Midterm

Practice

- P6/Chap 1

a. Propagation delay: d_prop = m/s (m: distance - meters, s: propagation speed - meters per second)

b. transmission time: d_trans = L/R (L: package size, R: transmit rate)

c. end-to-end delay: m/s + L/R

d. At the starting point.

e. on the link, does not arrive B yet.

f. Arrived at B.

g. m/s = L/R ⇒ m = L/R * s

- P25/Chap 1

d: 20 000 000 m

R = 5 Mbps

s: 2.5 ∗ 10^8 m/s

By default, we just ignore the d_proc and d_queue, otherwise they will be given in the task description.

a0. L = 10 MB

t_total = t_trans + t_prop = L/R + d/s = 10 000 / (5000 000 / 8) + 20 000 000 / (2.5 ∗ 10^8) = 16.08 (s)

a. R * d_prop = 5000000 * (20 000 000 / (2.5 ∗ 10^8)) = 400000 (bits).

c. The maximum number of bits in the link in one second.

b. 400000 (the bandwidth-delay)

d. The width of a bit in the link = d / bandwidth-delay = 20000000 / 400000 = 50 (m). It is not longer than a football field.

e. width of a bit = s / R

- P29/Chap 1

R = 10Mbps = 10∗10^6 bps

s = 2.4 * 10^8 m/s

d = 36000 km = 36000000 m

a. d_prop = d / s = 36000000 / (2.4*10^8) = 0.15s

RTT ≥ 2 d_prop

b. bandwidth-delay = R * d_prop = 10*10^6 * 0.15 = 1500000 bits

c. The minimum value of x is: R * 60 = 10*10^6 * 60 = 600 Mbs

- P7/Chap 2

total dns resolve time = RTT1 + RTT2 + ... + RTTn

total time to get html from the web server (3 ways hand shake) = 2 * RTT0

total time: RTT1 + RTT2 + ... + RTTn + 2 * RTT0

- P8/Chap 2

a. Non-persistent HTTP means we need 1 connection for each object. The result: 16RTT0 + total time.

b. Result: total time + 2RTT0 (the first 6 objects) + 2RTT0 (the last 2 objects)

c. Persistent HTTP means we need to initialize the connection to the server once, and then download the objects without needing to init the connection for each object.

Persistent HTTP and non-parallel TCP: total time + 9RTT0 (1 RTT0 for init the connection and 8 RTT0 for 8 objects).

Persistent HTTP and parallel: total time + 2RTT0 (1 RTT0 for init the connection and 1 RTT0 for the first 6 objects) + 1RTT0 (the last 2 objects).

Content

- 60 mins
- closed book
- Part 1 (60pts):
  - 40 MCs
- Part 2 (40pts):
  - 2 questions (exercises or calculations)