Practice Set

1. Consider an HTTP client that wants to retrieve a Web document at a given URL. The IP address of the HTTP server is initially unknown. What transport and application-layer protocols besides HTTP are needed in this scenario?

2. Suppose within your Web browser you click on a link to obtain a Web page. The IP address for the associated URL is not cached in your local host, so a DNS lookup is necessary to obtain the IP address. Suppose that n DNS servers are visited before your host receives the IP address from DNS; the successive visits incur an RTT of RTT 1 , . . ., RTT n . Further suppose that the Web page associated with the link contains exactly one object, consisting of a small amount of HTML text. Let RTT 0 denote the RTT between the local host and the server containing the object. Assuming zero transmission time of the object, how much time elapses from when the client clicks on the link until the client receives the object? suppose the HTML file references eight very small objects on the same server. Neglecting transmission times, how much time elapses with

   a. Non-persistent HTTP with no parallel TCP connections?

   b. Non-persistent HTTP with the browser configured for 5 parallel connections?

   c. Persistent HTTP?

3. Skype offers a service that allows you to make a phone call from a PC to an ordinary phone. This means that the voice call must pass through both the Internet and through a telephone network. Discuss how this might be done.

4. Suppose that your department has a local DNS server for all computers in the department. You are an ordinary user (i.e., not a network/system administrator). Can you determine if an external Web site was likely accessed from a computer in your department a couple of seconds ago? Explain.

5. True or false?

   a. A user requests a Web page that consists of some text and three images. For this page, the client will send one request message and receive four response messages.
   b. Two distinct Web pages (for example, *www.mit.edu/research.html* and *www.mit.edu/students.html*) can be sent over the same persistent connection.

   c. With nonpersistent connections between browser and origin server, it is possible for a single TCP segment to carry two distinct HTTP request messages.
        i. The **Date:** header in the HTTP response message indicates when the object in the response was last modified.
        ii. HTTP response messages never have an empty message body.

6. How does SMTP mark the end of a message body? How about HTTP? Can HTTP use the same method as SMTP to mark the end of a message body? Explain.

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