Handout #7 — CS 471

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Contents

1 Questions

1. A packet switch receives a packet and determines the outbound link to which the packet should be forwarded. When the packet arrives, one other packet is halfway done being transmitted on this outbound link and four other packets are waiting to be transmitted. Packets are transmitted in order of arrival. Suppose all packets are 1,500 bytes and the link rate is 2 MBPS. What is the queuing delay for the packet? More generally,what is the queuing delay when all packets have length L, the transmission rate is R, x bits of the currently- being-transmitted packet have been transmitted, and n packets are already in the queue?

    - Generally the queueing delay can be expressed as the following:

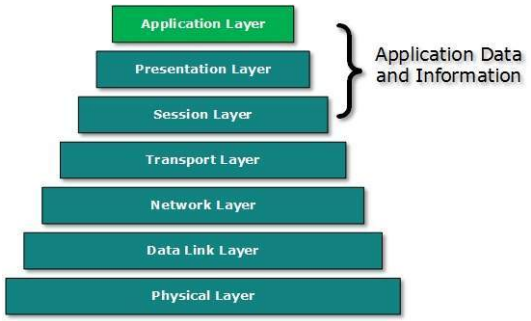
    $$\text{delay}_{\text{queue}} = \frac{n \times L + (L - x)}{R}$$

    - Therefore, if you plug in the correct values:

    $$\text{delay}_{\text{queue}} = \frac{4 \times 1500 + (1500 - 750)}{2 \times 10^6} = \frac{27}{8000} \text{ seconds}$$

2. What does the application layer define?

    - **Application layer:** specifies the shared communications protocols and interface methods used by hosts in a communications network



3. What four basic transport layer services may an application need?

    - Data integrity
    - Timing
    - Throughput
    - Security

4. I would like to fetch 10 images. How many HTTP requests must my browser send to the server?

    - 11: 1 for the HTML page and 10 for the other resources

5. For a communication session between a pair of processes, which process is the client and server?

   - Client process: initiates the communication
   - Server process: process that waits to be contacted

6. Suppose you wanted to transfer a file from a server to a client as fast as possible. Would you use TCP or UDP?

   - UDP because you are not concerned about the data integrity. You can transmit the data quickly.

7. Why do HTTP, FTP, SMTP, and POP3 run over TCP rather than UDP?

   - These protocols use TCP over UDP because of data integrity. All information requested will be collected.