

-Chapter: 1

Data: The word data refers to information presented in whatever form is agreed upon the parties creating and using data.

Networks :A network is a set of device(sometimes known as nodes) connected by communication links.

Protocol: a set of rules & regulations that determine how data is transmitted in telecommunications and computer networking.

E- Commerce: Airlines, book stores, and music vendors have discovered that many customers like the convenience of shopping from home. Consequently, many companies provide catalogs of their goods and services online and take orders on-line. It is called e-commerce (electronic commerce).

Broadcasting: Broadcast systems generally also allow the possibility of addressing a packet to all destinations by using a special code in the address field. When a packet with this code is transmitted, it is received and processed by every machine on the network. This mode of operation is called broadcasting.

Multicasting: broadcast systems also support transmission to a subset of the machines, something known as multicasting.

Unicasting : Point-to-point transmission with one sender and one receiver is sometimes called unicasting.

Full Forms:

PDA –Personnel Digital Assistant

WAP -Wireless Application Protocol

LAN- Local area networks

WAN- metropolitan area network

MAN- wide area network

ISO OSI - International Standards Organization Open Systems Interconnection

TCP- Transmission Control Protocol

IP - Internet Protocol

UDP- User Datagram Protocol

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Multimode Fiber: Light ray incident on the boundary above the critical angle will be reflected internally, many different rays will be bouncing around at different angles. Each ray is said to have a different mode, so a fiber having this property is called a multimode fiber.

Single Mode Fiber : fiber's diameter is reduced to a few wavelengths of light, the fiber acts like a wave guide, and the light can propagate only in a straight line, without bouncing, yielding a single-mode fiber.

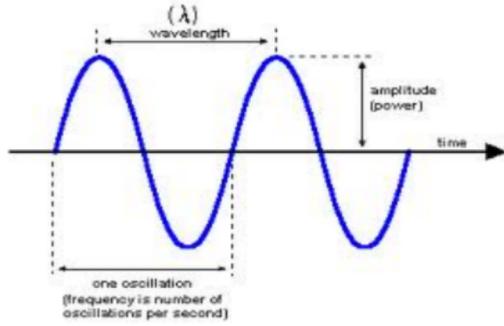
Chromatic Dispersion: Light pulses sent down a fiber spread out in length as they propagate. This spreading is called chromatic dispersion. The amount of it is wavelength dependent. One way to keep these spread-out pulses from overlapping is to increase the distance between them, but this can be done only by reducing the signaling rate.

Solitons : pulses in a special shape related to the reciprocal of the hyperbolic cosine, nearly all the dispersion effects cancel out, and it is possible to send pulses for thousands of kilometers without appreciable shape distortion. These pulses are called solitons.

Frequency: The number of oscillations per second of a wave is called its frequency, f , and is measured in Hz (in honor of Heinrich Hertz).

Wavelength: The distance between two consecutive maxima (or minima) is called the wavelength, which is universally designated by the Greek letter λ (lambda).

Bent Pipe : a communication satellite can be thought of as a big microwave repeater in the sky. It contains several transponders, each of which listens to some portion of the spectrum, amplifies the incoming signal, and then rebroadcasts it at another frequency to avoid interference with the incoming signal. The downward beams can be broad, covering a substantial fraction of the earth's surface, or narrow, covering an area only hundreds of kilometers in diameter. This mode of operation is known as a bent pipe.



Station Keeping: The effects of solar, lunar, and planetary gravity tend to move them away from their assigned orbit slots and orientations, an effect countered by on-board rocket motors. This fine-tuning activity is called station keeping.

Foot Print: The first geostationary satellites had a single spatial beam that illuminated about 1/3 of the earth's surface, called its footprint.

Spot Beam: Each downward beam can be focused on a small geographical area, so multiple upward and downward transmissions can take place simultaneously. Typically, these so-called spot beams are elliptically shaped, and can be as small as a few hundred km in diameter.

Local loop: The two-wire connections between each subscriber's telephone and the end office are known in the trade as the local loop.

Toll connecting trunks: Each end office has a number of outgoing lines to one or more nearby switching centers, called toll offices (or if they are within the same local area, tandem offices). These lines are called toll connecting trunks.

Attenuation: Attenuation is the loss of energy as the signal propagates outward. The loss is expressed in decibels per kilometer. The amount of energy lost depends on the frequency.

Distortion: Different signals propagate at different speeds in wire and leads to distortion. Distortion means signal **changes** its **form or shape**.

Noise: noise, which is unwanted energy from sources other than the transmitter. Thermal noise is caused by the random motion of the electrons in a wire and is unavoidable. Crosstalk is caused by inductive coupling between two wires that are close to each other.

Baud rate: Number of samples per second is measured in baud. **Baud rate** is the number of samples/sec made. Each sample sends one piece of information, that is, one symbol. The baud rate and symbol rate are thus the same.

Bit Rate: The bit rate is the amount of information sent over the channel and is equal to the number of symbols/sec times the number of bits/symbol.

Constellation Diagram: legal combinations of amplitude and phase, are called constellation diagrams.

Full duplex: A connection that allows traffic in both directions simultaneously is called full duplex. A two-lane road is full duplex.

Half duplex: A connection that allows traffic either way, but only one way at a time is called half duplex. A single railroad track is half duplex.

Simplex: A connection that allows traffic only one way is called simplex. A one-way street is simplex.

UDP- User Datagram Protocol

GEO- Geostationary Earth Orbit

VSAT - Very Small Aperture Terminal

MEO- Medium-Earth Orbit

LEO- Low-Earth Orbit.

PSTN- Public Switched Telephone Network
DSL- Digital Subscriber Line
ADSL- Asymmetric DSL
POTS -Plain Old Telephone Service
DMT-Discrete MultiTone
DSLAM- Digital Subscriber Line Access Multiplexer
MMDS- Multichannel Multipoint Distribution Service
LMDS- Local Multipoint Distribution Service.
FDM- Frequency Division Multiplexing
TDM- Time Division Multiplexing
IMTS- Improved Mobile Telephone System
AMPS- Advanced Mobile Phone System.
MTSO- Mobile Telephone Switching Office
MAHO- Mobile Assisted HandOff.
GSM - Global System for Mobile communications
CDMA- Code Division Multiple Access
GPRS- General Packet Radio Service

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True false

1. Error correction require more overhead than error detection. **Ans:** True

Reason: In error detection we are looking only to see if any error has occurred. The answer is yes or no only. We not even interested in the number of error, while in error correction we need to know exact number of fit that are corrupted.

Hamming Distance: The number of bit positions in which two code words differ is called the Hamming distance.

Piggybacking: When a data frame arrives, instead of immediately sending a separate control frame, the receiver restrains itself and waits until the network layer passes it the next packet. The acknowledgement is attached to the outgoing data frame. In effect, the acknowledgement gets a free ride on the next outgoing data frame. The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is known as piggybacking.

PAR: Positive Acknowledgement with Retransmission

ARQ: Automatic Repeat request

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Carrier sense protocols: Protocols in which stations listen for a carrier (i.e., a transmission) and act accordingly are called carrier sense protocols.

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Datagram: If connectionless service is offered, packets are injected into the subnet individually and routed independently of each other. No advance setup is needed. In this context, the packets are frequently called datagram (in analogy with telegrams) and the subnet is called a datagram subnet.

Virtual circuit: If connection-oriented service is used, a path from the source router to the destination router must be established before any data packets can be sent. This connection is called a VC (virtual circuit), in analogy with the physical circuits set up by the telephone system, and the subnet is called a virtual-circuit subnet.

Routing: routing, which is making the decision which routes to use.

Forwarding: Forwarding, which is what happens when a packet arrives. One can think of a router as having two processes inside it. One of them handles each packet as it arrives, looking up the outgoing line to use for it in the routing tables. This process is forwarding.

Jitter: For applications such as audio and video streaming, it does not matter much if the packets take 20 msec or 30 msec to be delivered, as long as the transit time is constant. The variation (i.e., standard deviation) in the packet arrival times is called jitter.

MAC: Medium Access control

CSMA: Carrier Sense Multiple Access

CSMA/CD: CSMA with Collision Detection

MACA: Multiple Access with Collision Avoidance

MACAW: MACA for Wireless

FDDI: Fiber Distributed Data Interface

FHSS: Frequency Hopping Spread Spectrum

DSSS: Direct Sequence Spread Spectrum

OFDM: Orthogonal Frequency Division Multiplexing

HR-DSSS: High Rate Direct Sequence Spread Spectrum

NAV: Network Allocation Vector

SIFS: Short Inter Frame Spacing

PIFS: PCF Inter Frame Spacing

DIFS: DCF Inter Frame Spacing

EIFS: Extended Inter Frame Spacing

Routing: routing which is making the decision which routes to use.

Forwarding: One can think of a router as having two processes inside it. One of them handles each packet as it arrives, looking up the outgoing line to use for it in the routing tables. This process is forwarding.

Congestion: When too many packets are present in (a part of) the subnet, performance degrades. This situation is called congestion.

Autonomous System (AS): since each network is independent, they may all use different algorithms. Because each network in an internetwork is independent of all the others, it is often referred to as an Autonomous System (AS).

MANETs: Mobile Ad hoc Networks

AODV: Ad hoc On-demand Distance Vector

RSVP: The Resource reservation Protocol

RARP: Reverse Address Resolution Protocol

DHCP: Dynamic Host Configuration Protocol

OSPF: Open Shortest Path First

IGMP: Internet Group Management Protocol

SIPP: Simple Internet Protocol Plus

Chapter: 6

Transport Entity : The ultimate goal of the transport layer is to provide efficient, reliable, and cost-effective service to its users, normally processes in the application layer. To achieve this goal, the transport layer makes use of services provided by the network layer. The hardware and/or software within the transport layer that does the work are called the transport entity.

Port: The method normally used is to define transport addresses to which processes can listen for connection requests. In the Internet, these end points are called ports.

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Reverse lookup: it is nearly always used to associate a name with an IP address to allow lookups of the IP address and return the name of the corresponding machine. These are called reverse lookups.

Cipher : A cipher is a character-for-character or bit-for-bit transformation, without regard to the linguistic structure of the message.

Code: a code replaces one word with another word or symbol. Codes are not used any more, although they have a glorious history.

Plain text: The messages to be encrypted, known as the plaintext.

Cipher text: The output of the encryption process, known as the cipher text.

Cryptology: The art of breaking ciphers, called cryptanalysis, and the art devising them (cryptography) is collectively known as cryptology.

Photons: Quantum cryptography is based on the fact that light comes in little packets called photons.