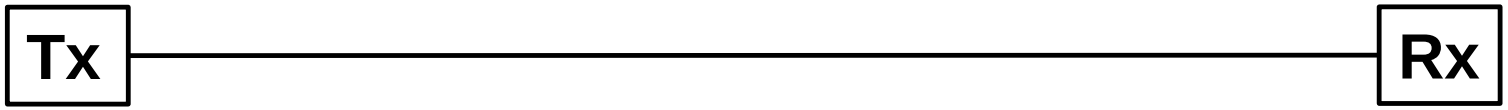
Transmission Parameters

- Distance: d meters
- Light transmission speed: $c = 3*10^8$ m/s
- Propagation delay: $t_p = d / c$ seconds
- End-to-end delay: D seconds
- Packet size: L bits
- Transmission bitrate: V_t b/s (bps)
- Packet transmission time: $t_{packet} = L / V_t$ sec
- Bandwidth-Delay product: $V_t * D$ bits

Example



$d = 10\ Km = 10^4\ m$

$t_p = d / c = 10^4 / 3*10^8 = 0'33*10^{-4} = 0'033*10^{-3} = 0'033\ ms$

$L = 1200\ bits$

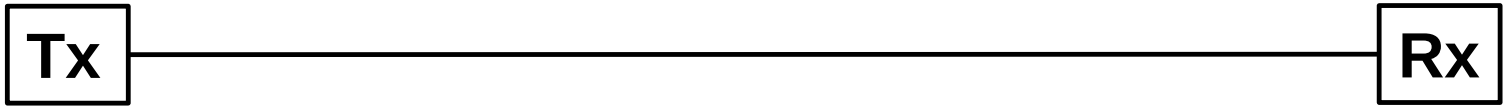
$v_t = 10\ Mbps = 10 * 10^6\ bits/sec$

$t_{paq} = L / v_t = 1200 / 10 * 10^6 = 120 * 10^{-6} = 120\ \mu s$

$D = t_p + t_{paq} = 33\ \mu s + 120\ \mu s = 153\ \mu s$

$D * v_t = 153*10^{-6} * 10*10^6 = 1530$ bits ("on the way")

Exercise



d = 10 Km; L = 1200 bits; v_t = 1 Mbps

Go to www.menti.com and use the code provided

Transmission delay (D) is:

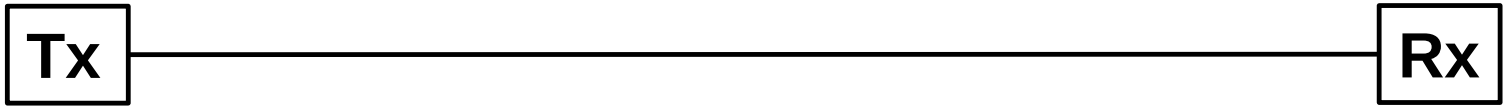
A) 153 ms

B) 1.23 ms

C) 1200 µs

D) 33 ms

Exercise



d = 10 Km; L = 1200 bits; v_t = 1 Mbps

Transmission delay (D) is:

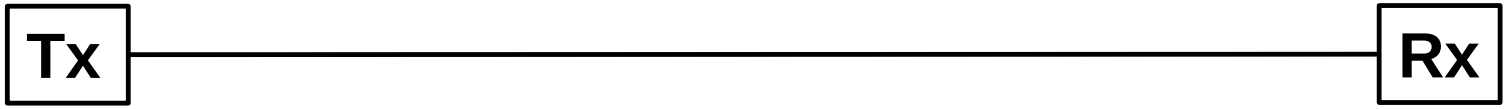
A) 153 ms

B) 1.23 ms (t_{paq}=1.2ms; t_p=0.033ms; D*v_t = 1233 bits)

C) 1200 µs

D) 33 ms

Exercise



d = 1000 Km; L = 1200 bits; v_t = 10 Mbps

Go to www.menti.com and use the code provided

Bandwidth-Delay product (D*v_t) is:

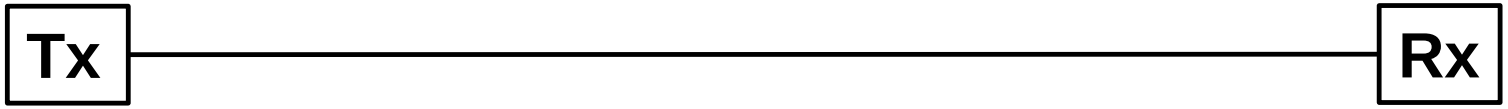
A) 1530 bits

B) 15300 bits

C) 34533 bits

D) 33 bits

Exercise



d = 1000 Km; L = 1200 bits; v_t = 10 Mbps

Bandwidth-Delay product ($D*v_t$) is:

A) 1530 bits

B) 15300 bits

C) 34533 bits (t_p = 3.33ms; t_{paq}=0.12ms; D = 3.453ms)

D) 33 bits

Quiz

Go to www.menti.com and use the code provided

Check the correct sentences:

A) In circuit switching links may operate at different bitrates

B) The end-to-end propagation delay depends on the distance and on the transmission rate

C) In packet switching links are shared by several connections

D) Packets can be transmitted over a switched circuit

Quiz

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Quiz

Go to www.menti.com and use the code provided

Check the correct sentences:

A) A Virtual Circuit requires a connection setup

B) A Virtual Circuit guarantees that all packets arrive at destination and in order

C) The header of a Datagram carries the identification of the destination device

D) Packets are stored and forwarded at each node in the network

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Quiz

Go to www.menti.com and use the code provided

A message is 4000 bytes long. The TCP header is 20 bytes, the IP header is 20 bytes, the Ethernet header and trailer is 18 bytes and the payload is 1500 bytes.

Check the correct sentences:

A) The length of the Ethernet frame is 1558 bytes

B) The segment length is 1480 bytes

C) The message is transmitted using 5 Datagrams

D) The message is transmitted using one Datagram

Quiz

Go to www.menti.com and use the code provided

A message is 4000 bytes long. The TCP header is 20 bytes, the IP header is 20 bytes, the Ethernet header and trailer is 18 bytes and the payload is 1500 bytes.

Check the correct sentences:

A) The length of the Ethernet frame is 1558 bytes (1518)

B) The segment length is 1480 bytes

C) The message is transmitted using 5 Datagrams (3)

D) The message is transmitted using one Datagram

Quiz

Go to www.menti.com and use the code provided

Check the correct sentences about the Service Access Point (SAP):

A) The SAP of the transport layer is the username

B) The SAP of the Link layer is the port number

C) The SAP of the Network Layer is the IP address

D) The SAP of the Link layer is the MAC address

Quiz

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C) The SAP of the Network Layer is the IP address

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Quiz

Go to www.menti.com and use the code provided

Check the correct sentences:

A) The transport layer allows multiple simultaneous communications with a single destination host

B) The IP layer allows multiple communications with different destinations

C) The transport layer allows multiple simultaneous communications with different destination hosts

D) A host may support several clients of a given server

Quiz

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