

Data Center Storage 100GE Test Load Module

Storage switch fabric test platform

Problem: Rocketing Storage Workloads Overwhelm Storage Switch Fabrics

Organizations are turning to data center convergence to manage ever-expanding data growth, especially storage workload growth. Convergence of compute, networking, and storage is resulting in significant saving in cost of equipment, energy consumption, and hardware footprint. It also provides the needed infrastructure to enable machine learning, artificial intelligence, and storage network scale-out.

Remote Direct Memory Access over Converged Ethernet version 2 (RoCEv2) technology promises high efficiency in transferring the massive volume of data needed by many modern applications. However, incorrectly configured or non-optimized buffering in a data center Ethernet switching fabric will result in poor application performance, especially under high load.

Solution: Tune Converged Switching Fabric for High Performance and Low Latency

Keysight's Data Center Storage 100GE Test Load Module generates realistic RoCEv2 traffic at line-rate in a controlled and repetitive manner. It enables users to characterize the performance and latency impacts of various storage workloads and tune switching fabric parameters to overcome network congestion. Running on purpose-built Data Center Storage Load Modules - with 2 x QSFP28 ports that can operate in 100GE, or fanout to 2 x 40GE ports, or fanout to 8 x 25GE ports, or fanout to 8 x 10GE ports, the test solution provides metrics on volume of traffic, latency, and the congestion control mechanism.



Figure 1. Data Center Storage 100GE Test Load Module with 2x100GE QSFP28 Ports

Driven by IxLoad – the test application for measuring the quality of experience (QoE) of real-time, business-critical applications with converged multiplay service emulations – the Data Center Storage 100GE Test Load Module is a unique platform for validating RoCEv2 implementations and parameter settings of converged data center switches.

Compared to homegrown or open source test solutions on commercial compute servers, the Keysight RoCEv2 test solution brings higher efficiency through high scalability, high density, simplified and unified management, easier configurability, and lower maintenance while providing comprehensive and replicable testing.

Product Capabilities

Keysight’s Data Center Storage Test Load Module provides data center performance for RoCEv2 and HTTP traffic with full congestion control mechanism support for exercising the systems under test (SUT) in real-world conditions, enabling users to easily identify performance and interoperability issues. The modular architecture of the solution allows linear performance scaling to multi terabits by populating a Keysight XGS12-HSL or XGS12-SDL chassis with up to 12 Data Center Storage Test load modules.

When the testing topology requires more than 24 x 100GE/40GE ports, or more than 96 x 25GE/10GE ports, additional chassis can be used in the same test configuration.



Figure 2. XGS12-SDL Chassis with Data Center Storage Load Modules

Hardware

The Data Center Storage Test Load Module employs cutting-edge architectural innovations that combine powerful multi-core, multi-threaded network processors and inline field programmable gate arrays (FPGAs) to generate realistic, cloud-scale volume of state-full traffic while maintaining nanoseconds resolution accuracy for latency measurements.

The Data Center Storage 100GE Test Load Module has two native 100GE QSFP28 ports, providing support for pluggable multi-mode optical transceivers or single mode optical transceivers. The load module can support 100/50/40/25/10GE on the same port, reducing capital expenditure by eliminating the need to buy different hardware for each speed and increasing the efficiency of the test platform.

Each of the 100GE QSFP28 ports can operate through a fan-out cable as 4 x 25GE SFP28 ports or 4 x 10GE SFP+ ports, or speed down as 1 x 40GE QSFP+ port. The Data Center Storage Test Load Module is multiuser: the ports are independent and can be used in a single or multiple concurrent test sessions.

The load module also includes a mission control center CPU (MCC) equipped with dedicated memory and a solid-state drive (SSD) to accelerate boot time and reduce test configuration time.

Specifications

Specification	Data center storage test load module DCS100GE2Q28ALL
Keysight Applications Support	<ul style="list-style-type: none">• IxOS• IxLoad• TCL API• REST API
Hardware, load module specifications	
Physical Interfaces	2-port, 100GE QSFP28
Transceiver support	QSFP28 SR4 and LR4 (pluggable transceivers)
Memory	128 GB
Hardware encryption offload	Yes
Capture memory (for IxLoad)	Maximum between 2 GB or 2 Million packets, per interface
FPGA offload	Yes
IPv4, IPv6, UDP, TCP	Hardware checksum generation
Load module dimensions	16.4" (L) x 12.0" (W) x 1.3" (H) 417 mm (L) x 305 mm (W) x 33 mm (H)
Load module weights	<ul style="list-style-type: none">• Module only: 10.2 lbs. (4.6 kg)• Shipping: 19.9 lbs. (9.0 kg)
Operating temperature	41 °F to 95 °F (5 °C to 35 °C), ambient air

Specification**Data center storage test load module DCS100GE2Q28ALL****Chassis capacity**

Cards per chassis	<ul style="list-style-type: none"> • 12 on XGS12-HSL or XGS12-SDL • 2 on XGS2-HSL or XGS2-SDL
Port density	<ul style="list-style-type: none"> • XGS12-HSL/SDL: 24-ports, 100GE QSFP28 • XGS12-HSL/SDL: 24-ports, 40GE QSFP28 • XGS12-HSL/SDL: 96-ports, 25GE QSFP28 • XGS12-HSL/SDL: 96-ports, 10GE QSFP28 • XGS2-HSL/SDL: 4-ports, 100GE QSFP28 • XGS2-HSL/SDL: 4-ports, 40GE QSFP28 • XGS2-HSL/SDL: 16-ports, 25GE QSFP28 • XGS2-HSL/SDL: 16-ports, 10GE QSFP28
XGS12 chassis bundles	<ul style="list-style-type: none"> • XGS2-SDL (940-0013) • XGS2-HSL (940-0014) • XGS12-SDL (940-0015) • XGS12-HSL (940-0016) • XGS2-SDL (940-0013) • XGS2-HSL (940-0014) • XGS12-SDL (940-0015) • XGS12-HSL (940-0016)

Data center storage test load module, IxLoad performance

Performance numbers are provided in back-to-back scenario using a single Data Center Storage Test Load Module (a pair of 100GE ports).

Performance metric	Data center storage 2 X 100GE DCS100GE2Q28ALL test load module	XGS12 chassis with 12 load module
HTTP Throughput	100 Gbps	1.2 Tbps
RoCEv2 Throughput	100 Gbps	1.2 Tbps
Number of Q-Pairs	4K	48K
Latency	< 100 ns	

IxLoad, application support

IxLoad application support	Data center storage test load module (DCS100GE2Q28ALL)
Application delivery	<ul style="list-style-type: none">• RoCEv2• HTTP

Ordering Information

947-5110

Bundle, Data Center Storage 100 GigE with enabled support for 100GigE, 25GigE, 40GigE and 10GigE. Includes Qty 1 each Data Center Storage 100GigE 2-port QSFP28 DCS100GE2Q28ALL Load Module (944-1242), Qty 2 each QSFP28 100GBASE-SR4 pluggable optical transceivers (QSFP28-SR4-XCRV) and Qty 2 MT-to-4x10GE LC fan-out, MMF, 3-meter cable for 10GE and 25GE fan-out cables (942-0067). Transceivers and fan-out cables for other modes are available to be ordered separately.

947-5111

IXIA Bundle, Data Center Storage 400 GigE with enabled support for 100GigE, 25GigE, 40GigE and 10GigE. Includes Qty 4 each Data Center Storage 100GigE 2-port QSFP28 DCS100GE2Q28ALL Load Modules (944-1242), Qty 8 each QSFP28 100GBASE-SR4 pluggable optical transceivers (QSFP28-SR4-XCRV) and Qty 8 MT-to-4x10GE LC fan-out, MMF, 3-meter cable for 10GE and 25GE fan-out cables (942-0067). Transceivers and fan-out cables for other modes are available to be ordered separately.

947-5112

IXIA Bundle, Data Center Storage 1.2 TbE with enabled support for 100GigE, 25GigE, 40GigE and 10GigE. Includes Qty 12 each Data Center Storage 100GigE 2-port QSFP28 DCS100GE2Q28ALL Load Modules (944-1242), Qty 24 each QSFP28 100GBASE-SR4 pluggable optical transceivers (QSFP28-SR4-XCRV) and Qty 24 MT-to-4x10GE LC fan-out, MMF, 3-meter cable for 10GE and 25GE fan-out cables (942-0067). Transceivers and fan-out cables for other modes are available to be ordered separately.

Transceivers and cables

QSFP28-SR4-XCVR

QSFP28 100GBASE-SR4 100GE pluggable optical transceiver, MMF (multimode), 850 nm, 100 m reach.

QSFP28-LR4-XCVR

QSFP28 100GBASE-LR4 100GE pluggable optical transceiver, SMF (single mode fiber), 1310 nm, 10km reach.

942-0088

QSFP28 passive, copper, Direct Attach Cable (DAC), 3-meter length

942-0092

QSFP28 Active Optical Cable (AOC), multimode fiber, 850 nm, 3-meter length

IxLoad software

925-3366

IXIA IxLoad PLUS Software Bundle, Layer 4-7 Performance Test Application. Enables support for HTTP, HTTPS, TCP Session, FTP, Application-Replay, Stateless Peer, Stream Blaster, DNS, DHCP, LDAP, and Telnet emulations. Includes: support for ADVNET-DHCP to emulate DHCP enabled clients and Software Impairment. Note: some of the features are available only on specific load modules.

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.



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