Made by vu £lon musk files
CS601 Mid-term Notes
Lec 1 to 113

LECTURE #1 Introductions to Data Communications

Communication:

Sharing of Information (Local or remote)

Telecommunications:

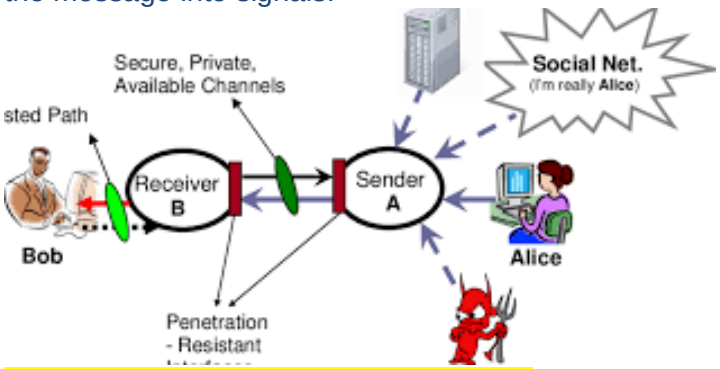
Communication at a Distance (includes telephony, telegraph, and television etc.)

Data communications:

"Data Communication is the exchange of data (in the form of 0's and 1's) between two devices (computers) via some form of the transmission medium."

A Simple Communication Model

In a simple model, often referred to as the **transmission model or standard view of communication**, information or content is sent in some form (as spoken language) from an transmitter/emisor/sender/encoder to a receiver/decoder. A transmitter, which encodes the message into signals.



LOCAL and REMOTE Data Communication

LOCAL Data communication

is considered to be local if the communicating devices are present in the same building or a similarly restricted geographical area.

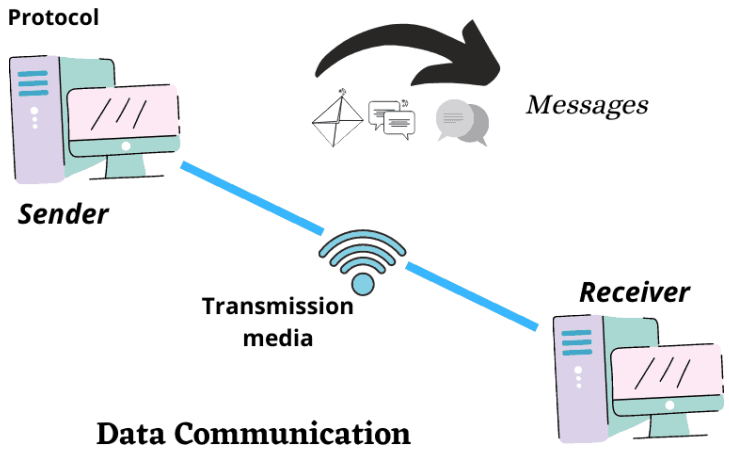
REMOTE Data

Communication is considered remote, if the devices are farther apart.

Effectiveness of a Data Communication System:

The effectiveness of a data communications system depends on four fundamental characteristics:

delivery, accuracy, timeliness, and jitter.



Data Communication

Components of a Data Communication system

A data communications system has five components.

- Message
- Sender
- Receiver
- Medium
- Protocol

Message

A message (verbal or nonverbal, or both) is the content of the communication process. The originator of the message in the communication process is the sender. In short anything that can be represented using binary bits.

- Files (meaningful collections of records)
- Data/information requests (database queries, Web page requests, etc.)
- Responses to requests and commands or error messages
- Status messages (about the network's functional status)
- Control messages transmitted between network devices to control network traffic
- Correspondence among network users

SENDER

A source or sender is one of the basic concepts of communication and information processing. Sources are objects which encode message data and transmit the information, via a channel, to one or more observers.

RECEIVER

In the communication process, the "receiver" is **the listener, reader, or observer**—that is, the individual (or the group of individuals) to whom a message is directed. The receiver is also called the "audience" or decoder.

Medium

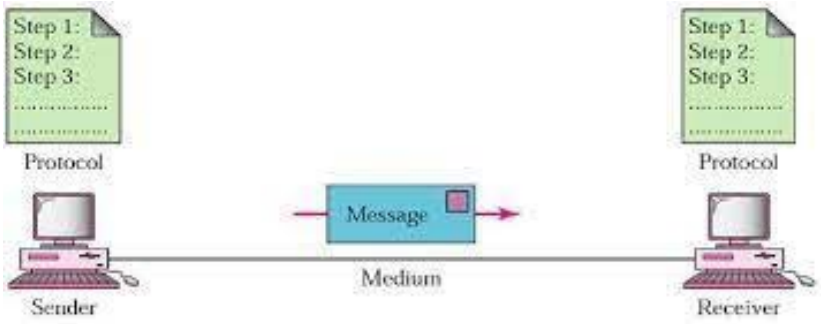
In the communication process, a medium is **a channel or system of communication**—the means by which information (the message) is transmitted between a speaker or writer (the sender) and an audience (the receiver). The plural form is media, and the term is also known as a channel.

PROTOCOL

A communication protocol is **a system of rules that allows two or more entities of a communications system to transmit information via any kind of variation** of a physical quantity. The protocol defines the rules, syntax, semantics and synchronization of communication and possible error recovery methods.

An Actual Digital Data Communication System Key Data Communication Terminology

- Session: communication dialog between network users or applications Different Types of this session for Info Exchange. ™
- Network: interconnected group of computers and communication devices we will look into it in a little bit.™
- Node: a network-attached device Node can be any device in the network.



LECTURE #2

KEY DATA COMMUNICATION TERMINOLOGY

- Link: connects adjacent nodes Wires, Cables, Anything that physically connects two nodes ™Path: end-to-end route within a network ™
- Circuit: the conduit over which data travels ™
- Packetizing: dividing messages into fixed-length packets prior to transmission over a network's communication media ™
- Routing: determining a message's path from sending to receiving nodes The transmission medium may itself be a network, so route needs to be specified

Network

"A NETWORK is a set of devices (Nodes) connected by Communication Links"

- Node: Can be a Computer, Printer or any other device capable of sending or receiving.

Two Main Classifications of the Networks

- LANS
- WANS

DISTRIBUTED PROCESSING

Instead of a single large machine being responsible for all aspects of a process, each separate computer handles a subset of the task.

Example – Office Work

Advantages of Distributed Processing

- Security

  A system designer can limit the kind of interaction that a given user can have with the entire

system.

For example : Bank’s ATM ™

- Distributed
  Data bases No one system need to provide storage capacity for the entire database
  For example WWW gives user access to pages stored anywhere on Internet ™
- Faster
  Problem Solving Multiple computers working on a problem can solve a problem faster than a computer working alone ™
- Security through Redundancy
  Multiple computers running the same program provides security through redundancy if one computer hardware breaks down then others cover up. ™
- Collaborative
  Processing Both multiple computers and multiple users can interact for a task

Network Criteria

A network must be able to meet a certain number of criteria:

- Performance
  - Throughput
  - Delay
- Reliability
- Security

Performance

Can be measured in many ways including Transit and Response Time

Depends on a no. of Factors:

- Number of USERS
- Type of Transmission Medium
- Hardware
- Software
- Network Criteria

Reliability

Depends on a no. of Factors:

- Frequency of Failure
- Recovery Time of a Network after Failure
- Catastrophe
- Fire , Earthquake or Theft

Security

Unauthorized Access

- Sensitive data
- Protection at multiple levels:
- Lower level: Passwords and user ID codes
- Upper Level: Encryption

Lecture No # 3

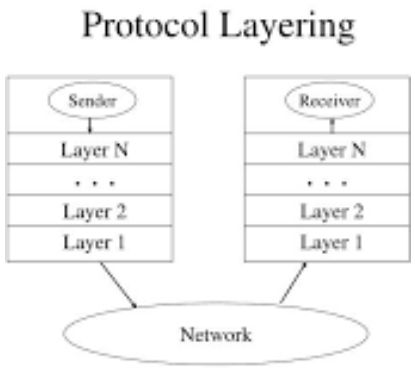
Protocol

Rules that both the sender and receiver and all intermediate devices need to follow to be able to

communicate effectively

Protocol Layering

Simple Communication: only one simple protocol Complex Communication, we need a protocol at each layer, or Protocol Layering.



Protocol Layering - Advantages and Disadvantages

Advantages

- Modularity
- Separation of Service & Implementation
- Reduced Complexity & Cost

Disadvantages

- None Really!

Protocol Layering Principles

Two Principles

- Bidirectional Communication ⟶ Each Layer performs two opposite tasks in each direction
- Two objects under each layer at both sites should be identical

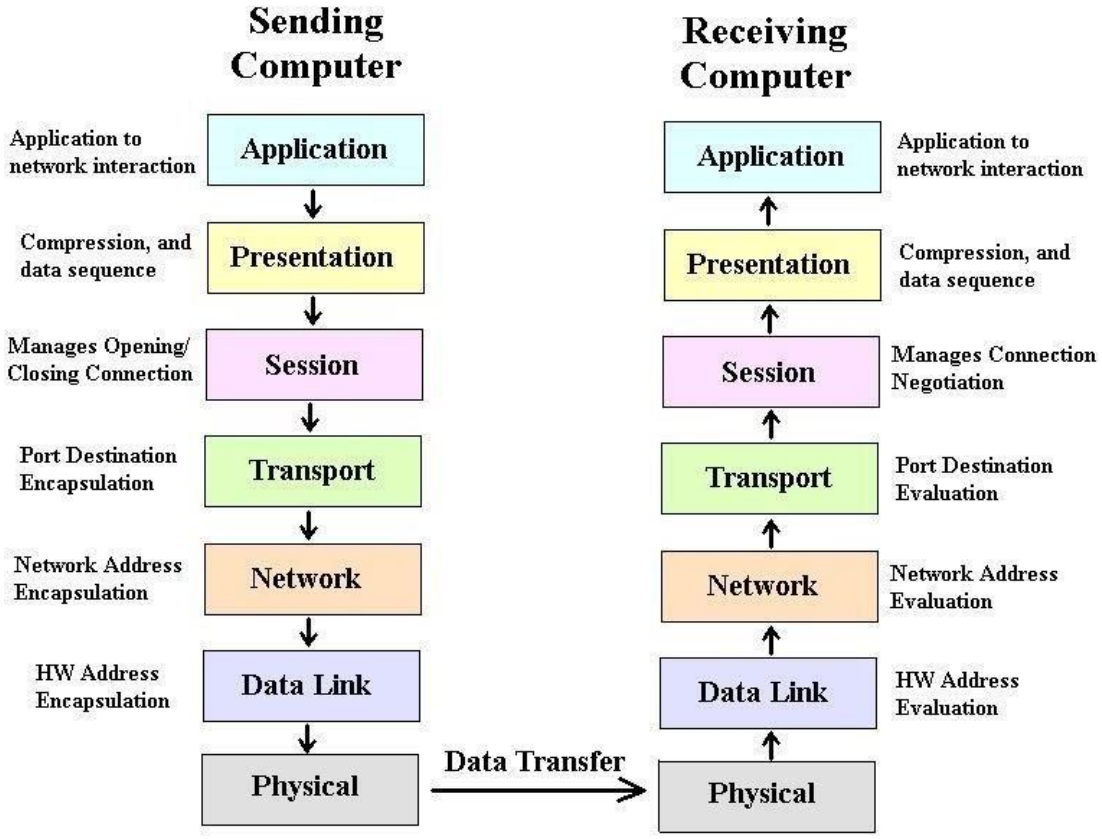
Protocol Layering Logical Connections

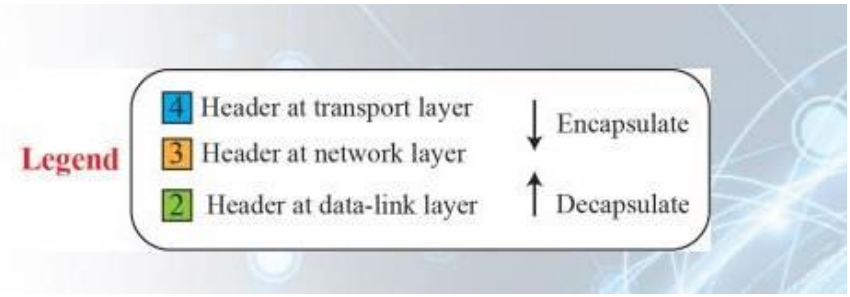
- Imaginary connection between each layer

TCP/IP Protocol Suite

- Protocol suite used in Internet today
- Each Layer provides specific functionality
- Hierarchical Protocol
- Presented in 1973 and chosen to be the official protocol of Internet in 1983

Network Layer Interaction





What do we mean by the term session?

Session is the period of time a user interfaces with an application. The user session begins when the user accesses the application and ends when the user quits the application.

How can I define Data communication?

Data Communication is the exchange of data (in the form of 0's and 1's) between two devices (computers) via some form of the transmission medium. Data communication is communication between computers. Data communication concerns the exchange of digital data between computers. Nowadays, data communication between computers also supports digital speech telephone and videophone, thus supporting direct communication between people.

How could it be more secure using distributed processing?

In this case security is achieved by providing the user with limited access. It means that user can only perform those tasks which are allowed by system designer. Its' simple example is bank's ATM. Where user can't perform operations on database other than provided.

What does the terms transit and response time mean? Also tell me about the topic peak load periods.

Transit time is the time taken by the message to travel from source to destination. Response time is the time of response (acknowledgement) from destination to source. Peak load periods are those periods of time in which number of users on a network are more than normal time.

What are the advantages of networking?

- Files can be stored on a central computer (the file server) allowing data to be shared throughout an organization.
- Files can be backed up more easily when they are all on a central fileserver rather than when they are scattered across a number of independent workstations.
- Networks also allow securityto be established, ensuring that the network users may only have access to certain files and applications.
- Software and resources can be centrally managed.
- Network versions of software often allow for their speedy installation on workstations from the file server.
- Expensive devices such aslaser printers or scanners can be shared.
- Users can access their files from any workstation

What are different factors to choose a network topology?

Working conditions of network, working scenarios, arrangement of links and devices. Depending upon our network what actually we are dealing withand in which geographical area our devices are present, small area available or have large area. All these factors are considered when choosing a Topology.

What is the relative status of the devices to be linked?

The geographical area in which our devices are present is the relative statusof devices.

What is the definition of Hub?

Hub is a common connection point for devices in a network. Hubs are commonly used to connect segments of a LAN. A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets. A passive hub serves simply as a conduit for the data, enabling it to go from one device (or segment) to another. So-called intelligent hubs include additional features that enable an administrator to monitor the traffic passing through the hub and to configure each port in the hub. Intelligent hubs are also called manageable hubs. A third type of hub, called a switching hub, actually reads the destination address of each packet and then forwards the packet to the correct port.

What do we mean by "TAP"?

A tap is a connection to a coaxial cable in which a hole is drilled through theouter shield of the cable so that a clamp can be connected to the inner conductor of the cable. Instead of cutting the cable and attaching connectors to both ends of the severed coaxial cable,

Give some detail about "fault tolerance".

Fault tolerance means the system will not fail because any one component fails. The system also should provide recovery from multiple failures. Components are often over engineered or purposely underutilized to ensure that while performance may be affected during an outage the system will perform within predictable, acceptable bounds.

What is PDU in OSI Model?

Normally a communication request originates at the highest layer (Application Layer). The request is passed down through the lower layers in the form of a packet called a protocol data unit (PDU). Layers in the protocol stack communicate with their adjacent layers via one or moreService Access Points (SAP). Each succeeding layer in the stack adds itsown information to the PDU that will be read by its counterpart (peer) layer on the receiving system. Once the data arrives at the lower layers, the PDUis encoded into data frames and placed onto the cable for transmission. The data frames make their way to the receiving system and the entire process is reversed as the PDU makes its way up the protocol stack. As it moves up the stack, each layer "unwrap" the PDU and receives the information from its peer layer on the sending system.

What is the difference between radio and microwave?

Although there is no clear-cut demarcation between radio and microwave, electromagnetic waves ranging in frequencies between 3 KHz and 1 GHz are normally called radio waves; waves ranging in frequencies between 1 GHz and 300 GHz are called microwaves. Radio waves are used for multicast communications, such as radio and television systems.

What is the difference between internet and intranet?

Internet The Internet is a system of linked networks that are worldwide in scope and facilitate data communication services such as remote login, file transfer, electronic mail, the World Wide Web and newsgroups. With the meteoric rise in demand for connectivity, the Internet has become a communications highway for millions of users. The Internet was

initially restricted to military and academic institutions, but now it is a full-fledged conduit for any and all forms of information and commerce. Internet websites now provide personal, educational, political and economic resources to every corner of the planet.

Intranet A network based on TCP/IP protocols (an internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with authorization. An intranet's Web sites look and act just like any other Web sites, but the firewall surrounding an intranet fends off unauthorized access. Like the Internet itself, intranets are used to share information. Secure intranets are now the fastest-growing segment of the Internet because they are much less expensive to build and manage than private networks based onproprietary protocols.

What is the difference between hub and switch?

On the outside, hubs and switches appear very similar in that they both havea number of RJ-45 jacks for connecting devices. Inside, however, they work very differently. To understand why switches provide so much more functionality than hubs, you must understand a fundamental limitation of (non-switched) Ethernet: there can only be one device transmitting on a segment at any given time. If two or more devices attempt to transmit at the same time, a collision occurs. (In fact, an Ethernet segment where only one conversation can occur is called a collision domain.) After a collision, all devices must retransmit. As you can imagine, as the number of devices on an Ethernet segment increases, the probability for collisions increase. Because devices must spend more time retransmitting data, the network is perceived to be slow. Before the advent of switches, a network could be divided into segments with a device called a bridge. Bridges have two Ethernet ports. As traffic flows through a network, a bridge learns which devices (identified by the MAC or "hardware" address) are on each side. Thebridge then makes decisions to forward or not forward each packet to the other side based on where the destination device is located. A bridge thus divides a network into two collision domains, allowing two independent "conversations" to occur. If a bridge is placed intelligently (e.g., separating two departments and their respective file servers), they can improve network efficiency. Hubs do no processing on network traffic--they simply repeat theincoming signal to all available ports. On a switch, every port acts as a bridge. If each switch port is connected to a single device, each device can,in principle, act independently of every other device. For example, considera switch with the following devices attached: computer 1 computer 2 computer 3 printer file server uplink to the Internet In this case, computer 1 could be printing a document, while computer 2 connects to a files server, while computer 3 accesses the Internet. Because the switch intelligently forwards traffic only to the devices involved, there can be multiple independent simultaneous conversations.

How different layers of OSI model are implemented?

The OSI 7 layers model has clear characteristics. Layers 7 through 4 deal with end to end communications between data source and destinations. Layers 3 to 1 deal with communications between network devices. On the other hand, the seven layers of the OSI model can be divided into two groups: upper layers (layers 7, 6 & 5) and lower layers (layers 4, 3, 2, 1). The upper layers of the OSI model deal with application issues and generally are implemented only in software. The highest layer, the application layer, is closest to the end user. The lower layers of the OSI model handle data transport issues. The physical layer and the data link layer are implemented in hardware and software. The

lowest layer, the physical layer, is closest to the physical network medium (the wires, for example) and is responsible for placing data on the medium.

What is the difference between WAP and GPRS?

Wireless Application Protocol, a secure specification that allows users to access information instantly via handheld wireless devices such as mobile phones. Wireless

Application Protocol (or WAP) is envisioned as a comprehensive and scalable protocol designed to use with mobile phones using Short Message Services (SMS), General Packet Radio Services (GPRS), CDMA and GSM.

What are routers, repeaters and bridges?

Router: Routers relay packets among multiple interconnection networks. Router is device that determines the next network point to which a data packet should be forwarded enroute toward its destination. Routers create or maintain a table of the available routes and use this information to determinethe best route for a given data packet.

What do we mean by capacity of the channel?

Channel capacity: The maximum possible information transfer rate througha channel, subject to specified constraints.

What is remote data communication?

Data Communication is considered remote, if the devices are farther apart.

Explain VPN (Virtual Private Network

A virtual private network (VPN) is a way to use a public telecommunication infrastructure, such as the Internet, to provide remote offices or individual users with secure access to their organization's network. A virtual private network can be contrasted with an expensive system of owned or leased lines that can only be used by one organization. The goal of a VPN is to provide the organization with the same capabilities, but at a much lowercost.

Define encryption of data.

Encryption of data: The translation of data into a secret code. Encryption is the most effective way to achieve data security. To read an encrypted file, you must have access to a secret key or password that enables you to decryptit. Unencrypted data is called plain text; encrypted data is referred to as cipher text.

Can we implement OSI in wireless networks?

Wireless Application Protocol (WAP), a secure specification that allows users to access information via handheld wireless devices, specifies architecture based on layers that follow the OSI model fairly closely. WAP defines network architecture for content delivery over wireless networks. Central to the design of WAP is a network stack based on the OSI model. WAP implements several new networking protocols that perform functions similar to the well-known Web protocols HTTP, TCP, and SSL.

What is distributed processing?

It refers to any of a variety of computer systems that use more than one computer, or processor, to run an application. This includes parallel processing, in which a single

computer uses more than one CPU to execute programs. More often, however, distributed processing refers to local-area networks (LANs) designed so that a single program can run simultaneously at various sites. Most distributed processing systems contain sophisticated software that detects idle CPUs on the network and parcels out programs to utilize them. Another form of distributed processing involves distributed databases, Databases in which the data is stored across two or more computersystems. The database system keeps track of where the data is so that the distributed nature of the database is not apparent to users.

What is a sample?

Sample is the amplitude of an analog signal at some specific interval. It is achieved in pulse amplitude modulation, which is the first step towards analog to digital conversion.

What Is Line Discipline?

Whatever the system, no device in it should be allowed to transmit until that device has evidence that the intended receiver is able to receive and is prepared to accept the transmission. What if the receiver does not expect a transmission, is busy, or is out of commission? With no way to determine the status of intended receiver, the transmitting device may waste its time sending data to a nonfunctioning receiver or may interfere with signals already on the link. The line discipline function of the data link layer oversees the establishment of links and the right of a particular device to transmit at a given time. Line discipline answers the question. Who should send now?

Is it possible for digital data to be transmitted via ordinary phone line?

The Digital Subscriber line (DSL) is a newer technology that uses the existing telecommunication networks such as the local loop telephone line (still an analog line) to accomplish high speed delivery of data, voice, video and multimedia.

What is then difference between T-lines and E-Lines?

Europeans use a version of T lines called E lines. The two systems areconceptually identical, but their capacities differ.

What do we mean by wireless networking?

The term wireless networking refers to technology that enables two or more computers to communicate using standard network protocols, but without network cabling. Strictly speaking, any technology that does this could be called wireless networking. The current buzzword however generally refers to wireless LANs.

How can we define networking?

In information technology, networking is the construction, design, and useof network, including the physical (cabling, hub, bridge, switch, router, and so forth), the selection and use of telecommunication protocol and computer software for using and managing the network, and the establishment of operation policies and procedures related to the network

Define Protocols

Protocol is an agreed-upon format for transmitting data between two devices. The protocol determines the following: 1) The type of error checking to be used. 2) Data compression method, if any. 3) How thesending device will indicate that it has finished sending a message? 4) How the receiving device will indicate that it has received a message?

What is Tx and Rx?

Tx is the abrivation used for transmission/ transmitor and Rx is reciever.

What is walkie talkie?

A handie talkie, often referred to by its abbreviation, HT, is a handheld, portable two-way radio transceiver. This type of radio is sometimes called a "walkie talkie" or a "handheld." Handie talkies are popular among amateur radio operators, especially on their VHF and UHF bands at 144 and 432 MHz. Handie talkies are widely used by security personnel, military personnel, and police officers. Most HTs are used in conjunction with repeaters for extended range. Some HTs are designed for the 27-MHz Citizens Band (CB) radio service. A typical HT is a rectangular box about the size and weight of an old-fashioned telephone handset. The antenna protrudes from the top end, and consists of a coiled-up element encased in rubber and wound around a flexible rod. This type of antenna, known as a "rubber duck," is not particularly efficient, but is convenient and rugged. Volume and squelch controls are usually placed next to the antenna. The frequency control knob or buttons are on the top end or the front.

Give some detail about "fault tolerance".

Fault tolerance means the system will not fail because any one component fails. The system also should provide recovery from multiple failures. Components are often over engineered or purposely underutilized to ensure

that while performance may be affected during an outage the system willperform within predictable, acceptable bounds.

What are regulatory Agencies?

All communication technology is subject to regulation and laws by government agencies. The purpose is to protect Public Interest by regulating Radio, Television and Cable Communications.

What is the main problem with ASK (amplitude Shift Keying)?

The main problem with ASK is the noise. Noise usually affected theamplitude so it is most affected by Noise.

What are the basic components of a data communication system ?

There are five basic components of a data communication. These are asfollows:- 1) message 2) sender 3) receiver 4) medium 5) protocol

What is the differences between OSI and TCP/IP Model?

OSI refers to Open Systems Interconnection whereas TCP/IP refers to Transmission Control Protocol. OSI follows a vertical approach whereas TCP/IP follows a horizontal approach**. OSI model, the transport layer, is only connection-oriented whereas the TCP/IP model is both connection-oriented and connectionless**

How can I define Data communication?

Data communication is the name of a communication between computers. More specifically, the exchange of data in the form 0's and 1's between two devices (computers) via some form of the transmission medium. Nowadays, data communication between computers also supports digital speech telephone and videophone, thus following direct communication between people.

What is PCMCIA?

PCMCIA (Personal Computer Memory Card International Association) is an international standards body and trade association with over 100 member companies that was founded in 1989 to establish standards for Integrated Circuit cards and to promote interchangeability among mobile computers where ruggedness, low power, and small size were critical. As the needs of mobile computer users has changed, so has PCMCIA. By 1991, PCMCIA had defined an I/O interface for the same 68 pin connector initially used for memory cards. At the same time, the Socket Services Specification was added and was soon followed by the Card Services Specifcation as developers realized that common software would be needed to enhancecompatibility.

Will VoIP work with DSL?

Yes, VoIP works with DSL. Many of the phone companies currently providing DSL and landline phone services are in the process of unbundling DSL and phone services.

What is attenuation?

Attenuation is signal loss due to the diminishing availability of signal energy, or signal power. As a analog or digital signal traverses across a medium, it fades. High attenuation may lead to the inability to recover the signal on the far end. Signal repeaters may be used on the transmission path to periodically boost the signal strength. Baseband transmission is extremely limited to attenuation. Broad-band much less so, In addition, wireless communications is much less susceptible to attenuation that is wire-line communications such as x-DSL or cable modems.

What is difference between logical address and physical address?

The OSI model is a good place to start to learn more about the differences between physical and logical addressing. Think of the physical address as the 48-bit MAC address that manufacturers encode in their network interface cards (NICs). This type of address is unique, referred to as the Ethernet or hardware address, and cannot be changed. The MAC or Ethernet address is associated with Layer 2 (data Link) of the OSI Model. The logical address isa 32-bit IP address that is not embedded in the network card but it is assigned to it for the purpose of routing between networks. This type of address operates at Layer 3 (network) of the OSI Model.

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Encryption of data: The translation of data into a secret code. Encryption is the most effective way to achieve data security. To read an encrypted file, you must have access to a secret key or password that enables you to decryptit. Unencrypted data is called plain text; encrypted data is referred to as cipher text.

Can we implement OSI in wireless networks?

Wireless Application Protocol (WAP), a secure specification that allowsusers to access information via handheld wireless devices, specifies architecture based on layers that follow the OSI model fairly closely. WAP defines network architecture for content delivery over wireless networks. Central to the design of WAP is a network stack based on the OSI model. WAP implements several new networking protocols that perform functions similar to the well-known Web protocols HTTP, TCP, and SSL.

What is distributed processing?

It refers to any of a variety of computer systems that use more than one computer, or processor, to run an application. This includes parallel processing, in which a single computer uses more than one CPU to execute programs. More often, however, distributed processing refers to local-area networks (LANs) designed so that a single program can run simultaneously at various sites. Most distributed processing systems contain sophisticated software that detects idle CPUs on the network and parcels out programs to utilize them. Another form of distributed processing involves distributed databases, databases in which the data is stored across two or more computersystems. The database system keeps track of where the data is so that the distributed nature of the database is not apparent to users.

What is a sample?

Sample is the amplitude of an analog signal at some specific interval. It is achieved in pulse amplitude modulation, which is the first step towards analog to digital conversion.

What Is Line Discipline?

Whatever the system, no device in it should be allowed to transmit until that device has evidence that the intended receiver is able to receive and is prepared to accept the transmission. What if the receiver does not expect a transmission, is busy, or is out of commission? With no way to determine the status of intended receiver, the transmitting device may waste its time sending data to a nonfunctioning receiver or may interfere with signals already on the link. The line discipline function of the data link layer oversees the establishment of links and the right of a particular device to transmit at a given time. Line discipline answers the question. Who should send now?

Is it possible for digital data to be transmitted via ordinary phone line?

The Digital Subscriber line (DSL) is a newer technology that uses the existing telecommunication networks such as the local loop telephone line (still an analog line) to accomplish high speed delivery of data, voice, video and multimedia.

What is then difference between T-lines and E-Lines?

Europeans use a version of T lines called E lines. The two systems are conceptually identical, but their capacities differ.

What do we mean by the term session?

Session is the period of time a user interfaces with an application. The user session begins when the user accesses the application and ends when the user quits the application.

How can I define Data communication?

Data Communication is the exchange of data (in the form of 0's and 1's) between two devices (computers) via some form of the transmission medium. Data communication is communication between computers. Data communication concerns the exchange of digital data between computers. Nowadays, data communication between computers also supports digital speech telephone and videophone, thus supporting direct communication between people.

How could it be more secure using distributed processing?

In this case security is achieved by providing the user with limited access. It means that user can only perform those tasks which are allowed by system designer. Its' simple example is bank's ATM. Where user can't perform operations on database other than provided.

What does the terms transit and response time mean? Also tell me about the topic peak load periods.

Transit time is the time taken by the message to travel from source to destination. Response time is the time of response (acknowledgement) from destination to source. Peak load periods are those periods of time in which number of users on a network are more than normal time.

What are the advantages of networking?

Files can be stored on a central computer (the file server) allowing data to be shared throughout an organization.

- Files can be backed up more easily when they are all on a central fileserver rather than when they are scattered across a number of independent workstations.
- Networks also allow securityto be established, ensuring that the network users may only have access to certain files and applications.
- Software and resources can be centrally managed.
- Network versions of software often allow for their speedy installation on workstations from the file server.
- Expensive devices such aslaser printers or scanners can be shared.
- Users can access their files from any workstation

What are different factors to choose a network topology?

Working conditions of network, working scenarios, arrangement of links and devices. Depending upon our network what actually we are dealing withand in which geographical area our devices are present, small area available

or have large area. All these factors are considered when choosing aTopology.

What is the relative status of the devices to be linked?

The geographical area in which our devices are present is the relative statusof devices.

What is the definition of Hub?

Hub is a common connection point for devices in a network. Hubs are commonly used to connect segments of a LAN. A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so thatall segments of the LAN can see all packets. A passive hub serves simply as a conduit for the data, enabling it to go from one device (or segment) to another. So-called intelligent hubs include additional features that enable an administrator to monitor the traffic passing through the hub and to configure each port in the hub. Intelligent hubs are also called manageable hubs. A third type of hub, called a switching hub, actually reads the destination address of each packet and then forwards the packet to the correct port.

What do we mean by "TAP"?

A tap is a connection to a coaxial cable in which a hole is drilled through theouter shield of the cable so that a clamp can be connected to the inner conductor of the cable. Instead of cutting the cable and attaching connectors to both ends of the severed coaxial cable,

Give some detail about "fault tolerance".

Fault tolerance means the system will not fail because any one component fails. The system also should provide recovery from multiple failures. Components are often over engineered or purposely underutilized to ensure that while performance may be affected during an outage the system will perform within predictable, acceptable bounds

What is the difference between radio and microwave?

Although there is no clear-cut demarcation between radio and microwave, electromagnetic waves ranging in frequencies between 3 KHz and 1 GHz are normally called radio waves; waves ranging in frequencies between 1 GHz and 300 GHz are called microwaves. Radio waves are used for multicast communications, such as radio and television systems.

What is the difference between internet and intranet?

Internet The Internet is a system of linked networks that are worldwide in scope and facilitate data communication services such as remote login, file transfer, electronic mail, the World Wide Web and newsgroups. With the meteoric rise in demand for connectivity, the Internet has become a communications highway for millions of users. The Internet was initially restricted to military and academic institutions, but now it is a full-fledged conduit for any and all forms of information and commerce. Internet websites now provide personal, educational, political and economic resources to every corner of the planet. Intranet A network based on TCP/IP protocols (an internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with authorization. An intranet's Web sites look and act just like any other Web sites, but the firewall surrounding an intranet fends off

unauthorized access. Like the Internet itself, intranets are used to share information. Secure intranets are now the fastest-growing segment of the Internet because they are much less expensive to build and manage than private networks based onproprietary protocols.

What is the difference between hub and switch?

On the outside, hubs and switches appear very similar in that they both have a number of RJ-45 jacks for connecting devices. Inside, however, they work very differently. To understand why switches provide so much more functionality than hubs, you must understand a fundamental limitation of (non-switched) Ethernet: there can only be one device transmitting on a segment at any given time. If two or more devices attempt to transmit at the same time, a collision occurs. (In fact, an Ethernet segment where only one conversation can occur is called a collision domain.) After a collision, all devices must retransmit. As you can imagine, as the number of devices onan Ethernet segment increases, the probability for collisions increase. Because devices must spend more time retransmitting data, the network is perceived to be slow. Before the advent of switches, a network could be divided into segments with a device called a bridge. Bridges have two Ethernet ports. As traffic flows through a network, a bridge learns which devices (identified by the MAC or "hardware" address) are on each side. Thebridge then makes decisions to forward or not forward each packet to the other side based on where the destination device is located. A bridge thus divides a network into two collision domains, allowing two independent "conversations" to occur. If a bridge is placed intelligently (e.g., separating two departments and their respective file servers), they can improve networkefficiency. Hubs do no processing on network traffic--they simply repeat the incoming signal to all available ports. On a switch, every port acts as a bridge. If each switch port is connected to a single device, each device can,in principle, act independently of every other device. For example, consider a switch with the following devices attached: computer 1 computer 2 computer 3 printer file server uplink to the Internet In this case, computer 1 could be printing a document, while computer 2 connects to a files server, while computer 3 accesses the Internet. Because the switch intelligently forwards traffic only to the devices involved, there can be multiple independent simultaneous conversations.

How different layers of OSI model are implemented?

The OSI 7 layers model has clear characteristics. Layers 7 through 4 deal with end to end communications between data source and destinations.Layers 3 to 1 deal with communications between network devices. On the other hand, the seven layers of the OSI model can be divided into two groups: upper layers (layers 7, 6 & 5) and lower layers (layers 4, 3, 2, 1). The upper layers of the OSI model deal with application issues and generallyare implemented only in software. The highest layer, the application layer, is closest to the end user. The lower layers of the OSI model handle data transport issues. The physical layer and the data link layer are implemented in hardware and software. The lowest layer, the physical layer, is closest to the physical network medium (the wires, for example) and is responsible for placing data on the medium.

How can we define networking?

In information technology, networking is the construction, design, and use of network, including the physical (cabling, hub, bridge, switch, router, and so forth), the selection and use of telecommunication protocol and computer software for using and managing the network, and the establishment of operation policies and procedures related to the network

What is walkie talkie?

A handie talkie, often referred to by its abbreviation, HT, is a handheld, portable two-way radio transceiver. This type of radio is sometimes called a "walkie talkie" or a "handheld." Handie talkies are popular among amateur radio operators, especially on their VHF and UHF bands at 144 and 432 MHz. Handie talkies are widely used by security personnel, military personnel, and police officers. Most HTs are used in conjunction with repeaters for extended range. Some HTs are designed for the 27-MHz Citizens Band (CB) radio service. A typical HT is a rectangular box about the size and weight of an old-fashioned telephone handset. The antenna protrudes from the top end, and consists of a coiled-up element encased in rubber and wound around a flexible rod. This type of antenna, known as a "rubber duck," is not particularly efficient, but is convenient and rugged. Volume and squelch controls are usually placed next to the antenna. The frequency control knob or buttons are on the top end or the front.