Introduction to Networks

Short Answer Type Questions

Q-1. Which Technologies of this age had led to the emergence of computer network?

Ans: The technologies are Computer technology and Communication technology with the support of VLSI Technology.

Q-2. What are the two broad classifications under which Networks can be divided?

Ans: All computer networks fit in one of the two dimensions namely:

a) Transmission Technology, this focuses on the basic underlying physical network, for e.g. whether the nodes share a communication media or each pair of node has a separate dedicated link.

b) Scale, it focuses on the scale of network how large is your network.

Q3. Mention different categories of computer networks (on the basis of scale) and distinguish one from the other.

Ans: Local Area Network (LAN): It is privately owned communication systems that cover a small area, say a building or a complex of buildings. Length is about 10 meters to few kilometers and operates at a high speed like 10 MBPS to 1000 MBPS. It has very low error rate.

Metropolitan Area Network (MAN): It is public or privately owned communication system that typically covers a complete city. Speed is about 10 MBPS and follows DQDB (Distributed Queue Double Bus) standard. Its reliability is moderate.

Wide Area Network (WAN): It covers a large geographical area and usually owned by a state. Data transfer rate is low (few KBPS to 10 MBPS) and error rate is much higher.

Q4. What are the two types of Transmission technologies, basis on which computer networks can be categorized?

Ans: Broadly there are two types of transmission technology:

1. Broadcast networks: a single communication channel that is shared by all the machines on the network

2. Point-to-point networks: This network consists of many connections between individual pairs of machines. To go from the source to destination a message (or packet) may have to visit one or more intermediate machines

Q5. What is Internet?

Ans: Internet is a collection of networks or network of networks. Various networks such as LAN and WAN connected through suitable hardware and software to work in a seamless manner. It allows various applications such as e-mail; file transfer, remote log-in, World Wide Web, Multimedia, etc run across the internet.

Q6. How do you account for higher reliability and scalability of computer network?

Ans: Computer network can have a large number of computers, which can share software, database and other resources. In the event of failure of one computer, its workload can be taken over by other computers. So, it provides higher reliability than centralized computing system.

Requirement of software, hardware, database etc. increases gradually. In centralized computing system, if one computer is not able to serve the purpose, we have to replace it by new one. Replacement of new computer requires lot of investment and effort, which can be avoided in computer network system. If there is need for more, one can buy another powerful computer, add it to computer network and use it. The various resources like computers, peripherals, etc. can be added in a scalable manner.

Q7. Mention important benefits of computer network.

Ans: Important benefits of computer networks are:

- Resource sharing
- Powerful communication medium
- Higher reliability
- Higher flexibility
- Lower cost
- Incremental expansion

Q8. What are the main categories based on which applications of computer network can be categorized?

Ans: The main areas under which the applications for computer network can be categorized are as follows:

Scientific and Technical Computing

–Client Server Model, Distributed Processing

–Parallel Processing, Communication Media

Commercial

–Advertisement, Telemarketing, Teleconferencing

–Worldwide Financial Services

Network for the People (this is the most widely used application nowadays)

–Telemedicine, Distance Education, Access to Remote Information, Person-to-Person Communication, Interactive Entertainment

Q9 How is computer networks used in marketing and sales, financial services, teleconferencing?

Ans: Computer network have led to a new age of all of these services. They have helped in the following way to individual sector:

Marketing and sales: Computer networks are used extensively in both marketing and sales organizations. Marketing professionals use them to collect, exchange, and analyze data related to customer needs and product development cycles. Sales application includes teleshopping, which uses order-entry computers or telephones connected to order processing network, and online-reservation services for hotels, airlines and so on.

Financial services: Today's financial services are totally depended on computer networks. Application includes credit history searches, foreign exchange and investment services, and electronic fund transfer, which allow user to transfer money without going into a bank (an automated teller machine is an example of electronic fund transfer, automatic pay-check is another).

Teleconferencing: Teleconferencing allows conference to occur without the participants being in the same place. Applications include simple text conferencing (where participants communicate through their normal keyboards and monitor) and video conferencing where participants can even see as well as talk to other fellow participants. Different types of equipments are used for video conferencing

depending on what quality of the motion you want to capture (whether you want just to see the face of other fellow participants or do you want to see the exact facial expression).

Q10. Why it is necessary to have layering in a network?

Ans: A computer network is a very complex system. It becomes very difficult to implement as a single entity. The layered approach divides a very complex task into small pieces each of which is independent of others and it allow a structured approach in implementing a network. The basic idea of a layered architecture is to divide the design into small pieces. Each layer adds to the services provided by the lower layers in such a manner that the highest layer is provided a full set of services to manage communications and run the applications.

Q11. What are the key benefits of layered network?

Ans: Main benefits of layered network are given below:

- Complex systems can be broken down into understandable subsystems.
- Any facility implemented in one layer can be made visible to all other layers.
- Services offered at a particular level may share the services of lower level.
- Each layer may be analyzed and tested independently.
- Layers can be simplified, extended or deleted at any time.
- Increase the interoperability and compatibility of various components build by different vendors.

Q12. What do you mean by OSI?

Ans: The Open System Interconnection (OSI) reference model describes how information from a software application in one computer moves through a network medium to a software application in another computer. The OSI reference model is a conceptual model composed of seven layers, each specifying particular network functions. The model was developed by the International Standardization Organization (ISO) in 1984, and it is now considered the primary architectural model for inter-computer communications.

Q13. What are the seven layers of ISO's OSI model?

Ans:- The seven layers are:

- Application Layer
- Presentation Layer

- Session Layer
- Transport Layer
- Network Layer
- Data Link Layer
- Physical Layer

Q14. Briefly write functionalities of different OSI layers?

Ans: The OSI Reference Model includes seven layers. Basic functionality of each of them is as follows:

1. Physical Layer: Controls the transmission of the actual data onto the network cable. It defines the electrical signals, line states and encoding of the data and the connector types used. An example is 10BaseT.

2. Data-Link Layer: This layer takes the data frames or messages from the Network Layer and provides for their actual transmission. At the receiving computer, this layer receives the incoming data and sends it to the network layer for handling. The Data-Link Layer also provides error-free delivery of data between the two computers by using the physical layer. It does this by packaging the data from the Network Layer into a frame, which includes error detection information. At the receiving computer, the Data-Link Layer reads the incoming frame, and generates its own error detection information based on the received frames data. After receiving the entire frame, it then compares its error detection value with that of the incoming frames, and if they match, the frame has been received correctly.

3. Network Layer: This is responsible for addressing messages and data so they are sent to the correct destination, and for translating logical addresses and names (like a machine name FLAME) into physical addresses. This layer is also responsible for finding a path through the network to the destination computer.

4. Transport Layer: Ensures that data is delivered error free, in sequence and with no loss, duplications or corruption. This layer also repackages data by assembling long messages into lots of smaller messages for sending, and repackaging the smaller messages into the original larger message at the receiving end.

5. Session Layer: Allows two applications to establish, use and disconnect a connection between them called a session. Provides for name recognition and additional functions like security, which are needed to allow applications to communicate over the network.

6. Presentation Layer: Determines the format used to exchange data among networked computers.

7. Application Layer: Provides Applications with access to network services.

Q16. How two adjacent layers communicate in a layered network? (or What do you mean by Service Access Point?)

Ans: In layered network, each layer has various entities and entities of layer i provide service to the entities of layer i+1. The services can be accessed through service access point (SAP), which has some address through which the layer i+1 will access the services provided by layer.

Q17. What are the key functions of data link layer?

Ans: Data link layer transfers data in a structured and reliable manner so that the service provided by the physical layer is utilized by data link layer. Main function of data link layer is framing and media access control.

Q18. What do you mean by Protocol?

Ans: In the context of data networking, a protocol is a formal set of rules and conventions that governs how computers exchange information over a network medium. A protocol implements the functions of one or more of the OSI layers.