

CloudStorm-XP 100GE Application and Security Test Load Module

Enterprise-scale application delivery and network security test platform

Problem: An All-Encrypted World and Increasing User Experience Expectations

Massive concerns around security are driving an increased use of encryption. An all-encrypted world is not far away. At the same time, the scale of traffic continues to grow at an exponential rate and the industry is moving to new cloud-based architectures. Users of services and applications, however, continue to expect their experience to be at or above the current level.

To keep pace, network equipment manufacturers race to build higher-scale, more capable network security and application delivery solutions. In turn, the world's largest Enterprise data center operators struggle to find the right balance between performance and security in today's hyper-scale, dynamic world. The uncertainty that comes with this change is best mitigated through Enterprise-scale validation.



CloudStorm-XP CS100GE2Q28NGALL 2 x 100GE QSFP28 load module

Highlights

- **Enterprise-scale** under realistic traffic conditions, CloudStorm-XP enables **multi-terabit** solution in a modular, using a pay-as-you grow approach
- Hardware-based **SSL acceleration** delivers 2X encryption performance of previous PerfectStorm generation
- Emulate **multi-terabit DDoS** and botnet attacks to future-proof security solutions
- **Unified** application and security test platform, with Layers 2-7 capabilities and support for BreakingPoint and IxLoad software
- **Multi-rate ready**: future-proof your investment with CloudStorm-XP; capable of supporting 100/50/40/25/10GE on a single port
- **Multi-user** environment leverages the per-port user ownership model for all ports on the test modules installed into the chassis

Each CloudStorm-XP load module supports two native QSFP28 100GE interfaces with an innovative architecture that allows concurrent emulation of complex applications, unprecedented SSL encrypted applications, and a large volume of DDoS traffic to validate your network infrastructure is high performing and secure. CloudStorm-XP achieving over 500+ Gbps of traffic with strong encryption and ciphers, 1.2 Tbps application traffic mix and 2.4 terabit DDoS throughput in a 12-slot single chassis. CloudStorm-XP is driven by Keysight's BreakingPoint and IxLoad applications—industry-leading test solutions for application delivery and security resiliency testing.

Product capabilities

CloudStorm-XP provides Enterprise-scale L4-7 application performance with fully integrated L2/3 stateless traffic support, for exercising the systems under test in real world conditions, helping the customers to easily identify the performance and interoperability issues. The modular architecture of the solution allows linear performance scaling to multi terabit, by populating a Keysight's XGS12-HSL chassis with multiple CloudStorm-XP load modules—up to 12.



XGS12-HSL Chassis with CloudStorm-XP load modules

CloudStorm-XP packs massive SSL and IPsec performance, with capability to benchmark 500+ Gbps of encrypted traffic from a single fully populated XGS12 chassis. Powered by encryption hardware offload, CloudStorm-XP enables data center operators to find the right balance between security and end-user quality of experience as traffic is moving toward total encryption, with HTTP/2, 2/4k keys and ECC ciphers are adopted.

The proliferation of IoT poses new security risks, as highjacked IoT devices can easily be used to generate ground-breaking DDoS attacks. Also, network infrastructures need to be able to support billions of concurrent connections to service these IoT devices. CloudStorm-XP allows future-proof validation of cloud data center infrastructure and DDoS mitigation devices by simulating IoT device behavior under a deluge of legitimate IoT and botnet traffic. With the capacity to generate 700M concurrent sessions and 2.4 Terabits of DDoS traffic from a fully populated chassis, CloudStorm-XP allows organizations to assess their mitigation solutions, as well as people and process.

Hardware

Continuing the cutting-edge innovation, CloudStorm-XP's architecture combines powerful multi-core, multi-threaded network processor and inline field programmable gate arrays (FPGAs) to generate realistic, enterprise-scale volume of traffic while maintaining 10 ns resolution accuracy pertaining to latency measurements.

The CloudStorm-XP 100GE load modules are available in two variants:

- CloudStorm-XP Fusion, 2-port 100GE QSFP28 load module
- CloudStorm-XP 2-port 100GE QSFP28 load module

Both variants provide support for native QSFP28 100GE pluggable multi-mode optical transceiver or single-mode optical transceiver.

The CloudStorm-XP 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.

The dual-port capabilities enable 100GE inline devices like firewalls can be tested with a single card; this reduces CAPEX, simplifies the management of the test system, while allowing higher density. The load module is capable of supporting 100/50/40/25/10GE on the same port, saving CAPEX by eliminating the need to buy different hardware for each speed and increasing the efficiency of the test platform.

Specifications

Specification	CloudStorm-XP fusion 2-port 100GE QSFP28 CSXP100GE2Q28NGALL	CloudStorm-XP 2-port 100GE QSFP28 CSXP100GE2Q28ALL
Keysight applications support		
IxOS		Yes
IxLoad		Yes
BreakingPoint	Yes	No
TCL API		Yes
Hardware load module specifications		
Physical interfaces	2-port, 100GE QSFP28	
Transceiver support	QSFP28 SR4 and LR4 (pluggable transceivers)	
Memory	64 GB	
Hardware encryption offload	Yes	
Hardware-based traffic capture (for BreakingPoint)	2GB per 100GE interface	N/A
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)	
Operating temperature	41 °F to 95 °F (5 °C to 35 °C), ambient air	
Chassis capacity		
Cards per chassis	• 12 on XGS12-HSL • 2 on XGS2-HSL	
Port density	• XGS12-HSL: 24-ports, 100GE QSFP28 • XGS2-HSL: 4-ports, 100GE QSFP28	
XGS12 chassis bundles	• XGS12-HSL (940-0016) • XGS2-HSL (940-0014)	

CloudStorm-XP, BreakingPoint performance

Performance numbers are provided in back-to-back scenario by using a single CloudStorm-XP load module (a pair of ports). Published SSL metrics were measured with 2K key-size in ideal test configurations to maximize performance.

Performance metric	CloudStorm-XP fusion CSXP100GE2Q28NGALL	XGS12 chassis with 12 blades
Routing robot L23 Throughput	200 Gbps	2.4 Tbps
Application Throughput	100 Gbps	1.2 Tbps
HTTP Connection Rate (CPS)	1.5 Million	18 Million
HTTP Concurrent Connections (CC)	60 Million	722 Million

Performance metric	CloudStorm-XP fusion CSXP100GE2Q28NGALL	XGS12 chassis with 12 blades
SSL Throughput	50Gbps	600Gbps
SSL Connection Rate (CPS)	145K	1.7 Million
SSL Concurrent Connections (CC)	1.5 Million	18 Million
IPsec Throughput	40 Gbps	780 Gbps
Application Throughput over GTP	85 Gbps	1 Tbps

CloudStorm-XP, BreakingPoint test components

BreakingPoint	CloudStorm-XP Fusion (CSXP100GE2Q28NGALL)
Test components	• Bit blaster • Routing robot • Application simulator • Session sender • Security • Security NP • Recreate • Live AppSim • Stack scrambler • Hardware-based packet capture, 2 GB per port
Labs	• RFC 2544 lab • DDoS lab • Multicast lab • Lawful Intercept lab • Session Sender lab • Device Validation lab • Resiliency score • Data center resiliency

CloudStorm-XP, IxLoad performance

Performance numbers are provided in back-to-back scenario by using a single CloudStorm load module (a pair of ports). Published SSL metrics were measured with 2K key-size in ideal test configurations to maximize performance.

Performance metric	CloudStorm-XP fusion and non-fusion CSXP100GE2Q28NGALL CSXP100GE2Q28ALL	XGS12 chassis with 12 blades
HTTP Throughput	95 Gbps	1.14 Tbps
HTTP Connection Rate (CPS)	2.5 Million	30 Million
HTTP Concurrent Connections (CC)	30 Million	360 Million
SSL Throughput	38 Gbps	456 Tbps

Performance metric	CloudStorm-XP fusion and non-fusion CSXP100GE2Q28NGALL CSXP100GE2Q28ALL	XGS12 chassis with 12 blades
SSL Connection Rate (CPS) SR=0	200 K	2.4 Million
SSL concurrent flows	1.5 Million	18 Million
DNS Queries per Second (QPS)	4 Million	48 Million
IPsec, concurrent tunnels	500 K	6 Million
IPsec, tunnel setup rates	20 K	240 K
IPsec, Throughput (UDP) with 100K IPsec tunnels	84 Gbps	1 Tbps
IPsec, Throughput (TCP) with 100K IPsec tunnels	29 Gbps	348 Gbps

IxLoad application support

IxLoad application support	CloudStorm-XP (CSXP100GE2Q28NGALL & CSXP100GE2Q28ALL)
Application delivery	• AppLibrary • TCP plugin • Application replay • HTTP • HTTPS • FTP • SMTP • POP3 • DNS • TFTP • IMAP • Stateless peer
Video delivery	• VoD (RTSP, QoE) • RTSP (RTP/TCP) • IPTV multicast IPv4 • Silverlight • Adobe HDS • Apple HLS • Flash player • MPEG DASH • Video quality
VoIP	• Advanced SIP • SIP Cloud/SIP proxy • RTP/RTCP • SRTP & TLS • WebRTC, DTLS, STUN • Audio, voice, video

IxLoad application support	CloudStorm-XP (CSXP100GE2Q28NGALL & CSXP100GE2Q28ALL)
	• Video telepresence • MSRP • Voice quality / Video quality
IPsec	• IKEv1, IKEv2, IPsec Suites B • IPsec quick tests
Storage	• CIFSv1 • SMB 2.1 • SMB 3.0 • iSCSI • NFSv3, NFSv4, NFSv4.1
Stack manager	• Static ARP • GratARP • IPv4 / IPv6 • PPP • DNS • DHCPv4 • DHCPv6 • IPv6 SLAAC

Ordering information

Part number	Description
944-1252	IXIA CloudStorm-XP CSXP100GE2Q28ALL, 100GE 2-port , all speeds enabled, Load Module (944-1252). The 100GigE, 50GigE, 25GigE, 40GigE and 10GigE speeds are enabled. Requires Qty 2 QSFP28 100GBASE-SR4 pluggable optical transceivers (QSFP28-SR4-XCVR) and Qty 2 MT-to-4x10GE LC fan-out, MMF, 3-meter cable for 10GE and 25GE fan-out cables (942-0067) to be ordered separately. The load module is compatible with XGS12-HSL, XGS2-HSL, XGS12-SDL (with Native IxOS), and XGS2-SDL (with Native IxOS) chassis.
944-1253	IXIA CloudStorm-XP Fusion CSXP100GE2Q28NGALL, 100GE 2-port , all speeds enabled Fusion Load Module (944-1253). Requires BreakingPoint Application & Threat Intelligence (ATI) (909-0856), sold separately, at the time of purchase. Requires 2 optional QSPF28 transceivers/cable assemblies (QSFP28LR4-XCVR or QSFP28-SR4-XCVR or 942-0087 or 942-0088 or 942-0092) to be ordered separately. The load module is compatible ONLY with XGS12-HSL and XGS2-HSL chassis.

Upgrade options

Part number	Description
905-1220	IXIA, field hardware upgrade from CloudStorm-XP non-fusion to CloudStorm-XP fusion. From: -- 944-1250 (CSXP10GE8) to 944-1253 (CSXP10GE8NG), or from -- 944-1252 (CSXP100GE2) to 944-1253 (CSXP100GE2NG).

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

BreakingPoint

909-0856

BreakingPoint - Application & Threat Intelligence Program

IxLoad

925-3371

IxLoad Multiplay-Security-2016, Software Bundle, Layer 4-7 Performance Test Application Data-Video-Voice-Security package. Includes:

- **Data:** Enables support for HTTP, HTTPS, TCP Session, FTP, DNS, Mail (SMTP, POP3 and IMAP), Database, SSH, RADIUS, TFTP, Application-Replay, DHCP, LDAP, Telnet, Stateless-Peer and StreamBlaster emulations.
- **Video:** Enables support for basic RTSP, IPTV (Multicast), Video-ADVANCED (VoD), Adobe Flash Client, Apple HLS Client, Microsoft Silverlight Client, Adobe HDS Client and DASH Client emulations. Includes Video Quality VQMON engine for up to 10Gbps and TCP VQ Video quality for TCP video traffic for up to 10 Gbps.
- **Voice:** Advanced VoIP SIP & RTP, Audio Codecs, VoLTE extensions, and Bulk SIP & MGCP. Includes: Voice Quality engine for up to 10Gbps, Video Quality engine for up to 10Gbps conversational video traffic.
- **ADVNET:** Enables support for Advanced Access networking protocols such as DHCP for IP address acquisition, DHCP Server, PPP, L2TP and IPsec.
- **Storage:** iSCSI, CIFSv1, CIFSv2 (SMB2), SMB3, NFSv3 Client, NFSv4 Client, NFS4.1 Client, Cloud Storage Client, DCBX, FCoE and FC; Note the FCoE and FC emulation is only supported on selected load modules.
- **Access:** DHCP, PPP, L2TP, L2TP, IPsec, IPsec Performance Benchmarking QuickTest & SuiteB Cryptographic, 6RD, DSLITE and IPv6 SLAAC, 8021X, NAC and WEBAUTH.

Note: some of the features are available only on specific load modules

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