IxNetwork Overview — L2/3 Network Infrastructure Performance Testing

Scales to Handle the Most Powerful Devices and Largest Networks

Problem: Network Complexities Put Performance to the Test

Organizations have long evaluated their networks for scale and performance. But as networks become increasingly complex, so do the challenges of ensuring peak network performance and resiliency. Forget about simply testing for sluggish response times — the right testing tool must now assess complex network topologies with thousands of network devices, emulate sophisticated traffic flows. Conduct stress tests under countless scenarios and network conditions.

Solution: A Reliable Test System for Complex and Unpredictable Networks

IxNetwork delivers performance testing under the most challenging conditions. Capable of generating multiple terabytes of data and analyzing up to 4 million traffic flows simultaneously, IxNetwork scales to handle the most powerful devices and the largest networks. With its enhanced real-time analysis and statistics, this powerful solution emulates everything from routing and switching, data center Ethernet and SDN to broadband access and industrial Ethernet for comprehensive testing. And Graphical User Interface (GUI) wizards make it easier for our customers to meet a wide range of performance requirements with minimal resources.

Key Features

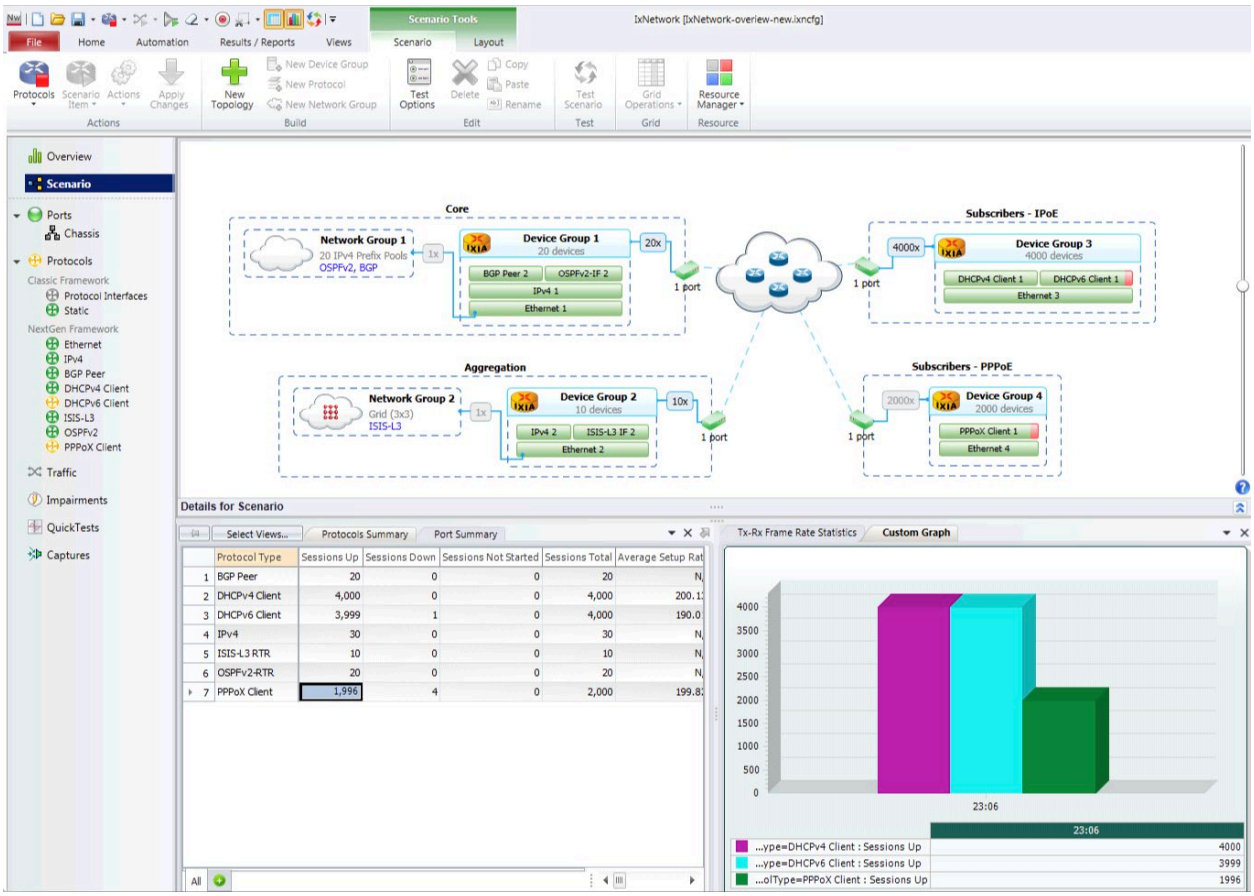
- Offers test coverage from 1G to 1600G Ethernet
- Provides comprehensive protocol coverage for routing/switching, Multiprotocol Label Switching (MPLS), Software-Defined Networking (SDN), data center networking, carrier Ethernet, broadband access, time synchronization, automotive and industrial Ethernet (AVB/TSN), L2 security (MACsec)
- Generates traffic flows that mimic realistic user applications and scenarios
- Emulates RoCEv2 endpoint and generates AI workload traffic pattern to stress test AI data center fabric.
- Generate UET and MRC compliant traffic to validate AI fabric forwarding performance.
- Validates Ultra Ethernet Link Layer Retry (LLR) and Credit-based Flow Control for enhanced Link Layer reliability
- Works smoothly in virtualized network environments, and runs from any commercially available compute environment
- Delivers end-to-end test system automation

KEYSIGHT

- Performs rapid isolation of service violations, including thorough traffic-flow analysis

Highlights

- **Save capital expenditure in testing**—emulate a very large number of routers/switches without using real devices
- **Reduce test time**—use visual topology-based protocol configuration and comprehensive analytics with drill-down and learned information
- **Identify problems in the lab before deployment in the field**—realistically mimic real-world conditions with granular traffic generators and stateful AppLibrary
- **Understand performance and scaling bottlenecks**—rely on unparalleled density, scale, and performance to stress and take down the most powerful networking devices
- **Ease of deployment and access**—available either as a Windows application or a web-based application that is running on Linux

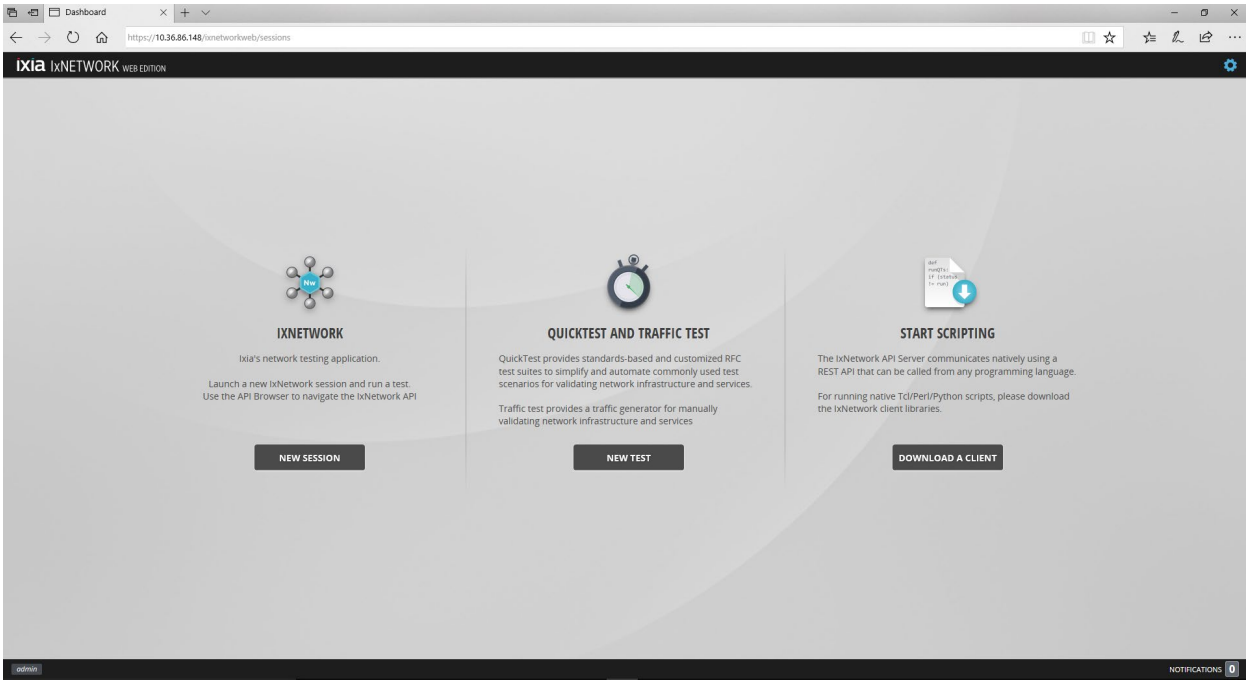


IxNetwork — Web Edition

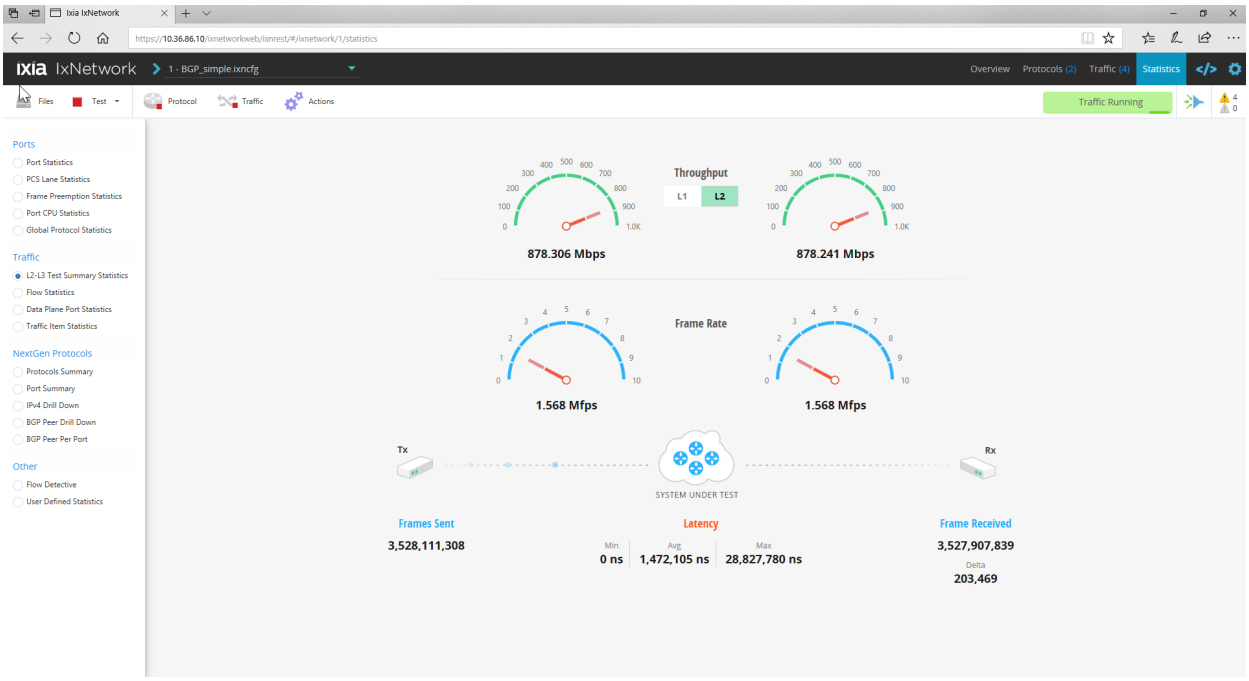
With the introduction of IxNetwork Web Edition, users now have a choice to use complete Linux deployment of IxNetwork test environment. Lightweight HTML5 based user interface lets user connect to the IxNetwork test session with a web browser from anywhere, anytime and does not need installing PC based large memory footprint client application. IxNetwork web edition empowers users to perform testing manually and seamlessly move to automation using a modern automation framework like REST API.

IxNetwork Web Edition includes the following:

- IxNetwork Web UI (protocol emulation and traffic test)
- QuickTest (RFC benchmarking test suites) and basic traffic test
- API Browser (powerful automation tool)



IxNetwork Web Edition options menu



IxNetwork Web Edition test summary statistics

Specifications

Protocols

IxNetwork emulates a wide variety of protocols by using Keysight's CPU-based test port. Each test port supports an independent multi-core CPU running protocol emulations under a Linux operating system. Using the IxNetwork test application, each Keysight test port is capable of emulating thousands of routers or bridges with millions of reachable networks and hosts. Users can easily scale the size of emulated topologies by adding additional test ports. Combined with line-rate traffic generation and QoS measurement capabilities, the CPU-based load modules verify advertised topologies and networks for reachability and QoS performance.

Technology	Protocol
Routing and switching	BGP-4, BGP+, OSPFv2/v3, ISISv4/v6, EIGRP, EIGRPv6, RIP, RIPng, BFD, S-BFD, IGMP/MLD, PIM-SM/SSM, STP/RSTP/MSTP, PVST+/RPVST+, Link Aggregation (LACP), LISP, LLDP, BGP FlowSpec,
Software defined network	OpenFlow, Segment Routing (ISISv4/v6, OSPFv2/v3, BGP), Segment Routing v6 (ISISv6, OSPFv3, L3VPN/EVPN), BGP Link State (BGP-LS), PCEP, BGP SR TE Policy, ISIS/OSPF Flex-Algo, SRv6 OAM, NETCONF, BIER, VXLAN, EVPN VXLAN, OVSDB, GENEVE, BGP FlowSpec, gRPC, Path Tracing
MPLS	RSVP-TE P2P/P2MP, LDP/LDPv6/mLDP, LDP L2VPN (PWE/VPLS), BGP VPLS/VPWS, L3VPN/6VPE, 6PE, Inter-AS VPN Options A/B/C, BGP LU, MPLS-TP, MPLS OAM, EVPN/PBB-EVPN, Multicast VPN Rosen Draft, NG Multicast VPN, MPLSoUDP, MPLSoGRE
Broadband and authentication	PPPoX/L2TPv2, DHCPv4/DHCPv6, Radius attributes for L2TP, ANCP, IPv6 Autoconfiguration (SLAAC), IGMP/MLD, IPTV, 802.1x, WebAuth, EAPoUDP, Cisco NAC, Bonded GRE, Control and User Plane Separation Protocol (CUSP)
Carrier Ethernet	Link OAM (IEEE 802.3ah), CFM IEEE 802.1ag, Service OAM ITUT-Y.1731, PBT/PBB-TE, ELMI, TWAMP/TWAMP Light
Timing Synchronization	Sync-E ESMC, PTP IEEE 1588 with G.8265.1/G.8275.1/G.8275.2 Telecom Profile, ST-2059-2 SMPTE Profile, IEEE C37.238 (Power profile), gPTP IEEE 802.1AS, IEEE 802.1AS-2020, NTP
Automotive and industrial ethernet	gPTP IEEE 802.1AS, MSRP IEEE 802.1 Qat, Layer 2 AVB Transport Protocols IEEE 1722, Time Aware Shaper IEEE 802.1Qbv, Credit Based Shaper IEEE 802.1Qav, Frame Preemption IEEE 802.3br / IEEE 802.1Qbu, Frame Replication IEEE 802.1CB, Stream Filtering and Policing IEEE 802.1Qci, Avnu Automotive Profile, TSN Conformance Test package
Data center	DCBX/LLDP, FCoE/FIP, Priority Flow Control IEEE 802.1Qbb (PFC), TRILL, TRILL OAM, Cisco FabricPath, SPBM, VEPA, VNTAG/VIC, VXLAN, EVPN VXLAN, OVSDB, GENEVE
L2 security	MACsec
5G Transport	eCPRI, ORAN CU-Plane Messages Generation, nFAPI
AI Transport	RoCEv2, Ultra Ethernet LLR and CBFC

Traffic

IxNetwork supports hardware-based traffic generation and measurement that can ensure highest precision and performance. The sophisticated traffic generator is also tightly integrated with the control-plane protocols.

Traffic Generator	Specification	
Configuration	Advanced Traffic Wizard—steps by steps wizard assisted traffic configuration Quick FlowGroup—granular control of packet sequence and variations	
Scale	• Generate up to 4 million trackable flows • Configure up to 16,000 Flow Groups—each supporting a transmit profile • Up to 4,096 hardware streams per-port • Learn and bind up to 4 million MPLS labels	
Dynamic controls	• Change frame rate and frame size on the fly • Change pre-defined packet header field on the fly • Update MPLS and PPP traffic dynamically, without having to stop and restart traffic	
Traffic types	IPv4, IPv6, MPLS multi-labels, Ethernet, VLAN, provider bridges (Q-in-Q), provider backbone bridges (MAC-in-MAC), frame relay, ATM, PPP, HDLC, L2 MPLS VPN (including FR and ATM to Ethernet PWE3 Internetworking), L3 MPLS VPN, VPLS, 6PE, 6VPE, multicast, multicast VPN	
Source/Destination ports mapping	One–to-one, many-to-many, fully meshed	
Routes mapping between peer ports	One-to-one, fully meshed	
Flow grouping	Build flow groups based on packet content (e.g., QoS or VLAN ID)	
Traffic profile	Frame size	Fixed, increment, random, IMIX, custom IMIX, Quad Gaussian distribution, auto
	Rate	percent line rate, packets/sec, L2 bit rate (bps, Bps, KBps, MBps)
	Payload pattern	Increment byte/word, decrement byte/word, random, custom
	QoS	TOS, DSCP, IPv6 traffic classes, 802.1p, MPLS EXP
	Dynamic	Traffic supports gratuitous ARP - auto Re-ARP on cable re-connect
Dynamic fields	Pre-defined packet header field, MPLS, and PPP—update corresponding traffic packets on the fly when control plane information changes	
Packet error injection	Bad CRC, No CRC	
Per-flow traffic tracking	Single or multi-field tracking of any field including: QoS (TOS / DSCP), VLAN, source MAC address, destination MAC address, source IP address, destination IP address, MPLS label, MPLS flow descriptor, streams, Src / Dst IP pair, Src / Dst MAC pair, custom packet tracking	
Real-time flow filtering and flow detective	Real-time filtering of flows based on tracking settings with user defined criteria. Single out the good / bad performing flows based on Rx count, min / max / average latency, timestamp, real-time packet loss using sequence, identify dead flows	
Packet editor	Edit packet header fields and payload	

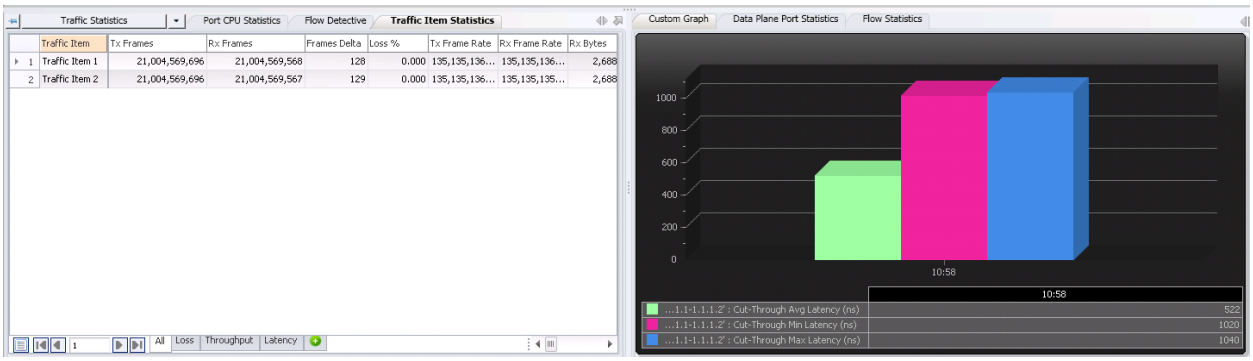
Traffic Generator	Specification	
	Header field value editing	Increment, decrement, list, user defined, default, link/unlink with other header fields
	Add tracking	Track user defined traffic flows
	Payload editing	Increment byte/word, decrement byte/word, repeat, fixed, user defined
	Custom editing	Add or insert additional layers of protocols

Measurement	Specification
Loss	Track Tx frames, Rx expected frames, Rx frames, Rx bytes frame delta loss %
Rate	Tx frame rate, Rx frame rate, Rx rate (bps, Bps, Kbps, Mbps)
Latency	Store and forward, cut-through, MEF frame delay, forwarding delay
Delay variation (jitter)	Delay variation measurement (jitter) minimum, average, maximum
Inter-arrival time	Inter-arrival minimum, average, maximum
Sequence	Small error, big error, reverse error, last sequence number, duplicate frames, sequence gaps
Time stamps	First and last timestamp per flow
TrueView™ convergence	Control plane and data plane integrated time stamping for calculating convergence measurements
Packet loss duration	Estimated time without received packets calculated by frames delta at the expected Rx rate
Misdirected packets	Per-port based count of packets not expected on a Rx port
Late packets	Per-flow count of packets that arrived late; user-defined threshold for late packets
Re-ordered packets	Per-flow count of packets that were received out of order
Duplicate packets	Per-flow count of duplicate packets that were received
In-order packets	Per-flow count of packets that were received in order

Test Results — Statistics Viewer

The IxNetwork statistics viewer is a powerful tool for viewing and analyzing real-time results and generating test reports.

- Aggregate statistics are displayed hierarchically, with the ability to drill-down to group-level and flow-level statistics
- Different modes to view traffic statistics — Instantaneous, Cumulative, or both
- CSV files can be used to capture a single result view or, at the global level, to capture all results in real-time. An integrated CSV viewer is provided to view large-result files

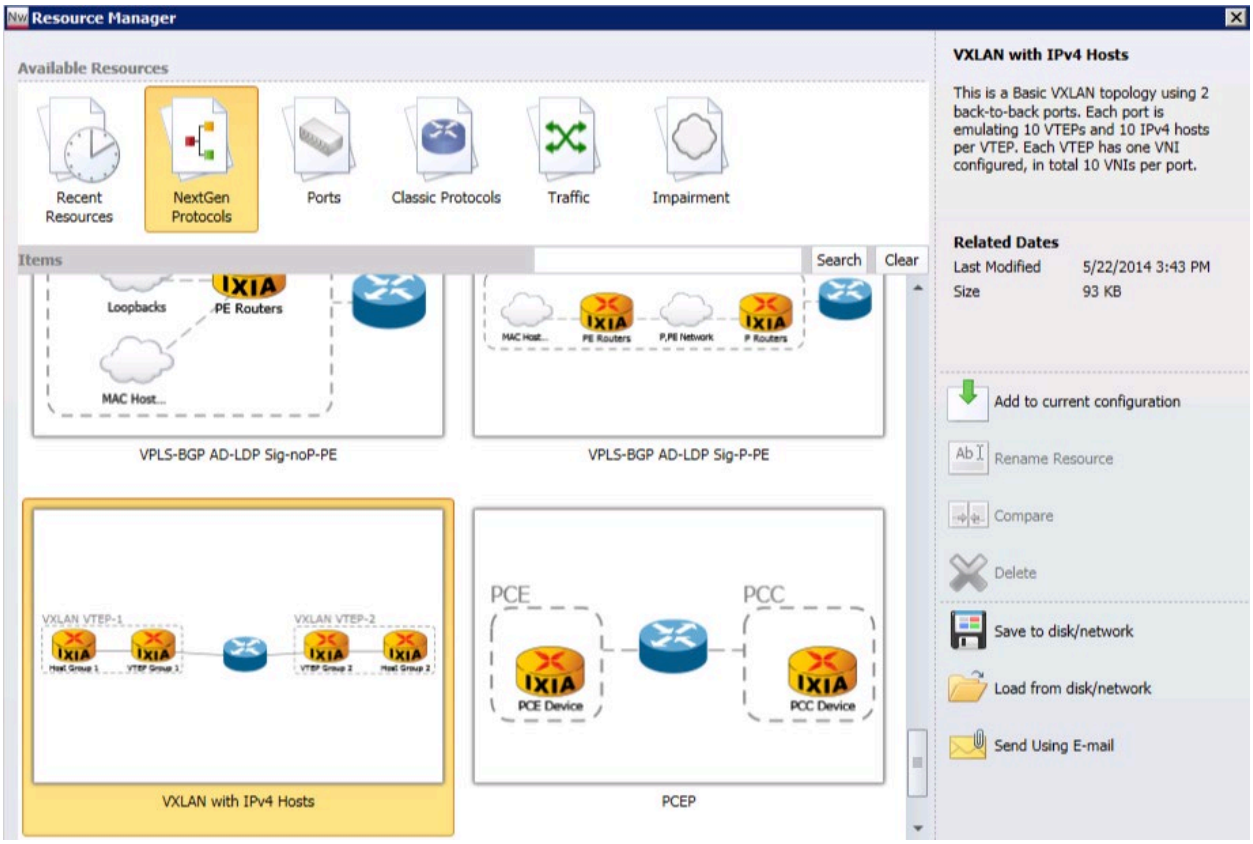


Statistics viewer

Function	Statistics
Global protocol	Port-level protocol counters
Port	Port mode, speed, frame and data rate, OAM statistics, misdirected
Tx-Rx frame rate	Tx-Rx frame rate graph
Port CPU	Port CPU utilization and statistics
Data plane port	Port-based frame counts and rate excluding control-plane traffic
Traffic item	Statistics provide an aggregate of all the flows in the Traffic Item
User defined	User-defined view is used for drill-down to user-defined tracking options
Flow statistics	Flow-level measurements
Flow detective	Filtering and sorting based results

Resource Manager

Often expertise for different protocols lies within different members of a testing team. A common pain-point for our customers was the lack of a collaboration tool to aid them in incrementally building configurations. With the Resource Manager, users can now piece-meal their configurations together. The Resource Manager allows users to save different pieces of their configurations, like protocols and traffic elements, and then build a configuration by re-using saved elements in their current configuration.



Resource Manager

It also allows users to clearly see changes made to their resources/configurations by using a 'diff' functionality within the application. Using the Resource Manager is a powerful way to collaborate and quickly build expertise with a team.

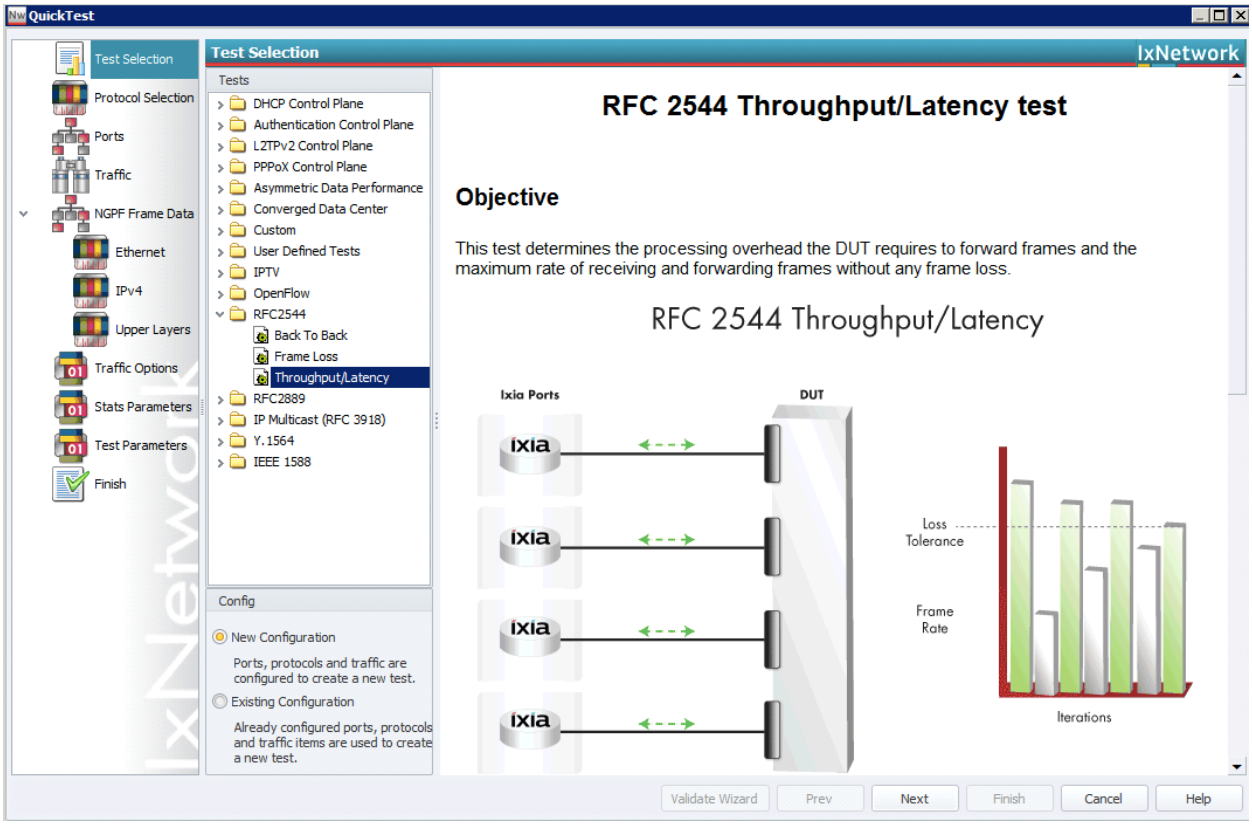
Reports

Building a test-results report requires test data. IxReporter introduces a new database, referred to in the application as an 'object model.' The object model is populated by a testing application (like IxNetwork) with the test configuration parameters and the test results. All of these 'objects' can be included in a report, usually in a table or chart. With this powerful concept, tables and charts can be created, which combine statistics and configuration information as well as have multiple protocols.

Automation

IxNetwork provides powerful GUI-based automation with Test Composer and QuickTest. It also has a robust feature set for GUI-to-script and API-based automation. IxNetwork's automation is simple. Test scenarios are set up by using IxNetwork's step-by-step GUI, and then selecting a single button generates a test script. Scripts may be modified and combined in any fashion. When the script is run, the IxNetwork GUI watches the execution—providing real-time statistics and state information.

Types	Test Requirements	Detail
QuickTest	Scalability	• Standards-based IETF RFC test methodologies, as well as a custom mode for user-defined performance tests • Easy-to-use, configurable, pre-packaged tests • Generate detailed reports of results
Macro recorder	Functionality	• 'Click-thru automation' means no more scripting • Rapid capture of manual test cases • Capture steps that cause a failure for reproducibility
Test composer and Tweakables	Regression	• GUI-based solution to automate test actions • Detailed control over test execution without Tcl expertise • Complete access to the Tcl API with easy UI • Edit 'Macro Recorded' steps for customization of GUI captured events
ScriptGen	Regression	• Provides an easy, one-click GUI-to-script generation
Low-level and high-level APIs	Functionality and regression	• For Tcl scripting experts • One-click GUI to Tcl script conversion available (Scriptgen) • Complete access to and control over test configuration • Tcl, Perl, Python, Ruby
REST API/ RESTPy/ Robot/API browser	Functionality and regression	• Modern automation technologies like REST APIs, JSON data models, Robot keywords, and the Python programming language • RESTPy enables users to use REST API with built-in Python wrapper • API Browser enables users to browse IxNetwork API hierarchy and expedites automation by using any language



QuickTest end-to-end wizards

QuickTest	Tests
RFC 2544 tests	Throughput and latency, frame loss, back-to-back; available in QuickTest Web Edition
RFC 2889 tests	Address Cache, Address Rate, Broadcast Rate, Congestion Control, Frame Error Filtering, Fully Meshed, Many to One, One to Many, Partially Meshed; available in QuickTest Web Edition
RFC 7747 tests	BGP convergence over ECMP benchmark test; available in QuickTest Web Edition
RFC 3918 tests	Aggregated Multicast Throughput, Burdened Group Join Delay, Burdened Multicast Latency, Forwarding Latency, Group Join/Leave delay, Mixed Class throughput, Multicast Group Capacity, Multicast Group Pattern Verification, Scaled Group Forwarding
IEEE 1588v2 (PTP)	Master Selection, Transparent Clock Correction Factor Error, Slave Scalability
ITU-T Y.1564 service activation	Service configuration, service performance
Asymmetric data performance	Throughput/latency, frame loss
IPTV	Channel zapping
Converged data center	FCoE Max No Drop Throughput, FCoE Max No Pause Throughput, Cloud Performance

QuickTest	Tests
Broadband control plane tests	Session setup rate and session capacity tests for PPP/L2TPv2, 802.1x, and NAC
OpenFlow	Failover Performance, L2 Address Learning, L3 Address Learning, Switch Flow Table Capacity
Custom tests	Continuous run, fixed duration run, incremental, throughput (binary search)

Built-In Data Capture and Analysis

Internet protocols are complex—multi-protocol emulations even more so. IxNetwork's built-in tool captures control-plane traffic along with line-rate data-plane traffic, merging both into a single capture file. The optional Analyzer module is a sophisticated network analyzer that can display protocol ladder diagrams. IxNetwork allows you to trigger and filter control and data plane packet captures based on user-defined packet field.

Platform Options

Visit keysight.com for More Information on IxNetwork Platform Options

Virtual platform	IxNetwork Virtual Edition (VE)
Chassis	• XGS12-HSL/SDL/SD Chassis • XGS2-HSL/SDL/SD Chassis
Fixed chassis	• AresONE-M 800GE QSFP-DD800 • AresONE-M 800GE OSPF800 • AresONE-M 800GE Dual Interface Model • AresONE-S 400G QSFP-DD • AresONE 400G QSFP-DD • AresONE 400G OSFP • AresONE 400G High Performance QSFP-DD • AresONE 1600GE • INPT-800GE-2P-BT • INPT-800GE-4P-BT • INPT-1600GE-2P-BT • INPT-1600GE-2P-RM Switch and Edge Router Tester 100GE
Appliances	• NOVUS ONE PLUS 3- and 5-Speed 10GE/5GE/2.5GE/1GE/100M
Load modules	• K400 QSFP-DD 400/200/100/50GE • K400 CFP8 400GE • NOVUS QSFP28 100/50/40/25/10GE • NOVUS SFP28/QSPF28 100/50/25/10GE • NOVUS 3-Speed 10GE/1GE/100M • NOVUS 5-Speed 10GE/2.5GE/100M • Xcellon-Multis QSFP28 100/50/25GE

Visit keysight.com for More Information on IxNetwork Platform Options

- Xcellon-Multis CFP4 100GE
- Xcellon-Multis CXP 100/40/10GE
- Xcellon-Multis QSFP 40/10GE
- Xcellon-Lava CFP 100/40GE
- Xcellon-Flex QSFP/SFP+ 40/10GE

Technology Solutions

Visit keysight.com for More Information on IxNetwork Technology Solutions

- IxNetwork Overview — L2/3 Network Infrastructure Performance Testing
- IxNetwork Software Defined Networking (SDN) Test Solution
- IxNetwork Routing and Switching Test Solution
- IxNetwork MPLS Test Solution
- IxNetwork Industrial Ethernet Test Solution
- IxNetwork Data Center Ethernet Test Solution
- IxNetwork Broadband and Authentication Test Solution
- IxNetwork MACsec Test Solution
- IxNetwork RoCEv2 Test Solution
- IxNetwork Ultra Ethernet LLR and CBFC Test Solution

Product Ordering Information

930-2076

IxNetwork Base Layer 2-3 Performance Test Application (930-2076); node-locked perpetual license. INCLUDES: Base Software, Layer 2-3 Performance Test Application, Supports Traffic Generation and Analysis, RFC 2544, and Custom Integrated Tests over Advertised Topologies, IxNetwork Floating Client Framework, Floating Macro Recorder, Floating DUT CLI Integration, Floating DUT SNMP Integration, Floating DUT SYSLOG.

930-2212

IxNetwork Base Layer 2-3 Performance Test Application for 2-Slot XGS2-SD/SDL/HSLChassis (930-2212); Enable IxNetwork Base Software Layer 2-3 Performance Test Application, Supports Traffic Generation and Analysis, and RFC 2544 and Custom Integrated Tests over Advertised Topologies

Software Tier/Package Bundles

For XGS Chassis:

928-0020

IxNetwork Base Software Bundle; Includes: IxNetwork Base, BGP/BGP+, ISISv4/v6, OSPFv2/v3, RIP/RIPng, MPLS LDP/RSVP-TE, IGMP/MLD/PIM, , RFC 2544/2889/3918 QuickTest.

930-3500

IxNetwork Volume SW Package Tier 1, Supports IxNetwork IPv4/IPv6 Unicast/Multicast Routing Protocols, Switching (Layer 2 Protocols), and MPLS VPN protocols

930-3501

IxNetwork Volume SW Package Tier 2. Supports IxNetwork IPv4/IPv6 Routing Protocols, Switching (Layer 2 Protocols), MPLS VPN Protocols, and Carrier Ethernet Protocols

930-3502

IxNetwork Volume Software Package Tier 3. Supports IxNetwork IPv4/IPv6 Routing Protocols, Switching (Layer 2 Protocols), MPLS Protocols, Multicast VPN Protocols, Carrier Ethernet Protocols, Data Center Ethernet Protocols, and Broadband/Authentication protocols

930-2210

IxNetwork, node-locked perpetual license, All Inclusive package for Chassis. Supports all IxNetwork software features with exclusion; Excludes: 930-3461 IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; 930-2135 IxNetwork MACsec emulation. Any optional script package or IxSuiteStore optional test suite is not considered as part of IxNetwork software features

930-2211

IxNetwork, All Inclusive package for 2-Slot XGS2-SD/SDL/HSLChassis (930-2211); Supports all IxNetwork software features with exclusion; Excludes: 930-3461 IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; 930-2135 IxNetwork MACsec emulation. Any optional script package or IxSuiteStore optional test suite is not considered as part of IxNetwork software features

For AresONE Family

930-2200

IxNetwork, node-locked perpetual license, All Inclusive package for AresONE. Supports all IxNetwork software features with exclusion; Excludes: 930-2207 IxNetwork Encryption test package for AresONE, 930-2208 IxNetwork RoCEv2 Lossless Ethernet Test Package for AresONE, 930-3461 IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; Any optional script package or IxSuiteStore optional test suite is not considered as part of IxNetwork software features

930-2201

IxNetwork Basic package for AresONE; INCLUDES: IxNetwork Base, RFC2544/2889/3918 QuickTest

930-2202

IxNetwork Routing, Switching and Carrier Ethernet package for AresONE; Includes Routing, Switching and Carrier Ethernet Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE

930-2203

IxNetwork MPLS and VPN package for AresONE; INCLUDES: Routing, MPLS and VPN Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE

930-2204

IxNetwork SDN package for AresONE; INCLUDES: Routing and SDN Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE

930-2205

IxNetwork Data Center package for AresONE; INCLUDES: Routing, Data Center Overlay and Data Center Ethernet Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE

930-2206

IxNetwork Broadband Access and Authentication package for AresONE; INCLUDES: Broadband Access and Authentication Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE

930-2207

IxNetwork, Encryption Test package for AresONE; INCLUDES: MACsec Emulation; REQUIRES: 930-2201 IxNetwork Basic package for AresONE; Recommend with: 930-3461 IxNetwork AppLibrary Slot Bundle, Optional Software, Layer 4-7 Performance Test Application for additional encryption/decryption capability in Static MACsec emulation

930-2208

Keysight IxNetwork RoCEv2 Lossless Ethernet Test Package for AresONE-S 400GE, AresONE-M 800GE, and AresONE 1600GE fixed chassis models (930-2208); Enable RoCEv2 Lossless Ethernet validation with Queue Pairs, Congestion Notification and DCQCN emulation; REQUIRES: 930-2201 IxNetwork Basic package for AresONE; and 905-1092 RoCEv2 Lossless Ethernet Enablement FACTORY INSTALLED Option OR 905-1093 RoCEv2 Lossless Ethernet Enablement FIELD UPGRADE Option

For Novus ONE Plus

930-2220

IxNetwork, node-locked perpetual license, All Inclusive package for Novus ONE PLUS. Supports all IxNetwork software features with exclusion; Excludes: 930-3461 IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; 930-2222 IxNetwork Encryption test package for Novus ONE PLUS. Any optional script package or IxSuiteStore optional test suite is not considered as part of IxNetwork software features

930-2221

IxNetwork Basic package for Novus ONE PLUS; INCLUDES: IxNetwork Base, RFC2544/2889/3918 QuickTest

930-2222

IxNetwork, Encryption Test package for Novus ONE PLUS; INCLUDES: MACsec Emulation; REQUIRES: 930-2221 IxNetwork Basic package for Novus ONE PLUS; Recommend with: 930-3461 IxNetwork AppLibrary Slot Bundle, Optional Software, Layer 4-7 Performance Test Application for additional encryption/decryption capability in Static MACsec emulation.

For Interconnect and Network Performance Tester (INPT)

930-2250

IxNetwork Premium Package for Interconnect and Network Performance Tester; INCLUDES: IxNetwork Base, RFC2544/2889/3918 QuickTest, and Protocol emulation for Routing, Switching, MPLS/VPN, Carrier Ethernet and Timing, Data Center Ethernet, Broadband and Authentication, SDN, and 5G Transport

930-2251

IxNetwork Basic Package for Interconnect and Network Performance Tester; INCLUDES: IxNetwork Base, RFC2544/2889/3918 and ITU-T Y.1564 QuickTest, and IGMP/MLD emulation.

930-2252

IxNetwork Routing/Switching/MPLS/VPN Package for Interconnect and Network Performance Tester; INCLUDES: Protocol emulation for Routing, Switching, and MPLS/VPN; REQUIRES: 930-2251 Keysight IxNetwork Basic Package for Interconnect and Network Performance Tester.

930-2254

IxNetwork RoCEv2 Lossless Ethernet Package for Interconnect and Network Performance Tester (930-2254); Perpetual node-locked license; Enable RoCEv2 Lossless Ethernet validation with emulation of Queue Pairs, Congestion Notification and DCQCN; REQUIRES: 930-2251 IxNetwork Basic Package for Interconnect and Network Performance Tester; and 930-3300 RoCEv2 Lossless Ethernet Enablement for Interconnect and Network Performance Tester

For Switch and Edge Router Tester (SERT)

930-2240

IxNetwork Premium Package for Switch and Edge Router Tester 100GE; INCLUDES: IxNetwork Base, RFC2544/2889/3918 QuickTest, and Protocol emulation for Routing, Switching, MPLS/VPN, Carrier Ethernet, Timing, Data Center Ethernet, Broadband and Authentication, SDN, and 5G Transport.

930-2241

IxNetwork Basic Package for Switch and Edge Router Tester 100GE; INCLUDES: IxNetwork Base, RFC2544/2889/3918 and ITU-T Y.1564 QuickTest, and IGMP/MLD emulation.

930-2242

IxNetwork Routing/Switching/MPLS/VPN Package for Switch and Edge Router Tester 100GE; INCLUDES: Protocol emulation for Routing, Switching, and MPLS/VPN; REQUIRES: 930-2241 IxNetwork Basic Package for Switch and Edge Router Tester 100GE.

QuickTest

930-2022

IxNetwork, Optional Software, RFC2544 and Custom Integrated Tests over Advertised Topologies; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2027

IxNetwork, Optional Software, Control Plane Tests for PPP/L2TPv2, 802.1x, NAC; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2401

IxNetwork, Optional Software, RFC 2889 QuickTest; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2403

IxNetwork, Optional Software, IP Multicast RFC 3918 QuickTest; REQUIRES 930-2067 IGMP/MLD Emulation (or 930-2004 IxNetwork Multicast Emulation); REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2405

IxNetwork, Optional Software; FCoE/FC Performance QuickTest; This QuickTest performs binary and step search to find the max no-drop and no-PAUSE throughput performance of a DCB switch, an FCoE switch, or an FC switch; REQUIRES 930-2039 IxNetwork FCoE-Client Emulation; REQUIRES 930-2043 IxNetwork DCBX emulation if DCBX is required; REQUIRES 930-2049 IxNetwork FCF emulation if FCF emulation is required; REQUIRES 930-2074 IxNetwork FC N_Port emulation if Fibre Channel is required; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2407

IxNetwork, Optional Software, IPTV QuickTests; REQUIRES 930-2067 IGMP/MLD Emulation (or 930-2004 IxNetwork Multicast Emulation); REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2408

IxNetwork, Optional Software, Y.1564 QuickTest; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2409

IxNetwork, Optional Software, Asymmetric Data Performance QuickTest; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2410

IxNetwork, Optional Software, 1588v2 (PTP) QuickTest; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2411

IxNetwork, IxCloudPerf QuickTest; Measures the forwarding performance of a data center switch using simulated data center North-South and East-West traffic profiles; Provides a binary-search test methodology, a timeline test methodology, and a dynamic test methodology; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2412

IxNetwork, OpenFlow Switch Benchmarking QuickTest. OpenFlow Benchmark Test for OpenFlow Switch. REQUIRES IxNetwork OpenFlow Controller Emulation License (930-2104) AND pre-existing (930-1999) IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

930-2424

IxNetwork, Optional Software, RFC 7747 BGP Convergence QuickTest Web Edition; Requires BGP Emulation (930-2005, 930-2007); REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

AppLibrary

930-3461

IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; Enables support for AppLibrary on a single supported load module. It includes the AppLibrary feature and subscription service to access new application flows for one-year period. Requires previous purchase of 930-2056 (IxNetwork Base) or higher bundle

930-3463

IxNetwork AppLibrary Chassis Bundle, Layer 4-7 Performance Test Application. Enables support for AppLibrary on up to 12 supported load modules in a single XM/XG chassis. INCLUDES: The AppLibrary feature and subscription service to access new application flows for one year. Requires: Previous purchase of 930-2056 (IxNetwork Base) or higher bundle

IxNetwork Subcription

930-9521

IxNetwork Tier1 One-Year FLOATING Subscription Per User License for use with IXIA Hardware (930-9521); Support IxNetwork base with Traffic and Statistics, RFC2544/2889/3918 QuickTest, Protocol Emulation of Routing, Switching, MPLS and VPN, relevant control plane QuickTest, for a duration of 1-Year

930-9522

IxNetwork Tier2 One-Year FLOATING Subscription Per User License for use with IXIA Hardware (930-9522); Support IxNetwork base with Traffic and Statistics, RFC2544/2889/3918 QuickTest, Protocol Emulation of Routing, Switching, MPLS and VPN, Carrier Ethernet, Data Center Ethernet, Broadband/Authentication, relevant control plane QuickTest, for a duration of 1-Year

930-9523

IxNetwork Tier3 One-Year FLOATING Subscription Per User License for use with IXIA Hardware (930-9523); Supports IxNetwork base with Traffic and Statistics, RFC2544/2889/3918 QuickTest, Protocol Emulation of Routing, Switching, MPLS and VPN, Carrier Ethernet, Data Center Ethernet, Broadband/Authentication, SDN, Timing, TSN, 5G, relevant control plane QuickTest, AppLibrary, for a duration of 1-Year

IxNetwork-FT

930-2215

IxNetwork FT Base (930-2215); Enable IxNetwork FT support for Novus 10G/1G load module family; REQUIRES: 930-2056 IxNetwork PLUS Software, AND additional protocol license as required

TAA compliant

930-5000-T

ITAA Compliant IxNetwork PREMIUM SW. INCLUDES: Base Software, Layer 2-3 Performance Test Application, Supports Traffic Generation and Analysis, RFC 2544, and Custom Integrated Tests over Advertised Topologies, IxNetwork Floating Client Framework, Floating Macro Recorder, Floating DUT CLI Integration, Floating DUT SNMP Integration, Floating DUT SYSLOG

930-5001-T

ITAA Compliant IxNetwork, Volume SW Package Tier 1, Supports IxNetwork IPv4/IPv6 Unicast/Multicast Routing Protocols, Switching (Layer 2 Protocols), and MPLS VPN protocols. INCLUDES: IxNetwork Base PLUS, IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSMv4/v6, BGP, BGP4 Emulation with additional Layer 2 MPLS/VPN and Layer 3 MPLS/VPN and Multicast VPN Support, BGP4 Emulation with additional IPv6 support, OSPFv2/v3, ISISv4/v6, RIP/RIPng, LACP, Protocol over LACP, BFD, STP/RSTP/MSTP, RSVP-TE, LDP, P2MP RSVP-TE, LDP FEC 129, BGP Extension for NG mVPN with RSVP-TE P2M, mLDP, BGP Extensions for NG mVPN with mLDP, QuickTests RFC 2544/2889/3918, DHCPv4/v6 Client

930-5002-T

TAA Compliant IxNetwork Volume SW Package Tier 2. Supports IxNetwork IPv4/IPv6 Routing Protocols, Switching (Layer 2 Protocols), MPLS VPN Protocols, Carrier Ethernet Protocols. INCLUDES: IxNetwork Base PLUS, IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSMv4/v6, BGP, BGP4 Emulation with additional Layer 2 MPLS/VPN and Layer 3 MPLS/VPN and Multicast VPN Support, BGP4 Emulation with additional IPv6 support, OSPFv2/v3, ISISv4/v6, RIP/RIPng, LACP, Protocol over LACP, BFD, STP/RSTP/MSTP, RSVP-TE, LDP, P2MP RSVP-TE, LDP FEC 129, BGP Extension for NG mVPN with RSVP-TE P2M, mLDP, BGP Extensions for NG mVPN with mLDP, QuickTests RFC 2544/2889/3918, Ethernet CFM IEEE 802.1g and ITU-T Y.1731, PBB-TE, Ethernet OAM, TWAMP, IEEE 1588v2 PTP, ITU-T SyncE (ESMC)

930-5003-T

TAA Compliant IxNetwork Volume Software Package Tier 3. Supports IxNetwork IPv4/IPv6 Routing Protocols, Switching (Layer 2 Protocols), MPLS Protocols, Multicast VPN Protocols, Carrier Ethernet Protocols, Data Center Ethernet Protocols, Broadband/Authentication protocols INCLUDES: IxNetwork Base PLUS, IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSMv4/v6, BGP, BGP4 Emulation with additional Layer 2 MPLS/VPN and Layer 3 MPLS/VPN and Multicast VPN Support, BGP4 Emulation with additional IPv6 support, OSPFv2/v3, ISISv4/v6, RIP/RIPng, LACP, Protocol over LACP, BFD, STP/RSTP/MSTP, RSVP-TE, LDP, P2MP RSVP-TE, LDP FEC 129, BGP Extension for NG mVPN with RSVP-TE P2M, mLDP, BGP Extensions for NG mVPN with mLDP, QuickTests RFC 2544/2889/3918, Ethernet CFM IEEE 802.1g and ITU-T Y.1731, PBB-TE, Ethernet OAM, TWAMP, IEEE 1588v2 PTP, ITU-T SyncE (ESMC), FCoE, DCBX, PPP/L2TPv2, Dual-stack PPP/L2TP, DHCPv4/v6, ANCP, L2TP Radius, Session Aware Traffic, 802.1X, WebAuth, L2/3 NAC, QuickTest (PPP/L2TPv2, 802.1x and NAC)

930-5004-T

TAA Compliant IxNetwork, All Inclusive package for Chassis. Supports all IxNetwork software features with exclusion; Excludes: 930-3461 IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; 930-2135 IxNetwork MACsec emulation. Any optional script package or IxSuiteStore optional test suite is not considered as part of IxNetwork software features

930-5005-T

TAA Compliant IxNetwork, Basic package for Novus ONE PLUS. INCLUDES: IxNetwork Base, RFC2544/2889/3918 QuickTest

930-5006-T

TAA Compliant IxNetwork, All Inclusive package for Novus ONE PLUS. Supports all IxNetwork software features with exclusion; Excludes: 930-3461 IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; 930-2222 IxNetwork Encryption test package for Novus ONE PLUS. Any optional script package or IxSuiteStore optional test suite is not considered as part of IxNetwork software features

Note: See our IxNetwork technology segment data sheets for protocol emulation part numbers

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