Advanced Computer Networks - Set 1

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1. Host	End systems/devices
2. Router	Perform routing. Only have lower 3 layers of TCP/IP model
3. Switch	Perform forwarding only. Only has lower 2 layers of TCP/IP model
4. Transmission Rate	Link capacity, bandwidth
5. Internet	Network of Networks
6. Protocols	Control sending and receiving of messages (TCP, SMTP, IP, UDP, etc.).
	Define format, order of messages sent and received, and actions taken on message transmission and receipt.
7. Network Edge	Hosts: Clients and servers
8. Access Networks, Physical Media	Wired or wireless com- munication links
9. Network Core	Interconnected routers
10. Packets	Pieces of a fragmented message
11. L	Length of packet in bits
12. R	Transmission rate in bits/second



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13. Guided vs Unguided media	Guided: Signals propagate in solid media (copper, fiber, coax) Unguided: Signals propagate freely (radio)
14. PDU	Protocol Data Unit, a header and data at one layer of a network stack
15. Packet switching	Break data into packets without making reservation
16. Circuit Switching	Send packet as one chunk, making reserva-tion for path even if no data to be sent. Bad performance
17. Transmission Delay (Dtrans)	Amount of time it takes to put whole packet on the link
18. Propagation Delay (Dprop)	Amount of time packet travels on the link distance/speed
19. N	Number of links
20. p	Number of packets
21. General formula for end-end delay	N(Dtrans) + (p-1)Dtrans

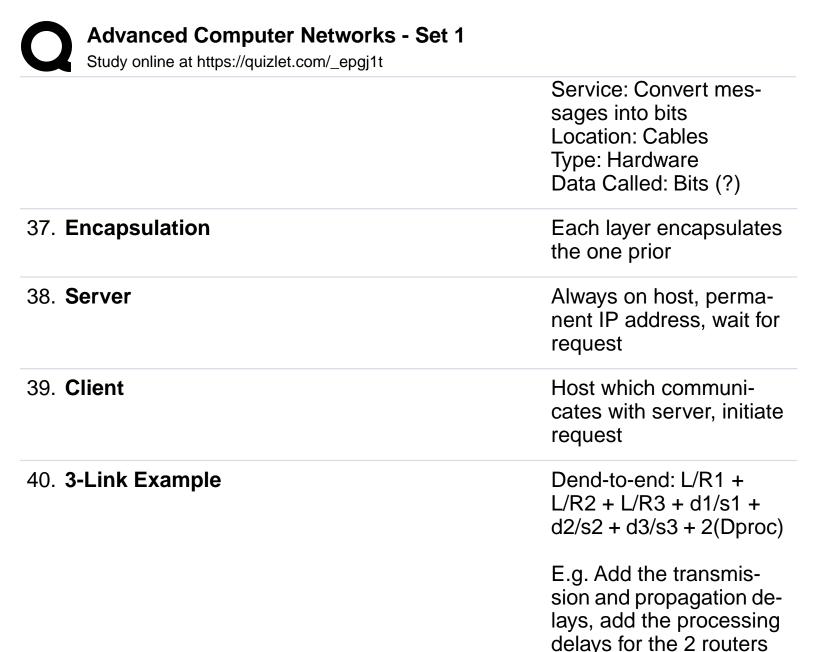
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	N(Dproc + Dtrans + Dprop)
22. Queuing Delay (Dqueue)	Amount of time in the routers buffer before being sent on the link
23. Processing Delay (Dproc)	Amount of time router takes to check packet for errors and where to send packet
24. Packet Loss	Packets can be dropped if the routers buffer is already full and more packets arrive
25. Routing	Determine source desti- nation using header of packet
26. Forwarding	Simply move packet from appropriate input to output
27. FDM	Frequency-Division Multiplexing. Reserving frequency (bandwidth). Technique in circuit switching.
28. TDM	Time Division Multiplex- ing. Reserving time (take turns). Technique in cir- cuit switching.
29. IXP	Internet Exchange Point; a meeting point where multiple ISPs can peer together

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30.	ľ

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30. NEED	formula for Dqueue, avg Dqueue, end to end
31. Throughput	Rate (bits/time unit) which bits are trans- ferred. Actual amount of data you can send or receive. Determined by smallest link. min{Rs, Rc, R/M}
32. Application Layer	Service: Serve your apps Location: Inside the app Type: Software Data Called: Messages
33. Transport Layer	Service: Provide virtual connection between apps Location: Inside the OS Type: Software Data Called: Segments
34. Network Layer	Service: Create virtual connection between hosts Location: Inside the OS Type: Software Data Called: Datagrams
35. Link Layer	Service: Send packet to next physical location Location: NIC Type: Software/Hard- ware Data Called: Frames



41. Ex: Suppose users share a 3 Mbps link. Suppose 3000000 bps / 120000 each user requires 150 kbps when transmitting, bps = 20 channels = 20 but each user only transmits 10% of the time. users When circuit switching is used, how many users can be supported?

42. **Dqueue** ((N-1)L)/2R