CNT 5106

Homework Assignment 2

1. Solution:
   The client would query the local DNS server, the root DNS server, the com DNS server, Yahoo DNS server, and then, the client would create TCP connection and retrieve the web document.
   The total delay is 6*RTT=60ms

2. Solution:
   The total time to get the IP address is $\sum_0^n RTT$, and then TCP connection will cost RTT0 to set up, so the total elapses is 2RTT0+ $\sum_1^n RTT$

3.
   a.
   Solution:
   8*2RTT0+2RTT0+ $\sum_1^n RTT$
   =18 RTT0+ $\sum_1^n RTT$

   b.
   Solution:
   (8/5) *2RTT0+2RTT0+ $\sum_1^n RTT$
   =6RTT0+$\sum_1^n RTT$

   c.
   Solution:
   3RTT0+$\sum_1^n RTT$

4. Solution:
   We can use the dig tool to view the DNS architecture of the website, if the query time is less than 1ms, the site is visited a couple of seconds ago, if the query time is larger than 1ms, the site isn't visited a couple of seconds ago.

5. Solution:
a: We can consider dividing the bandwidth equally, so the rate of each user is u_s /N, and the distribution time of each user is NF/u_s.

b: We can consider dividing the bandwidth equally with the minimum rate d_{min}, so that the bandwidth above the rate X could have user rate equal, below the rate X could reach the bandwidth limit, the distribution time of each user is F/d_{min}.

c: As we know, $t \geq max \{NF/us, F/d_{min}\}$. Then we prove $t \leq max \{NF/us, F/d_{min}\}$. From subsection a we know when $u_s/N \leq d_{min,}$, $t = NF/u_{s.}$, and from subsection b we also know when $u_s/N \geq d_{min}$, $t = F/d_{min..}$.
To sum up,

6. Solution:
DNS, TCP, UDP, TLS

7. Solution:
1. join(n0): the node n joins a Chord ring and contains a node n0.n.
2. stabilize(): the node n queries the predecessor node P of its successor node to decide whether P should be the successor node of n. That is, when p is not the node n itself, it means that p is newly joined, and the successor node of n is set to P at this time.
3. notify(n0): the node n0 notifies the node n of its existence, and if currently the node n has no predecessor node or, n0 is closer to the node n than n's existing predecessor node, then n sets it as a predecessor node.
4. fix_fingers(): Modify the routing table.

8. Solution:
At first, the client would request the manifest file from the cloud server, then the manifest file which contains the necessary information such as video's URL, is returned to the client host, and the client host uses the information to request the video file from the CDN, finally the CDN send the video file to the client host, which then assembles the components.