

Group: 27

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1. Suppose a data stream goes through a fiber of 1000 km, with a bandwidth of 1 Mbps and a signal propagation delay in the fiber of 2×10^5 km/s. If the data set consists of 1 Mbytes, calculate the time to transmit the data set. You can ignore the processing and queuing delays.

Propagation delay = Length of the fiber / Signal propagation speed

$(1000\text{km}) / (2 \times 10^5 \text{ km/s}) = 0.005 \text{ seconds} = 5 \text{ milliseconds}$

Transmission time = Data set size/Bandwidth

Bandwidth = 1 Mbps = 1000000 bits per second

Data set size = 1 Mbyte = 1000000 bytes = 8000000 bits

$8000000 / 1000000 = 8 \text{ seconds}$

Total time = transmission time + propagation delay

$8 + 0.005 = 8.005$

2. Compute the time to transmit a packet of size 2kbytes on a link with a bandwidth of 10 Mbps. The link propagation delay is 20 ms.

Propagation delay = 20 milliseconds = 0.02 seconds

Transmission time = Data set size/Bandwidth

2 kbytes = $2 \times 1024 \text{ bytes} = 2048 \text{ bytes} = 16384 \text{ bits}$

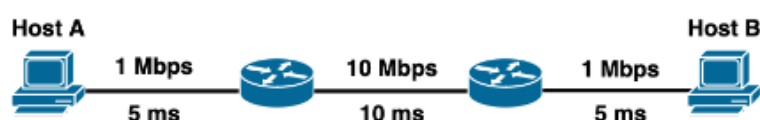
10 mbps = 10000000 bits/s

$16384 / 10000000 = 0.0016384 \text{ seconds}$

Total time = $0.0016384 + 0.02 = 0.0216384 \text{ seconds}$

3. Consider the network scenario in the figure below, and assume there are no queuing delays in hosts and routers, and the processing delays at hosts and routers are negligible.

- a) What is the capacity of the network path between hosts A and B?
- b) Compute the bandwidth-delay product of the network path between hosts A and B.
- c) Explain how the bandwidth-delay product of the network path between hosts A and B would change if the link between the two routers was upgraded to 1 Gbps.



A The capacity of the network path is the link with the lowest bandwidth which is 1 mbps.

B Bandwidth delay = Bandwidth * Delay = 1 mbps * 20ms = 0.02 mbps = 20000 bits for one way, two way 20000*2 = 40000bits.

C It's the same due to the link with the lowest bandwidth remains the same at 1 mbps.

4. HTTP is a stateless protocol. Still, both a web browser and a server need to keep track of session states. e.g., goods in your cart on an e-commerce site. How is that possible?

It works by using cookies which stores data on the client which is sent by the server usually a unique id the server can use to get a saved state.

5. What is the difference between a domain name and an email address?

A domain name and email address both have an ip destination however the difference between a domain name and email address is that the @ splits ip address and the user in the destination.

6. Why does not HTTP include any mechanism for retransmission of requests and responses?

HTTP is a protocol that is built on top of the TCP protocol which handles the retransmission and response instead of the HTTP protocol.

7. When a person sends an email to another person, the email is not directly sent between the persons' mail clients. Why?

Because the mail clients do not need to be online to receive an email instead the clients read the emails from smtp servers which sends emails between them.

8. Is it true that a web server must have a domain name that begins with "www". Explain.

No the WWW only specify that the domain as a web address.