EE450 Introduction to Computer Networks

Homework #5, Fall 2019

Due Thursday, October 10th, 2019 in class

Reading Assignment:

Chapter 2

Problems to be solved:

1. Chapter 2, Page 171: R11 (15 points)

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

2. Chapter 2, Page 172: R19 (15 points)

Is it possible for an organization's Web server and mail server to have exactly the same alias for a hostname (for example, foo.com)? What would be the type for the RR that contains the hostname of the mail server?

3. Chapter 2, Page 172: R21 (15 points)

In BitTorrent, suppose Alice provides chunks to Bob throughout a 30-second interval. Will Bob necessarily return the favor and provide chunks to Alice in this same interval? Why or why not?

4. Chapter 2, Page 172: R25 (15 points)

Besides network related considerations such as delay, loss, and bandwidth performance, there are other important factors that go into designing a CDN server selection strategy. What are they?

5. Chapter 2, Page 175: P7 (20 points)

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, . . ., RTTn. 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?

6.   Chapter 2, Page 178:   P20 (20 points)
Suppose you can access the caches in the local DNS servers of your department. Can you propose a way to roughly determine the Web servers (outside your department) that are most popular among the users in your department? Explain.