Section 5

Wednesday, June 19, 2019 11:43 AM

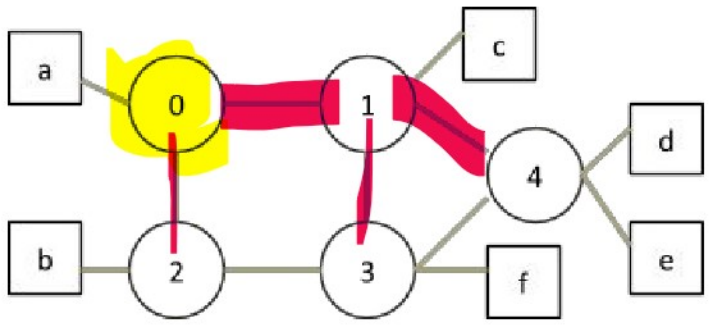
Worksheet

Includes all node in the original graph

Section #5: Spanning Tree, DHCP/ARP and Transport Layer

Spanning Tree

Consider the following topology of Switched Ethernet switches. 0-4 are switches and a-f are hosts.



(a) List the root and edges of the spanning tree obtained by running the Spanning Tree protocol.

(b) For this part only, suppose Switch 0 fails. What is the new spanning tree?

skip

(c) Suppose Switch 0 comes back up, and the spanning tree is recomputed. Assume these switches are Learning Switches and the following sequence of packets are sent in order. For each packet, will it be flooded or forwarded based on state in switch (or some of both)? The switch tables are empty to start out.

1. b to a
2. e to b
3. f to c
4. c to f
5. d to c
6. a to e
7. d to f

skip

DHCP and ARP

Hosts execute DHCP protocol via DORA pattern
D: host broadcasts a Discovery message asking for offers from DHC
O: DHP servers reply with offers on available IPs
R: host chooses one and sends a request message
A: server sends an ack (you got it buddy!)

1. How does a host know its own IP address

.

2. How does it know whether a destination host is local?

   When you get your IP, you're alsog iven your subnet mask.
   So, if you want tos end something to adestination host, and its' SNM prefix matches yours, THEN ITS LOCAL!!!!

3. When sending to a remote host, where does the packet go first (and how does the sending host know where this is)?

   Goes to a gateway specified as the "first hop router"

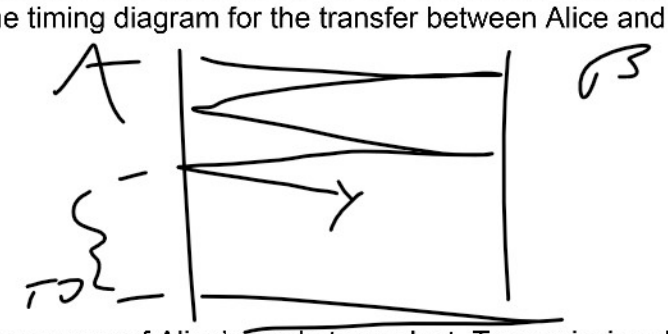
4. How many messages does a typical DHCP exchange require? What do they each do?

   4.
   DORA, see above

Transport Layer: Sliding Windows and ACKs

Alice and Bob are designing an experimental transport protocol. Alice controls the sending host, and Bob controls the receiving host; their computers are connected by a direct link (*ie.*, there are no routers in between them – just a direct cable).

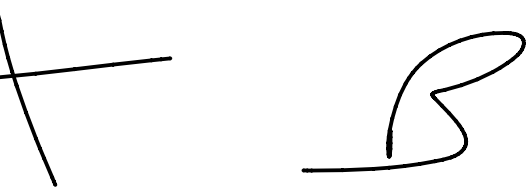
i) Suppose Alice and Bob use a window size of one (i.e., stop and wait): Alice only sends a new packet once the previous packet has been acknowledged. Bob responds to Alice's packets with cumulative ACKs. Alice sends 5 packets, but the 3rd one is lost. Show the timing diagram for the transfer between Alice and Bob.

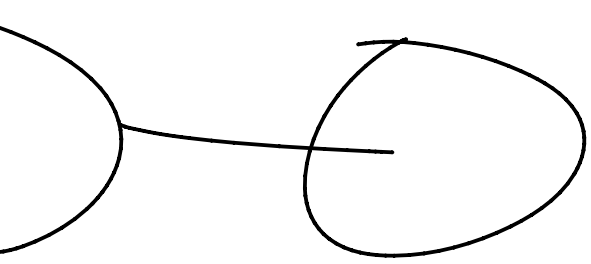


ii) Let's say none of Alice's packets are lost. Transmission delay is 2ms for both Alice's packets and Bob's ACKs, and propagation delay is 30 ms. How long does it take for Alice to transmit all five packets and receive an ACK back from Bob for the last packet?

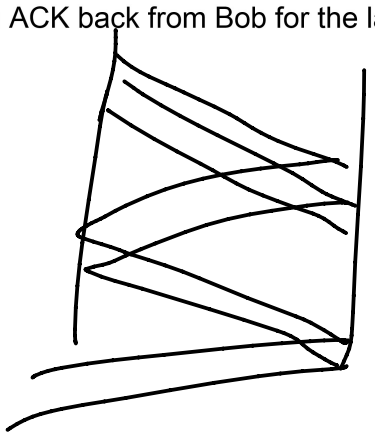
64 * 5 = 340

CP servers





iii) Realizing that this is rather slow, Alice upgrades to using a “sliding window” algorithm with a window size of 3. Bob continues sending cumulative ACKs. No packets are lost. How long does it take (using the parameters from (ii)) for Alice to transmit all five packets and receive an ACK back from Bob for the last packet?



2+30+2+30+2+30+2+30 + 2 = 130

iv) Now assume that packet #3 is lost. What does the exchange look like now?