Subject AbdelRahman Adel AbdelFattah Sheet 2 Date 17/12/96

Essay Questions :-

① if you just want to send fast and don't care about reliability use UDP but if reliability is important then use TCP

② All the clients act as clients & servers of a communication session

③ Caching decreases the time taken to get the file from the origin server by placing it nearer to the ISP that requested the object. And it would only decrease the delay if the object requested is in the cache else it doesn't decrease the delay.

④ Yes, because each has a different type of DNS reading.

Mail type = MX

⑤ ~~In-band~~ out-of-band Transmits control data on a seperate connection from the main one

In-band ~~sense~~ control data & main data on the same connection

In-band	out-of-Band
HTTP	FTP
SMTP	DNS
~~DNS~~	TCP

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Problems:-

① $F = 15$ Gbits $= 15 \times 10^9$ bits

N peers

$u_s = 30$ Mbps $= 30 \times 10^6$ bits/s

$d_i = 2$ Mbps $= 2 \times 10^6$, $u_i = U \Rightarrow N = 10, 100, 1000$

$U = 300 \times 10^3, 700 \times 10^3, 2 \times 10^6$

Client-Server

Distribution: $D_{c-s} \geq \max\{NF/u_s, F/d_{min}\}$

~~N~~ ~~Server NF/us~~ ~~P2P F/dmin~~ ~~Dcs~~

P2P $D_{P2P} \geq \max\{F/u_s, F/d_{min}, NF/(u_s + \Sigma U_i)\}$

~~N~~ ~~F/us~~ ~~NF/us~~ ~~F/dmin~~

N	F/us	NF/us	F/dmin	ΣU_i	$NF/(u_s+\Sigma U_i)$	D_{c-s}	D_{P2P}
10	500	~~5000~~ 5×10^3	7.5×10^3	3×10^6	4545.45	7.5×10^3	7.5×10^3
100	500	50×10^3	7.5×10^3	70×10^6	15,000	50×10^3	15×10^3
1000	500	500×10^3	7.5×10^3	2×10^9	7,389	500×10^3	7.5×10^3

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② Size of object = 850×10^3 bits

request rate = 16 / second

HTTP reject = 3 seconds

access link = 15×10^6

$\Delta / (1 - \Delta\beta)$

a) $\Delta = \frac{850 \times 10^3}{15 \times 10^6} = 0.0567$ seconds

$\beta = 16$

$\beta\Delta = 0.9067$

$\frac{\Delta}{(1 - \Delta\beta)} = \frac{0.0567}{(1 - 0.9067)}$

$= 0.61$

Average = 3 + 0.61 = 3.61 seconds

b) 40% = miss rate

$\beta\Delta = 0.4 \times 0.9067 = 0.3627$

$\frac{\Delta}{(1 - \Delta\beta)} = 0.0889$

Avage delay of access link = 3.0889

Avage access with cache = 1.23556 seconds

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③ www.b.com/bigfile = 1×10^9 bits

~~1. DNS → local DNS~~
~~2. local DNS → root DNS~~
~~3. Root DNS → TLD DNS (.com)~~

1. m1.a.com $\xrightarrow{DNS}$ local DNS
2. local DNS $\xrightarrow{DNS}$ Root DNS
3. Root DNS $\xrightarrow{DNS}$ TLD .com
4. TLD.com $\xrightarrow{DNS}$ Autorabrative name b.com
5. b.com $\xrightarrow{DNS}$ local DNS
6. local DNS $\xrightarrow{DNS}$ b1.com
7. b1.com $\xrightarrow{DNS}$ IP of b1.com to local DNS
8. HTTP request to b1.com (GET ~~request~~)
9. 1 Gbps $\xrightarrow{HTTP}$ Cache
10. Cache $\xrightarrow{HTTP}$ m1.a.com

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OSCAR