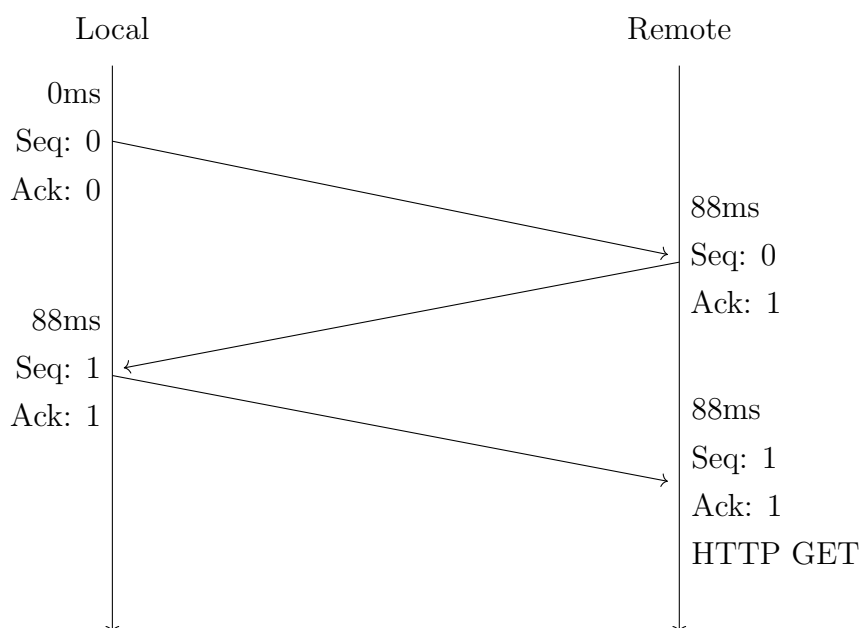


Step 3.) Packet #5 from `trace-tcp.pcap`:

Source	Dest	Seq. #	Ack. #	Length & Flags	Window	...
2 Bytes	2 Bytes	4 Bytes	4 Bytes	2 Bytes	2 Bytes	
Checksum	Urg. Ptr.	Options				
2 Bytes	2 Bytes	12 Bytes				

Step 4.) Three-way Handshake:



The round trip time for this instance was 88ms.

Step 4.1) The options contained in the SYN packets were:

Maximum Segment Size: 1046 bytes

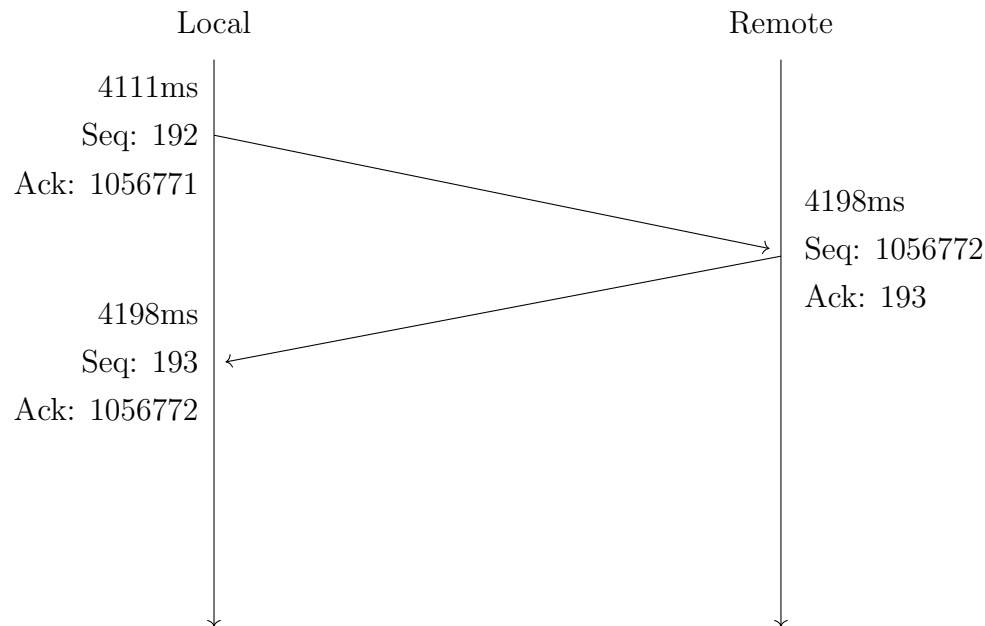
Window scale: 3

Timestamps: TSval 256679793, TSecr 0

SACK permitted

The rest were NOP's or end-of-list indicators.

Step 4.2) Connection teardown:



The round trip time for this instance was 87ms, which is very close to the connection setup time.

Step 5.1) Between 1 and 4 seconds, the download rate maintains a rough average of 30 packets/second, or 30,000 bytes/second.

Step 5.2) Studying the trace, we find a common pattern of 2 large packets with length 1434, then one much smaller packet with length 66. The larger packets tend to have a payload size of 1368 bytes, thus the approximate percentage of the download rate that contains actual content is given by:

$$\frac{\text{payload size}}{\text{total packets size}} = \frac{2 \times 1368}{2 \times 1434 + 66} \approx 93\%$$

Step 5.3) We can similarly find the approximate percentage of the download rate that contains ACK overhead:

$$\frac{\text{ACK size}}{\text{total packets size}} = \frac{66}{2 \times 1434 + 66} \approx 2\%$$

Step 5.4) Studying the trace, we find that subsequent Seq and Ack numbers match each other the majority of the time.