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Spirent TestCenter

RFC 8239 Data Center Benchmarking Test Package

Application Overview

RFC 8239 Data Center Benchmarking is a comprehensive test package for Spirent TestCenter offering automated benchmark testing of L2/L3 network devices as per IETF RFC 8239 Data Center Benchmarking Methodology. This IETF standard provides methodology to benchmark data center physical network devices, including congestion scenarios, switch buffer analysis, microburst, and head-of-line blocking, while also using a wide mix of stateful and stateless traffic conditions. RFC 8238 contains the new terminology in relation to benchmarking of data center network equipment.

Traffic patterns in the data center are shaped by all sort of applications that using it. The nature and variety of the applications are constantly changing, so do the traffic patterns. There could be combinations of east-west (server to server) and north-south (end-user to server) traffic flows with many-to-one, many-to-many, or full-mesh patterns. These flows may be bursty in nature and sensitive to latency or throughput. Traffic also can be a mix of UDP and TCP flows. Most importantly, all of these can pass through a single network device at the same time.

Popular benchmarking tests, RFC 2544, RFC 2889, RFC 3918, have been focused on measuring theoretical throughput, forwarding rates, and latency under testing conditions; however, they do not represent real traffic patterns that may affect the networking devices. RFC 8239 includes test cases that represent the wide range of traffic conditions that can exist in a data center.

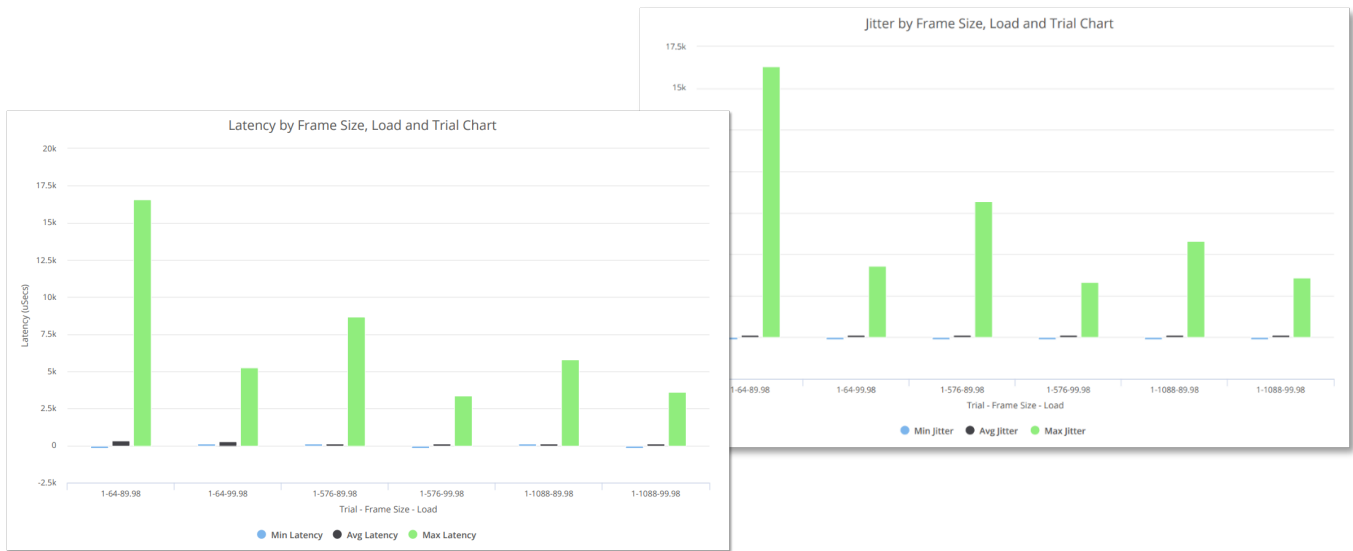
This package includes the following test cases.

- **Line Rate Testing**
 - Purpose is to find the performance values for throughput, latency, and jitter through a high-speed maximum-rate test. This test also verifies that DUT is capable of forwarding packets at line-rate in absence of any congestions.
- **Buffering Testing**
 - Purpose of this test is to measure the buffer size of a DUT under various traffic conditions. This benchmarking methodology measures the buffer size, irrespective of buffer architecture used in the DUT.
- **Microburst Testing**
 - Purpose of the test is to find out the maximum amount of packet bursts that a DUT can sustain under various configurations.
- **Head-of-Line Blocking (HOLB) Testing**
 - HOLB is a performance-limiting phenomenon that occurs when a line of packets is held up by the first packet, waiting to be transmitted to a different output port. Purpose of this test is to understand the DUT's behavior in the HOLB scenario and measure the packet loss.
- **Incast Stateful and Stateless Traffic Testing**
 - Incast is a many-to-one traffic pattern commonly found in cloud data centers. Purpose of this test is to measure TCP Goodput and latency with a mix of stateful and stateless flows. The test simulates a mixed environment of stateful (TCP) flows that require high goodput and stateless (UDP) flows that require low latency.

- **Network Equipment Performance Validation**—verify performance of Layer 2 & Layer 3 devices, quickly and consistently in data center network
- **Designed for Data Center**—validate your data center network performance using RFC 8239 test suite, that is specially curated for complex traffic patterns in data centers
- **Increased Productivity**—reduce time-to-test through easy configuration wizards and fast automated execution
- **Cost-Effective Solution**—affordable performance testing of data center network using RFC 8239 benchmarking test suite combined with high port density load modules from Spirent
- **Trusted Partner**—benefit from decades of testing experience with Spirent as your guide through a world of complex testing

Features and Benefits

- Measure throughput, latency, and jitter in a “maximum-rate” performance test
- Generate microburst for a variety of burst size and inter frame gap
- Test performance of DUTs in mixed IPv4 and IPv6 configurations
- Test with jumbo frames and verify low-latency and wire-rate
- Measure impact of QoS/DiffServ and latency types, including FILO/FIFO in a single test
- Large port, full mesh tests through millions of available streams
- Summary and comprehensive detailed results analysis and reporting using the Spirent TestCenter IQ



Microburst Per Frame Size Iteration Summary Results											
Snapshot Name	Trial Number	Frame Size	Load	Burst Size	No. of Ingress ports	No. of Egress ports	Tx Rate	Tx Count	Rx Count	Frame Loss	Frame Loss
T1-NumTxPorts:2-NumRxPorts:2-FrameSize:1024-Load:100-Burst:50 Frames	1	1,024	100	50	2	2	2,394,636	10,000,000	10,000,000	0	0
T1-NumTxPorts:2-NumRxPorts:2-FrameSize:1280-Load:100-Burst:50 Frames	1	1,280	100	50	2	2	2,394,636	10,000,000	10,000,000	0	0
T1-NumTxPorts:3-NumRxPorts:1-FrameSize:1024-Load:100-Burst:50 Frames	1	1,024	100	50	3	3	2,394,636	10,000,000	10,000,000	0	0

Microburst Per Burst Size Iteration Summary Results											
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T1-NumTxPorts:2-NumRxPorts:2-FrameSize:1280-Load:100-Burst:10 Frames	1	1,280	100	10	2	2	1,923,076	2,000,000	2,000,000	0	0
T1-NumTxPorts:2-NumRxPorts:2-FrameSize:1280-Load:100-Burst:50 Frames	1	1,280	100	50	2	2	1,923,076	10,000,000	10,000,000	0	0

About Spirent

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

For more information visit:
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Technical Specifications

Parameter	Description
Key Tests	RFC 8239 Data Center Benchmarking Methodology • Line Rate Testing • Buffering Testing • Microburst Testing • Head-of-Line Blocking Testing • Incast Stateful and Stateless Traffic Testing
	• Ethernet II, IPv4, IPv6 frame support • IP Next Protocol setting • TTL (time to live) setting • DiffServ selection though Code Point (DSCP) or Class Selector
Traffic Control	• Stagger start • Delay after transmission • Delay at traffic start • Duration in seconds or by frame burst
Test Control	• L2 learning • L3 learning (ARP-IPv4, neighbor discovery-IPv6) • Delay before learning • Learning rate • Retry count • Frame sizes same as stream or user defined (L2 Learning) • Cyclic flow ARP requests (L3 Learning) • Per test, per trial and per frame size learning
Learning Options	

Ordering Information

Product Number	Description
TPK-1085	RFC-8239 Data Center Benchmarking Test Package
BPK-1001A	Packet Generator and Analyzer Base Package
BPK-2001	STC Enhanced L4-7 License (required to run Incast Stateful and Stateless Traffic Testing)
C50-TPK-1085	C50 RFC-8239 Data Center Benchmarking Test Package
C50-BPK-1001	C50 Packet Generator and Analyzer Base Package
C50-BPK-2001	C50 STC Enhanced L4-7 License (required to run Incast Stateful and Stateless Traffic Testing)

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