Tutorial – Application layer

Q1) What information is used by a process running on one host to identify a process running on another host?

Q2) Why do HTTP, FTP, SMTP, and POP3 run on top of TCP rather than on UDP?

Q3) Suppose Alice, with a Web-based e-mail account (such as Hotmail or gmail), sends a message to Bob, who accesses his mail from his mail server using POP3. Discuss how the message gets from Alice's host to Bob's host. Be sure to list the series of application-layer protocols that are used to move the message between the two hosts.

Q4) 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?

Q5) Suppose a website has a base HTML page with 5 JPEG images embedded in it. How many round trip time (RTT) will be required to fully render the webpage in your browser if it used persistent HTTP connection

Q6) Consider the following string of ASCII characters that were captured by Wireshark when the browser sent an HTTP GET message (i.e., this is the actual content of an HTTP GET message). The characters <cr><lf> are carriage return and line-feed characters (that is, the italized character string <cr> in the text below represents the single carriage-return character that was contained at that point in the HTTP header). Answer the following questions, indicating where in the HTTP GET message below you find the answer.

GET /cs453/index.html HTTP/1.1<cr><lf> Host: gai

a.cs.umass.edu<cr><lf> User-Agent: Mozilla/5.0 (

Windows;U; Windows NT 5.1; en-US; rv:1.7.2) Gec

ko/20040804 Netscape/7.2 (ax) <cr><lf> Accept:ex

t/xml, application/xml, application/xhtml+xml, text

/html;q=0.9, text/plain;q=0.8,image/png,*/*;q=0.5

<cr><lf> Accept-Language: en-us,en;q=0.5<cr><lf> Accept-

Encoding: zip,deflate<cr><lf> Accept-Charset: ISO

-8859-1,utf-8;q=0.7,*;q=0.7<cr><lf> Keep-Alive: 300<cr>

<lf> Connection:keep-alive<cr><lf><cr><lf>

a. What is the URL of the document requested by the browser?

b. What version of HTTP is the browser running?

c. Does the browser request a non-persistent or a persistent connection?

d. What is the IP address of the host on which the browser is running?

e. What type of browser initiates this message? Why is the browser type

needed in an HTTP request message?

Q7) 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.

d. The Date: header in the HTTP response message indicates when the object in the response was last modified.

e. HTTP response messages never have an empty message body.