KEYSIGHT TECHNOLOGIES

High-Volume Traffic Generator Products Catalog

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Replicate Your Network in Action with Keysight Test Traffic Generators

Your high-performance networks, devices, and services are what give you a competitive edge. But the evolution of technology is constant — it doesn't stop once the integration or transition phase is complete. That's why comprehensive, real-world testing brings unique benefits and solves complex problems that ensure you stay a step ahead. This fact is true whether you're an equipment manufacturer creating new devices or an organization that uses those devices to build and protect networks.

Whether you are conducting proof of concepts, planning and validating designs, or continuously testing into production, test traffic profiles need to reflect actual use in live networks. The ability to replicate your network in action means you can ensure performance, functionality, quality of experience (QoE), and security efficacy.

Take a look at Keysight's high-volume traffic generator test products. They enable you to validate across the stack, including networking protocols, services, applications, and cybersecurity. To ensure that your test results are meaningful and deliver the right insights, we offer the industry's highest-performance solutions with the most realistic application workloads, traffic mixes, dynamic payloads, and threat simulation and evasions. It is testing that replicates your network in action.

Read the white paper

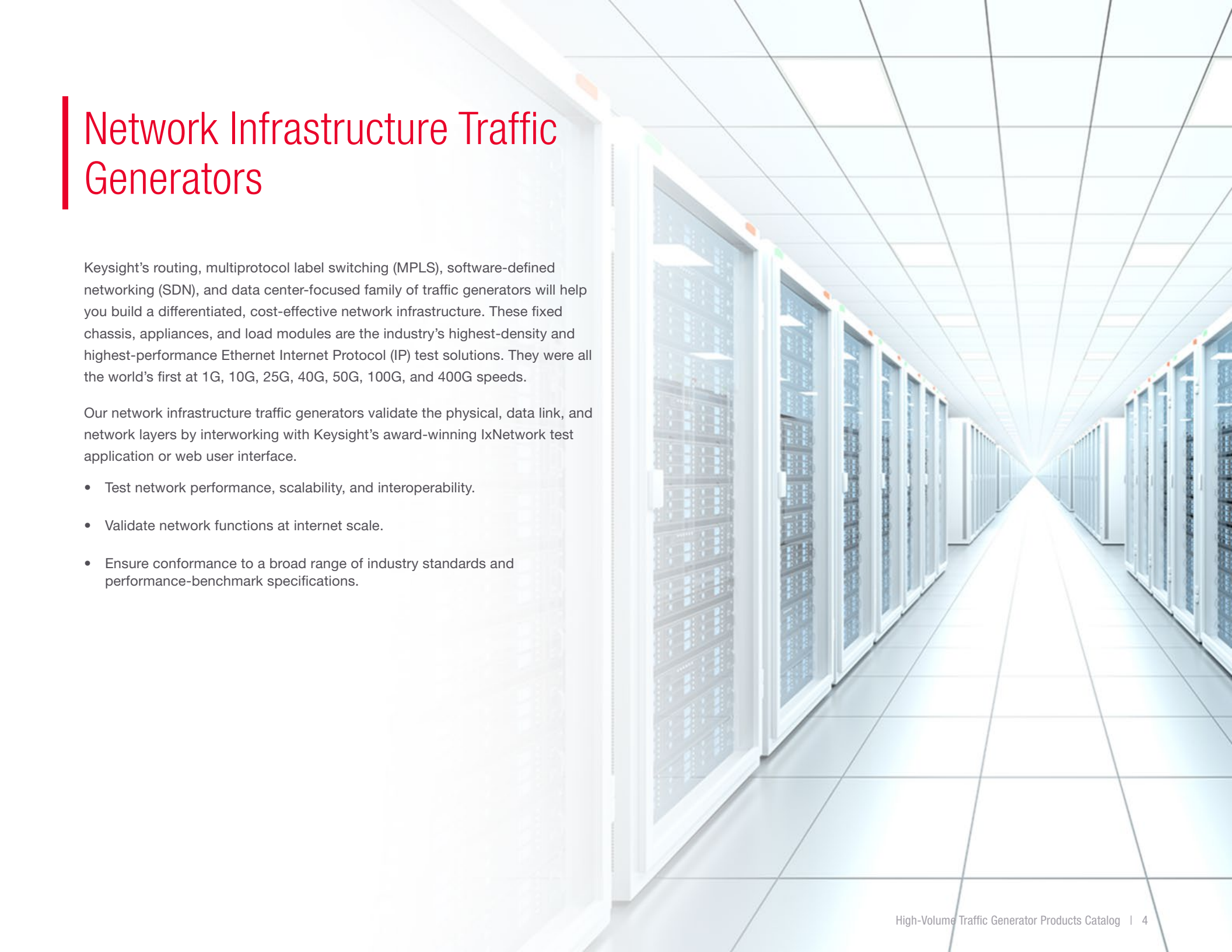
Chaos to Control: Validating Distributed, Desaggregated Digital Transformation

Network Infrastructure Traffic Generators

Keysight's routing, multiprotocol label switching (MPLS), software-defined networking (SDN), and data center-focused family of traffic generators will help you build a differentiated, cost-effective network infrastructure. These fixed chassis, appliances, and load modules are the industry's highest-density and highest-performance Ethernet Internet Protocol (IP) test solutions. They were all the world's first at 1G, 10G, 25G, 40G, 50G, 100G, and 400G speeds.

Our network infrastructure traffic generators validate the physical, data link, and network layers by interworking with Keysight's award-winning IxNetwork test application or web user interface.

- Test network performance, scalability, and interoperability.
- Validate network functions at internet scale.
- Ensure conformance to a broad range of industry standards and performance-benchmark specifications.



IXIA ARESONE 400GE: HIGHEST-PERFORMANCE 400GE TESTING

To realize the cost efficiencies of 400GE, you must achieve the highest density in the smallest size so you can reduce power, cooling, cabling, and rack space. When it comes to testing 400GE equipment, optics, and cables, the same is true.

Keysight's Ixia AresONE fixed chassis is the 400GE test system of choice for validating the performance of networking equipment and qualifying optical transceivers and copper cables. It provides comprehensive Layer 2 and 3 traffic generation and protocol emulation, along with Layer 1 bit error rate (BER), forward error correction (FEC) statistics and symbol bit error correction distribution, and physical coding sublayer (PCS) / FEC symbol error injection stress testing.

- Use up to eight 400GE ports that generate up to 3.2 Tbps of traffic each — all in the industry's-smallest, two-rack-unit fixed chassis.
- Choose QSFP-DD or OSFP interfaces, density, and performance options, including reduced and full functionality.
- Fan out each 400GE port to test 2 x 200GE, 4 x 100GE, or 8 x 50GE multirate Ethernet.
- Take advantage of first-to-market support for 4 x 100GE none-return-to-zero (NRZ) testing from a QSFP-DD PAM4 port using active electrical cable conversion technology.
- Test carrier-class traffic and protocol emulation with the only system that retains data-plane traffic scale from 1 x 400GE to 2 x 200GE and 4 x 100GE fan-outs.

LEARN ABOUT 400GE NETWORK TESTING

These popular on-demand webinars offer a primer on the new world of 400GE and show you how to eliminate FEC frame loss.

Up to 13x protocol scale and performance over any other test system in the industry.

AresONE-S 400GE QSFP-DD high-density, 16-port, full-performance fixed chassis test system

Product name	Number of ports	Stream count per port	Physical interface	Variants			
				Physical ports	Performance	Model number	
AresONE-S 16-port	16 x 400GE physical ports can fan-out[1] to: PAM4 32 x 200GE 64 x 100GE 128 x 50GE NRZ 32 x 100GE 72 x 50GE 32 x 40GE 128 x 25GE 128 x 10GE 8 x 400GE physical port models fan out to half the port density shown above	Full performance 400GE: 64 200GE: 64 100GE: 32 50GE: 16 40GE: 16 25GE: 16 10GE: 16 Reduced performance 400GE: 32 200GE: 32 100GE: 16 50GE: 8 40GE: 8 25GE: 8 10GE: 8	QSFP-DD	16	Full	S400GD-16P-QDD	GET A QUOTE
				16	Reduced	S400GDR-16P-QDD	
				8	Full	S400GD-16PHW-8P-QDD	
				8	Reduced	S400GDR-16PHW-8P-QDD	
AresONE-S 8-port	8 x 400GE physical ports can fan out[1] to: PAM4 16 x 200GE 32 x 100GE 64 x 50GE NRZ 16 X 100GE 36 x 50GE 16 x 40GE 64 x 25GE 64 x 10GE 4 x 400GE physical port models fan out to half the port density shown above	Full performance 400GE: 64 200GE: 64 100GE: 32 50GE: 16 40GE: 16 25GE: 16 10GE: 16 Reduced performance 400GE: 32 200GE: 32 100GE: 16 50GE: 8 40GE: 8 25GE: 8 10GE: 8	QSFP-DD	8	Full	S400GD-8PHW-8P-QDD	GET A QUOTE
				8	Reduced	S400GDR-8PHW-8P-QDD	
				4	Full	S400GD-8PHW-4P-QDD	
				4	Reduced	S400GDR-8PHW-4P-QDD	
AresONE high-density	8 x 400GE physical ports can fan out[1] to: 16 x 200GE 32 x 100GE 64 x 50GE 4 x 400GE physical port models fan out to half the port density shown above	Full performance 400GE: 128 200GE: 128 100GE: 32 50GE: 16 Reduced performance 400GE: 32 200GE: 32 100GE: 16 50GE: 8	QSFP-DD	8	Full	T400GD-8P-QDD	GET A QUOTE
				8	Reduced	T400GDR-8P-QDD	
				4	Full	T400GD-4P-QDD	
				4	Reduced	T400GDR-4P-QDD	
			OSFP	8	Full	T400GD-8P-OSFP	
				8	Reduced	T400GDR-8P-OSFP	
				4	Full	T400GD-4P-OSFP	
				4	Reduced	T400GDR-4P-OSFP	
AresONE high-performance	4 x 400GE physical ports can fan out[1] to: 8 x 200GE 16 x 100GE 32 x 50GE	400GE: 512 2 x 200GE: 512 4 x 100GE: 512 8 x 50GE: 256	QSFP-DD	4	N/A	T400GD-4P-QDD	GET A QUOTE

[1] Using logical or physical fan-out optics and cables

IXIA UHD100T32: HIGHEST-DENSITY 100GE TESTING

With the mass deployment of 100GE in the data center, the cost per gigabit of traffic has become a key metric. With UHD100T32, Keysight reduces the cost of test by matching the port density, power, cooling, and form factor of data center switches. Now you can perform high-scale testing at manageable costs:

- Validate high-port-count devices for performance, scalability, and interoperability.
- Speed time to test with an easy-to-deploy, out-of-the-box solution.
- Conduct data center vendor selection tests for disaggregated white-box and network operating system deployments (including SONiC-based switches).
- Detect and debug data transmission errors for multiple speeds with line-rate 3.2 Tbps packet generation and analysis of received traffic.

Seamlessly connect to a continuous integration and deployment (CI/CD) environment using powerful representational state transfer application programming interface (REST API) automation and a web-based application

IXIA UHD100T32: HIGHEST-DENSITY 100GE TESTING

Product	Number of ports	Stream count	Control plane
UHD100T32, perpetual	32 x 100GE 64 x 50GE 32 x 40GE 128 x 25GE 128 x 10GE	100GE: 16 50GE: 8 40GE: 16 25GE: 4 10GE: 4	IPv4 / IPv6, BGP4 / BGP4+, OSPFv2 / v3, ISISv4 / v6, LAG
UHD100T32, base subscription		100GE: 1 50GE: 1 40GE: 1 25GE: 1 10GE: 1	IPv4 / IPv6
UHD100T32, standard subscription		100GE: 16 50GE: 8 40GE: 16 25GE: 4 10GE: 4	IPv4 / IPv6, BGP4 / BGP4+, OSPFv2 / v3, ISISv4 / v6, LAG

GET A QUOTE

UDT100T32
Ultra-high density, 32-port test system

IXIA NOVUS: FLEXIBLE + SCALABLE MIXED-SPEED TESTING

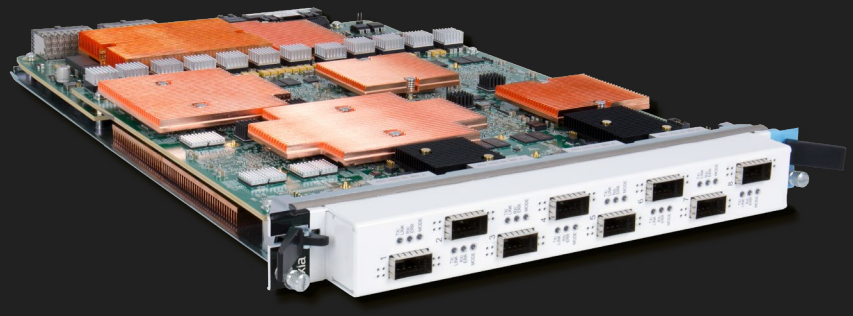
Evolving your network is never easy. In fact, just selecting the right networking gear is challenging. But to keep up with ever-growing needs and speeds, you must take the leap forward.

With Keysight, testing won't become your next big challenge. Keysight's Ixia Novus appliance and load modules give you the flexibility and scale needed to validate from 100 Mbps to 100GE technologies. They support the validation of OSI Layers 2 through 7 with Keysight's award-winning IxNetwork and IxLoad test solutions.

Our five- and three-speed models are the industry's only dual-PHY fiber and copper test solutions. They are meant for applications that require portability.

> The Novus appliance and load modules deliver the options, speeds, and flexibility that today's network engineers need, all in a single test device.

Watch the video to learn more about how the Novus five-speed system generates up to 9.6 Tb of traffic in a single chassis, making it the right choice for large, multirate 100GE test beds.



LOAD MODULE FORM FACTOR
Load modules insert into Keysight's Ixia XGS chassis, available in 12-slot or 2-slot models
Novus QSFP28 100 / 50 / 40 / 25 / 10GE shown

APPLIANCE FORM FACTOR
Standalone, portable test system
Novus ONE PLUS shown

Product name	Form factor	Number of ports	OSI-layer support	Users per load module	Physical interface	Variants			
						Physical interface	Performance	Model number	
Novus QSFP28 100G / 50G / 25G	Load module	8 x 100GE 16 x 50GE[1] 8 x 40GE[1] 32 x 25GE[1] 32 x 10GE[1]	Layers 2–3 using IxNetwork	8	QSFP28	8	Full	NOVUS100GE8Q28+FAN	GET A QUOTE
						8	Midrange	NOVUS-M100GE8Q28+FAN	
						8	Reduced	NOVUS-M100GE8Q28+FAN	
NOVUS 3-speed 32-port 10G / 1G / 100M SFP+	Load module	32 x 10GE 32 x 1GE 32 x 100M		16	SFP+	32	N/A	NOVUS10/1GE32S	GET A QUOTE
Novus 5-speed 10G / 5G / 2.5G / 1G / 100M	Load module	8 or 16	Layers 2–3 using IxNetwork Layers 4–7 using IxLoad	8 to 16	Dual-PHY SFP+ and 10GBASE-T RJ-45	16	Full	NOVUS10/5/2.5/1/100M16DP	GET A QUOTE
						8	Full	NOVUS10/5/2.5/1/100M8DP	
						16	Reduced	NOVUS10/5/2.5/1/100M16DP-R	
						8	Reduced	NOVUS10/5/2.5/1/100M8DP	
Novus 3-speed 10G / 1G / 100M	Load module					16	10 / 1G / 100M	NOVUS10/1GE16DP	GET A QUOTE
						8	10 / 1G / 100M	NOVUS10/1GE16DP	
						16	1G / 100M	NOVUS1GE16D	
Novus-NP 10G / 1G / 100M	Load module					16	N/A	NOVUS-NP10/1GE16DP	GET A QUOTE
						8	N/A	NOVUS-NP10/1GE16DP	
Novus ONE Plus, 3-speed 10G / 1G / 100M	Appliance	4, 8, or 16				16	N/A	Novus ONE PLUS 10/1GE16DP	GET A QUOTE
						8	N/A	Novus ONE PLUS 10/1GE8DP	
						4	N/A	Novus ONE PLUS 10/1GE4DP	
Novus ONE Plus, 5-speed 10G / 5G / 2.5G / 1G / 100M	Appliance					16	N/A	Novus ONE PLUS 10/5/2.5/1GE8DP	
						8	N/A	Novus ONE PLUS 10/5/2.5/1GE8DP	
						4	N/A	Novus ONE PLUS 10/5/2.5/1GE8DP	
Novus SFP28 / QSFP28 high-density 100G / 25G / 10 G	Load module	8	Layers 2–3 using IxNetwork	8	SFP28 and QSFP28	8	N/A	NOVUS-S 10/25GE8SFP28, 100GE option, time-sensitive networking option	GET A QUOTE

Virtualized Layer 2 and 3 testing

Keysight's IxNetwork Virtual Edition (VE) offers protocol emulation to perform wide-scale network infrastructure, capacity, scalability, convergence, and functional testing, ensuring peak performance of data center and cloud computing environments.

GET A QUOTE

[1] Using logical or physical fan-out optics and cables

Application and Security Traffic Generators

Keysight's application-focused family of load modules and standalone appliances includes Ixia CloudStorm, Ixia PerfectStorm, and Ixia Novus-NP. They are the industry's most scalable solutions for testing converged multiplay services, application delivery, and network security platforms for wired and wireless networks.

Our test products deliver the insights needed to balance cybersecurity with application performance, optimize Transport Layer Security (TLS) encryption policies, and identify performance and interoperability issues.

Ultra-high-scale test solution

Novus-NP is a high-density dual-PHY tri-speed (10G / 1G / 100M) solution for ultra-high-scale and performance testing with 40 Gbps of application traffic.

Learn more

CloudStorm 100G / 25G / 40G / 10G

3x application and 4x TLS emulation scale over any other test system in the industry

PerfectStorm ONE 10 / 40GE

Enterprise scalability in a compact form factor for use with constrained lab space and power availability

IXIA CLOUDSTORM: CLOUD-SCALE APPLICATION AND SECURITY TESTING

CloudStorm delivers 3x application and 4x TLS emulation scale over any other test system in the industry. With two QSFP28 ports and being multispeed capable — 10 / 25 / 40 / 50 / 100GE — CloudStorm helps network equipment manufacturers shorten their development cycles. It also helps enterprises and data center operators find the right balance between mitigating security risks and delivering high end-user application performance.

Product name	Number of ports	Performance	Application support	Physical ports	Variants		
					Speeds	Model	
CloudStorm Fusion	2 x 100GE 4 x 50GE[1] 2 x 40GE[2] 8 x 25GE[1] 8 x 10GE[1]	• Enterprise application mix: 198 Gbps • HTTP bidirectional throughput: 200 Gbps • HTTP connection rate: 3.5M CPS • TLS throughput: 95 Gbps	BreakingPoint IxLoad	2	100GE	944-1231 CS100GE2Q28NG	GET A QUOTE
					100 / 50 / 40 / 25 / 10GE	947-5101 CS100GE8NGALL	
					40 / 25 / 10GE	947-5102 CS25GE8Q28NG	GET A QUOTE
					40 / 10GE	947-5103 CS40GE2Q28NG	GET A QUOTE
					10GE	947-5104 CS10GE8Q28NG	
CloudStorm	2 x 100GE 4 x 50GE[1] 2 x 40GE[2] 8 x 25GE[1] 8 x 10GE[1]	• HTTP bidirectional throughput: 192 Gbps • HTTP connection rate: 4.5M CPS • TLS throughput: 92 Gbps	IxLoad	2	100GE	944-1232 CS100GE2Q28	GET A QUOTE
					100 / 50 / 40 / 25 / 10GE	947-5105 CS100GE8ALL	
					40 / 25 / 10GE	947-5106 CS25GE8Q28	GET A QUOTE
					40 / 10GE	947-5107 CS40GE2Q28	GET A QUOTE
					10GE	947-5108 CS10GE8Q28	

[1] Using logical or physical fan-out optics and cables
[2] Through speed-down

IXIA PERFECTSTORM: ENTERPRISE-SCALE APPLICATION AND SECURITY TESTING

PerfectStorm is a scalable solution for testing converged multiplay services, application delivery, and network security platforms for wired and wireless networks. A flexible pay-as-you-grow model allows you to spread the investment over time to lower the initial capital expenditure or add performance when required.

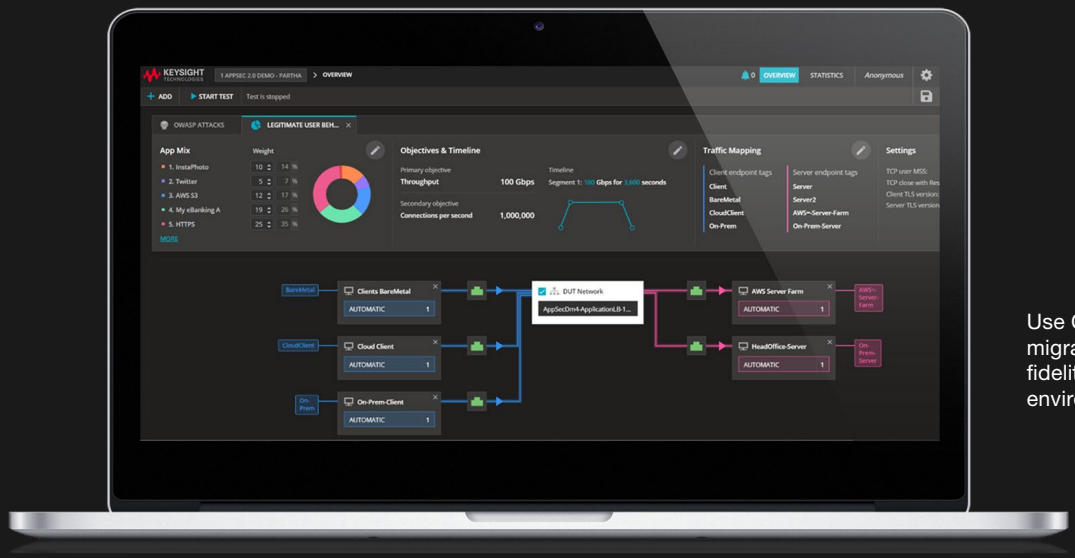
Product name	Form factor	Performance[2]	Number of ports	Physical interface	Application support	Variants			
						Physical ports	Speeds	Model number	
PerfectStorm Fusion 10 / 40GE	Load module	Enterprise application mix: 76 Gbps HTTP bidirectional throughput: 80 Gbps HTTP connection rate: 1.5 M CPS TLS throughput: 20 Gbps	2 x 40GE 8 x 10GE[1]	QSPF+	BreakingPoint IxLoad	2	10 / 40GE	PerfectStorm Fusion 40/10 GigE 2-port QSFP+	GET A QUOTE
PerfectStorm 10 / 40GE					IxLoad			PerfectStorm 40/10 GigE 2-port QSFP+	
PerfectStorm ONE Fusion 10 / 40GE	Appliance				BreakingPoint IxLoad			PerfectStorm ONE Fusion 40/10 GigE 2-port QSFP+	GET A QUOTE
PerfectStorm ONE 10 / 40GE					IxLoad			Perfect Storm ONE 40/10 GigE 2-port QSFP+	
PerfectStorm Fusion 1 / 10GE	Load module		8 x 10GE 4 x 10GE 2 x 10GE 8 x 1GE	SFP+	BreakingPoint IxLoad	8	10GE	PerfectStorm Fusion 10GE 8-port SFP+	GET A QUOTE
						4		PerfectStorm Fusion 10GE 4-port SFP+	
						2		PerfectStorm Fusion 10GE 2-port SFP+	
						8	1GE	PerfectStorm Fusion 1GE 8-port SFP+	
PerfectStorm 1 / 10GE					IxLoad	8	10GE	PerfectStorm 10GE 8-port SFP+	
						4		PerfectStorm 10GE 4-port SFP+	
						2		PerfectStorm 10GE 2-port SFP+	
						8	1GE	PerfectStorm 1GE 8-port SFP+	
PerfectStorm ONE Fusion 1 / 10GE	Appliance		8 x 10GE 8 x 10GE 4 x 10GE 2 x 10GE 8 x 1GE 4 x 1GE	SFP+	BreakingPoint IxLoad	8	10GE	PerfectStorm ONE Fusion 10GE 8-port SFP+	GET A QUOTE
						4		PerfectStorm ONE Fusion 10GE 4-port SFP+	
						2		PerfectStorm ONE Fusion 10GE 2-port SFP+	
						8	1GE	PerfectStorm ONE Fusion 1GE 8-port SFP+	
						4		PerfectStorm ONE Fusion 1GE 4-port SFP+	
PerfectStorm ONE 1 / 10GE					IxLoad	8	10GE	PerfectStorm ONE 10GE 8-port SFP+	
						4		PerfectStorm ONE 10GE 4-port SFP+	
						2		PerfectStorm ONE 10GE 2-port SFP+	
						8	1GE	PerfectStorm ONE 1GE 8-port SFP+	
						4		PerfectStorm ONE 1GE 4-port SFP+	

[1] Using logical or physical fan-out optics and cables
[2] Maximum performance shown; PerfectStorm variants with reduced number of ports or lower speeds provide lower performance

SOFTWARE-BASED APPLICATIONS AND SECURITY TESTING

When migrating to the cloud, organizations need to deliver performance that is the same as — or better than — traditional networks. We offer virtualized traffic generator solutions for application and security testing that validate virtual compute and network elements.

Software	Test type	Description	
CyPerf	Distributed, elastic performance and security testing	Cloud-native, lightweight agents deployed across physical and cloud environments deliver unprecedented insights to validate cloud and SD-WAN migration, discover undisclosed third-party infrastructure issues, and validate elastic scalability of cloud infrastructures and security architectures.	GET A QUOTE
IxLoad Virtual Edition (VE)	Virtualized multiplay application performance testing	Converged multiplay service emulations provide functional and performance testing of virtualized assets, including servers, firewalls, deep packet inspection (DPI) devices, load balancers, and converged network adapters (CNAs). Use it to ensure the QoE for real-time, business-critical applications.	GET A QUOTE
BreakingPoint Virtual Edition (VE)	Virtualized application and security testing	Real-world application and threat emulation delivers complete performance and security testing. Use it to validate network security posture and optimize virtual or physical network security devices in private or public cloud environments.	GET A QUOTE



Use CyPerf to validate cloud and SD-WAN migration in half the time and with more fidelity by replicating distributed deployment environments with realistic workloads

Network Impairment Generator

IXIA NETWORK EMULATOR II — REAL-WORLD NETWORK IMPAIRMENT

Many organizations overlook the importance of emulating realistic and worst-case network scenarios in the lab. Failure to test variables such as application performance, effect of delay, and fail-over protection can have serious real-world implications.

Keysight's Ixia Network Emulator II is a precision test instrument for 10GE, 1GE, and 100MbE Ethernet impairment that enables you to accurately emulate network conditions that occur over live local and wide area networks. With Keysight's network emulation, you can validate and test the performance of new hardware, protocols, and applications in a controlled lab environment to identify the following:

- application performance across distributed data centers
- effects of delay on application and network performance
- efficacy of data center backup

GET A QUOTE

Looking for high-speed network emulation?

In-depth testing that includes substantial packet delay and traditional network impairments is now available for 100 / 50 / 40 / 25GE technologies.

Read about our Hybrid Network Emulator solution

Network Emulator II - Ethernet
10GE, 1GE, and 100MbE

Modular Chassis

IXIA XGS2 AND XGS12 CHASSIS

Keysight's Ixia chassis make our modular test systems possible, providing the power and performance necessary for portable to massive-scale testing of Layers 2 to 7. All XGS chassis have a front-to-back airflow system to ensure that load modules operate efficiently. And true modular construction maximizes serviceability as each major system component is self-contained and easily removed or installed in the field.

Each load module is hot-swappable, allowing for a highly flexible testing environment. This chassis family supports Novus, PerfectStorm, and CloudStorm load modules, providing seamless integration with existing Keysight test systems.

Product name	Form factor	Slots	Rack units	
XGS12	Rackmount	12	11	GET A QUOTE
XGS2	Benchtop (rackmount optional)	2	3	GET A QUOTE