Computer Network

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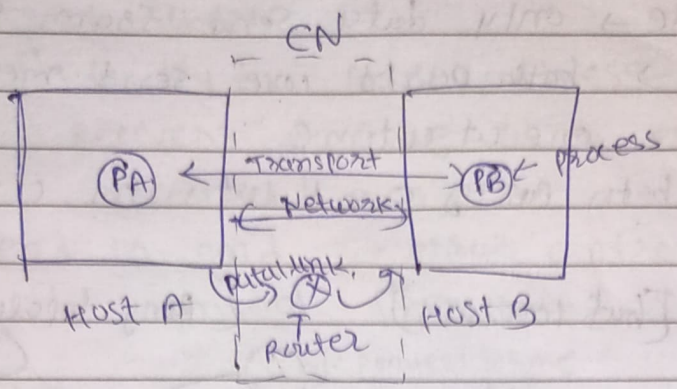
APV 2-12-2022



→ when PA want to communicate with PB then first that PA have to notify HOST A

for creating computer → network model (reference model)

i> ISO - OSI ← interconnection

[International standard organization] open system

→ Interoperability : when different platform will talk with each other

→ whichever is open to communicate will use → OSI model

smart A - Application } ← layer of ISO - OSI model
encrypt P - Presentation } Application software
manage session S - Session
divide in segment T - Transport } network software [Bottom layer provide support for upper level layer]
packet N - Network
frames D - Data link ← Interface
bit P - Physical } Network hardware

→ Physical layer → bit (convert bit) to [signal or wave]
- encoding ↳ Receiving the bit from upper
- Transmission mode layer and send through (wire,
- Topology or wireless) transmission

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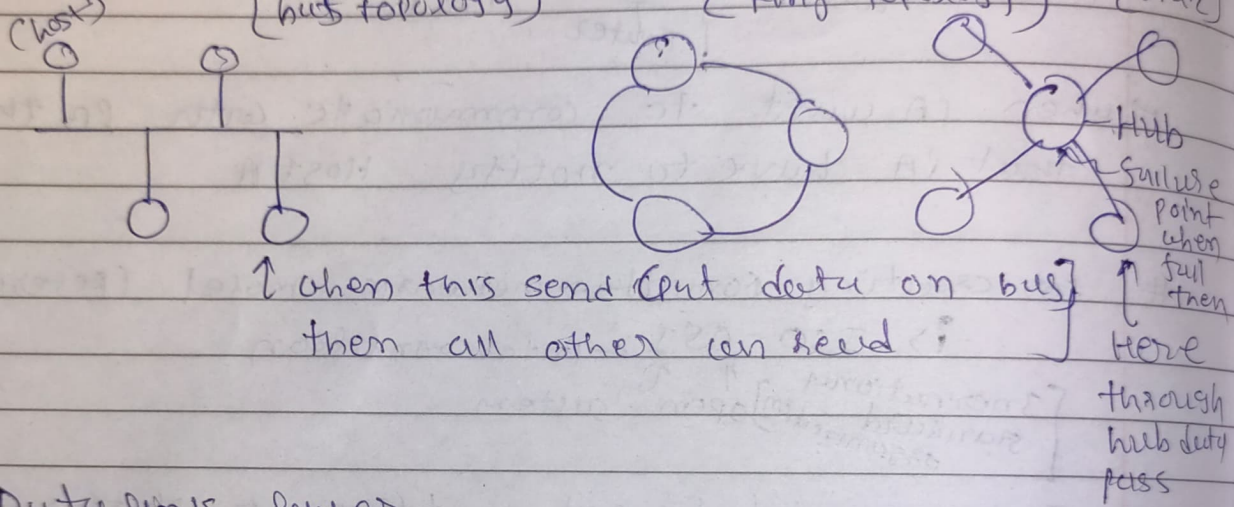
4 transmission mode
Simplex mode → only data send from source to dest
half duplex → both party use send message but one at a time
full duplex → both party send data at a time.

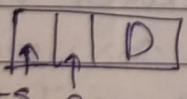
[bus topology] [Ring topology] [star]



Data link layer
↳ robustness give to our data.

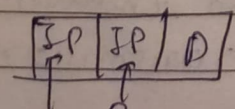
- framing
- flow control [when sender is faster [10mbps] and receive is slower [1mbps] then slow down the sender therefore buffer on receiver use not overflow]
- error control
- Access control
- Physical Addressing

any bit not become-1 [parity check]



- mac Addr = Physical Add
Ⓒ writed on NIC card in laptop

Network layer
① Logical Addressing ← Assign the IP address to our data packet
② Routing
③ congestion control ↑ in network when data transfer through (ex. optical fiber) then if that capacity is 10mbps and if I send 20mbps then problem



Routing table → contain where to this msg I have to send

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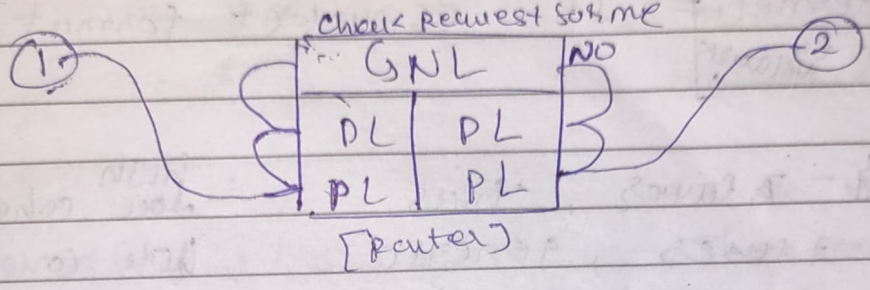
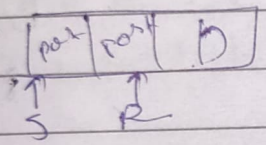
Transport layer

[Identify by Port address when msg at receiver machine which process I have to give that msg]

- end to end, - error control, - segmentation
- flow control [Recording. Segment]





session layer

- checkpointing [when any problem then not need to restart go back to in any checkpoint]
- synchronization [when in video audio is slow that is not good sync.]

presentation

encryption. decryption

- Translation [Character translation char to ASSCII]

Application

[Actually get message from protocol http, https, smtp

full form
Internet → Interneetworking

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TCP/IP [first design protocol and then put in model]
ISO-OSI [first strategy then programming]

Application
Transport ≠ TCP - Transmission control protocol
Internet ⇒ IP as packet format
Host to Network

TCP/IP } - ~~4~~ layer, bias
ISO/OSI } 7 layers, generic

high cohesion } good model
low coupling }

↳ ISO/OSI provide more good

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Comparision of ISO/OSI → TCP/IP
- Layers
- Protocol bias
- Model design ← service Interface } more popular in ISO/OSI
  protocol } in TCP/IP
- Connection mode

Service : In ISO-OSI data-link and physical are different layer, but in TCP/IP both are in Host to Network. If we pass info then get Host to Network but what is in that that is undefined.

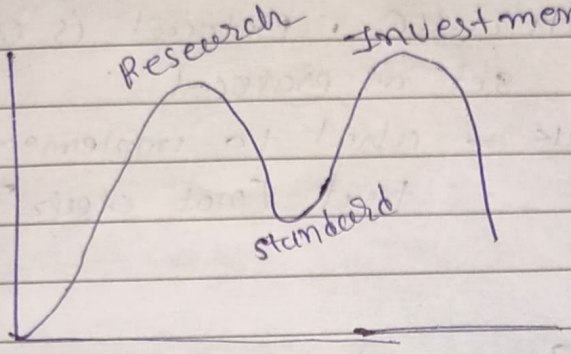
OSI
connection-oriented mode - transport-layer
↑ TCP/IP → Network layer

TCP-IP
connection-oriented and connection less
- transport-layer
↳ OSI - Network layer

[transport layer more important - [end to end process to process]

Critic of ISO/OSI

- Bad timing



→ Here this will (OSI) west time in writing standard and publish very late.

→ first for ML project you find many best algo and you research more thing

→ then getting all standard thing make project

→ Then if project very good then company invest on that.

→ In TCP first protocol and then model therefore no time take for publish

Bad Technology

- In OSI, session and presentation is not required That all function is know by Application
- Redundency
  - ↳ error control is required in both transport and network layer
  - Therefore error control is only require on the higher layer

Bad Implementation:- In OSI 7 layer are more therefore complexity of the implemention for more layer is higher

Bad Politics

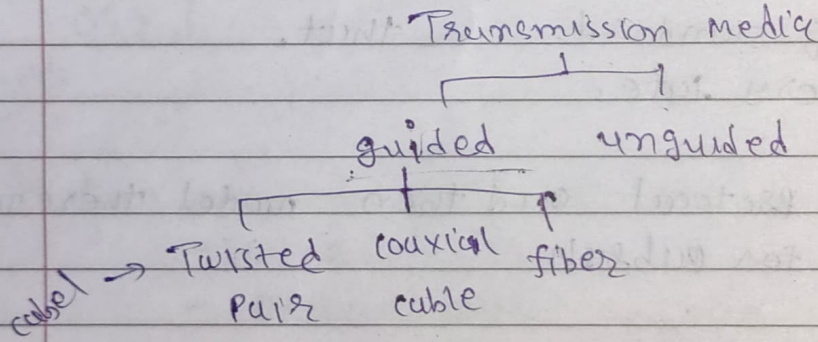
TCP IP is free

OSI is costly.

critic of TCP/IP

- No clear division in terms of service and Interface. protocol is clear
- Bias towards set of protocol.
- Host to network ⇐ what to implement in that [not clear]

Physical layer [transmit data physically]
(wire
(wireless



⇒ why Twisted pair
- Two copper wire
- twisted in helical form [like DNA]

RJ 45 - dial up modem - internet
connect with ↑ dial no.
use Telephone

→ cat-3 : required Repeater frequently
cat-5 ; some no. of Repeater [costly] } Based on amount of twist

Twisted use more [more wire] then loss will low and Therefore we transmit data at far with min. loss

Repeater: Take input and pass to another

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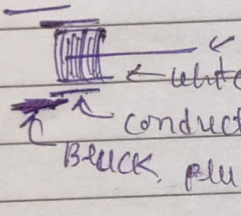
⇒ UTP - unshielded Twisted pairs
↳ data lost will be happen because.

STP - more costly
shilded Twisted pairs.
} both based on shield or not.

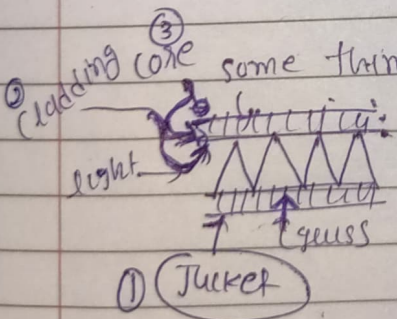
→ STP used if company wants to invest that much
→ more UTP is used in company

⇒ Coaxial cable → Better insulation (shield)
→ less Repeaters Required.

[coaxial cable] ④ layer ⇒ Take signal for long distance



optical fiber ⇒ It can handle high bandwidth



some thing which reflect the