

Computer Networks and Distributed Systems Exercise Sheet 3

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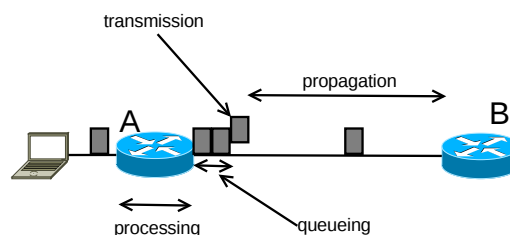
Quiz questions

1. What is the difference between authentication and authorization?
2. Is HTTP in the versions 1.0 and 1.1 a stateless or a stateful protocol?
3. Some P2P services need a central server (BitTorrent tracker, XMPP server). Why?

Exercise 3.1

Two hosts A and B are connected via a single connection with capacity R bps. Assume, that the distance between the hosts is s meters and the velocity of propagation for the connection is v meter/second. Host A sends a packet consisting of L bits to host B.

- (a) Express the *propagation delay* d_{prop} as a function of s and v .
- (b) Express the *transmission time* d_{trans} of the packet as a function of L and R .
- (c) Find a term for the end-to-end delay neglecting the delay caused by queues or processing by hosts.
- (d) Assume that host A starts the transmission at time $t = 0$.
At what location is the last bit of the packet a time $t = d_{trans}$?
- (e) Assume that d_{prop} is greater than d_{trans} .
At what location is the first bit of the packet at time $t = d_{trans}$?
- (f) Assume that d_{prop} is less than d_{trans} .
At what location is the first bit of the packet at time $t = d_{trans}$?
- (g) Assume that $v = 2,8 * 10^8 \frac{m}{s}$, $L = 100$ bits and $R = 28$ kbps.
Compute the distance s , such that $d_{prop} = d_{trans}$.



Exercise 3.2

A. Nonymous performs a VoIP phone call to his sister B. His Computer transforms the analog voice data into a digital 64 kbps bit stream in real time, groups the bits into 56-byte packets and sends them to B. B's Computer decodes complete packets in real time as they arrive. The link between A. and B. has a bandwidth of 2 Mbps and a propagation delay of 10 msec.

What is the time between the creation of a bit of voice data on A's side and the end of its decoding?

Exercise 3.3

In this problem, we consider a typical request workflow between a web browser and a web server. Connect via telnet with `tu-dortmund.de` and ask for the URL `http://tu-dortmund.de` via HTTP 1.0 and 1.1.

- (a) What are the responses of the Web server?
- (b) What requests have to be made to receive a status code "OK" with the contents of the university Web site? Describe the process in a time diagram.