

Lab session: TP 1 Manual

You will be working under Windows and connecting remotely to a Linux machine by calling **xfree**. (Start->ALL programs->cygwin-X->start Xserver with Xdmcp)

Create a directory in your home and from there do:

```
ln -s /datas/teaching/courses/cours15_Erbi/TP1/conn_4.dump
ln -s /datas/teaching/courses/cours15_Erbi/TP1/home.dump
ln -s /datas/teaching/courses/cours15_Erbi/TP1/metro20ms_cong.dump
ln -s /datas/teaching/courses/cours15_Erbi/TP1/home-linux.dump
ln -s /datas/teaching/courses/cours15_Erbi/TP1/mail_leader-phonet.dump
```

(don't copy these files, just put soft-links!!)

Now look at the different traces in the following order:

- metro20ms_cong.dmp
 - trace was taken at the **receiver**, look at connection 1 by using **tcptrace -o1** ...
- conn_4.dump
 - trace was taken at the **sender** (at Eurecom), is part of a BitTorrent trace
- mail_leader-phonet.dump
 - trace was taken at the **receiver**

Useful commands with tcptrace:

(for details consult man page or on Web: www.tcptrace.org)

- What are the args and what do they mean???
tcptrace
- Run the program quickly over a dump file
tcptrace dumpfile
- Get longer output (general statistics about each connection)
tcptrace -l dumpfile
- Limit output to connection *N* [through *M*] (useful if dumpfile contains trace for many connections and you are interested in only a single connection)
-o*N*[-*M*]
- Print each segment (packet header)
tcptrace -p dumpfile

- Print progress info (useful for large files)
tcptrace -t dumpfile

Tcptrace used to produce output for xplot

- Compute **sequence number** plot to be visualized by xplot
tcptrace -S dumpfile
- Compute **round trip times** plot to be visualized by xplot
tcptrace -R dumpfile
- Compute **throughput** evolution to be visualized by xplot
tcptrace -T dumpfile
- Compute **throughput** evolution (*aggregate 10 samples*) to be visualized by xplot
tcptrace -T -A10 dumpfile
- Compute **throughput evolution** (*aggregate 20 samples*) and *omit instantaneous throughput samples* to be visualized by xplot
tcptrace -T -y -A20 dumpfile
- Generate lots of **different plot files** to be visualized by xplot
tcptrace -G dumpfile
- Compute **bytes/sec** to be visualized by xplot
tcptrace -xtraffic'-B' dumpfile

Tcptrace used to produce output for gnuplot

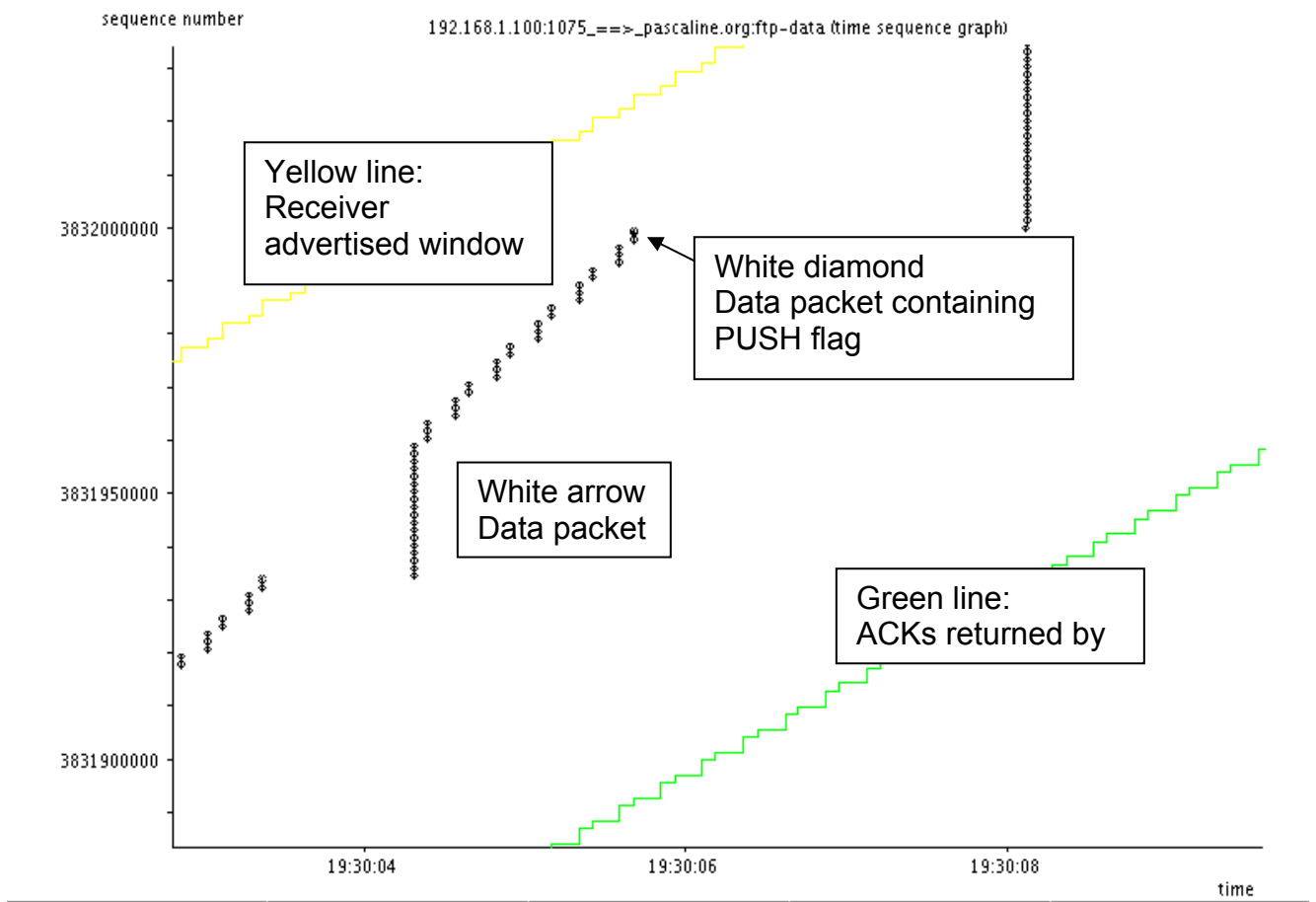
- Dump raw RTT samples be visualized by gnuplot
tcptrace -Z dumpfile

Xplot info

Mouse Bindings: You can use all three buttons of the mouse:

- Left button: Push and hold and draw a rectangle to **zoom in**. Simply click means to **zoom out**
- Middle button: Push and hold to **move** the part of the plot you see on the screen
- Right button: click to **EXIT**

The following example shows a time-sequence number plot captured at the sender

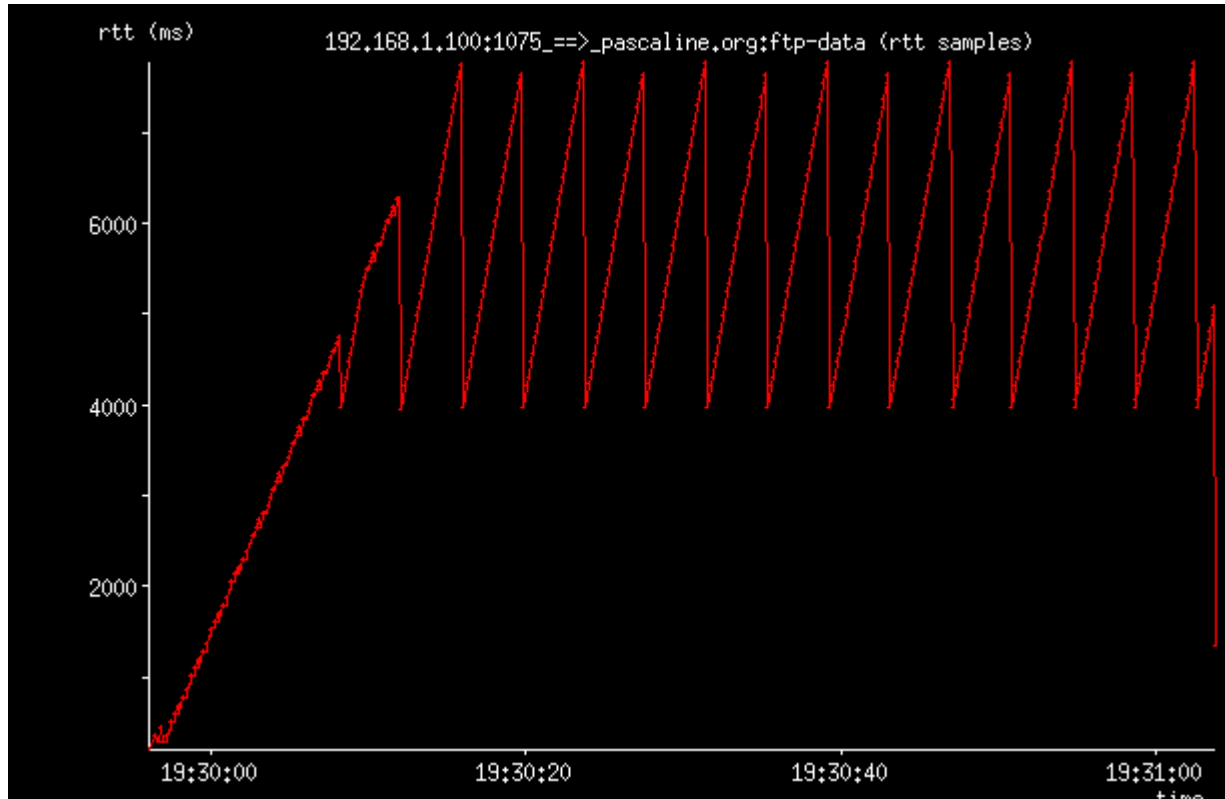


The xplots are annotated by characters with the following meaning

- R retransmitted segment
- 3 a triple dup ACK of a segment
- P a zero window as probe packet
- S selective ACK

- O out of order
- Z zero window advertisement by receiver
- CE congestion experienced
- CWR congestion window reduced

The following figure shows an RTT plot



For each of the TCP dumps ask the following questions:

- Are delayed ACKs used
- What version of TCP
- Performance observed
- Slow start behavior
- RTTs observed
- Capacity of bottleneck
- Dup Acks and timeouts seen
- Evolution of the sequence number plot
- What is limiting the throughput performance of the sender