**1. First Connection (3 RTT)**

The first connection requires three key steps:

**TCP Handshake (1 RTT)**

Establishing a TCP connection requires a **three-way handshake**:

The client sends a SYN packet.

The server replies with SYN-ACK.

The client responds with an ACK.

This process takes **1 RTT**.

**TLS Handshake (2 RTT with TLS 1.2)**

HTTP/2 requires encryption via TLS. In **TLS 1.2**, two additional RTTs are needed:

Negotiating the TLS protocol (1 RTT).

Exchanging keys and validating the server’s certificate (1 RTT).

**Total: 1 RTT (TCP) + 2 RTT (TLS 1.2) = 3 RTT**

**2. Repeat Connection (2 RTT)**

For repeat connections, certain optimizations come into play:

**Reusing the TCP Connection**

If the client reuses an existing TCP connection (e.g., through HTTP/2 multiplexing or persistent connections), the TCP handshake is already complete, saving **1 RTT**.

**TLS Session Resumption**

TLS supports mechanisms like **Session Tickets** or **Session IDs** that allow a client to resume a previous session without a full TLS handshake. This reduces the TLS handshake to **1 RTT** instead of 2 RTTs.

With **TLS 1.3**, session resumption is even more efficient, and connections can achieve **0-RTT** resumption under certain conditions.

**Total: 1 RTT (TLS resumption) + 1 RTT (for sending HTTP/2 data) = 2 RTT**