

Spirent TestCenter

RoCEv2 Storage Fabric Test Solution

Application Overview

Enterprises, data centers and cloud service providers increasingly need to process large scale big data, AI/ML workload. Edge computing and high-performance computing (HPC) systems are required to excel in compute, storage, and networking performance. With rapid improvements in CPU and storage performance, now-a-days network become the bottleneck.

RDMA technology offers efficient and faster way to move data between networked computers without involving the remote Operating System and CPU, boosting network and host performance with lower latency, lower CPU load and higher bandwidth.

RDMA over Converged Ethernet (RoCE) brings all the advantages of RDMA in existing Ethernet networks, thus saving massive amounts of capital expenditures. RoCE is the ideal technology to address requirements of high performance, low latency, and low-cost data transfer network. RoCE increases performance in search, storage, database, financial and high transaction rate applications.

RDMA over Converged Ethernet version 2 (RoCEv2) enables routing functionality by changing the packet encapsulation to include IP and UDP headers. RDMA technology now can be used across both L2 and L3 networks with multiple subnets. This allows efficient clustering for elastic and scale out deployments.

RoCEv2 increases efficiency in existing network infrastructure, improve overall CPU utilization for running applications and host memory usage, that results in reduced power, cooling, and rack space requirements and lower cost of ownership and higher return on investment for organizations.

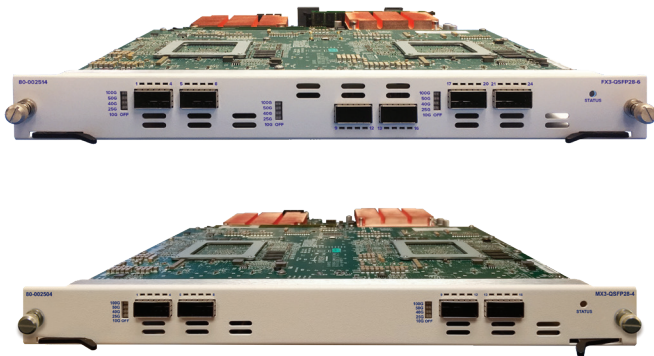
Since its inception in 2014, many organizations are deploying RoCEv2 in their datacenters. Incorrect or non-optimized network settings in a high scale data center can result in poor application performance. It is critical to validate switch fabric performance, ensure optimal configurations and network stability under congestion conditions. Testing using homegrown (with real servers) and open-source test solutions falls short of addressing the scale and efficiency requirements.

- **Optimize Storage Fabric Performance**—verify reliability, scale, and performance of switches or entire storage networks in large scale data center deployments and optimize network settings with **industry's highest density RoCEv2 test solution** (3 x 100GE ports or 12 x 25GE ports in a single test module). A fully loaded chassis can generate up to 3.6 terabits of RoCEv2 traffic.
- **Realistic RoCEv2 traffic**—stress your network with high scale and mix of continuous and bursty traffic at 100Gbps and 25Gbps line rate under different congestion conditions
- **Accelerated time-to-market**—validate the switches and networks in RoCEv2 environments and bring products to market faster, rollout application, network architecture design to production, run vendor selection tests with confidence
- **Lower Cost of Ownership**—replace racks of real servers in a test bed with RoCEv2 server emulation and save on inventory cost, complexity, and maintenance
- **Investment Protection**—leverage FX3/MX3 high-density multi-speed test modules in multiple ways:
 - UPGRADE existing FX3/MX3 high density test modules to RoCEv2 testing via licensing
 - REUSE test modules for regular L2-7 testing
 - LEVERAGE additional new speeds for RoCEv2 testing in the future
- **Trusted Partner**—benefit from decades of testing experience with Spirent as your guide through a world of complex testing

Spirent offers a comprehensive RoCEv2 test solution to address the performance testing needs of individual switches as well as entire data center switch fabrics. Spirent **RoCEv2 Storage Fabric Test Solution** generates realistic RoCEv2 traffic at accurate line rate and supports congestion control. Users can measure important network KPIs like throughput, latency, packet loss, network stability under congestion conditions and link flap. It enables users to characterize performance of switch fabric and optimize the relevant network configurations including buffer size, ECN and QoS settings.

Spirent's RoCEv2 test solution is an innovative offering that runs on three of the existing best-in-class high-density multi-speed ethernet test modules. FX3-QSFP28-6 is industry's highest density RoCEv2 supported test module which offers 3x 100GE ports or fanout to 12x 25GE ports. In addition, MX3-QSFP28-4 and FX3-QSFP28-4 each offers 2x 100GE ports or fan out to 8x 25GE ports for RoCEv2 testing.

The multi-user support is available with per-port user reservation. Ports from a single test module can be used in a single or multiple, concurrent test sessions. In addition, these test modules can be used in regular L2-7 tests (outside RoCEv2 profile) for 100/50/40/25/10GE speeds as usual.



This solution is an integrated component of Spirent TestCenter and works with other Spirent TestCenter components to deliver easy, consistent TCL and REST API for scripting and Command Sequencer NoCode automation.

Features

- RoCEv2 Server emulation with Queue Pairs (QP) as traffic endpoints
- Realistic RoCEv2 traffic in continuous and bursty mode at line rate of 100Gbps and 25Gbps
- High scale with thousands of Queue Pair per port
- RoCEv2 traffic over **Lossy** and **Lossless** fabric with **hardware-based congestion control** with **ECN** and **PFC** combination
- **Bidirectional** RoCEv2 traffic
- QoS settings for L2 (VLAN) and L3 (DSCP) mode
- ECN and PFC congestion control settings
- Granular **per Queue Pair congestion control** validation
- QoS measurements, Per QP stats – Tx and Rx ECN/ CNP packet
- Simulated One-to-One data transfer between Queue Pairs
- Full mesh, One-to-One, Many-to-Many traffic between emulated servers
- Easy-to-use wizard to scale up Queue Pairs
- Background traffic to induce congestion

Benefits

- **Emulate servers** in a test bed, thereby reducing inventory cost and maintenance significantly
- **Reduce time-to-test** through easy configuration of realistic test topology
- **Scale up easily** with thousands of Queue Pairs in a few clicks using wizard
- **Collect key statistics** and generate intuitive reports with TestCenter IQ
- **Repeat tests** with consistent and accurate results

Technical Specs	
Parameters	Description
Application Support	
Application	Spirent TestCenter
RoCEv2 Configuration	<ul style="list-style-type: none"> RoCEv2 profile applied per test module 1 server emulation per port Thousands of queue pairs per port
RoCEv2 Throughput	100 and 25Gbps
QoS	<ul style="list-style-type: none"> L2 – VLAN based 8 priority values L3 – DSCP based 64 priority values
Congestion Control	ECN, PFC combination for lossy and lossless fabric <ul style="list-style-type: none"> ECN detection, CNP notification CNP interval QoS priority for CNP notification DCQCN rate control settings
Traffic Configuration	<ul style="list-style-type: none"> Traffic Endpoints – Queue Pairs Traffic Mode – Continuous and bursty Full Mesh, One-to-One, Many-to-Many traffic between servers Bidirectional and Unidirectional traffic
Key Results (TestCenter IQ)	<ul style="list-style-type: none"> Throughput, Latency, Packet Loss ECN, CNP TX/RX Congestion control validation per Queue Pair, Per QP Stats QoS Measurements
Test Module Support	
FX3-QSFP28-6	Port Density for RoCEv2 testing – 3x 100GE -Or- 12 x 25GE ports (Regular L2-7 testing DS)
FX3-QSFP28-4	Port Density for RoCEv2 testing – 2x 100GE -Or- 8 x 25GE ports (Regular L2-7 testing DS)
MX3-QSFP28-4	Port Density for RoCEv2 testing – 2x 100GE -Or- 8 x 25GE ports (Regular L2-7 testing DS)
User Reservation	Per-port user reservation
Chassis Support	
SPT-N12U	Slots per chassis: 12 Port Density for RoCEv2 testing: <ul style="list-style-type: none"> 36 x 100GE -Or- 144 x 25GE ports (FX3-QSFP28-6) 24 x 100GE -Or- 96 x 25GE ports (MX3-QSFP28-4) 24 x 100GE -Or- 96 x 25GE ports (FX3-QSFP28-4)
SPT-N4U	Slots per chassis: 2 Port Density for RoCEv2 testing: <ul style="list-style-type: none"> 4 x 100GE -Or- 16 x 25GE ports (MX3-QSFP28-4) 4 x 100GE -Or- 16 x 25GE ports (FX3-QSFP28-4)
Ordering information	
Part Number	Description
HWO-FX3-6-ROCE-ECN-100-3	SPIRENT RoCE ECN-100G UPGRADE FOR FX3 QSFP28-6 – 3 PORTS – 3 X 100G PORTS total per Test Module. For non-ECN operation, additional normal speed licence required.
HWO-FX3-4-ROCE-ECN-100-2	SPIRENT RoCE ECN-100G UPGRADE FOR FX3 QSFP28-4 – 2 PORTS – 2 X 100G PORTS total per Test Module. For non-ECN operation, additional normal speed licence required.
HWO-MX3-4-ROCE-ECN-100-2	SPIRENT RoCE ECN-100G UPGRADE FOR MX3 QSFP28-4 – 2 PORTS – 2 X 100G PORTS total per Test Module. For non-ECN operation, additional normal speed licence required.
HWO-FX3-6-ROCE-ECN-25-12	SPIRENT RoCE ECN-25G Upgrade for FX3 QSFP28-6 – 12 Ports – 128 X 25G Ports total per Test Module. For non-ECN operation, additional normal speed licence required.
HWO-FX3-4-ROCE-ECN-25-8	SPIRENT RoCE ECN-25G Upgrade for FX3 QSFP28-4 – 8 PORTS – 8 X 25G Ports total per Test Module. For non-ECN operation, additional normal speed licence required.
HWO-MX3-4-ROCE-ECN-25-8	SPIRENT RoCE ECN-25G Upgrade for MX3 QSFP28-4 – 8 PORTS – 8 X 25G Ports total per Test Module. For non-ECN operation, additional normal speed licence required.
Test Modules	FX3-QSFP28-6 , FX3-QSFP28-4 , MX3-QSFP28-4
Chassis	SPT-N12U Chassis , SPT-N4U Chassis

About Spirent Communications

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: www.spirent.com

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