Branch : CSE & IT Batch : Hinglish

Computer Networks

TCP & UDP

DPP 02

[NAT]

1. Given the bandwidth of a network is 512MB/sec. Calculate the wrap around time? (in sec upto 2 decimal places)

[MCQ]

2. Which of the following statements is true regarding wrap around time in transport layer protocol?

(a) It's a time to use upto 2^{32} ports number.

(b) It's a time to use upto 2^{32} sequence number.

(c) It's a time to use upto 2^{32} bits of data.

(d) None of the above.

[NAT]

3. Consider a long – lived TCP session with an end to end bandwidth of 1.5 GB/sec. The session start with a sequence number 8328. The minimum time before this sequence number can be used again is ____second. (Rounded to the closest integer.)

[MSQ]

4. Which of the following conditions are true to avoid wrap around time? (B = Bandwidth)

(a) Minimum sequence number required to avoid wrap around with in the lifetime = 2 × life time × B

(b) Minimum sequence number required to avoid wrap around with in the lifetime = lifetime × B

(c) Minimum number of bits required in the sequence number field to avoid wrap around with in life time = $\lceil \log_2(\text{lifetime}) \times B \rceil$

(d) None of the above.

[MCQ]

5. Consider 400 Mbps network with a sequence number field 30 bits. The wrap around time of the sequence number is _____.

Answer Key

1. **(8.36 to 8.39)**
2. **(b)**
3. **(23 to 23)**
4. **(b, c)**
5. **(21.47)**

Hints & Solutions

1. (8.36 to 8.39)

Bandwidth = 512 MB/sec
= 512×10^6 Bytes/sec.
Means 512×10^6 bytes of data transfer – 1 sec.
For generating 2^{32} bytes of data
Transfer time (wrap around time)

Will be = $\frac{2^{32} \text{ bytes}}{512 \times 10^6 \text{ Bytes / sec}}$

= 8.38860 sec.

2. (b)

Wrap around time is a time taken to use all 2^{32}-sequence number.

3. (23 to 23)

Bandwidth = 1.5 GB/sec

= 1.5×10^9 bits sec

When the same sequence will be generated again actually have it asking as to calculate the wrap around time indirectly.

Wrap around time = $\frac{2^{32} \text{ bytes}}{1.5 \times 10^9 \text{ bits / sec}}$

= $\frac{2^{32} \times 8 \text{ bits}}{1.5 \times 10^9 \text{ bits / sec}}$

= 22.906492

4. (b, c)

Only option b and c are correct condition to avoid wrap around time.

5. (21.47)

B = 400 Mbps

= 400×10^6 bits / sec

= $\frac{400 \times 10^6}{8}$ bytes/sec

= 50×10^6 bytes/sec

Sequence number = 29 bits

= 50×10^6 byte – 1 sec

1 byte = $\frac{1}{30 \times 10^6}$ sec

1 sequence number = $\frac{1}{50 \times 10^6}$ sec

2^{30} sequence number = $\frac{2^{30}}{50 \times 10^6}$

= 21.47 sec