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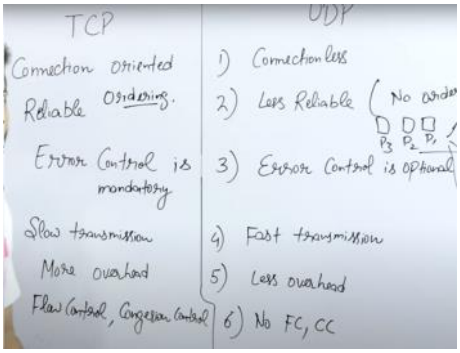
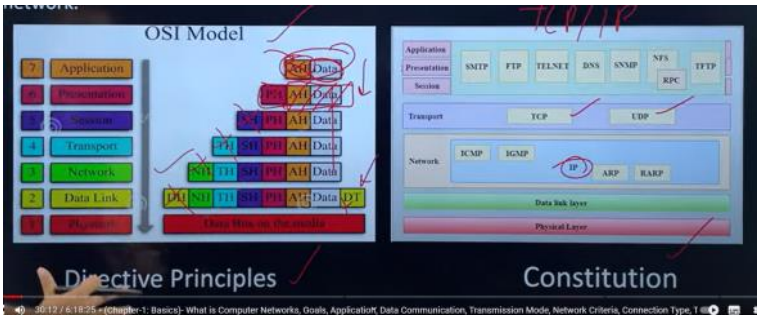
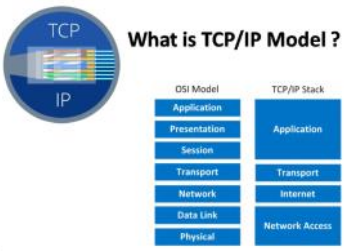
Two types of communication service

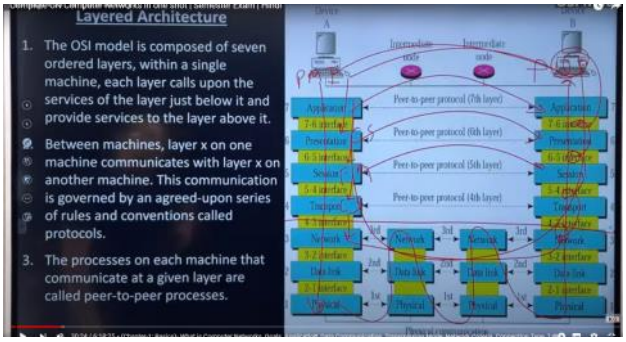
Connectionless and connection oriented service



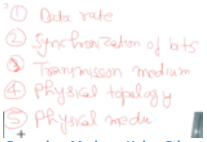


This Is the approach **This is the principle**

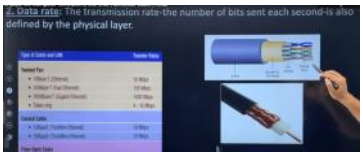


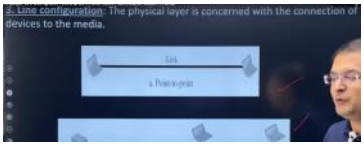


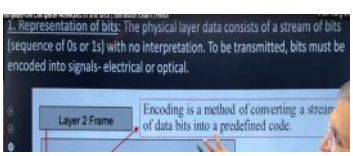
OSI Layers (7)
Physical

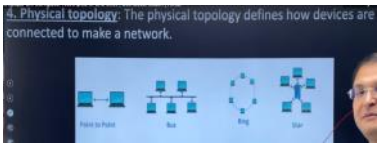


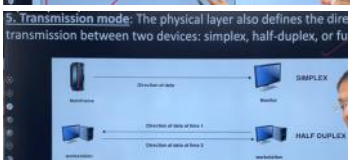
Example :- Modem , Hubs , Ethernet
Analog to digital and vice versa yeh kaam hota hai physical Layer ka







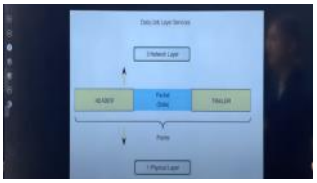




OSI Layers (6)
Datalink

- A Reliable link
- Means of activating, maintaining and deactivating
- **Framing (Header and Trailer)**
- Flow control

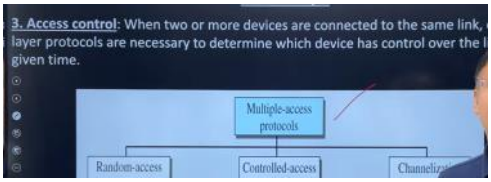
- A Reliable link
- Means of activating, maintaining and deactivating
- **Framing (Header and Trailer)**
- Flow control
- Error Control
- Access Control

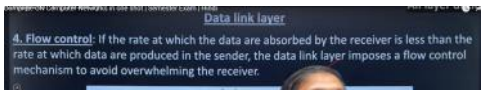


Physical Addressing

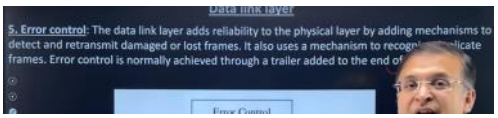
- MAC address 48 bit

  Example :-Switch





Speed ka dhyaan rakhna

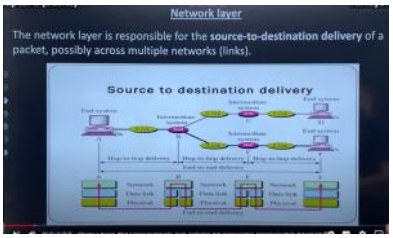


OSI Layers (5)

Network

- **Logical addressing and Routing**
  IP address :- 32 bit
- Transport of information.
- Both connection-less and connection-oriented

  Example :-Router



OSI Layers (4)

Transport

- Exchange of data between end systems
- No losses
- No duplicates
- Quality of service(Throughput, transit delay, error rate)
- Port addressing and socket addressing ko pehchanana
- Segmentation and reassembly
- Traffic management between the network

Jo kaam datalink layer karta hai local level par wahi
kaam transport layer karta hai bade level par

OSI Layers (3)

Session

- Control of dialogues between applications/Dialogue discipline
- Grouping
- Synchronization/check points Recovery

OSI Layers (2)

Presentation

- Provide conversion from one encoding
- schema to another encoding schema
- Translation
- **Encryption**
- **Compression**

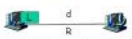
OSI Layers (1)

Application

- Means for applications to access OSI environment
- E mail, web browsers,

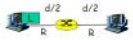
Store-and-forward: illustration

- distance = d meters; speed of propagation = s m/sec
- transmission rate of link = R bits/s



- delay (one packet only) = L/R + d/s

Example:
- d/s = 0.5 sec
- L = 10 Mbits
- R = 1 Mbps
- delay = 10.5 sec



- delay (one packet only) = L/R + ½d/s + L/R + ½d/s = 2L/R + d/s

Example:
- d/s = 0.5 sec
- L = 10 Mbits
- R = 1 Mbps
- delay = 20.5 sec

Question:

- At what rate (bandwidth) R would the propagation delay equal the transmission delay?

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Answer:

- Propagation delay = $2x10^3$ (m)/$2x10^8$ (m/s) = 10^{-5} sec
- Transmission delay = 100x8 (bits)/R
- Prop. delay = trans. delay => $R=10^5x100x8$ = 80 Mbps

How much time will it take to send a packet of size L bits from A to B
in given setup if Bandwidth is R bps, propagation speed is t meter/sec and distance b/w any two points is d meters (ignore processing and queuing delay) ?

```
A---R1---R2---B
```

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- Total time = 3*(L/R + d/t) *sec*

Suppose two hosts A and B are separated by 10,000 kilometers and are connected by a direct link of R=1 Mbps. Suppose the propagation speed over the link is 2.5×10^8 m/sec.
a) Calculate the bandwidth-delay product R*t