicit issue can be settled in lesser time.

3.**It is highly flexible –**   
This innovation is known to be truly adaptable, as it offers clients the chance to investigate everything about fundamental things, for example, programming without influencing their usefulness.

**DISADVANTAGES OF NETWORK**

**1.Virus and Malware –**   
On the off chance that even one PC on a system gets contaminated with an infection, there is a possibility for alternate frameworks to get tainted as well. Infections can spread on a system effectively, in view of the availability of different gadgets.

**2 .Cost of the** **network –**   
The expense of executing the system including cabling and equipment can be expensive.

3. **It lacks independence –**   
PC organizing includes a procedure that is worked utilizing PCs, so individuals will depend on a greater amount of PC work, rather than applying an exertion for their jobs that needs to be done. Besides this, they will be subject to the primary document server, which implies that, in the event that it separates, the framework would end up futile, making clients inactive. 

**Applications of computer networks**

**1. Resource Sharing**

  Resource sharing is an application of a computer network. Resource sharing means you can share one Hardware and Software among multiple users. Hardware includes printers, Disks, Fax Machines, etc. Computing devices. And Software includes Atom, Oracle VM Virtual Box, Postman, Android Studio, etc.

**2. Information Sharing**

  Using a Computer network, we can share Information over the network, and it provides Search capabilities such as WWW. Over the network, a single information can be shared among the many users over the internet.

**3. Communication**

  Communication includes email, calls, message broadcast, electronic funds transfer system etc.

**4. Entertainment Industry**

 In Entertainment industry also uses computer networks widely. Some of the Entertainment industries are Video on demand, Multi person real-time simulation.

Q2. Discuss the peer-to-peer connections and multipoint connection.

Ans.

|  |  |  |
| --- | --- | --- |
| **Basis** | **Point-to-Point Connection** | **Multipoint Connection** |
| **Meaning** | A method where two communication devices get connected with each other forming a link between them. | A method where more than two communication devices get linked to each other forming a relationship between them. |
| **Linkage** | A proper link between two devices exists. | Stay connected at all times as they share the connection. |
| **Capacity** | The capacity of the system remains same. | Become shared on a temporary basis. |
| **Objects** | One transmitter and one receiver. | One transmitter and multiple receivers. |
| **Systems** | phone lines, rink line, mobile phone networks, digital cable, radio signals, and fiber optics. | Online working, offices, organizations, shared networks. |
| **Example** | Frame Relay, T-carrier, X.25 | Frame Relay, token ring, Ethernet, ATM. |

Q3. Discuss the components required to make a computer network.

Ans.

Computer networks components comprise both physical parts as well as the software required for installing computer networks, both at organizations and at home. The hardware components are the server, client, peer, transmission medium, and connecting devices. The software components are operating system and protocols.

**Hardware Components**

**Servers** −Servers are high-configuration computers that manage the resources of the network. The network operating system is typically installed in the server and so they give user accesses to the network resources. Servers can be of various kinds: file servers, database servers, print servers etc.

**Clients** − Clients are computers that request and receive service from the servers to access and use the network resources.

**Peers**− Peers are computers that provide as well as receive services from other peers in a workgroup network.

**Transmission Media** − Transmission media are the channels through which data is transferred from one device to another in a network. Transmission media may be guided media like coaxial cable, fibre optic cables etc; or maybe unguided media like microwaves, infra-red waves etc.

**Connecting Devices** − Connecting devices act as middleware between networks or computers, by binding the network media together. Some of the common connecting devices are:

             a. Routers

             b. Bridges

             c. Hubs

             d. Repeaters

             e. Gateways

              f. Switches

**Software Components**

**Networking Operating System** − Network Operating Systems is typically installed in the server and facilitate workstations in a network to share files, database, applications, printers etc.

**Protocol Suite** − A protocol is a rule or guideline followed by each computer for data communication. Protocol suite is a set of related protocols that are laid down for computer networks. The two popular protocol suites are −

a. OSI Model ( Open System Interconnections)

 b. TCP / IP Model

Q4. Discuss the types of networks as LAN, WAN and MAN.

Ans.

|  |  |  |  |
| --- | --- | --- | --- |
| **Basis of Comparison** | **LAN** | **MAN** | **WAN** |
| Full Form | LAN stands for Local Area Network. | MAN stands for Metropolitan Area Network. | WAN stands for Wide Area Network. |
| Definition | It is the type of networking system in which systems are very near to each other. This system is generally in a single office, building or home. | It is a type of networking system in which two or more LANs are communicated. It is located in a vast geographical area. | This networking system has many connections, and these are associated with various companies or organizations at an equivalent time. |
| Ownership of Network | LAN is under the complete control of the owner, i.e., Private. | The ownership of the network can be private or public. | The ownership of the network can be private or public. |
| Speed | Data transmission speed is high. | Data transmission speed is average. | Data transmission speed is low. |
| Maintenance and Design | It can be easy to design and maintain. | It is tough to maintain. | It is tough to maintain. |
| Operational Speed | Its operational speed usually is 10,100 and 1000 Mbps. | Its operational speed usually is 1.5 Mbps, and it may be very at the wireless network. | Its operation is speed usually is 100 Mbps. |
| Fault Tolerance | There is higher fault tolerance in LAN. | There is smaller fault tolerance. | There is smaller fault tolerance. |

Q5. Differentiate between physical and logical topologies.

Ans:

| **Physical Topology** | **Logical Topology** |
| --- | --- |
| Physical Topology means the physical layout of the network. | Logical topology means how the network device layout will be shown and how the data will be transferred. |
| For example − Ring, Bus, Star, and Mesh. | For example − Ring and Bus. |
| In this topology, we are concerned with how data will be transferred from the actual path. | This topology is concerned with the high-level representation of the data transfer. |
| As per the requirement, we can modify the layout of the network. | There is no change accepted. |
| It can affect cost, bandwidth, scalability etc. | It can affect data delivery. |
| Types of physical topologies are star, mesh, bus, and ring. | Types of logical topologies are logical bus, and logical ring. |
| It is an actual route concerned with transmission. | It is a high level representation of data flow. |
| Physical connection of the network. | Data path followed on the network. |

Q6. List the different types of networks from surroundings as client-server network, distributed networks, peer-to-peer networks and cloud based networks.

# Ans: Client and Server model

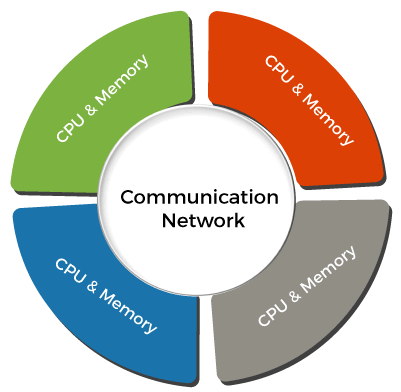
* A client and server networking model is a model in which computers such as servers provide the network services to the other computers such as clients to perform a user based tasks. This model is known as client-server networking model.
* The application programs using the client-server model should follow the given below strategies:

#### Client and Server model

# Distributed Operating System

A distributed operating system **(DOS)** is an essential type of operating system. Distributed systems use many central processors to serve multiple real-time applications and users. As a result, data processing jobs are distributed between the processors.

It connects multiple computers via a single communication channel. Furthermore, each of these systems has its own processor and memory. Additionally, these **CPUs** communicate via high-speed buses or telephone lines. Individual systems that communicate via a single channel are regarded as a single entity. They're also known as **loosely coupled systems**.



# Computer Network Architecture

Computer Network Architecture is defined as the physical and logical design of the software, hardware, protocols, and media of the transmission of data. Simply we can say that how computers are organized and how tasks are allocated to the computer.

**The two types of network architectures are used:**

* Peer-To-Peer network
* Client/Server network

Q7. Discuss the concept of Network Topologies.

Ans:

A network topology is the physical and logical arrangement of nodes and connections in a network. Nodes usually include devices such as switches, routers and software with switch and router features. Network topologies are often represented as a graph.

Network topologies describe the arrangement of networks and the relative location of traffic flows. Administrators can use network topology diagrams to determine the best placements for each [node](https://www.techtarget.com/searchnetworking/definition/node) and the optimal path for traffic flow. With a well-defined and planned-out network topology, an organization can more easily locate faults and fix issues, improving its data transfer efficiency.

Network geometry can be defined as the physical topology and the logical topology. Network topology diagrams are shown with devices depicted as network nodes and the connections between them as lines. The type of network topology differs depending on how the network needs to be arranged.

Q8. Protocols and their usage e.g. TCP/IP, http, https, ftp.

1. **Transmission Control Protocol (TCP):** TCP is a popular communication protocol which is used for communicating over a network. It divides any message into series of packets that are sent from source to destination and there it gets reassembled at the destination.
2. **Internet Protocol (IP):** IP is designed explicitly as addressing protocol. It is mostly used with TCP. The IP addresses in packets help in routing them through different nodes in a network until it reaches the destination system. TCP/IP is the most popular protocol connecting the networks.
3. **Hyper Text Transfer Protocol (HTTP):** HTTP is designed for transferring a hypertext among two or more systems. HTML tags are used for creating links. These links may be in any form like text or images. HTTP is designed on Client-server principles which allow a client system for establishing a connection with the server machine for making a request. The server acknowledges the request initiated by the client and responds accordingly
4. **Hyper Text Transfer Protocol Secure (HTTPS):** HTTPS is abbreviated as Hyper Text Transfer Protocol Secure is a standard protocol to secure the communication among two computers one using the browser and other fetching data from web server. HTTP is used for transferring data between the client browser (request) and the web server (response) in the hypertext format, same in case of HTTPS except that the transferring of data is done in an encrypted format
5. **File Transfer Protocol (FTP):**FTP allows users to transfer files from one machine to another. Types of files may include program files, multimedia files, text files, and documents, etc.