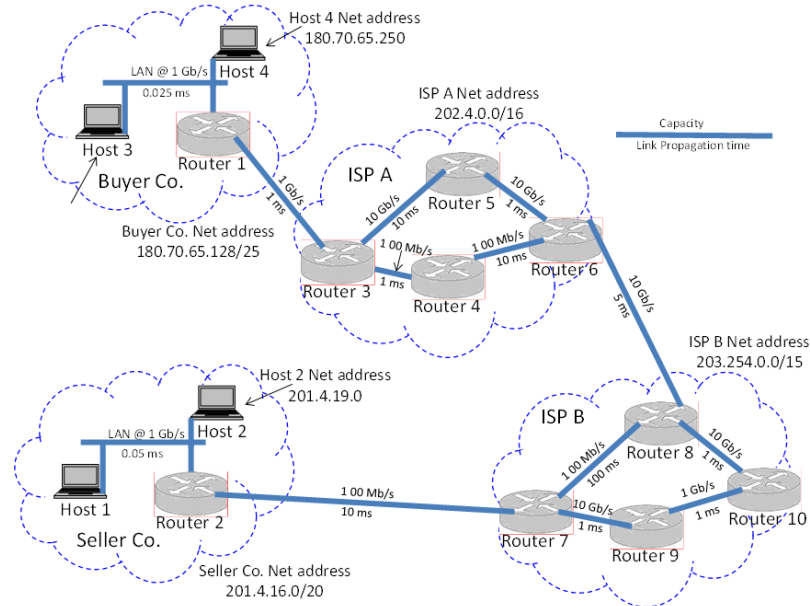


EECS 563 Homework 12

All the problems on this assignment use the network given below.



1. Host 6 was just attached to Router 6, how does Host 6 get an IP address?
2. Host 1 knows Host 4's name, e.g., lead_buyer.buyer.com, how does Host 1 get Host 4's IP address?
3. Host 1 knows Host 2's IP address, however to send packets over the LAN Host 1 must use Host 2's MAC address. How does Host 1 learn Host 2's MAC address?
4. The LAN's in Buyer Co. and Seller Co. use CSMA/CD. Which network has a higher SMax? Circle Buyer Co. or Seller Co. and justify.
5. A sliding window link data layer protocol is used between Router 7 and Router 9. Assume the frame size is 5000 bits. The protocol header includes an 8 bit field for the sequence number. What is the efficiency?
6. The forwarding table in Router 8 must contain an entry for packets being sent to the Buyer Co. network, i.e., Router 8 must contain an entry for 180.70.65.128/25. Circle True or False and justify.
7. Consider communications between Host 1 and Host 4. Find the minimum delay path between Host 1 and Host 4. That is, list the set of routers in the minimum delay path between Host 1 and Host 4.
8. Wavelength division multiplexers are used to connect a set of servers to Router 6. The fiber and associated equipment between the wavelength division multiplexer and Router 6 can support N wavelengths. Note there is a cost per wavelength. Each wavelength operates at the same data rate. The servers transmit large files; the average file transmission time is 1 sec. The servers generate files transmission requests at a rate of 9 files/sec. A request holds a wavelength for the file transmission time. If all wavelengths are busy serving other files transmissions then the requests is blocked. Design the systems, i.e., find the number of wavelengths, required to for a probability of blocking of 2%.

9. Packets arrive at Router 2 destined for Router 7 at a rate of 9000 packets/sec, the average length per packet is 1250 Bytes bits.
- What is the average delay in ms.
 - Specify a new link rate in Mb/s to reduce the average delay by a factor of 4.
10. The Buyer Co. and Seller Co. negotiate with ISP A and ISP B to use MPLS.
- Why do both ISP A and ISP B have to be involved in the negotiation.
 - What is the benefit to Buyer Co. and Seller Co. of using MPLS?
11. Buyer Co., Seller Co., ISP A, and ISP B are all AS's. BGP is a routing protocol is used to build the forwarding tables in Routers 3, 4, 5, and 6, TRUE or FALSE. Circle your answer.
12. The IPv4 layer in Host 1 sets the TTL field in the IP packet header.
- Does the IP packet reach Host 4 if Host 1 sets the TTL =4? Circle YES or
NO
 - Does the IP packet reach Host 4 if Host 1 sets the TTL =15? Circle YES or
NO
13. Suppose there are hosts directly connected to Router 2 and Router 7 using TCP Reno with an MSS = 1500 Bytes. There is wireless link between Router 2 and Router 7 operating at a BER = $4 * 10^{-7}$. Assume the link layer does not do error recovery, i.e., use an ARQ. What is the average throughput in Mb/s on the link between Router 2 and Router 7? Your answer can be checked using [Average Throughput of TCP Connection for TCP Reno](#)