Assignment 1

Network Architecture-I, Spring 2016

Due: February 11th 2:30 pm (paper submission & blackboard submission)

(Show your steps of work, not just the final answers.)

1. Suppose two hosts, A and B are separated by 20,000 kilometers and are connected by a direct link of R=1 Mbps. Suppose the propagation speed over the link is $2*10^8$ meters/sec. Consider sending a file of 2,000,000 bits from Host A to Host B.
    a. Suppose the file is sent continuously as one big message. How long does it take to send the file, assuming it is sent continuously?
    b. Suppose now the file is broken up into 1000 packets with each packet containing 2,000 bits. Suppose that each packet is acknowledged by the receiver and the transmission time of an acknowledgement packet is negligible. Finally, assume that the sender cannot send a packet until the preceding one is acknowledged. How long does it take to send the file?
    c. Calculate the bandwidth-delay product, $R*t_{prop}$. What does it mean? (Provide an interpretation of the bandwidth-delay product.)
    d. If there are two routers between Host A and B (rather than a direct link), and all three links have 1 Mbps links, how long does it take to send the file? (use the assumptions in 1.b)

2. Read articles on two Internet pioneers from http://www.ibiblio.org/pioneers/index.html, and write 1~2 paragraph(s) of your personal perspective (why you chose the person, what part of the story strikes/interests you, or what you learned from the story, etc.) on each person's story (thus 2~4 paragraphs total).

3. Discuss on computer virus, worm, spyware, malware, Trojan horse, and botnet (1~5 sentences each).

Laboratory Homework

This portion of homework is to give you some hands-on experience which will help you to understand concepts that were or will be dealt in class.

4. Explore ‘ping’ and ‘traceroute’ (or ‘tracert’ on Windows) which are basic tools used to measure network performance and retrieve network status. Run ‘ping’ and ‘traceroute’ with at least three different hosts and options. Record the commands and their output.

5. Explore ‘nslookup’ which is a program to query Internet domain name servers. Particularly,
    a. find out the ip address(es) of www.yahoo.com
    b. find out the name servers and their IP addresses of yahoo.com domain.
    c. find out the email servers and their IP addresses of yahoo.com domain.
    d. Try two other options (same server, different command parameters).

    Record the commands and their output.

6. Explore IETF web page (www.ietf.org) and find out how many RFCs are there currently? Then, list at least 5 working groups. Among those working groups, choose one of them and summarize its activities in one page, i.e., objective of the charter, documents/issues published or discussed in the working group.