CSE 4215 :: Lab 3
Indirect TCP

Issued May 1, 2009; Due May 14, 2009.

In this lab, you will evaluate the operation of indirect TCP, in the manner described in the lecture on April 28. For complete details, you may wish to consult the notes and lecture video from that class (links are available from the course web site).

1. In the programming language of your choice, write a simulator for a two-hop TCP link, where the router between the two hops is the indirect TCP access point.
    - **Note:** Unlike the situation presented in class, you *must* simulate the emptying of the access point's buffer during slow start, and thus your simulation must handle the case where the buffer does not completely empty after a slow start.
    - Include your properly commented source code with your submission.

2. Set the wireless link capacity k to 10 packets per round trip time. Assume no packets are lost to fading or noise.
    - For various buffer sizes n, find and plot the average throughput. (It is sufficient to simulate the TCP link for a long time and divide the number of successfully transmitted packets by the number of round-trip times. It is not necessary to find the exact steady-state throughput.) Discuss the effect of n on throughput.

3. Set the buffer size n to 20 packets. Assume no packets are lost to fading or noise.
    - For various wireless link capacities k, find and plot the average throughput. Discuss the effect of k on throughput.

4. Considering your answers to questions 2 and 3, is there an optimal buffer size for each k? Discuss. You may wish to include extra plots to amplify your discussion.

5. Repeat parts 2, 3, and 4 where the probability of each packet being lost to fading is 0.05 and 0.1 (assume indirect TCP is working properly, as in Example 3 from the lecture).

6. For each plot you produce in part 5, also plot (on the same graph) the throughput if ACK messages are not returned when packets are lost to fading (as in Example 2 from the lecture). Discuss the effectiveness of indirect TCP, as well as any effects of n and k.