

thrulay: Network Tester

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thrulay: Network Tester

- network measurement tool
- tools can be intrusive and non-intrusive
- thrulay's intrusive
- send a bulk TCP or UDP stream
- observe results

thrulay: Measured Metrics

- TCP (adaptable sending rate)
 - throughput
 - round-trip **delay**
- UDP (fixed specified sending rate)
 - one-way delay, with quantiles
 - packet loss
 - packet duplication
 - reordering

Other Throughput Testers

- Numerous existing similar tools
 - iperf
 - netperf
 - nettest
 - nuttcp
 - ttcp
 - fping
 - ...
 - rig your own with netcat or netpipes (poor reporting)
 - discard and chargen services of inetd (unusable)
- None that I found measure delay

thrulay: Special and novel features

- For TCP, measure delay
- For UDP, send precisely positioned true Poisson streams (microsecond errors in sending times)
- Human- and machine-readable output (ready to be fed to gnuplot)

New in thrulay 0.7 (0.8 is a bugfix release)

Work by Bernhard Lutzmann during Google's Summer of Code.

- GNU autotools
- Multiple TCP streams
- API for programmatic execution of tests
- Report MTU/MSS
- Set DSCP value for TOS byte
- New platforms: Mac OS X, Solaris (+ FreeBSD, Linux)
- IPv6 support
- documentation: manual pages
- UDP statistics: duplication, reordering, delay quantiles
- client authorization
- integration of TSC timekeeping projects

thruRay Findings and Uses

- Internal (in-host) queues
- FAST TCP testing
- Better understanding of TCP dynamics
- Use in noise calibration project by Cesar Marcondes (SoC 2005)

- thrulay contributions
 - Delay measurements can reveal internal queues
 - Delay measurements can help understand TCP dynamics in some regimes
 - Sending Poisson streams with UDP is non-trivial
- <https://sourceforge.net/projects/thrulay> to download
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