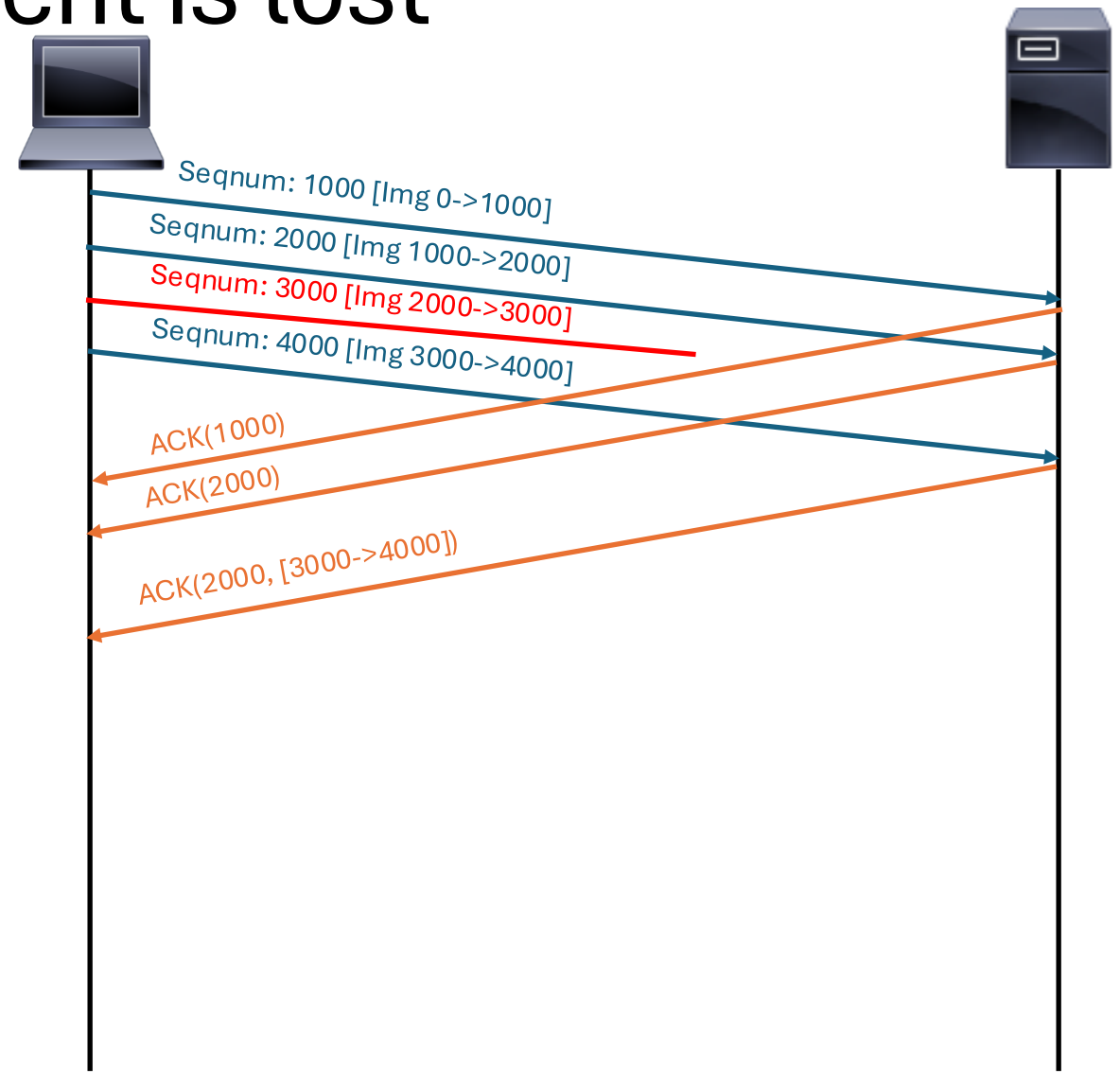
TP7 - QUIC

Introduction to the Head of Line Blocking problem

- We have to send 1 image (4000 bytes) and 1 HTML file (2000 bytes)
- Using TCP: Send HTTP/2 DATA frames in a single TCP stream
- Send first the image, then the HTML file
- 1000 bytes per segment
- Window: 4 packets
- Selective repeat: 1 timer per packet
- How long will we have to wait to receive the HTML file?

Question 1: HoL blocking with TCP: 3rd segment is lost



Reminder on the QUIC protocol

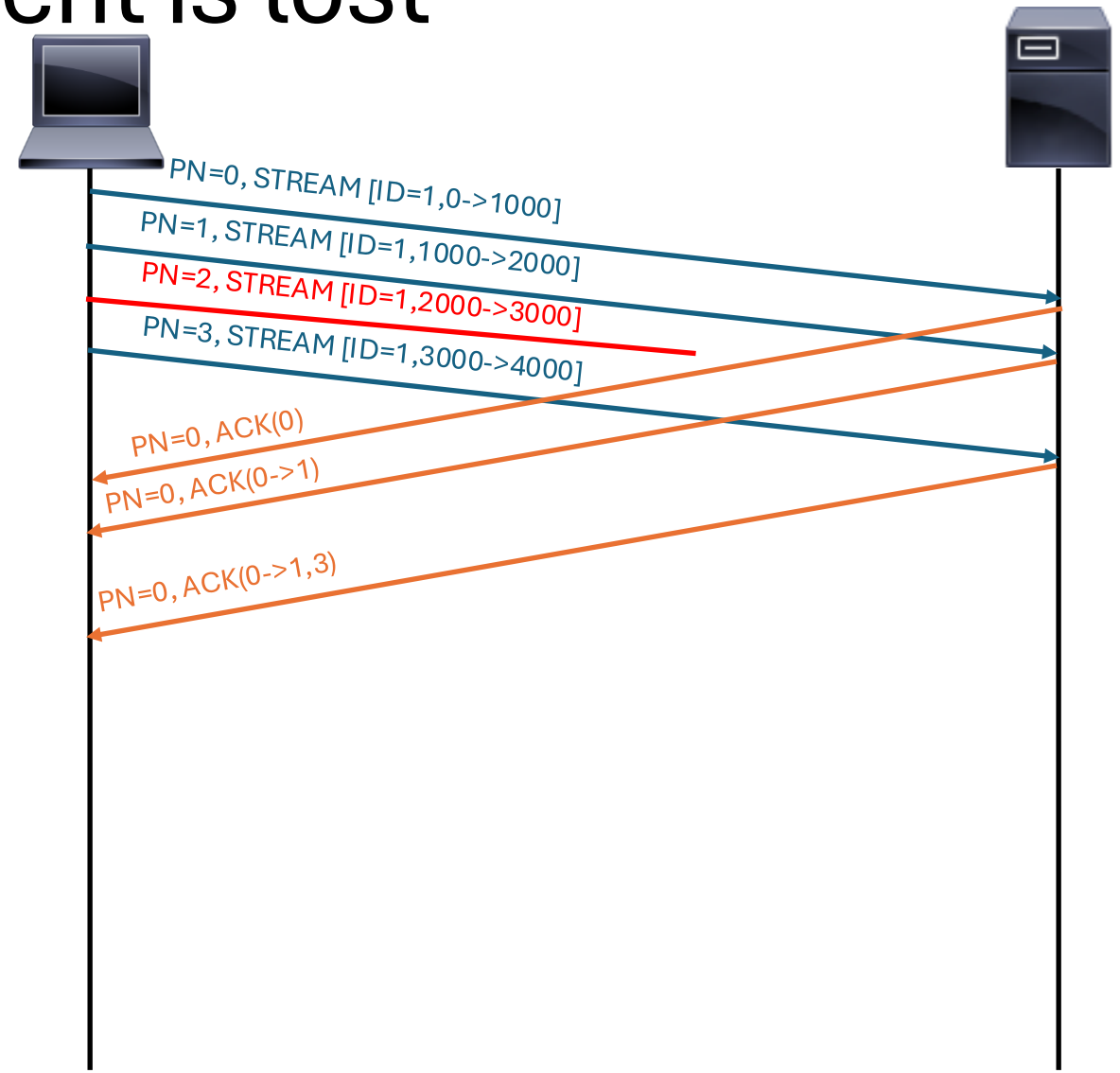
- Stream multiplexing
- Packets are frame containers
  - Unique packet number
  - Retransmission = new packet with increased packet number
- Sliding window -> Window
- STREAM => reliable, DATAGRAM => unreliable
- Embedded encryption (TLS)
- 4-tuple (IP/Port source/destination) -> Connection ID

Question 2: HoL blocking with QUIC

- Again, image of 4000 bytes, HTML file of 2000 bytes
- Image: Stream ID=1
- HTML file: Stream ID=2
- Send all stream 1 then stream 2
- Each STREAM frame: 1000 bytes
- 1000 bytes per STREAM frame
- Window: 4 packets
- Selective repeat: 1 timer per packet
- How long will we have to wait to receive the HTML file?

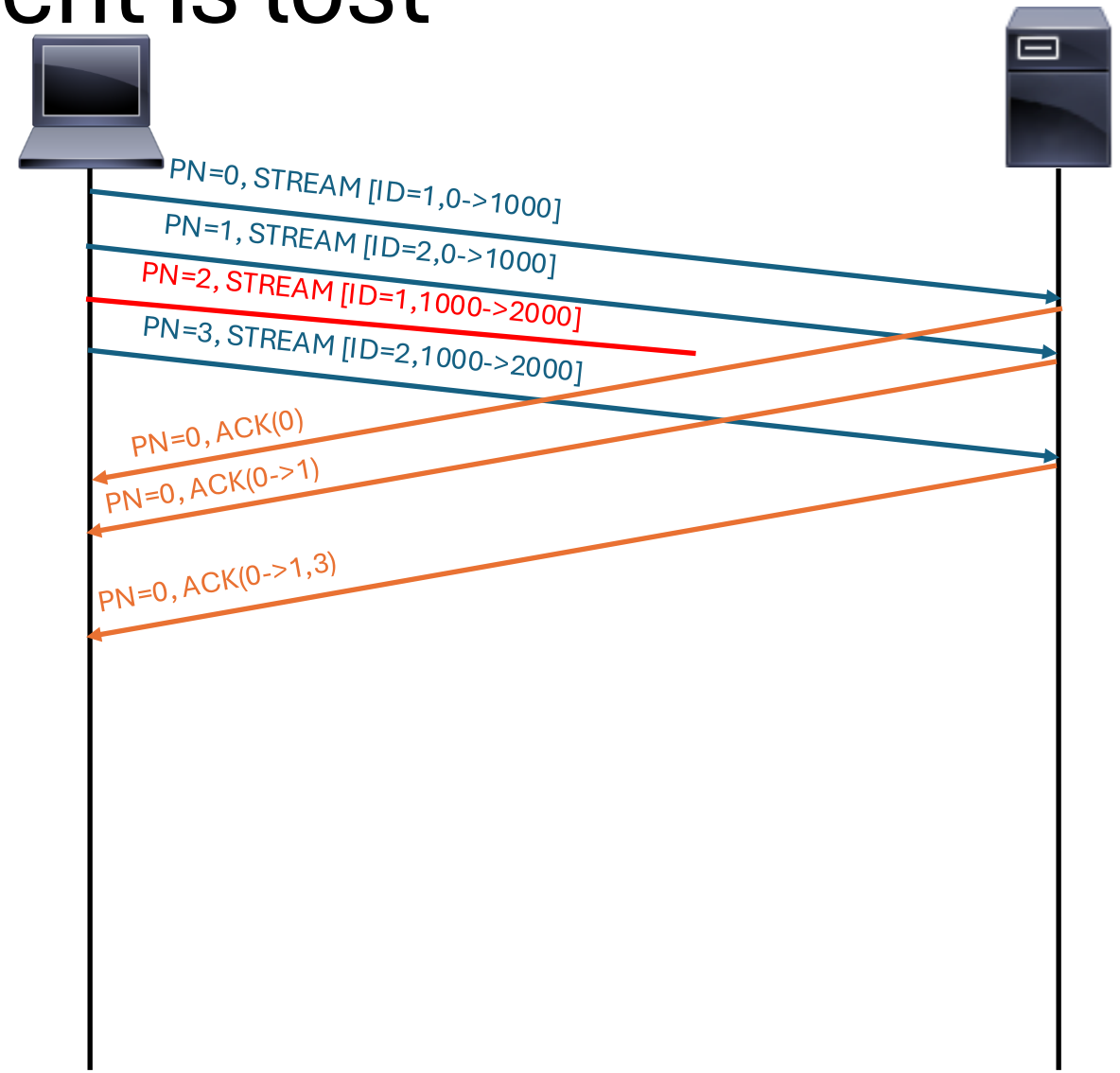
Question 2: HoL blocking with QUIC: 3rd segment is lost

Send all STREAM frames from stream 1, then stream 2



Question 3: Change the scheduler: 3rd segment is lost

Alternate between stream 1 and stream 2



How long does it take to receive the HTML file (stream 2)?

Question 3: QUIC Stream and datagrams

- Stream 1: 4000 bytes, Stream 2: 2000 bytes
- 4 Datagrams to send: "Hello", "World", "From", "QUIC"
- Round-robin scheduler:
  Stream 1, Stream 2, Datagram, Stream 1, Stream 2, Datagram,...

- How fast finishes stream 2?
- What is the datagram message received in the end?

Question 3: QUIC Stream and datagrams: 3rd and 7th packets are lost