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CS558 HW 2

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R6

In order to perform a transaction from a remote client to a server as fast as possible, you would choose UDP as your transport protocol. This is because UDP is 'connectionless' and does not require an initial handshake to set up communication between the two machines. As a result, the transaction can be completed in a single round trip time (RTT), as opposed to TCP, which requires at least two RTTs.

R19

Yes, it is possible for an organization's Web server and mail server to have the same alias as a hostname. The resource record that contains the hostname of the mail server would have Type=MX in this case.

P4

a. The URL of the document requested by the browser is at gaia.cs.umass.edu/cs453/index.html according to the first line of the GET request
b. The browser is running HTTP version 1.1 according to the end of the request line
c. The browser requests a persistent connection according to the header Connection: keep-alive
d. Not provided in the HTTP request.
e. The browser is identified as Netscape 7.2 according to the User-Agent header. This is necessary in an HTTP request because it informs the server about which content and features are available to the client. The Web objects that are meant to be returned to the client may or may not be compatible with the browser that requested this data.

P9

$$Total\ avg\ response\ time = avg\ access\ delay + avg\ Internet\ delay$$

$$Total\ avg\ response\ time = \frac{\Delta}{1 - \Delta\beta} + 3s$$

$$\Delta = \frac{0.1Mb}{15\frac{Mb}{s}} = 0.00\bar{6}s, \qquad \beta = 16\frac{requests}{s}$$

$$Total\ avg\ response\ time = \frac{0.00\bar{6}\ s}{1 - (0.00\bar{6}\frac{s}{requests} * 16\frac{requests}{s})} + 3\ s = \ 3.0075\ s$$

P22

F = 20000 Mb, d_{min} = 2 Mbps, u_s = 30 Mbps

Client-Server: $D \geq \max\frac{NF}{u_s}, \frac{F}{d_{min}}$

Peer-to-Peer: $D \geq \max \frac{F}{u_s}, \frac{F}{d_{min}}, \frac{NF}{u_s + \sum u_i}$

N	u_i (Mbps)	Client-Server (s)	Peer-to-Peer (s)
10	0.3	10000.0	10000.0
	0.7	10000.0	10000.0
	2	10000.0	10000.0
100	0.3	66666.66666666667	33333.333333333336
	0.7	66666.66666666667	20000.0
	2	66666.66666666667	10000.0
1000	0.3	666666.6666666667	60606.06060606061
	0.7	666666.6666666667	27397.260273972603
	2	666666.6666666667	10000.0