Assignment-1

Name:- Md. Shariyar Akbar

ID :- 22201232

section: 23

Answer to the question:- 1

a) I Disagree to the statement "Proxy servers act only as servers." Because, they act as intermediaries between client & servers. They rely responses back to client. They minimize access link load to the internet by caching frequently requested web objects locally. If then a cached object is requested, The proxy server serves it directly without fetching it again from the internet which reduces external bandwidth usage.

b)① No, Because they use different DNS records and different protocols. A web servers uses an A record (RAAA for IPV6) to map the domain name to an IP address for HTTP/HTTPS services. On the other hand, a mail server uses an MX (Mail Exchange) record which specifies the mail server responsib for receiving emails for the domain.
Although, Both server can run on the same physical machine, they must have distinct DNS entries or service identifiers to properly route traffic to the correct

application,

<u>11)</u> for Bittorent, if a new peer 'Alpha', join without any chunks, she can't become a top uploader immediately since she has no data to share. Alpha will get her first chunk via "rearest first" piece selection strategy from existing peers that upload chunks to new joiners. Once she receives a chunk, she can start uploading to others, improving her rank as an uploader.

<u>2|a)</u> when reifat opens a Chrome tab to acess his Daraz account, the request segment sent via the Chrome tab to the Daraz server uses:

<u>Source Port</u>: Dynamically allocated ephemeral port number on reifat's machine (client side)

<u>Destination Port</u>: The server port, typically port 443 for HTTPS. ~~Thus, the segment has 1 source port~~

Thus, The segment has 1 source port & 1 Destination port address, both 16-bit number.

S] a. 10 July 2022 13:01:22 , PC B received a DNS reply
with TTL = 24 hours.

b. 11 July 2022 10:01:23, PC B visited the same website
again.

c. RTT for each DNS lookup = 50 ms.

d. Request sending time = 25 ms.

f. 12 objects × 85 ms [each]

g. HTTP not persistent.

① TTL = 24 hours.

But the revisit is only 21 hours , so the local
DNS cache is still valid.

Thus, the local DNS server returns the stored
record immediately – no itrative lookup is needed

Total RTT = 0 ms.

② RTT = 50 . [one way = 25 ms]

2 RTT = 50×2 = 100 ms per object

∴ 12 objects = 12×100 = 1200 ms   RTT in total

(Ans)

(iii) **Total Production**

Each object needs 85 ms .

Thus,

Time per object = 100 + 85 ms = 185 ms .

∴ for 12 objects = 12 × 185 = 2220 ms

$$\approx 2.2 \text{ seconds}$$

(Ans!)

2) b) Q. The system uses tuple:

(i) Destination IP address (network - layer)

(ii) Destination port number (transport - layer)

(iii) Transport protocol identifier (UDP/TCP)

(ii) The HLEN for TCP header length = 1010

∴ Decimal = 10

We know, that HLEN is measured in 32 bit or 4 bytes.

Thus, The length = 10 × 4 = 40 bytes.

c] Client ISN = 9666

Server ISN = 5549

Client RWND = 8000

Server = 7000

① Server ISN = 5549 + 1 = 5550

Client ISN = 9666 + 1 = 9667

after 569 bytes, the next byte expected from

Client = 9667 + 569 = 10236.

∴ The sequence number = 5550

Acknowledgement number = 10236.

⑪ As second segment is lost client will be waiting and not receiving any data befor it receives it. So in the buffer the segment after 2 will be stacked

Sequence number = $9666 + 1 + 569 + 999$

$$= 11235$$

rwnd $= 8000 - 280 - 1 \text{kB} = 7611$

(Ans!)

Ans no: 3

a) (I) After Traversing: (with layers)

5. Alice composes a letter for Bob. (Application)

3. Encrypts Data (Presentation)

4. Controls session (session)

2. Creates a reliable process to process connection. (Transport)

6. Fixes the source and destination IP address (network)

7. Provide hop to hop delivery (Data link)

8. 1. The data is transmitted over the medium (Physical)

(II) End to End a(remains same), Source IP address and destination IP address (network layer), Source port and Destination Port (transport layer) These addresses remain the same.

c. MTU = 3038 bytes.

IP header = 38 bytes.

∴ max payload per fragment = 3038 - 38

= 3000 bytes.

~~3000~~

① Number of fragments = 28939 / 3000 = 10

∴ 3000 × 9 = 27000 [9 full fragments]

∴ The remainder = 28939 - 27000

= 1939 [10th fragment]

∴ Total 10 fragments.

∴ ~~full fragment of 3000 bytes~~

② Total fragment = 10

3rd last = 10 - 2 = 8

All the fragments ~~have~~ except the last one

have MF = 1. Only fragment 10 has

MF = 0

∴ MF = 1 for 3rd last fragment.

(III). Last. packet data = remainder.

∴ remaider = 1939 bytes. [from ⓘ]

(IV) Fragment 1 carries bytes from 0 to 2999
                                                    (3000 bytes each)

∴ Fragment 2 start at byte offset = 3000

∴ offset field value = 3000/8 = 375

(Ans.)

3) b) Here we can see, one of the ping replies came back successfully (Reply from 10.10.111.10 ; bytes = 32 , time ≃23 TTL = 119).

This means R2 successfully reached the destination 10.10.111.10 (and received a reply). So too The "Request timed out" lines just mean othe ping attempts were lost or dropped, but at least one succeeded. Thus, the ping was successful.

Now,

TTL = 119

default TTL = 123

$$\therefore 123 - 119 = 4 \text{ hops.}$$

From, R2.

$$R_1 - R_2 - R_3 - R_4 - R_5^{\neg}.$$
$$\qquad (1) \quad (2) \quad (3)$$

Here The 4th hop is R5 itself.

∴ R2 pings R5, which is 4 hop away.