Internet Architectures and Protocols (Netw_II)

Homework: TCP over Access Links

General remarks

- **Do the homework in groups of two**
- Return the homework by the date indicated on the course Web page
- Into the box outside of office 0 15
- Please provide also a softcopy (file) containing your homework
  - Put the homework in the file whose name consists of the two LAST NAMEs
  - Copy under *Unix/Linux* your file into the directory /archives/ce/NetwII/HW_ADSL/ by doing
    cp your_file.doc /archives/ce/NetwII/HW_ADSL/
    Note: you **cannot enter or read** the directory /archives/ce/NetwII/HW_ADSL/ !!

This HW assumes that you have access to the Internet via and ADSL or Cable provider, as the goal of the HW is to test the performance and behavior of TCP over access links.
Do not do the tests from Eurecom or another high speed (> 10 Mbit/sec) access link. However, you can do them at a place such as MCDonalds where they provide free Internet access.

The following URLs point to Web pages that allow you to test your access link

- **http://avband2.eurecom.fr/**
- **http://loki04.mpi-sws.mpg.de/bb/bb.php**

What do you have to return:

1. Provide basic information about our access such as

- Kbps downstream bandwidth
- Kbps upstream bandwidth
- Name of broadband provider (ISP)
- Is your computer connected through a wired or wireless network
- Operating system running on your computer

2. Execute the test of your access link that is available under
   http://loki04.mpi-sws.mpg.de/bb/bb.php

- Copy the result that is posted by your browser into the report and comment on the results (buffer size and bandwidth) you have obtained [note: for some connections this test does not work, in which case you should provide a copy of screen with the error message]
- Repeat this test **TWICE** and present both results. Are they consistent??

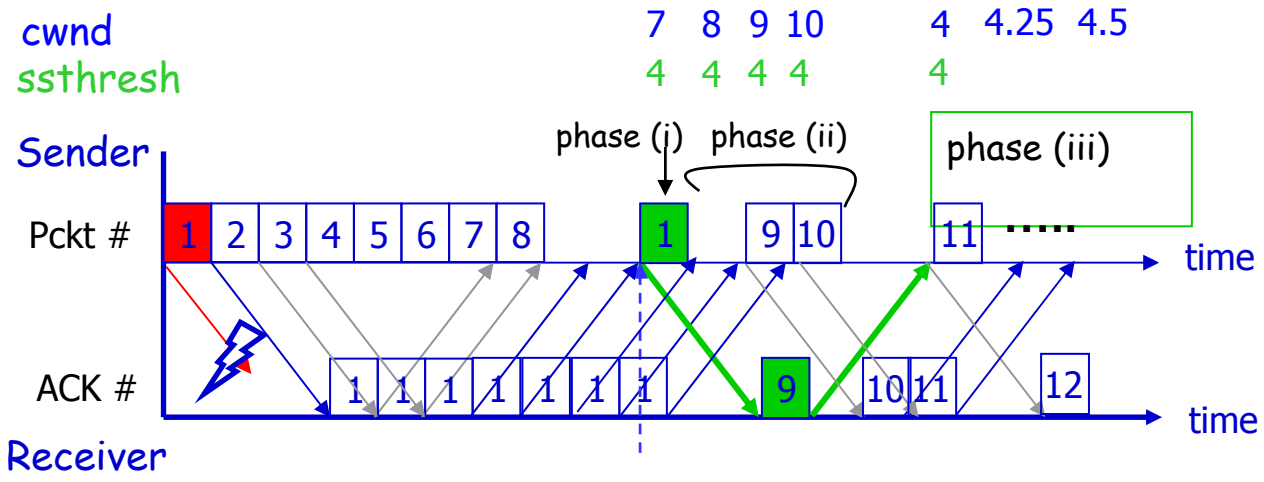
3. Execute the test of your access link that is available under **http://avband2.eurecom.fr/**
   Carry out the following experiments, namely

   i. *There is no other transfer going on over your link to/from home* and you launch the test **download** (this gives you the best case result for download). [transmit a large enough amount so the download buffer overflows, if possible] **Present the results the download**
   ii. *There is no other transfer going on over your link to/from home* and you launch the test **upload file** (this gives you the best case result for up-load). **Present the results the upload.**
   iii. *There is no other transfer going on over your link to/from home* and you open two browser windows with the web page **http://avband2.eurecom.fr/** You first start a long *download* from Eurecom to your PC in one web page and while the download is still going on
   you launch the test **upload file** in the other. There you should observe the interference of the download with the test upload.
   Please present the results for both, the up- and download.

   For each of the three tests, copy the results posted by your Web browser(s) and comment the results, in particular with respect to the performance TCP seen and the possible causes that limit the performance.

TCP Reno with Fast retransmit and fast recovery:

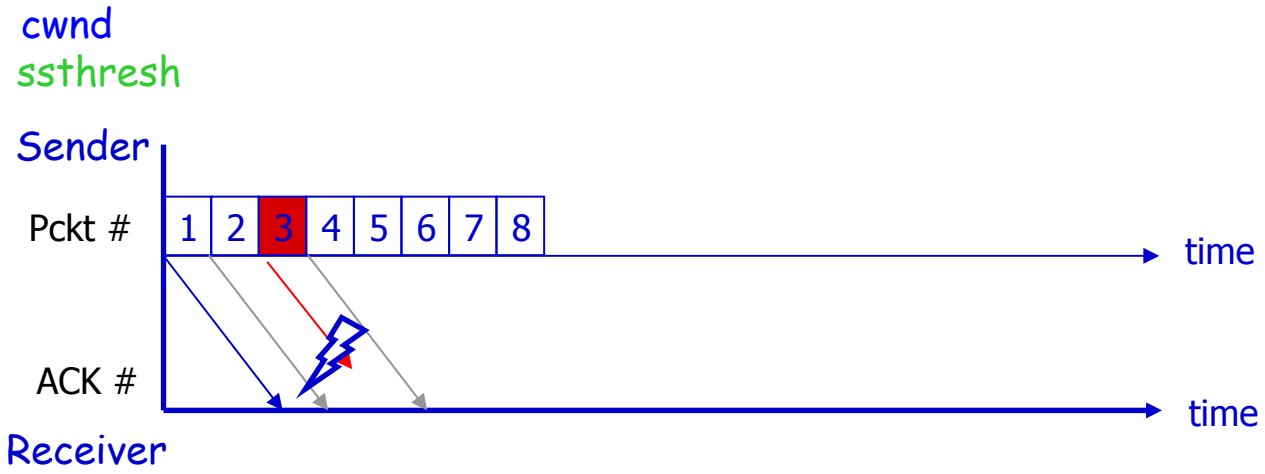
The following picture is from the course notes



Do a similar picture for the following two cases:
Note:

- Sender is in *congestion avoidance.*
- cwnd=8 at the instant when the 3rd DUP ACK (ACK3) comes back

1: Packet #3 is lost



Note:

- Sender is in *congestion avoidance.*
- cwnd=8 at the instant when the 3rd DUP ACK (ACK7) comes back

2: Packet #7 is lost