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CS164 HW#1

1. 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 your local DNS server has cached the TLD Name Server's address. Thus, a *number N* of DNS servers are visited (starting with your local DNS server which has the cached entry for the TLD DNS) before your host receives the IP address from DNS. What is the number *N* of DNS servers visited?

With the key fact that your local DNS server has the TLD Name server's address cached, we won't need to visit the root DNS server, so the likely steps are

DNS Server Route

1.Local -> 2.TLD -> 3.authorative (This is where youd get the IP mappings)

-> 4.TLD -> 5.root ->6. local -> request

6 DNS Servers visited

Assume the successive visits (including the local DNS) incur an RTT of RTT_1, \dots, 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? Ignore all transport protocol effects. (15 points)

Assuming we have RTT_6 to obtain IP address. Now that we have the IP address we need to throw an HTTP request out there. If it is a non-persistent HTTP, we are looking at two RTT per object, if we're looking at a persistent HTTP, we are looking to get as little as one RTT per object. Because it has exactly one object, it will be 7-8 Round Trip Times to receive the object

2. Referring to Problem 1, suppose the HTML file references four (5) very small objects on the same server. Neglecting transmission times, how much time elapses with

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

For a Non-persistent HTTP, you would need an RTT to initiate TCP connection and send back a request file, and after that another RTT to send the file that is

being requested. You would need to do this for each object leading to **8RTT (not including DNS visits)**

b. Persistent HTTP (with no parallel TCP connections)?
(15 points)

For a Persistent HTTP, the server leaves the initial connection open after sending the response. Because of this subsequent HTTP messages between the same client/server are sent over an open connection. We would get as little as 1RTT per object, so we're looking at only 4RTT (not including DNS visits)

3. Describe the use of the "If-Modified-Since" header in the HTTP protocol. (10 points)

The use of the "If-Modified-Since" tag is to make sure our cache doesn't have non updated links that would leak to more link utilization. This header falls under a conditional get so that it won't send an object if the cache already has an up-to-date version.

4. What is the role of a HTTP proxy server in network? What does it do when it gets requests from a client browser and response from a server? What does it do when it gets a subsequent request from a different client? (10 points)

The role of a proxy server is to satisfy client request without involving origin server. If a client sends an HTTP request and it lies in the cache, it simply returns the object. If it gets a subsequent request from a different client, it would again check if the object is in the cache and return the object. For both of these cases, if the object is not in the cache, it would just send an HTTP request to the origin server and that object would go back to the proxy server to the client.