【CN】 Day13

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【Ch2】 Application Layer

2.2.2 Non-Persistent and Persistent Connections

HTTP with Non-Persistent Connections

Let's walk through the steps of transferring a Web page from server to client for the non-persistent connections.

Let's suppose the page consists of a base HTML file and 10 JPEG images, and that all 11 of these objects reside on the same server.

1. The HTTP client process initiates a TCP connection to the server on port number 80, which is the default port number for HTTP.

   There will be a socket at the client and a socket at the server

2. The HTTP client sends an HTTP request message to the server via its socket. The request message includes the path name

3. The HTTP server process receives the request message via its socket, retrieves the object encapsulates in an HTTP response message, and sends the response message to the client via its socket.

4. The HTTP server process tells TCP to close the TCP connection.(But TCP doesn't actually terminate the connection until it knows for sure that the client has receives the response message intact)

5. The HTTP client receives the response message. The TCP connection terminates.

6. The first four steps are then repeated for each of the referenced JPEG objects.

Note that in this file transmission process we created 11 TCP connections to transport 11 objects.

We define the round-trip time(RTT), which is the time it takes for a small packet to travel from client to server and then back to the client.
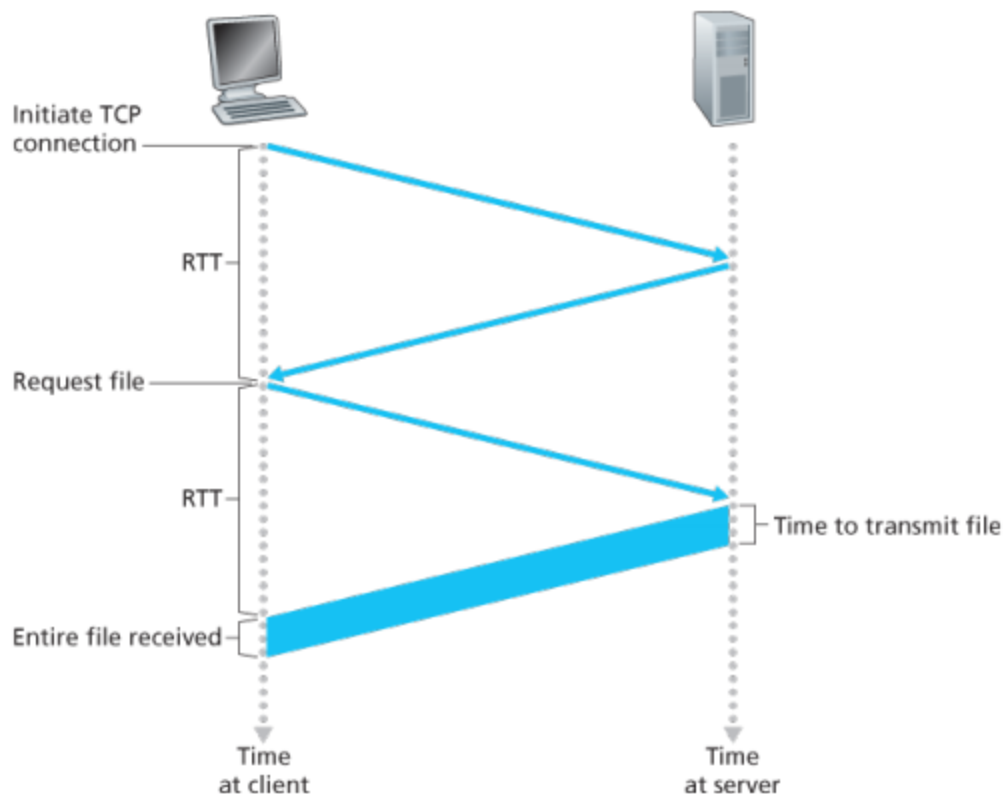
When a user clicks on a hyperlink, the browser initiates a TCP connection between the browser and the Web server.

This involves a "three-way handshake"-the client sends a small TCP segment to the server, the server acknowledges and responds with a small TCP segment, and the client acknowledges back to the server.

The first two parts take one RTT. After completing the first two parts, the client sends the HTTP request message combined with the third part of the three-way handshake into the TCP connection.

Thus, roughly, the total response is two RTTs plus the transmission time at the server of the HTML file.

HTTP with Persistent Connections

Non-persistent connections have some shortcomings. First, a brand-new connection must be established and maintained for each requested object.

For each of these connections, TCP buffers must be allocated and TCP variables must be kept in both the client and server. This can place a significant amount of burden on the Web server, which may be serving requests from hundreds of different clients simultaneously.

Second, each object suffers a delivery delay of two RTTs-one RTT to establish the TCP connection and one RTT to request and receive an object.

With persistent connections, the server leaves the TCP connection open after sending a response. Typically, the HTTP server closes a connection when it isn't used for a certain time.