

Exo 1 – Bases

- **At $t=0$, host A sends a packet of 1000 Bytes to host B. They are directly connected with a link for which the propagation speed is 2×10^8 m/s. When it will be received by B?**
 - Distance(A,B) = 1km, bit rate A-B = 10Mb/s
 - Distance(A,B) = 20m, bit rate A-B = 1Gb/s

Solution

- **Case 1: $0.005 + 0.8 = 0.805$ ms**
- **Case 2: $0.1 + 8 = 8.1$ us**

Exo 2 – 19 routers

- **Two hosts are connected via the Internet through 19 routers. The distance between both hosts is 10'000 km. All the links in the network operate at 10 Mbps.**
- **The user working on host A downloads a page of 1'000 bytes from server B. What is the total download time (between the click and the instant when the page is downloaded)?**
- **Assume that:**
 - HTTP uses a TCP connection with the MTU of 1460 bytes. Other TCP parameters are supposed to be known.
 - We ignore processing and waiting times, as well as the transmission time of short segments (short means that they are less than 1000 bytes), for instance connection establishment segments, ACKs, HTTP request. We also ignore the HTTP header attached to the page contents.

Host B

Host A

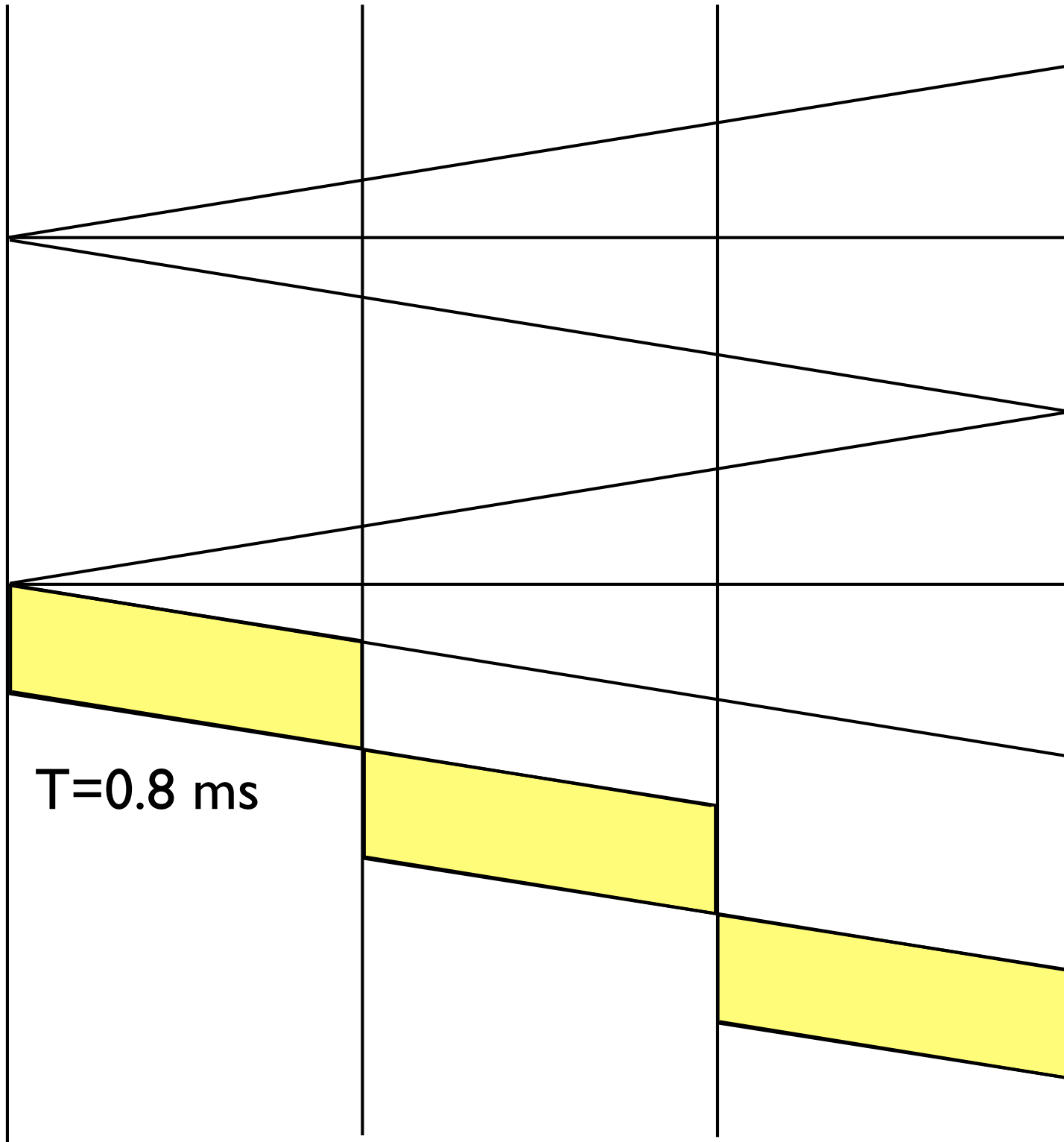
$D = 50 \text{ ms}$

Opening
connexion

Computer Networking - 1 - Introduction

$T = 0.8 \text{ ms}$

Web
page



Solution

- **216 ms**
- **delay: $3 \times 50 \text{ ms} + 50 \text{ ms} + 20 \times 0.8 = 216 \text{ ms}$**
- **throughput: $1000 \times 8 \text{ bits} / 216 \text{ ms} = 37 \text{ kbps}$**