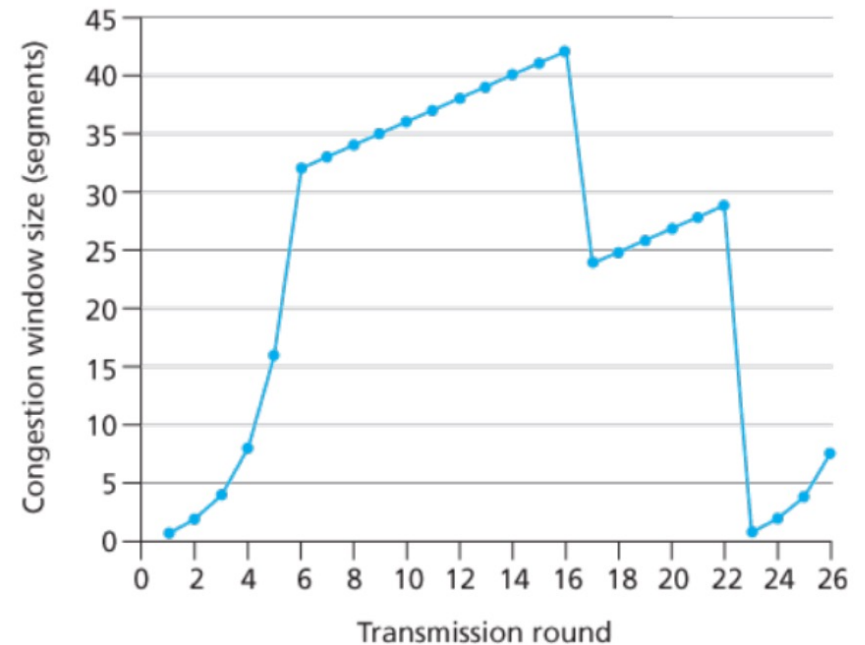


CSC458 Computer Networks

Problem Set #2 Tutorial

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- Identify the intervals of time when TCP slow start is operating.
- Identify the intervals of time when TCP congestion avoidance is operating.
- After the 16th transmission round, is segment loss detected by a triple duplicate ACK or by a timeout?
- After the 22nd transmission round, is segment loss detected by a triple duplicate ACK or by a timeout?
- What is the initial value of *ssthresh* at the first transmission round?
- What is the value of *ssthresh* at the 18th transmission round?
- What is the value of *ssthresh* at the 24th transmission round?
- During what transmission round is the 70th segment sent?
- Assuming a packet loss is detected after the 26th round by the receipt of a triple duplicate ACK, what will be the values of the congestion window size and of *ssthresh*?



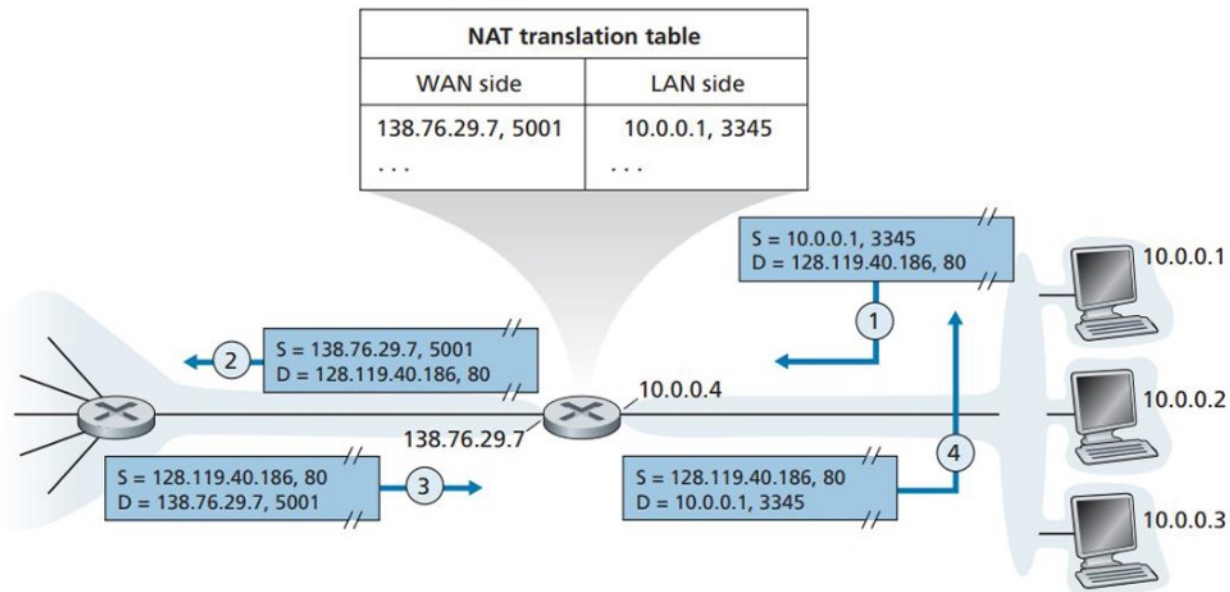
- a. [1,6] and [23,26]
- b. [6,16] and [17,22]
- c. After the 16th transmission round, packet loss is recognized by a triple duplicate ACK.
- d. After the 22nd transmission round, segment loss is detected due to timeout, and hence the congestion window size is set to 1.
- e. The threshold is initially 32, since it is at this window size that slow start stops and congestion avoidance begins.
- f. The threshold is set to half the value of the congestion window when packet loss is detected. When loss is detected during transmission round 16, the congestion windows size is 42. Hence the threshold is 21 during the 18th transmission round.
- g. When loss is detected during transmission round 22, the congestion windows size is 29. Hence the threshold is 14 (taking lower floor of 14.5) during the 24th transmission round.
- h.

Transmission round	Number of packets sent	Packet # sent
1	1	1
2	2	2-3
3	4	4-7
4	8	8-15
5	16	16-31
6	32	32-63
7	33	64-96

Thus packet 70 is sent in the 7th transmission round.

- i. The threshold will be set to half the current value of the congestion window (8) when the loss occurred and congestion window will be set to the new threshold value + 3 MSS on entry to the fast-recovery state. Thus the new values of the threshold and window will be 4 and 7 respectively.

Consider the network setup in figure below, ignore the addresses. Suppose that the ISP instead assigns the router the address 24.34.112.235 and that the network address of the home network is 192.168.1/24. Suppose each host has two ongoing TCP connections, all to port 80 at host 128.119.40.86. Provide the six possible entries in the NAT translation table.



Suppose three hosts with private IP addresses 192.168.1.1, 192.168.1.2, 192.168.1.3 each has two ongoing TCP connections (source port is 3345 and 3346).

WAN side		LAN side	
IP address	port	IP address	port
24.34.112.235	5001	192.168.1.1	3345
24.34.112.235	5002	192.168.1.1	3346
24.34.112.235	5003	192.168.1.2	3345
24.34.112.235	5004	192.168.1.2	3346



24.34.112.235	5005	192.168.1.3	3345
24.34.112.235	5006	192.168.1.3	3346

Suppose that the five measured SampleRTT values are 106 ms, 120 ms, 140 ms, 90 ms, and 115 ms. Compute the EstimatedRTT after each of these SampleRTT values is obtained, using a value of $\alpha = 0.125$ and assuming that the value of EstimatedRTT was 100 ms just before the first of these five samples were obtained. Compute the TCP TimeoutInterval after each of these samples is obtained.