

Traffic Management Benchmarking Framework

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Benchmarking Traffic Management Capabilities

- RFC 2544 “discusses and defines a number of tests that may be used to describe the performance characteristics of a network interconnecting device”
- Tests defined in RFC 2544 include:
 - Throughput, Latency, Frame loss rate
 - Back-to-back frames
 - System recovery, Reset
- Traffic management (i.e. policing, shaping, etc.) is an increasingly important component in today’s networks
 - There is no framework to benchmark these features, although some standards address specific areas

Traffic Management Benchmarking Overview

- Could be an extension of RFC 2544 benchmarking into traffic management functionality
 - Classification / Prioritization
 - Policing
 - Buffering
 - Queuing / Scheduling
 - Shaping
- In addition to packet based testing, would utilize “application test patterns” in order to fully characterize the performance of the device under bursty traffic conditions

Repeatable Application Testing

- To properly benchmark shaping and RED techniques, repeatable TCP test patterns (i.e. HTTP, Email, FTP) should be used
 - This framework will not define a fixed set of standard TCP test patterns, but would document the process to develop a repeatable test method over networks with differing characteristics
 - The tool to generate the TCP test patterns can be as simple as iperf / Flowgrind or as complex as a commercial application layer tester (Layer 7)
- There will also be UDP test patterns discussed in this framework

Traffic Management Benchmark Framework (1)

- **Policing tests:** verify the policer performance (CIR-CBS, EIR-EBS)
 - Would use back-back frame testing concepts from RFC 2544, but adapted to burst size algorithms and terminology
 - Reference MEF Equipment Certification work (MEF-14,19,37) as basis for specific components of this test
 - Metrics to include burst size achieved, lost frames, frame delay, and frame delay variation
- **Buffer tests:** verify device buffer performance (ingress and egress)
 - Would also use back-back frame testing concepts from RFC 2544, but adapted to buffer size algorithms and terminology
 - Metrics to include burst size achieved, lost frames, frame delay, and frame delay variation

Traffic Management Benchmark Framework (2)

- **Shaper tests:** benchmark the performance of a vendor's traffic shaper using some proposed TCP "test patterns"
 - The draft would illustrate the means to develop some typical test patterns with an emphasis upon the technique to produce repeatable tests (as opposed to a fixed set of TCP test patterns)
 - Performance metrics would include test pattern execution time (i.e. response time) as well as metrics from IPPM RFC 6349 (TCP Efficiency, Buffer Delay)
- **Congestion Management tests:** benchmark the performance of various congestive discard techniques such as FIFO, RED, WRED, etc.
 - Similar to the traffic shaping benchmarking test using TCP test patterns and the same performance metrics

Next Steps for the Traffic Management Draft

- Gain consensus from BMWG that this work is in scope and proceed to personal submission
 - The work idea has gained a lot of early interest from equipment vendors and network operators
- Submit draft status at IETF 86 along with preliminary testing in carrier benchmark lab
 - Goal would be for BMWG to formally adopt this work
- This work addresses a critical “hole” in the industry; would complement RFC 2544 and RFC 6349