
Assignment #3

Probability Ideas & Graphing Tools

Sunday Sept 17, 11:55pm

Probability/Statistics: Questions

- If two RVs (A and B) are independent, what is $P(A|B)$ in terms of $P(A)$ and $P(B)$? What does the knowledge about the occurrence of B give you in this case?
- What information can you get from a CCDF that is not prominent in a pdf?
- What is the difference between mean, median and mode? When would you use each?
- How is CoV different from covariance and correlation coefficient?
- How are confidence intervals different from hypothesis tests?
- Why is the normal distribution so important?
- State one key implication of heavy-tailed distribution (in internet modeling). Why does poisson modeling fail for internet traffic?

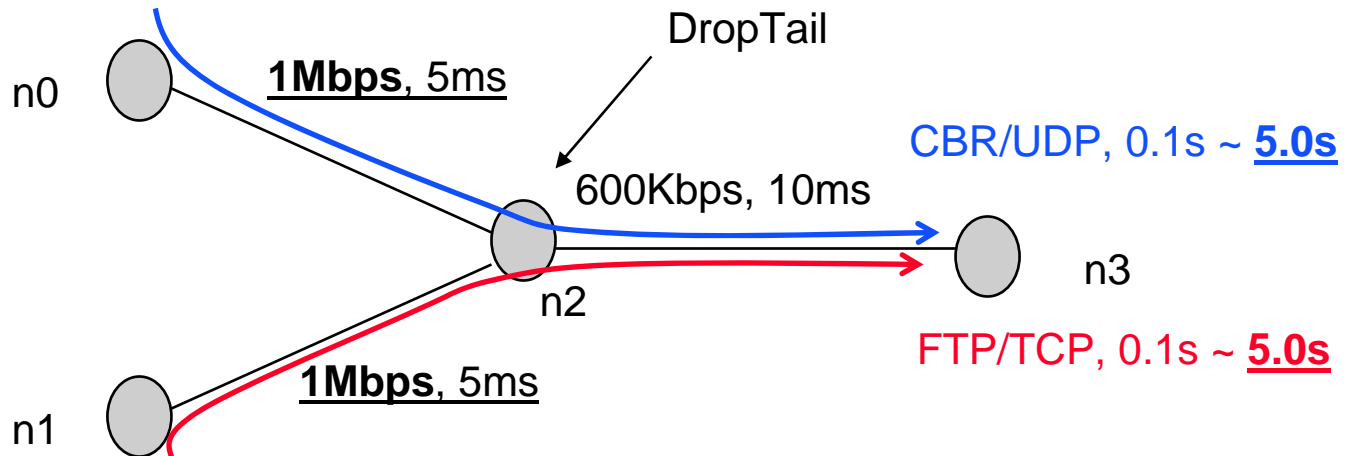
TCP Performance: what to measure?

- Average Performance
 - Throughput (goodput) measured at receiver → FTP;
 - Average end-to-end delay → TELNET.

- Dynamic Performance
 - Bottleneck utilization, queue length;
 - TCP source congestion window, sequence number
 - Throughput/Goodput.
 - Goodput is the number of bytes per second delivered to the destination application layer.
 - Delays, delay jitter.

Assignment #3: TCP

- TCP Dynamics



- Sequence number vs. Time at n1;
- Throughput vs. Time at n1 (RateVersusTime in GraphTool);
- Queue length vs. Time at n2;
- Num of dropped packets at n2.

Graduate Students

- Read & summarize the key points of the paper:
- **Difficulties in Simulating the Internet**
- Floyd, S. and Paxson, V.
IEEE/ACM Transactions on Networking, Vol.9,
No.4, pp. 392-403, August, 2001.
Winner of the Communications Society William R.
Bennett Prize Paper Award, 2001.
- http://www.icir.org/floyd/papers/simulate_2001.pdf

Submission

- Write ns2 script to measure TCP (it is a TCP Tahoe) performance.
- Submissions:
 - Answers to probability questions
 - Ns2 simulation script;
 - All the required graphs and statistics.
 - Grad students: summary of Floyd/Paxson paper
- Due **Sunday Sept 17, 11:55pm**

Note

- If you want to work on your own machine, you need to install [ns-allinone-2.26](#) and [graphing tool](#).
 - [Talk to Neeraj \(some of these versions may have changed\)](#)
- Example graph tool code (old version):
 - On your machine's directory
~/ns/ns-allinone-2.1b7/graph_v6.0.4/examples/
 - Downloadable at <http://networks.ecse.rpi.edu/~harrisod>
which works with ns-2.1b5 (recommended) or ns-2.1b7-old