Assignment – 1

[Summer 2022-B]

Name: Nuzhat Naushin
ID: 2220116 2
Section: 22

1

(a) **Disagree**. Cookies are stored locally on client's device, not on web server. So, if the computer is formatted or cookies are cleared, stored cookies data is lost.

(b) i Given, file size = 1.5 GB = 1536 MB

1 chunk = 1 MB

So, 1 MB = 1 chunk

∴ 1536 MB = 1536 chunks

Now,

1 peer ⟶ 512 chunks

∴ 2 peers ⟶ (512 × 2) chunks

= 1024 chunks

2 peers only cover 1024 chunks of the file, whereas whole file is 1536 chunks.

So, new peer **cannot download full file.**

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ii) It is possible because Youtube uses adaptive streaming and buffering techniques. So, when I'm downloading parts ahead of playback, so if the average download speed is above the playback rate over time, playback can still be smooth.

(c) i) Given, TTL = 48 hours = 2 days

Time difference from 16 July 13:01:22
to 19 July 11:01:23
= 2 days 22 hours

TTL expired after 2 days, so on 19th July, DNS cache is invalid.

∴ Iterative lookup happens again,

Each RTT = (55 ~~00~~ × 3) = 165 ms (Ans)

ii Persistent HTTP, so only 1 TCP handshake

~~first request = 125 ms~~

No. of objects = 21 (Each requires 125 ms)

∴ Total RTT = 21 × 125 = 2625 ms

(Ans)

iii Total time to load page = DNS time + TCP connection RTT + req transmission + data download

= (165 + 55 + 35 + 2625) ms

= 2880 ms

2

(a) Rafiq → Outlook → Gmail → Yahoo

(1) Sending email to gmail → SMTP → temporary port (SRC) → 587 SMTP (Dest)

(2) Gmail to Yahoo → SMTP → 587 or 25 (src) → 25 (Dest)

(3) Yahoo receiving → POP3 → temporary → 110 (POP3) (Dest)

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(b) i

$Sf = 100$

$Sn = 151$

Window size = 100 bytes

but

Unacknowledged bytes = $Sn - Sf$ = 51 bytes

Sent

Can be sent = $100 - 51$ = 49 bytes

ii If Ack is lost, sender doesn't receive Ack, so packet loss is assumed, then it retransmits after timeout.

(c) i Server ISN = 5549

Seq no. = 5549 + 1 = 5550

↓

(SYN)

Data segment size = 266 bytes

Ack = Client ISN + total bytes received + 1

= 9666 + 569 + 568 + 650 + 999 + 1

= 12853

(ii) Client's ISN = 9666

Next seq = 9666 + 569 + 999 + 1 = 11235

Two HTTP req

rand = 8800 bytes

3

(a) i

(1). Data transmitted over medium & received. (Physical)

↓

(2) Identifies correct hop. (DataLink)

↓

(6) Identifies correct host. (Network)

↓

(4) Control session. (Session)

↓

(3) Decrypt data. (Presentation)

↓

(2) Identifies process of delivery (Transport)

↓

(5) Bob reads the message. (Application)

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ii) Only Data Link (MAC) addresses change at each hop

(b) TTL increments to identify each hop & as it is increased by 1 when ~~packet~~ packet reaches next router. The originator knows that the packet has reached destination when ICMP Echo Reply is received.

(c) i) Max data per fragment = 2038 − 46 = 1992 bytes

Packets = $\frac{21739}{1992}$ = 10.92 ≈ 11 fragments

ii) MF = 0

iii) full 10 fragments = 10 × 1992 = 19920 bytes

Remaining = 21739 − 19920 = 1819 bytes

Add header = 1819 + 46 = **1865 bytes**

↑ last packet size

iv) ~~offset~~ → 3rd last packet = 9th fragment

8 fragments before = 8 × 1992 = 15936 bytes

∴ offset = $\frac{15936}{8}$ = **1992**