Chair of Network Architectures and Services
Department of Informatics
Technical University of Munich

Thesis B.Sc.

Thesis M.Sc.

Large-scale Capacity Measurements in the Internet

Motivation

Capacity estimation is purposed to determine the maximum physical bandwidth of a network path[a]. Estimated capacities can be used for different traffic analysis purposes like TCP throughput limitation analysis or determining available bandwidth shares.
While different estimation approaches exist[b], one way to measure capacity is the passive analysis of packet inter-arrival times (IAT) of a network connection[c]. The Chair of Network Architectures and Services has developed different approaches to generate traffic for such IAT-based capacity estimation, i.e., based on TCP and ICMP traffic.
Now, we are interested in conducting active capacity measurements in the Internet to
a) compare results by different capacity estimation approaches
b) assess the stability of capacity estimates of Internet paths and determine capacity bottlenecks.

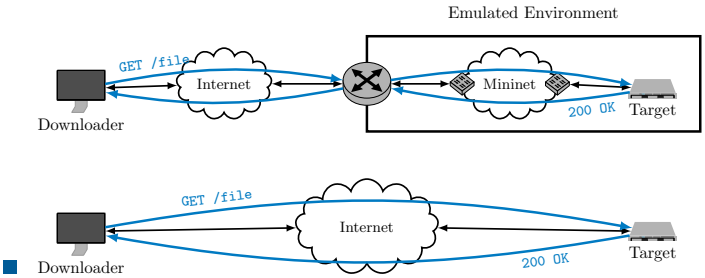
[a] Ravi Prasad, Constantine Dovrolis, Margaret Murray, and KC Claffy. "Bandwidth estimation: metrics, measurement techniques, and tools." IEEE network 17, 2003.

[b] Dovrolis, Constantinos, Parameswaran Ramanathan, and David Moore. "What do packet dispersion techniques measure?." Proceedings IEEE INFOCOM 2001. Conference on Computer Communications. Twentieth Annual Joint Conference of the IEEE Computer and Communications Society (Cat. No. 01CH37213). Vol. 2. IEEE, 2001.

[c] Taoufik En-Najjary and Guillaume Urvoy-Keller. "Pprate: A passive capacity estimation tool." 2006 4th IEEE/IFIP Workshop on End-to-End Monitoring Techniques and Services. IEEE, 2006.

Your Task

- Setup measurement points in the Internet to run experiments with controlled capacity based on an existing framework.
- Conduct large-scale measurements of capacities of Internet paths.
- Survey accuracy of considered approaches and analyze estimated capacities.



What you should bring

- Interest in the topic and networking in general.
- Fun to work with Python and Linux.

Contact

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