Computer Networking

Homework 1

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Problem 1: Packet switching and delay (30 points)

1. The transmission delay is for this message at a line. Because there are 3 lines from Source to Destination, the total time is 0.6s with ignoring propagation, queuing, and processing delays.
2. The time is for the first packet from source host to the first switch. When time is 0.004s from the first packet sent, the second packet is fully received at the first switch.
3. It takes 102x0.002=0.204s to complete this task. The answer of part (1) is 0.6s to complete the same task. Obviously, the speed of file transfer using the message segmentation method is better than one without this method.

Problem 2: HTTP1.1 (20 points)

1. The elapsed time is RTT1+…+RTTn+2RTT0, one RTT0 to initiate TCP connection, another RTT0 to request the object.
2. 1
   1. Suppose client had received the HTML. The elapsed time is 16 RTT0.
   2. Suppose client had received the HTML. The elapsed time is 4 RTT0.
   3. Suppose client had received the HTML. The elapsed time is RTT0 in pipeline.

Problem 3: HTTP/2 (20 points)

1. It needs 2015 frame times until all five images are sent.
2. It needs 18 frame times until all five images are sent.

Problem 4: Web Cache (20 points)

1. ,,the average access delay is , the average Internet delay is 3s, so the total average response time is 0.61s + 3s =3.61s
2. The total response time is

Problem 5: P2P (10 points)

1. Bob’s claim is impossible, because a complete copy of the file always is divided to lots of chunks and it is hard to collect all of the chunks with limit of system, such as Bob not being the top four peers of others, if Bob is free-riding.
2. He can use different computers with distinct IP addresses to request the same file from other peers, which can let Bob get complete file more quickly.