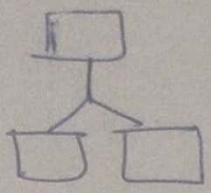
Path Vector Routing

categories of Network

① LAN (Local Area network) is usally limited of few kilometers of area

② office, building privately own floor

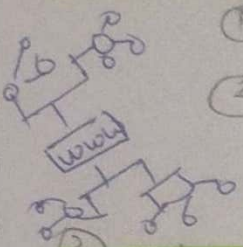
③



② WAN (wide Area Network)

① Geographically large area

② The network in the entire state UP could be a WAN

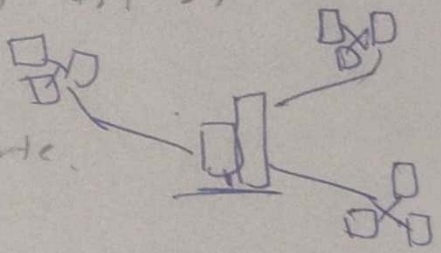


③ Metropolitan Area Network (MAN) →

① LAN से WAN के बीच MAN का size होता है

② LAN < MAN < WAN

example → पूरे city, का network.



network - models

दो open system पर दूसरे से communicate करने के लिए (regardless) standards follow करते हैं

① In general ② सबसे use model है OSI reference model. TCP practical model.

① layered architecture

② 7 layers

SAT 4 layers होते हैं

① OSI model

① 7 layers, layered architecture होता है

⑦ Application ⑥ Presentation ⑤ Session	SMTP, FTP, TELNET, DNS, SNMP, NFS, RPC
④ Transport	TCP UDP
③ Network	ICMP, IGMP, IP → ARP, RARP
② Data link	
① Physical layer	

Points

① ~~the~~ OSI में 7 layers होते हैं

② हर layer पर special service देता है.

③ ये जो 7 layers होते हैं वो दो तरह से communicate करते हैं

① peer to peer, point to point

② host to host.

④ HP2P → Application, Presentation, session, Transport

⑤ P2P → Network, Datalink, physical layer.

Detailed each layer

① physical layer

① Representation of bits - 0, 1 के form में data transmition होता है, इसकी responsibility ~~का~~ bits, ~~data~~ को ~~से~~ bits से wave करना, ~~या~~ electric signal करना, या sound signal करना, ~~और~~ ~~इस~~ इसका analog to digital, digital to analog conversion

② Data rate → number of bits send each second को भी ~~data link~~ physical layer define करता है.

कौन सा cable. twisted, coaxial, fiber cabel है। उसे कितना data भेजना है यही भेजना है वे सब भी देखता है।

③ line configuration

जो भी devices है वह कैसे connected है, point to point है, multipoint है।

④ topology, कैसा है इसको कैसे handle करना है.

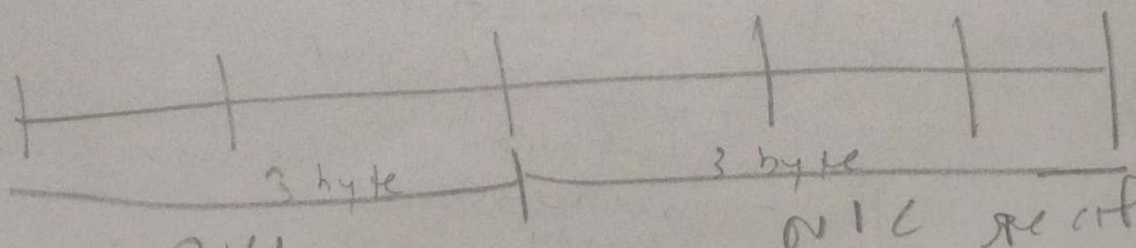
⑤ Transmission mode, half, full, simplex वे सब भी handle or manage करता।

Data link layer

① framing → जो भी data या packet N/W layer से आ रहा है उसको appropriate parts में divide करना framing कहलाता है। हर Network का अपना - अपना packet, frame, या MTU होता है। MTU से ज्यादा होने पर, उन्हें fragment किया जाता है। ये काम DLL का होता है

② physical addressing →

जो frames में physical address, MAC address को add करना, साथी ethernet communication में आए N/W के multiple systems DLL ही काम करता है 48 bit, 6 byte का mac address होता है



001 ⇒ bits

b24 ..... b3 | b2 | b1 | b0

b0 → 0 → unicast
1 → multicast

(3) access control - when two or more devices are connected to the same link, data link layer protocols are necessary to determine which device has control over the link at any given time

multiple-access protocol

- Random access protocol
  - ALOHA
  - CSMA
  - CSMA/CD
  - CSMA/CA
- Controlled access protocol
  - reservation
  - polling
  - token passing
- channelization protocol
  - FDMA
  - TDMA
  - CDMA

(4) Flow control → data absorbing rate of receiver is less than the rate of sender sending data then Data link layer imposes a flow control mechanism to avoid overwhelming the receiver

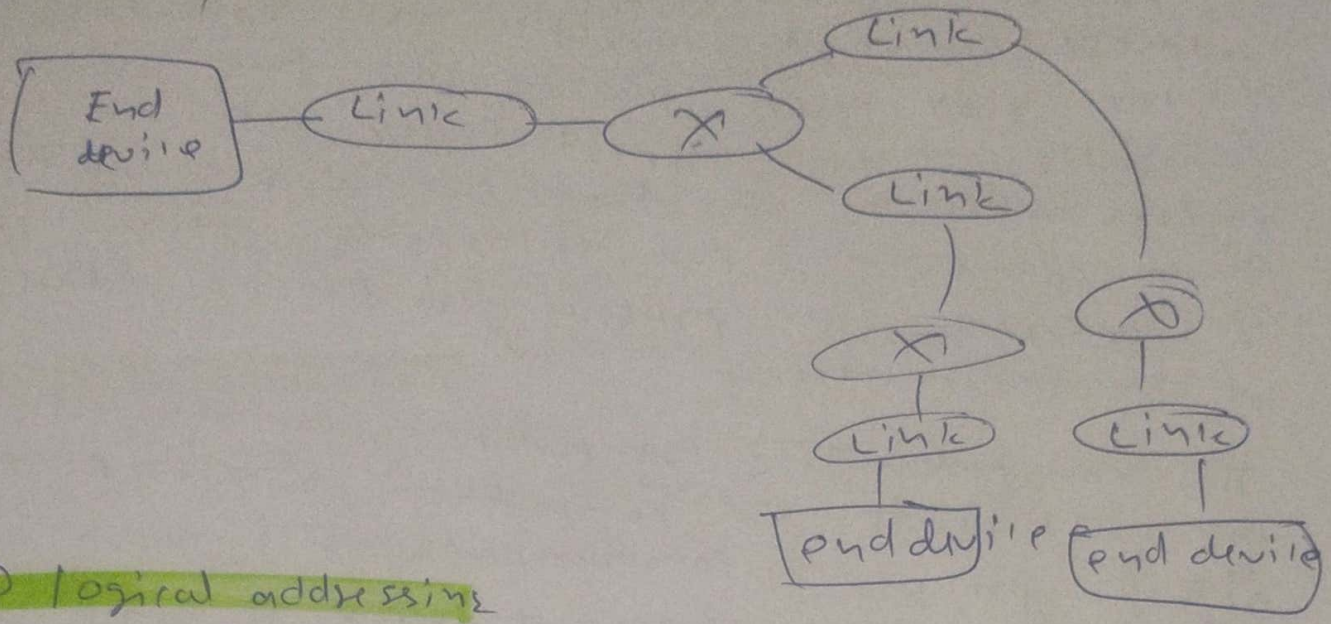
(5) Error control → data link layer adds reliability to the physical layer by adding mechanisms to detect and transmit damaged or lost frames. It also uses a mechanism to recognize duplicate frames. Error control is normally achieved through a trailer added to the end of the frame.

Error-control

- error detection
  - Two dimensional Parity
  - Internet checksum
  - Cyclic Redundant Check
- error correction
  - Hamming code.

Network layer

The network layer is responsible for the source to destination delivery of a packet possibaly across multiple networks (links)

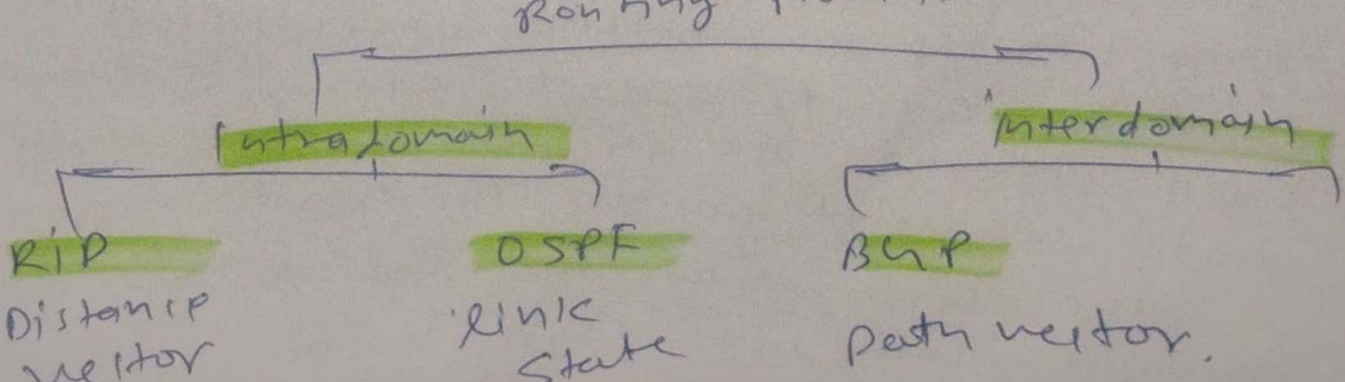


① logical addressing

if a packet is passes the network boundary we need ~~to~~ another addressing system to help distinguish the source and destination system. The network layer adds a header to the packet comming from the upper layer that among other things includes the logical addres of the senders and receiver.

② Routing →

when independent networks or links are connected to create internetworks (network to network) or a large network, the (connecting device (called Router or switches) router or switch the packets to their final destination, one of the functions of the network layer is provid this mechanism



Transport Layer

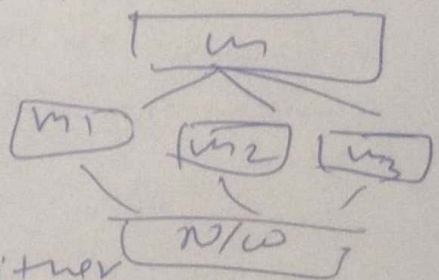
① Service-point addressing (port address)

The transport layer header must include a type of address called a service-point address (or port address). The network layer gets each packet to the correct computer. The transport layer gets the entire message to the correct process on that computer. The transport layer is responsible for process to process delivery of the entire message.

एक computer दूसरे computer से communicate करता है तो इन computers के कौन से process से communicate करेगा, यह सही-सही से यह Transport layer का काम होता है।

② Segment segmentation and reassembly

A message is divided into transmitted segments, with each segment containing a sequence number. These number enable the transport layer to reassemble the message. correctly upon arriving at the destination and to identify and replace packets that were lost in transmissions.



③ Connection control

The transport layer can be either connectionless or connection oriented. A connectionless transport layer treats each segment as an independent packet and delivers it to the transport layer at the destination machine. A connection oriented transport layer makes a

a connection with the transport layer at the destination machine first before delivering the packets. after all the data are transferred; the connection is terminated

④ Flow control → data link, layer, the transport layer is responsible for flow control, however, flow control at this layer is performed end to end rather than across a single link.

⑤ Error control → same as datalink layer here, error will check process to process, rather than a ~~single~~ across single link.

Session layer

① The session layer is the network dialog controller. It establishes, maintains, and synchronizes the interaction among communicating systems.

responsibilities

① dialog control → the session layer allows two system to enter into a dialog. It allows the communication between two processes to take place in either half duplex or mode

② synchronizations: the session layer allows a process to add checkpoints, or synchronization point, to a stream of data.

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presentation layer

① Translation → The processes in two system are usually exchanging information in the form of character strings, number.

and so on

The information must be changed to bit streams before being transmitted, because different

① languages को समझना किसर एक दूसरे के से एक understandable formate में change करना

② **Encryption** → plain text को ~~cifer~~ cipher test में convert करना, cipher text को वापस plain text में convert करना ये सब presentation layer में होता है

③ **compression** → Data compression reduces the number of bits contained in the information. Data compression become particulary important in the transmission of multimedia such as text, audio & video.

Application

- Application layer enables the user, whether human or software, to access the network
- It provides user interfaces and support for servises such as electronic mail, remote file access and transfer, shared database management and other types of distributed information servises.

servises

① **Network virtual terminal** →

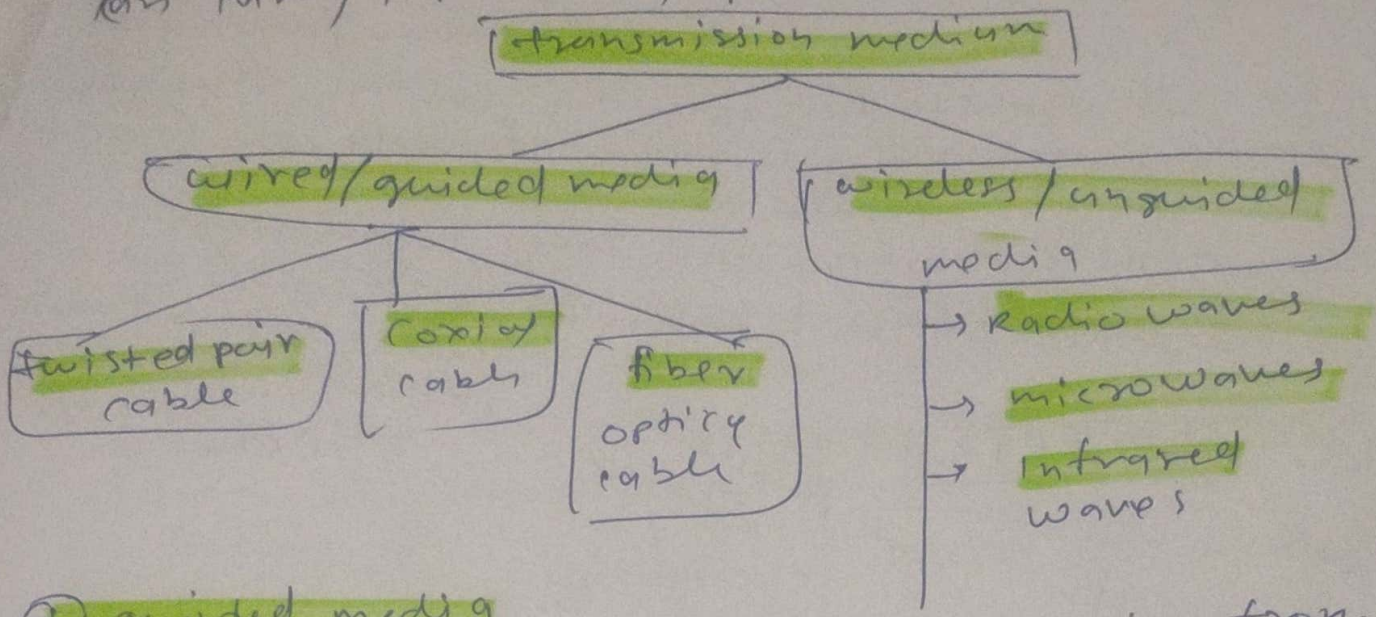
② **File transfer**, access and management.

③ **mail servises**

④ **Directory servises** (Study more using Youtube)

Transmission media

(layer 0) → can broadly be defined anything that can carry information from source to destination



① guided media

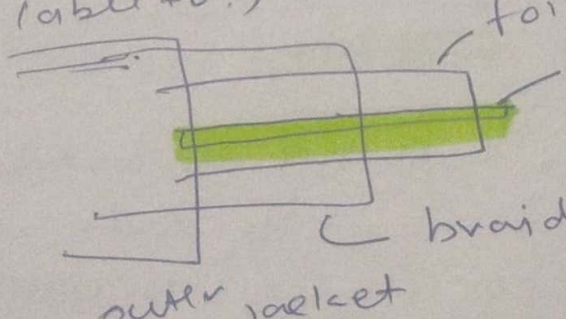
① are those which provide a connection from one device to another.

② twisted pair cable → shield / unshield

consist of two conductors (copper) each with it's own plastic insulation twisted together.

i.e - RJ-45.

② Coaxial cable → has a central core conductor of solid wire enclosed in an insulating sheath ~~with~~ wich in turn, encased in an outer conductor of metal foil, braid or a combination of two (cable tv.)



③ Fibre cable → long distance, continuous, high speed data transmission.

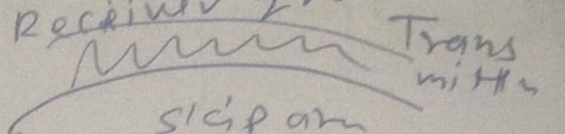
1600 gbps

T.M ① ground propagation (Radio waves)

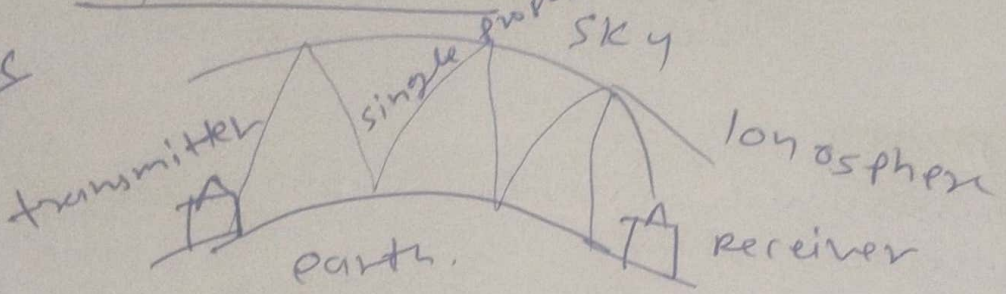
P.V ① waves travel through lower portion of the atmosphere hugging the earth, they are omni directional, distance depends on the amount of power.

② low frequency, and large wave length

③ short range में power ज्यादा होती है



② sky propagation



long distance communication.

I.R 30 GHz - 400 THz

③ Line of sight propagation → very high frequency signals transmitted in straight lines directly from ~~ate~~ antenna to antenna.

→ short range, like military use, walky-talky, one-way- communication

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switching

switching → is a technique by ~~which~~ which nodes (control) or switch data to transmit it between specific points on a network

- switching
  - circuit switching
  - packet switching
    - Datagram approach
    - virtual Approach.

① circuit switching

① इसमें dedicated path होता है
② path reserve होता है।

advantage ① कोई disturbance नहीं होता है
② कोई lag नहीं होता / Reliable है

dis → यदि users use नहीं कर रहे तब भी वो path आपके लिए ही reserve रहेगा। costally हो सकता है

• दो तरह से circuit switching किया जा सकता है time के base पर और frequency के base पर
→ time पर particular time पर आपके लिए reserve है
→ fix limited frequency आपके लिए receive होती है।

② packet switching

advantage ① The main advantage of circuit switching is that a committed transmission channel is established between the computers which gives guaranteed data rate.
② in circuit switching there is no delay in data flow because of the dedicated transmission path
③ No header is required
④ Recording of data cannot happen

Disadvantage → ① It has the following disadvantages
① take long time to establish connection
② more bandwidth is required is setting up of dedicated channels
③ outdated. not used now a days.

Packet switching

(1) कोई dedicated path नहीं होता है
(2) packet किसी भी order में किसी भी available path से जा सकते हैं
(3) destination में original form में arrange हो जाते हैं using header

Datagram network

Virtual network

(1) यहाँ path तो dedicated होता है पर
(2) जो packet का order है वो change
नहीं होता - फिर से जाते हैं
(3) destination में arrange हो जाते हैं. using
header.