Traffic Management Benchmarking Framework

IETF 88 Vancouver

draft-constantine-bmwg-traffic-management-02

Barry Constantine
barry.constantine@jdsu.com
Tim Copley
timothy.copley@level3.com
Ram Krishnan
ramk@brocade.com

Traffic Management Benchmarking Overview

- Extends RFC 2544 benchmarking into traffic management functionality of network elements:
  - Classification / Prioritization
  - Policing
 - Queuing / Scheduling
  - Shaping
  - AQM

Revisions Incorporated into Draft-02

- Incorporated extensive comments from AI, which included more references to existing RFCs and refining the accuracy of the stated measurements and metrics

- In the policer section, added reference to RFC 4115 policer attributes (in addition to MEF 10.2), cleaned up the example policer test per comments from Reinhard Schrage

- In the goals section, clearly indicated the purpose of the individual tests and clarified that this draft is not intended to be a conformance test (see next slides)

Traffic Shaper Benchmark Tests

- In draft-02 BMWG list discussions, a good bit of discussion surrounded traffic shapers and to ensure the test framework would not become a conformance test:

- Summary suggestion from the list: "compare shaper egress attributes which include shaped bytes per time interval along with other metrics such as loss, jitter, etc that are specified in the draft"

- The next slide documents a prototype test configuration and results between two (2) vendor's traffic shapers

Traffic Shaper Test Configuration
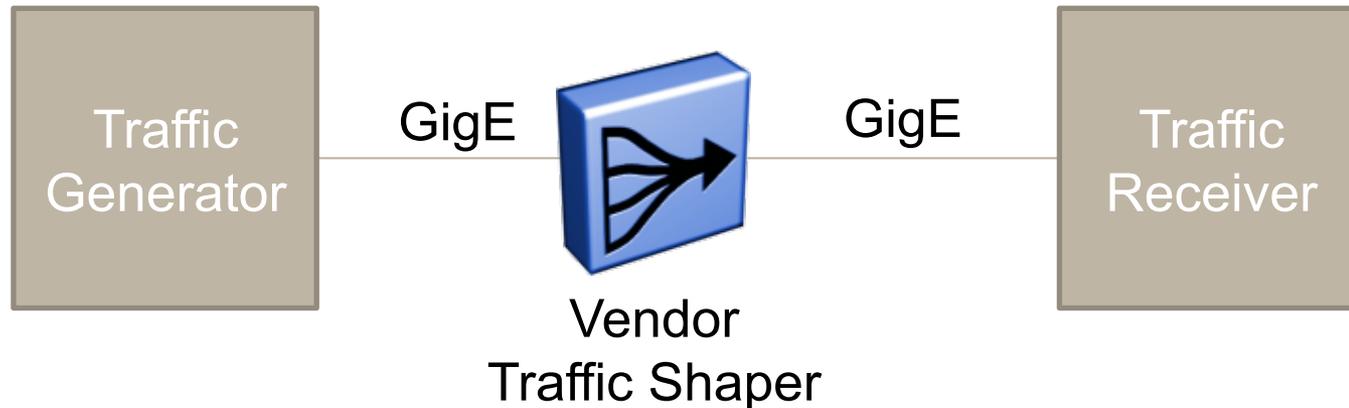
- Two (2) vendor's equipment were configured to shape to 40 Mbps CIR with Burst Commited (Bc) and Burst Excess (Be) both equal to 20,000 bytes
  - Each shaper ingress queue configured to handle 256 KB (ensure no ingress drops)

- Traffic generator sent a single 128,000 byte burst (back-back at GigE) while traffic receiver captured packets

- Vendor traffic shapers were compared according to the metrics defined in the traffic management benchmarking draft (results summary next slide)

Traffic Shaper Test Results Summary

1500 Byte Packets											
VENDOR "A"	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	**VENDOR "B"**	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Tc Interval#	Bytes Shaped	Bytes Shaped	Bytes Shaped	Bytes Shaped	Bytes Shaped	Tc Interval#	Bytes Shaped	Bytes Shaped	Bytes Shaped	Bytes Shaped	Bytes Shaped
1	39,468	42,504	39,468	47,058	39,468	1	21,252	21,252	21,252	21,252	21,252
2	19,734	19,734	19,734	19,734	19,734	2	1,518	1,518	1,518	1,518	1,518
3	19,734	19,734	19,734	19,734	19,734	3	1,518	1,518	1,518	1,518	1,518
4	21,252	21,252	21,252	21,252	21,252	.	1,518	1,518	1,518	1,518	1,518
5	19,734	19,734	19,734	19,734	19,734	.	1,518	1,518	1,518	1,518	1,518
6	7,590	4,554	7,590	0	7,590	71	1,518	1,518	1,518	1,518	1,518
Totals	127,512	127,512	127,512	127,512	127,512	Totals	127,512	127,512	127,512	127,512	127,512
Lost packets	"0" for all intervals					Lost packets	"0" for all intervals				
Max Burst Bytes	39,468	42,504	39,468	47,058	39,468	Max Burst Bytes	21,252	21,252	21,252	21,252	21,252
Average Burst Bytes	21,252	21,252	21,252	25,502	21,252	**Average Burst Bytes**	1,796	1,796	1,796	1,796	1,796
Max Jitter (usecs)	4,339	3,841	4,351	3,839	3,847	**Max Jitter (usecs)**	295.71	295.71	295.71	295.71	295.71
Ave Jitter (usecs)	206.26	226.79	199.12	180.89	216.83	Ave Jitter (usecs)	243.07	243.06	243.06	243.06	243.07
Ave Burst Interval (usecs)	3,653	4,003	3,534	4,010	3,832	Ave Burst Interval (usecs)	306.2	306.1	306.1	306.1	306.2

- Neither vendor dropped any packets

- Vendor "A" shaped in system time intervals (~4 msec) while vendor "B" shaped according to the CIR transmission rate (~250 usec), see **Max Jitter**

- Also related to timing interval, Vendor A "lumped" bytes (**Average Burst Bytes**) while Vendor B transmitted single frames (mostly*) at CIR rate
  - Vendor A also burst beyond Bc + Be, as high as 47,058 bytes in Trial 4

Next Steps for the Traffic Management Draft

- We seek the BMWG to formally adopt this personal submission as a chartered draft work

- Work on the next revision(s) to beef up each section after conducting lab trials similar to the shaper testing presented today