CS-307 Computer Networks 26 September 2018
QUIZ #1 Duration: 20 Minutes
Section – B Weightate 5%

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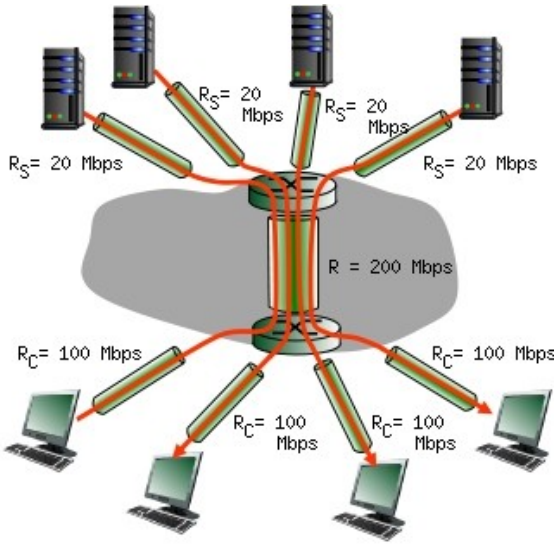
1. Consider the scenario shown below, with four different servers connected to four different clients over four three-hop paths. The four pairs share a common middle hop with a transmission capacity of R = 200 Mbps. The four links from the servers to the shared link have a transmission capacity of R_S = 20 Mbps. Each of the four links from the shared middle link to a client has a transmission capacity of R_C = 100 Mbps per second. [10+10+10=30 Marks]



1.1 What is the maximum achievable end-end throughput (in Mbps) for each of four client-to-server pairs, assuming that the middle link is fair-shared (i.e., divides its transmission rate equally among the four pairs)? Provide a brief explanation of your answer.

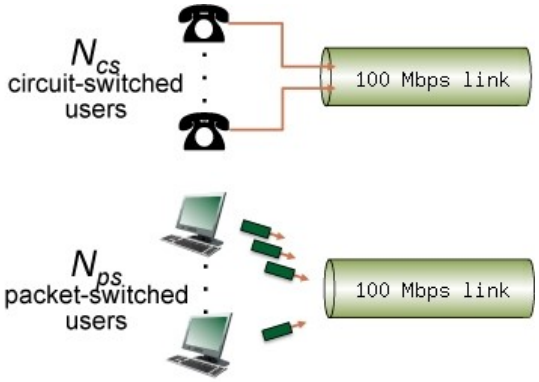
1.2 Which link is the bottleneck link for each session? and Why?

1.3 Assuming that the senders are sending at the maximum rate possible, what are the link utilizations for the sender links (R_S), client links (R_C), and the middle link (R)?

2. Consider the scenario below:

- A circuit-switching scenario in which N_{cs} users, each requiring a bandwidth of 25 Mbps, must share a link of capacity 100 Mbps.

[10+10 = 20 Marks]



2.1 When circuit switching is used, what is the maximum number of circuit-switched users that can be supported? Explain your answer.

2.2 Now suppose that packet switching is used. Suppose there are 7 packet-switching users (i.e., N_{ps} = 7). Can this many users be supported under circuit-switching? Explain.