Tutorial 5

Instructions

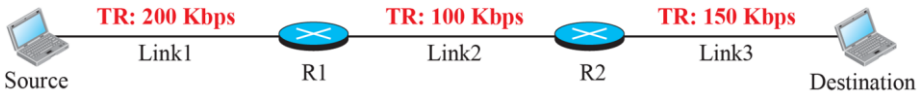
1. Form ad-hoc groups of 2 to 3 students to solve this week's exercise.
2. Each group must answer the following review Q's
3. Each group will use shared google docs to work with all group members and tutor. The document must include the group member's names and the tutorial sheet number.

Review Questions

1. Q4-1. Why does the network-layer protocol need to provide packetizing service to the transport layer? Why can't the transport layer send out the segments without encapsulating them in datagrams?

2. Q4-3. Distinguish between the process of routing a packet from the source to the destination and the process of forwarding a packet at each router.

3. Q4-9. In Figure 4.10, assume that the link between R1and R2 is upgraded to 170 Kbps and the link between the source host and Rl is now downgraded to 140 Kbps. What is the throughput between the source and destination after these changes? Which link is the bottleneck now?



a. A path through three links

4. Q4-11. A host is sending 100 datagrams to another host. If the identification number of the first datagram is 1024, what is the identification number of the last?

5. Q4-13. In classless addressing, we know the first and the last address in the block. Can we find the prefix length? If the answer is yes, show the process.

6. Q4-15. In classless addressing, can two different blocks have the same prefix length? Explain.

7. Q4-21. Compare and contrast the protocol field at the network layer with the port numbers at the transport layer. What is their common purpose? Why do we need two port-number fields but only one protocol field? Why is the size of the protocol field only half the size of each port number?

8. Q4-27. In a graph, if we know that the shortest path from node A to node G is (A→B→E→G), what is the shortest path from node G to node A?

9. Q4-33Assume that we have an isolated Autonomous System (AS) running RIP. We can say that we have at least two different kinds of datagram traffic in this AS. The first kind carries the messages exchanged between hosts; the second carries messages belonging to RIP. What is the difference between the two kinds of traffic when we think about source and destination IP addresses? Does this show that routers also need IP addresses?

10. Q4-35. At any moment, a RIP message may arrive at a router that runs RIP as the routing protocol. Does it mean that the RIP process should be running all the time?

11. Q4-37. We say that OSPF is a hierarchical intra-domain protocol, but RIP is not. What is the reason behind this statement?

12. Q4-39. Why do you think we need only one update RIP message, but several OSPF update messages?

13. Q4-41. OSPF messages and ICMP messages are directly encapsulated in an IP datagram. If we intercept an IP datagram, how can we tell whether the payload belongs to OSPF or ICMP?

14. Q4-65. List three protocols in the 1Pv4 network layer that are combined into a single protocol in IPv6.

15. P4-3. Which fields of the IPv4 main header may change from router to router?

16. P4-5. Briefly describe how we can defeat the following security attacks:
    a. packet sniffing b. packet modification c. IP spoofing

17. P4-9. Find the class of the following Classful IP addresses:
    a. 130.34.54.12 b. 200.34.2.1 c. 245.34.2.8

18. P4-13. In classless addressing, what is the value of prefix length (n) if the size of the block (N) is one of the following?

    a. N= 1

    b. N= 1024

    c. N= 2^{32}

19. Give some reasons for using fragmentation and reassembly at the network layer?