

## IxNetwork™ – Network Topology Testing and Traffic Analysis

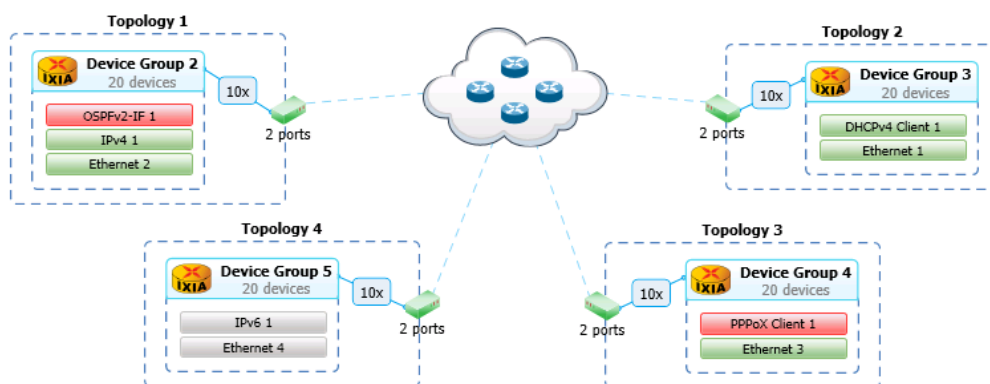


As networks converge into a single network infrastructure that is used to carry voice, video, data, and wireless traffic, it is critical to use leading-edge test systems to assess functionality, scale, and performance. IxNetwork provides wire-rate traffic generation with service modeling that builds realistic, dynamically-controllable data-plane traffic. IxNetwork offers the industry's best test solution for functional and performance testing by using comprehensive emulation for routing, switching, multi-protocol label switching (MPLS), IP multicast, broadband access, authentication, carrier Ethernet, and data center bridging (DCB) protocols. IxNetwork scales to handle the most powerful devices and largest networks.

IxNetwork offers the customization and flexibility to meet the wide range of requirements necessary for testing complex network topologies with thousands of network devices. It emulates millions of routes and reachable hosts and can customize millions of traffic flows to stress data plane performance. Powerful graphical user interface (GUI) wizards and grid controls allow simplified creation of sophisticated traffic flows. Its enhanced real-time analysis and statistics are capable of reporting comprehensive protocol status and detailed per-flow traffic performance metrics.

IxNetwork 7 introduces Ixia's next-generation protocol framework that brings multi-protocol visibility to a new level. It offers an industry-first high-level summary of port- and protocol-state and the ability to drill down to and control any port, all from a single, visual interface (see diagram).

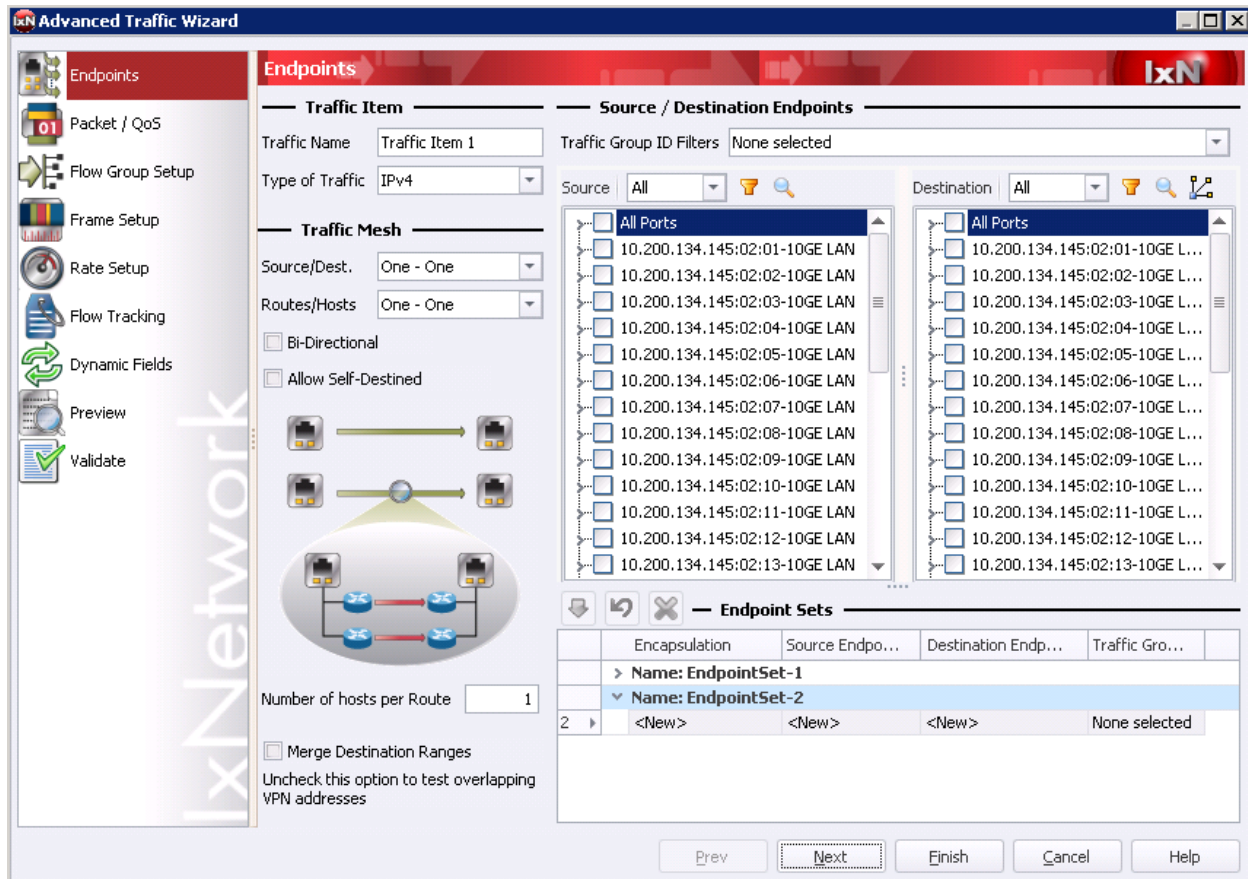
- Fast and efficient configuration of network emulation
- Improved scaling and efficiency
- Flexible protocol stacking to emulate realistic use cases
- Easier use-model with visual representative of test topology and protocol states
- Granular per session control and drill-down view
- Per session learned info and per session failure info for improved diagnostic
- Improved traffic generation flexibility with tagged protocol elements
- Real-world Traffic Mix with AppLibrary



**Multi-protocol visibility with protocol drill-down and control**

## Key Features

- Easy-to-use protocol and traffic wizards emulate complex networks with the widest selection of layer 2 (L2) and L3 protocols and traffic profiles
- Dynamic traffic support, with the ability to change rate and frame size on the fly, and dynamically-updated MPLS and PPP traffic without stopping and restarting
- Advanced measurements, including four latency modes, delay variation (jitter), inter-arrival time, sequence checking, misdirected packets, packet loss duration, and Rx rates
- Streamlined workflow that exposes all configuration options in context-sensitive ribbons and contains an overview summary of ports, protocols, and traffic with detailed views
- Collaborative resource management with Resource Manager – divide and conquer large, complex test topologies, compare resource versions and configuration changes, merge resources with easy-to-use wizards
- Statistics viewer providing summary-level, group-level, and per-flow statistics with sophisticated results filtering and sorting powered by Flow Detective™, enabling real-time analysis
- Virtual server and cloud testing through virtual test ports
- Quickly and easily record interactions with IxNetwork and save these recordings as tests for later use with Macro Recorder
- Multi-field ingress tracking to track flows based on multiple user-defined fields
- Multi-egress tracking provides a unique ingress/egress results view that compares sent traffic with received traffic, so as to accurately verify what DUT packet field modifications; QoS remarking is easily verified
- Ability to add custom formulas in any statistics view
- Powerful reporting with one-click report generation, data analysis, custom report and template builds, customizable charts and graphs, in PDF or HTML formats
- QuickTests for industry-standard test methodologies, including RFCs 2544, 2889, and 3918, and ITU-T Y.1564
- Easy one-click TCL, HLTAPI, or HLPAPI automation using ScriptGen, with complete API support – providing complete automation of IxNetwork functions



Advanced Traffic Wizard

## IxNetwork on IxVM

IxNetwork builds large-scale emulated network and complex traffic topologies using real-world routing and switching. IxNetwork's large library of L2-3 protocols allows advanced testing of multicast scenarios using IGMP, convergence testing for measuring outage duration during live migration, and LACP.

## Protocols

IxNetwork emulates a wide variety of protocols using Ixia'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 Ixia 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.

**L3 VPN/6VPE Wizard - DUT - Name**

**Ixia Port**

VLAN ID 100  
CE  
Routes  
#Routes/VRF = 25  
#Customer Ports = 1

DUT Loopback IP Addr  
1.1.1.1/32  
DUT PE  
20.20.20.1/24  
LDP  
OSPF  
EBGP

**Ixia Port**

PE Loopbacks  
2.2.2.2/32  
P  
PE  
Routes  
VRF  
#Routes/VRF = 25  
#P's = 1  
#PE's = 1  
#VRF's = 1  
#Provider Ports = 1

Connected Interface

**DUT - P**

☒ Enable VLAN

VLAN ID  Increment By

☐ Repeat VLAN Across Ports ☐ Use Same VLAN for All Emulated Routers

☒ Enable P Routers

Number of P Routers

Starting Subnet Between P and PE

IGP Protocol

MPLS Protocol

P Router IP Address

DUT IP Address

Increment Per Router

Increment Per Port

☐ Continuous Increment Across Ports

### Protocol Configuration Wizard

**Supported Protocols<sup>i</sup>**

	Protocol	Standard
<b>Routing</b>	RIP, RIPng	RFC 1058, RFC 2453
	OSPFv2/v3	RFC 2328, RFC 2740
	ISISv4/v6	ISO/IEC 10589
	EIGRP, EIGRPv6	Cisco proprietary
	BGP-4,BGP+	RFC 1771, RFC 2545
<b>MPLS</b>	RSVP-TE	RFC 3209, RFC 4974, RFC 5151
	RSVP-TE P2MP	RFC 4875
	LDP	RFC 3036
	mLDP	draft-ietf-mpls-ldp-p2mp-11 draft-ietf-mpls-mldp-in-band-signaling-02
	Labeled BGP	RFC 3107
	PWE	RFC 3916, RFC 4385, RFC 4447
	L3 MPLS VPN, 6VPE, RT-Constraint	RFC 2547bis, RFC 4364, RFC 4684
	Inter-AS VPN Options A, B, C	RFC 2547bis
	MPLS-TP	RFC 5654 RFC 5860 RFC 5921 RFC 5586 RFC 6371 RFC 6378 RFC 6426 RFC 6428 RFC 6478 draft-ietf-mpls-tp-loss-delay-00 draft-bhh-mpls-tp-oam-y1731-06

	MPLS OAM	<ul style="list-style-type: none"> <li>• RFC 4379: detecting MPLS data plane failures</li> <li>• RFC 5884: bidirectional forwarding detection (BFD) for MPLS label switched paths (LSPs)</li> <li>• RFC 5085: pseudowire virtual circuit connectivity verification (VCCV), a control channel for pseudowires</li> <li>• RFC 5885: BFD for the pseudowire VCC</li> </ul>
	Multicast VPN: GRE, mLDP, RSVP-TE P2MP	<ul style="list-style-type: none"> <li>• Draft-Rosen/RFC 6037</li> <li>• RFC 6514</li> </ul>
	EVPN, PBB-EVPN	<ul style="list-style-type: none"> <li>• draft-ietf-l2vpn-evpn-04</li> <li>• draft-ietf-l2vpn-pbb-evpn-06</li> </ul>
<b>VPLS</b>	6PE	RFC 4798
	BGP auto-discovery with LDP FEC 129 support	draft-ietf-l2vpn-signaling-08 RFC 4447
	VPLS-LDP	RFC 4762 draft-ietf-l2vpn-signaling-08
	VPLS-BGP	RFC 4761
<b>High-Availability</b>	BFD	draft-ietf-bfd-base
<b>IP Multicast</b>	IGMPv1/v2/v3	RFC 1112, RFC 2236, RFC 3376
	MLDv1/v2	RFC 2710, RFC 3810
	PIM-SM/SSM, PIM-BSR	RFC 2362, RFC 4601
	Multicast VPN, VPNv6	<ul style="list-style-type: none"> <li>• IETF draft-rosen-l3vpn-mvpn</li> <li>• draft-ietf-l3vpn-2547bis-mcast-07.txt (RSVP-TE P2MP Support)</li> <li>• draft-ietf-l3vpn-2547bis-mcast-bgp-05.txt (A-D route 1,3,4,5,7)</li> </ul>
<b>Switching</b>	STP/RSTP	IEEE 802.1D/802.1W
	MSTP	IEEE 802.1s
	PVST+/RPVST+	Cisco proprietary
	Link Aggregation (LACP)	IEEE 802.3ad
	LLDP	IEEE 802.1AB

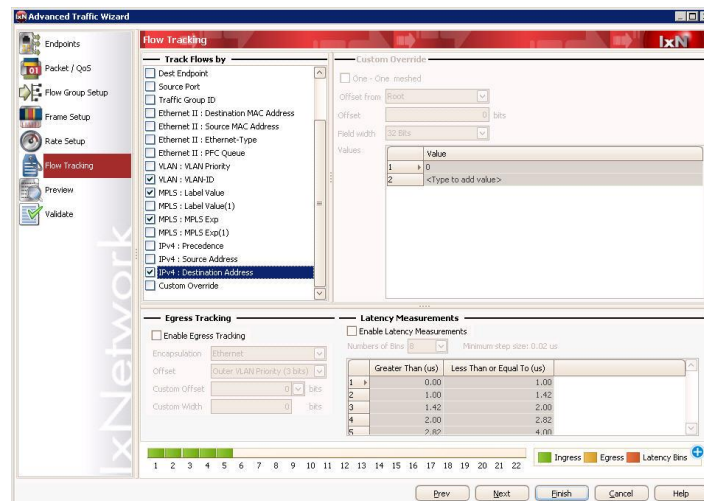
<b>Carrier Ethernet</b>	Link OAM	IEEE 802.3ah-2004 Clause 57
	CFM	IEEE 802.1ag-2007
	Service OAM	ITU-T Y.1731-2006
	PBT/PBB-TE	Nortel Standard/IEEE 802.1Qay
	ESMC	ITU-T G.8264/Y.1364 SyncE
	PTP	IEEE 1588-2008 (version 2) G.8265.1 Telecom Profile
	E-LMI	MEF 16
<b>Broadband</b>	ANCP	draft-ietf-ancp-protocol-02 draft-ietf-ancp-framework-05
	PPPoX	RFC 1331, RFC 2516, RFC 4241
	DHCPv4 Client/Server DHCPv6 Client/Server	RFC 2131 RFC 3315, RFC 3363
	L2TPv2	RFC 3817
	Radius attributes for L2TP	RFC 2865
	IPv6 Autoconfiguration (SLAAC)	RFC 4862
	IPTV	IGMP - RFC 1112, RFC 2236, RFC 3376 MLD - RFC 2710, RFC 3810
	AMT	IETF draft-ietf-mboned-auto-multicast-12
<b>Authentication</b>	802.1x	IEEE 802.1x
	WebAuth	Cisco and HP implementations
	Cisco NAC	Cisco proprietary
<b>Data Center</b>	Priority flow control	IEEE 802.1Qbb
	FCoE/FIP	T11 FC-BB-5
	LLDP/DCBX	CIN 1.0/Pre-CEE, IEEE Baseline 1.01/ CEE, IEEE 802.1Qaz
	VNTAG/VIC	Cisco proprietary

	TRILL	RFC6325 RFC6326 RFC6327
	SPBM	IEEE 802.1aq
	VEPA	802.1Qbg draft 2.1
	OpenFlow	ONF v1.0/v1.3.1
	VXLAN	draft-mahalingam-dutt-dcops-vxlan-04

## Traffic<sup>1</sup>

IxNetwork supports sophisticated traffic generation that is tightly integrated with the control-plane protocols.

- Basic Traffic Wizard, Advanced Traffic Wizard, and Quick Flow groups support simple to complex traffic creation
- Generate up to 4 million trackable flows
- Configure up to 16,000 unique Flow Groups – each supporting a unique transmit profile
- Up to 4,096 hardware streams per port
- Learn and bind up to 4 million MPLS labels
- Change frame rate and frame size on the fly
- Update MPLS and PPP traffic dynamically, without having to stop and restart traffic



**Multi-Field ingress tracking**



## Traffic Wizard Features

Feature	Specification	
<b>Traffic Types</b>	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	
<b>Source/Destination Ports Mapping</b>	One-to-one, many-to-many, fully meshed	
<b>Routes Mapping between Peer Ports</b>	One-to-one, fully meshed	
<b>Flow Grouping</b>	Build flow groups based on packet content (e.g., QoS or VLAN ID)	
<b>Traffic Profile</b>	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
<b>Dynamic Fields</b>	MPLS and PPP - update corresponding traffic packets on the fly when control plane information changes	
<b>Packet Error Injection</b>	Bad CRC, No CRC	
<b>Per-Flow Traffic Tracking</b>	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	
<b>Real-Time Flow Filtering and Flow Detective</b>	Real-time filtering of flows based on tracking settings with user defined criteria. Single out best/worst performing flows based on Rx count, min/max/average latency, timestamp, real-time packet loss using sequence, identify dead flows	

<b>Packet Editor</b>	Edit packet header fields and payload	
	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

### ***Traffic Measurements***

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

<b>Duplicate Packets</b>	Per-flow count of duplicate packets that were received
<b>In-Order Packets</b>	Per-flow count of packets that were received in order

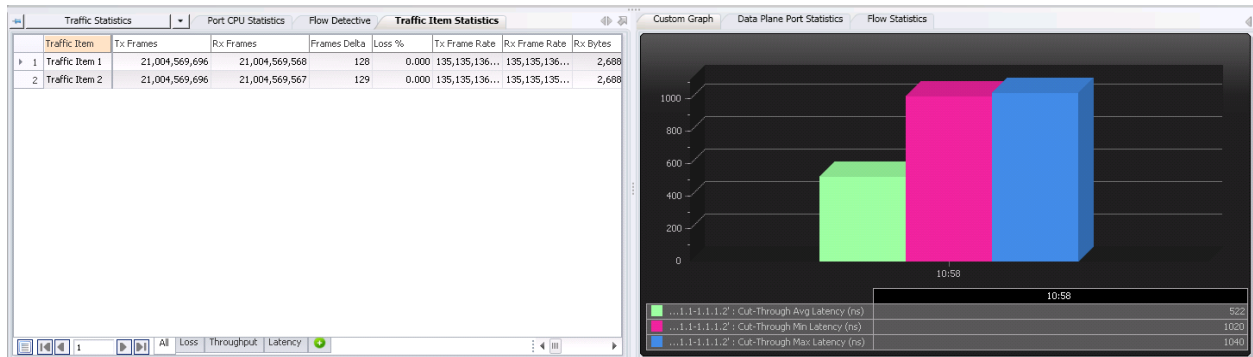
## ***IxNetwork AppLibrary***

Feature	Specification
Application Simulations	300+, and growing monthly
Application Simulations per Port	50
Ports Supported	128
Traffic over Protocol Emulations	Yes
Supported Load Modules	<ul style="list-style-type: none"> <li>• NGY-NP2-01</li> <li>• NGY-NP4-01</li> <li>• NGY-NP8-01</li> <li>• LSM10GXM2NG-01</li> <li>• LSM10GXM4NG-01</li> <li>• LSM10GXM8NG-01</li> <li>• LSM1000XMVDC16-01</li> <li>• LSM1000XMVDC4-01</li> <li>• LSM1000XMVDC16NG</li> <li>• LSM1000XMVDC4NG</li> </ul>

## ***Test Results***

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 results view or, at the global level, to capture all results in real-time. An integrated CSV viewer is provided to view large-result files.



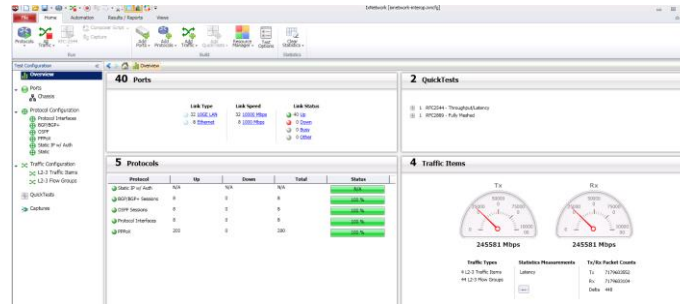
Statistic views

## Statistics

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

## Streamlined Workflow

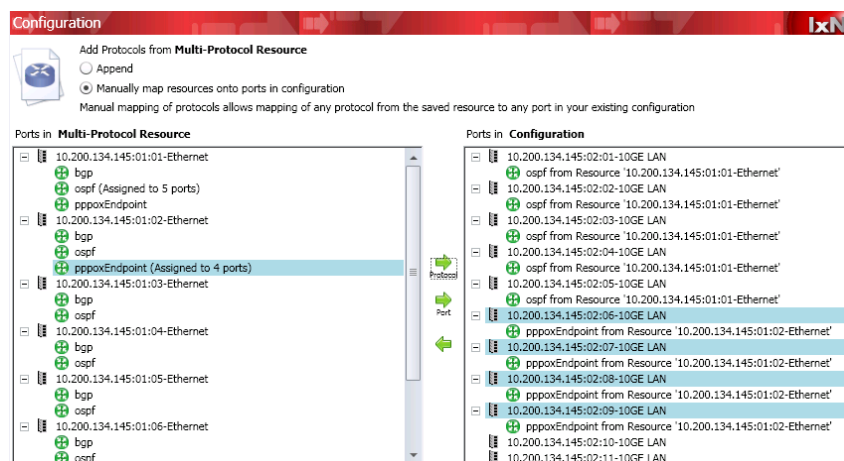
The new GUI greatly reduces clutter by organizing actions into context-sensitive ribbons. It only shows you enabled protocols in the configuration tree, as opposed to everything that is supported by the application. The configuration options exposed in the GUI are context sensitive, and you only see the options based on the element in the navigation tree you are on.



### Streamlined workflow

## 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.

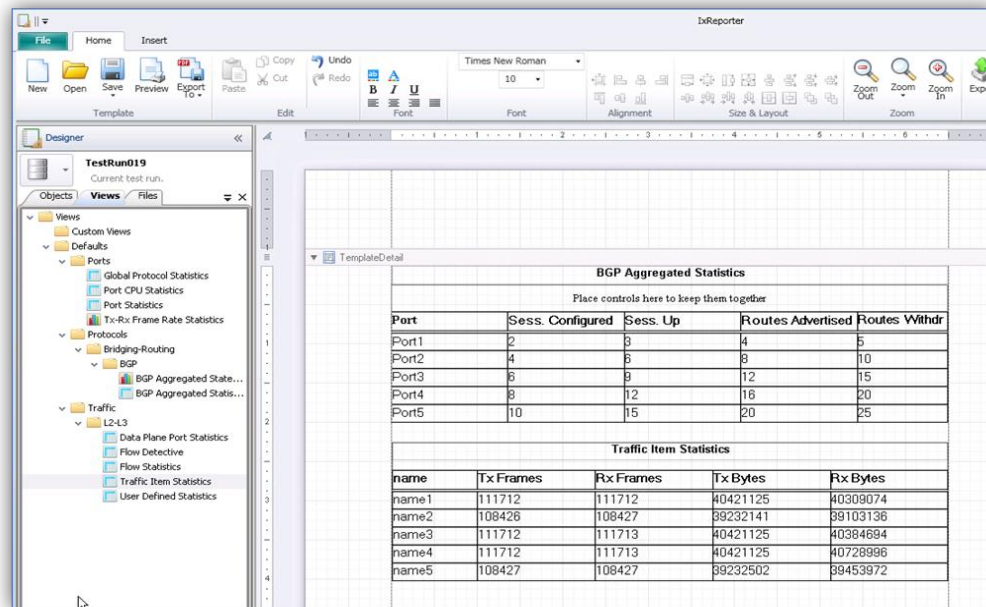


### Resource Manager

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.

## IxReporter

Building a test-results report requires test data. IxReporter 2.0 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.



## IxReporter

## Automation

IxNetwork provides powerful GUI-based automation with the Test Composer and QuickTests. It also has a robust feature set for GUI-to-script and API-based automation.

- Test Composer provides a GUI-based solution to automate test actions.
- QuickTests provides standards-based test methodologies, as well as a custom mode for user-defined performance tests.
- ScriptGen provides an easy, one-click GUI-to-script automation solution, as well as a GUI to watch running tests.
- IxNetwork provides a full-featured API for automated testing.

IxNetwork’s automation is simplicity at its best. Test scenarios are set up using IxNetwork’s step-by-step GUI, and then a single button-press generates a TCL 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.

## Automation Options

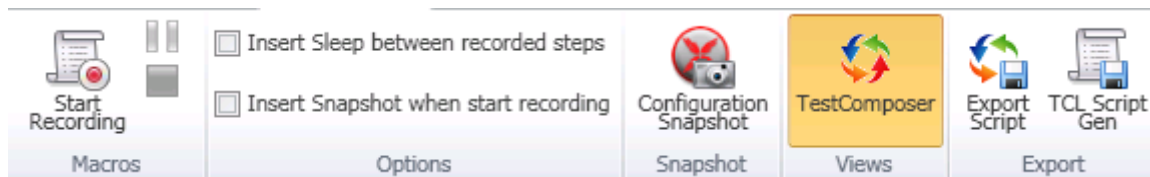
Request	Easy-to-Use	IxNetwork
"I just need a test that can stress my DUT"	QuickTests	Configurable, packaged tests
"I just want to capture what I'm doing in the GUI"	Macro Recorder	Click-thru test automation
"I need to build tests, but I need help with the scripting"	Composer	Test development environment
"I need control, but I don't want to learn the Tcl API"	Tweakables	GUI driven configuration
"I need low-level control of the test tool"	Tcl API	Total access to the configuration

## Automation Features

Feature	Test Requirement	Detail
QuickTests	Scalability	<ul style="list-style-type: none"> <li>• Easy-to-use, configurable, pre-packaged tests</li> <li>• Benchmark network performance with RFC-based test methodologies</li> <li>• Generate detailed reports of results</li> </ul>
Macro Recorder	Functionality	<ul style="list-style-type: none"> <li>• "Click-thru automation" means no more scripting</li> <li>• Rapid capture of manual test cases</li> <li>• Capture steps that cause a failure for reproducibility</li> </ul>
Composer and Tweakables	Regression	<ul style="list-style-type: none"> <li>• Detailed control over test execution without Tcl expertise</li> <li>• Complete access to the Tcl API with easy UI</li> <li>• Edit "Macro Recorded" steps for customization of GUI captured events</li> </ul>
Tcl API	Functionality and regression	<ul style="list-style-type: none"> <li>• For Tcl scripting experts</li> <li>• One-click GUI to Tcl script conversion available (Scriptgen)</li> <li>• Complete access to and control over test configuration</li> </ul>

## Macro Recorder

With Macro Recorder in IxNetwork 6.00, users can quickly and easily record their interactions with IxNetwork and save these recordings as tests for later use. A user simply turns on the recorder just before they begin the series of steps and interact with the GUI just as they normally do. When done, they stop recording. Macro Recorder captures the GUI interactions during the process and can replay the steps over and over again – saving a lot of time.



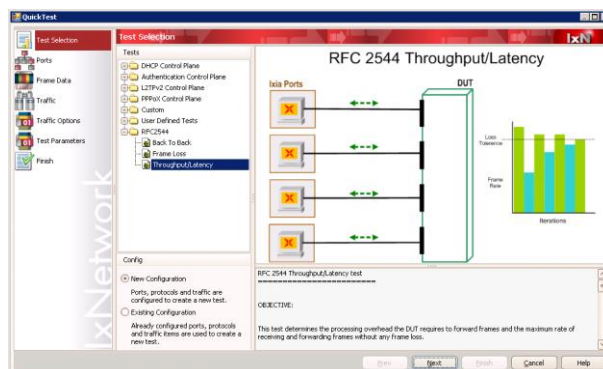
**Macro Recorder**

The user can choose to capture the time in between GUI clicks during the recording so that the pace of the commands is the same when the scenario replays. The user can also choose to take a snapshot of the configuration they are using so that the scenario always starts from the exact same condition as was originally configured.

## QuickTest

An important requirement of network device characterization is measuring throughput, latency, frame loss, and back-to-back rates as defined in RFC 2544. Automated tests use the traffic flows set up by the traffic wizard to perform tests, varying rates and sizes as necessary. QuickTest features include:

- End-to-end wizards for easy step-by-step configuration of test input and parameters
- Ability to run background traffic to load the DUT
- Integration with the ViperCore traffic and statistics engine
- Ability to run RFC test methodologies over routed topologies
- Ability to run strict RFC tests or allow users to customize any configured traffic property after the wizard runs



**QuickTest end-to-end wizards**



## QuickTest Features

Test Types	Tests
<b>RFC 2544 Tests</b>	Throughput and latency, frame loss, back-to-back
<b>RFC 2889 Tests</b>	Address Cache, Address Rate, Broadcast Rate, Congestion Control, Frame Error Filtering, Fully Meshed, Many to One, One to Many, Partially Meshed
<b>RFC 3918 Tests</b>	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
<b>IEEE 1588v2 (PTP)</b>	Best Master Selection, Transparent Clock Correction Factor Error, Slave Scalability
<b>ITU-T Y.1564 Service Activation</b>	Service Configuration, Service Performance
<b>Asymmetric Data Performance</b>	Throughput/Latency, Frame Loss
<b>IPTV</b>	Channel Zapping
<b>Converged Data Center</b>	FCoE Max No Drop Throughput, FCoE Max No Pause Throughput, Cloud Performance
<b>Control Plane Tests</b>	Session setup rate, session capacity
<b>Custom Tests</b>	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 includes a built-in tool that 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, with the ability to display protocol ladder diagrams. IxNetwork allows you to trigger and filter control and data plane packet captures based on user-defined packet field.

## Product Ordering Information

### 930-2056

IxNetwork, Base Software PLUS

INCLUDES; 930-1999 Base Software, Layer 2-3 Performance Test Application, Supports Traffic Generation and Analysis; 930-2022 RFC 2544 and Custom Integrated Tests over Advertised Topologies; 930-3900 IxNetwork Floating Client Framework, 930-3921 Floating DUT CLI Integration, 930-3922 Floating DUT SNMP Integration 930-3923 Floating DUT SYSLOG Integration; Includes Media Kit

### 930-2076

IxNetwork, Base Software PREMIUM

INCLUDES: 930-1999 Base Software, Layer 2-3 Performance Test Application, Supports Traffic Generation and Analysis; 930-2022 RFC 2544 and Custom Integrated Tests over Advertised Topologies; 930-3900 IxNetwork Floating Client Framework, 930-3903 Floating IxReporter Designer, 930-3904 Floating Macro Recorder, 930-3921 Floating DUT CLI Integration, 930-3922 Floating DUT SNMP Integration 930-3923 Floating DUT SYSLOG Integration; Includes Media Kit

## Routing & Switching

### 930-2004

IxNetwork, Optional Software, Multicast Emulation, includes IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSMv4/v6, and Multicast VPN support; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

### 930-2005

IxNetwork, Optional Software, BGP4 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)

### 930-2007

IxNetwork, Optional Software, BGP4 Emulation with additional IPv6 support; REQUIRES 930-2005 BGP4 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)

### 930-2008

IxNetwork, Optional Software, OSPFv2 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)

### 930-2009

IxNetwork, Optional Software, OSPFv3 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)

### 930-2010

IxNetwork, Optional Software, IS-IS 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)

### 930-2011

IxNetwork, Optional Software, IS-IS Emulation with additional IPv6 support; REQUIRES 930-2010 IS-IS 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)

**930-2012**

IxNetwork, Optional Software, RIPv2 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)

**930-2013**

IxNetwork, Optional Software, RIPv6 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)

**930-2017**

IxNetwork, Optional Software, STP/RSTP 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)

**930-2018**

IxNetwork, Optional Software, MSTP Emulation; **REQUIRES** 930-2017 STP/RSTP 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)

**930-2020**

IxNetwork, Optional Software, EIGRP 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)

**930-2023**

IxNetwork, Optional Software, BFD Emulation for use with OSPF, BGP, or ISIS; **REQUIRES** either 930-2008 OSPFv2 Emulation, OR 930-2009 OSPFv3 Emulation, OR 930-2005 BGP4 Emulation, OR 930-2006 BGP4 Emulation with Layer 3 MPLS/VPN & Multicast VPN Support, OR 930-2007 BGP4 Emulation with IPv6 support, OR 930-2010 IS-IS Emulation, OR 930-2011 IS-IS Emulation with IPv6 support. **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2035**

IxNetwork, Optional Software, LACP IEEE 802.3ad Protocol 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)

**930-2051**

IxNetwork, Optional Software, Protocol emulation over IEEE 802.3ad (LACP); **REQUIRES** 930-2035 LACP IEEE 802.3ad Protocol 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)

**930-2055**

IxNetwork, Optional Software, Spanning Tree protocol emulation per VLAN (PVST); **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076) AND 930-2017 STP/RSTP Emulation

**BUNDLES****930-2001**

IxNetwork, Optional Software Bundle, IPv4 Routing Protocols; includes 930-2005 BGP-4 Emulation, 930-2008 OSPFv2 Emulation, 930-2010 IS-IS Emulation, 930-2012 RIPv2 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)

## MPLS

### 930-2002

IxNetwork, Optional Software Bundle, IPv6 Routing Protocols; includes 930-2007 BGP4 with IPv6 Support, 930-2009 OSPFv3 with IPv6 Emulation, 930-2011 IS-IS IPv6 Support, 930-2013 RIPng 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) and 930-2001 Optional Software Bundle, IPv4 Routing Protocols; includes Media Kit

### 930-2006

IxNetwork, Optional Software, BGP4 Emulation with additional Layer 3 MPLS/VPN, VPLS & Multicast VPN Support; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076) and 930-2005 BGP4 Emulation; includes Media Kit

### 930-2014

IxNetwork, Optional Software, MPLS RSVP-TE 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)

### 930-2015

IxNetwork, Optional Software, MPLS LDP Emulation, includes Layer 2 MPLS VPN and VPLS support; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

### 930-2036

IxNetwork, Optional Software, MPLS P2MP RSVP-TE 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) and 930-2014 MPLS RSVP-TE Emulation

### 930-2052

IxNetwork, Optional Software, LDP extension to support FEC 129; **REQUIRES** 930-2005 BGP Emulation, 930-2006 BGP ext to support MPLS L3VPN/L2VPN/VPLS, 930-2015 LDP 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)

### 930-2053

IxNetwork, Optional Software, BGP Extension for NG mVPN with RSVP-TE P2MP; **REQUIRES** 930-2005 BGP Emulation, 930-2006 BGP ext to support MPLS L3VPN/VPLS, 930-2014 RSVP-TE Emulation, 930-2036 RSVP-TE P2MP 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)

### 930-2061

IxNetwork, Optional Software, MPLS-TP emulation; **REQUIRES** either 930-2032 Y.1731 protocol emulation or 930-2023 BFD protocol 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)

### 930-2062

IxNetwork, Optional Software, MPLS-TP APS Protocol State Coordination 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) and 930-2061 MPLS-TP emulation

**930-2080**

IxNetwork, Optional Software, MPLS mLDP Emulation; **REQUIRES** 930-2015 MPLS LDP 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)

**930-2081**

IxNetwork, Optional Software, BGP Extensions for NG mVPN with mLDP; **REQUIRES:** 930-2004 Multicast Emulation 930-2015 MPLS LDP Emulation 930-2080 MPLS mLDP Emulation 930-2005 BGP Emulation 930-2006 BGP extensions to support MPLS L3VPN/VPLS; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2094**

IxNetwork, Optional Software, MPLS OAM Ping and Traceroute

**REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076), and 930-2015 MPLS LDP Emulation or 930-2014 MPLS RSVP-TE Emulation

**930-2095**

IxNetwork, Optional Software, BFD over MPLS LSP; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076), and 930-2020 BFD Emulation, and 930-2015 MPLS LDP Emulation or 930-2014 MPLS RSVP-TE Emulation

**930-2096**

IxNetwork, Optional Software, VCCV Ping and BFD VCCV; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076), and 930-2020 BFD Emulation, and 930-2015 MPLS LDP Emulation or 930-2014 MPLS RSVP-TE Emulation, and 930-2006 BGP Extension to support BGP VPLS or 930-2052 LDP extension to support FEC 129

**930-2097**

IxNetwork, Optional Software, LISP MS/MR and xTR 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)

**BUNDLES****930-2003**

IxNetwork, Optional Software Bundle, MPLS VPN; includes 930-2006 Layer 3 MPLS/VPLS Support, 930-2014 RSVP-TE Emulation, 930-2015 LDP 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) and 930-2001 Optional Software Bundle, IPv4 Routing Protocols; includes Media Kit

**930-2057**

IxNetwork, Optional Software Bundle, Basic MPLS Bundle (L2 VPN/VPLS, L3 VPN, Multicast VPN (draft-rosen)); **INCLUDES:** 930-2001 IPv4 Routing Bundle 930-2002 IPv6 Routing Bundle 930-2003 MPLS VPN Bundle 930-2004 Multicast Bundle; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2064**

IxNetwork, Optional Software Bundle, MPLS-TP Bundle; **INCLUDES:** 930-2023 BFD emulation 930-2032 ITU-T Y.1731 emulation 930-2061 MPLS-TP emulation 930-2062 MPLS-TP APS 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)

## ***Broadband Access & Authentication***

### **930-2024**

IxNetwork, Optional Software, PPP and L2TPv2 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); operates with Optional Software 930-2027 Generic Control Plane Tests

### **930-2025**

IxNetwork, Optional Software, 802.1x 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); operates with Optional Software 930-2027 Generic Control Plane Tests

### **930-2026**

REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076); operates with Optional Software 930-2027 Generic Control Plane Tests

### **930-2028**

IxNetwork, Optional Software, Web Authentication 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)

### **930-2037**

IxNetwork, Optional Software, ANCP 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)

### **930-2038**

IxNetwork, Optional Software, Radius Attributes for L2TP; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

### **930-2045**

IxNetwork, Optional Software, DHCPv4/v6 Server 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)

### **930-2046**

IxNetwork, Optional Software, DHCPv4/v6 Client/Relay Agent 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)

### **930-2047**

IxNetwork, Optional Software, Dual-stack PPPoX emulation; REQUIRES: IxNetwork Base PLUS (930-2056) OR IxNetwork Base PREMIUM (930-2076), 930-2024 PPP and L2TPv2 Emulation Software

### **930-2065**

IxNetwork, Optional Software, Dual-stack PPPoX over L2TPv2 emulation; REQUIRES 930-2024 PPP and L2TPv2 Emulation Software; REQUIRES pre-existing 930-1999 Base License OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

### **930-2067**

IxNetwork, Optional Software, IGMP/MLD 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)



**930-2079**

IxNetwork, Optional Software, Session Aware Traffic; **REQUIRES** pre-existing 930-1999 Base License OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2100**

IxNetwork, Automatic Multicast Tunneling (AMT) Emulation; **REQUIRES:** 930-2056 Base Software; **AND** 930-2067 IGMP/MLD Emulation or 930-2004 Multicast Emulation

**930-2108**

IxNetwork, Protocol emulation over EoGRE; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**BUNDLES****930-2048**

IxNetwork, Dual-stack over DHCPv6-PD over PPPoX Bundle; **INCLUDES:** 930-2024 PPP and L2TPv2 emulation, 930-2045 DHCPv4/v6 Server emulation, 930-2046 DHCPv4/v6 Client and Relay Agent emulation, 930-2047 Dual-stack PPPoX emulation, and 930-2065 Dual-stack PPPoX over L2TP 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)

**930-2058**

IxNetwork, Broadband Bundle; **INCLUDES:** 930-2024 PPP/L2TP emulation, 930-2027 Control Plane Tests for PPP/L2TPv2, 802.1x, and NAC, 930-2037 ANCP Protocol emulation, 930-2045 DHCPv4/v6 Server emulation, 930-2046 DHCPv4/v6 Client and Relay Agent emulation, 930-2047 Dual-stack PPPoX emulation, 930-2065 Dual-stack PPPoX over L2TP 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)

**930-2059**

IxNetwork, Optional Software Bundle, DHCP Bundle; **INCLUDES:** 930-2045 DHCPv4/v6 Server Emulation; 930-2046 DHCPv4/v6 Client and Relay Agent 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)

**930-2090**

IxNetwork, Optional Software Bundle, IPTV Test Basic Bundle; **INCLUDES:** 930-2407 IPTV QuickTests; 930-2067 IGMP/MLD 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)

**930-2091**

IxNetwork, Optional Software Bundle, IPTV Test Advanced Bundle; **INCLUDES:** 930-2407 IPTV QuickTests; 930-2067 IGMP/MLD Emulation; 930-2046 DHCPv4/v6 Client/Relay Agent Emulation 930-2024 PPP and L2TP 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)

***Carrier Ethernet*****930-2032**

IxNetwork, Optional Software, Ethernet CFM IEEE 802.1ag and ITU-T Y.1731 Protocol 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)

**930-2033**

IxNetwork, Optional Software, PBB-TE 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)

**930-2040**

IxNetwork, Software Option, Ethernet Link OAM (IEEE 802.3ah Clause 57) 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)

**930-2041**

IxNetwork, Software Option, Two Way Active Measurement Protocol (TWAMP) RFC 5357 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)

**930-2070**

IxNetwork, Optional Software, IEEE 1588v2 (PTP) 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)

**930-2073**

IxNetwork, Optional Software, ITU-T SyncE (ESMC) Protocol 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)

**930-2075**

IxNetwork, Optional Software, ELMI (MEF 16) 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)

**BUNDLES****930-2034**

IxNetwork, Software Bundle, Carrier Ethernet; includes 930-2032 and 930-2033; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2501**

IxNetwork, Optional Software Bundle, Timing Protocols Bundle; **INCLUDES:** 930-2070 IxNetwork, Optional Software, IEEE 1588v2 (PTP) Emulation; 930-2073 IxNetwork, Optional Software, ITU-T SyncE (ESMC) 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)

***Data Center*****930-2039**

IxNetwork, Software Option, Fibre Channel over Ethernet (FCoE) 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), AND purchase of a supported load module with FCoE option enabled: [See 944-0048 (LSM10GXM2XP-01) or 944-0049 (LSM10GXMR2-01) with 944-0056 (SW-FCoE-OPT2)], [See 944-0039 (LSM10GXM4-01), 944-0043 (LSM10GXMR4-01), or 944-0059 (LSM10GXM4XP-01) with 944-0063 (SW-FCoE-OPT4)], [See 944-0040 (LSM10GXM8-01), 944-0044 (LSM10GXMR8-01), or 944-0060 (LSM10GXM8XP-01) with 944-0064 (SW-FCoE-OPT8)]



**930-2042**

IxNetwork, Software Option, Data Center Ethernet IS-IS (DCE IS-IS) 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)

**930-2043**

IxNetwork, Optional Software, DCBX emulation, includes IEEE 802.1AB Link Layer Discovery Protocol emulation of mandatory functions; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2049**

IxNetwork, Optional Software, FCF Emulation; REQUIRES purchase of a supported 10GE load module with FCoE option enabled; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2074**

IxNetwork, Optional Software, FC N\_Port 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)

**930-2078**

IxNetwork, Optional Software, VIC Client Emulation; REQUIRES 930-2043 DCBX 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)

**930-2084**

IxNetwork, Optional Software, SPBM (Shortest Path Bridging MAC-in-MAC); REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2093**

IxNetwork, Optional Software, IxNetwork, Optional Software, VEPA (Virtual Edge Port Aggregator), IEEE 802.1Qbg EVB (Edge Virtual Bridging); REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2098**

IxNetwork, Optional Software, TRILL (Transparent Interconnect of Lots of Links) 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)

**930-2099**

IxNetwork, Optional Software, FC F\_Port 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)

**930-2103**

IxNetwork, Optional Software, VXLAN Emulation; Supports functional and performance testing of VXLAN Gateways; REQUIRES: 930-2056 IxNetwork Base PLUS OR 930-2076 IxNetwork Base PREMIUM

**930-2104**

IxNetwork, Optional Software, OpenFlow Controller Emulation, provides functional and performance testing for OpenFlow Switch; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2105**

IxNetwork, Optional Software, OpenFlow Switch Emulation, provides functional and performance testing for OpenFlow Controller; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**BUNDLES****930-2504**

IxNetwork, Optional Software Bundle, FCoE QuickTest Bundle; **INCLUDES**; 930-2043 IxNetwork DCBX Emulation 930-2039 IxNetwork FCoE Emulation 930-2405 IxNetwork Quick Test FCoE Performance Test Suite; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2506**

IxNetwork, Optional Software Bundle, FCoE and FC QuickTest Bundle; **INCLUDES**; 930-2043 IxNetwork DCBX Emulation 930-2039 IxNetwork FCoE Emulation 930-2074 IxNetwork FC N\_Port Emulation 930-2405 IxNetwork Quick Test FCoE Performance Test Suite; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2508**

IxNetwork, Optional Software Bundle, FCoE and FC QuickTest Bundle with FCF Emulation; **INCLUDES**; 930-2043 IxNetwork DCBX Emulation 930-2039 IxNetwork FCoE Emulation 930-2074 IxNetwork FC N\_Port Emulation 930-2049 IxNetwork FCF Emulation 930-2405 IxNetwork Quick Test FCoE Performance Test Suite; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2510**

IxNetwork, Optional Software Bundle, DCB Performance QuickTest Bundle; **INCLUDES**; 930-2043 IxNetwork DCBX Emulation 930-2039 IxNetwork FCoE Emulation 930-2049 IxNetwork FCF Emulation 930-2405 IxNetwork Quick Test FCoE Performance Test Suite; **REQUIRES** pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2107**

IxNetwork, OpenFlow Emulation Bundle; **INCLUDES**; 930-2104 OpenFlow Controller Emulation; 930-2105 OpenFlow Switch 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)

**Quick Tests****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 QuickTest; OpenFlow Benchmarking test; Flow Table Capacity, Flow Learning Rate, Flow Failover Test; REQUIRES IxNetwork OpenFlow Emulation License (930-2077 ) AND pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**Other****930-2021**

IxNetwork, Optional Software, Application Traffic Support; REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076) AND the previous or adjoining purchase of IxLOAD Base Software OR any Software Bundle; 925-3300 (IXLOAD-PLUS), 925-3310 (IXLOAD-B1), 925-3320 (IXLOAD-B2), or 925-3330 (IXLOAD-B3)

**930-2083**

IxNetwork, Optional Software, Macro Recorder - Enables 3 concurrent client users

REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2600**

IxNetwork, Optional Software, Network Impairment Simulation Software for ImpairNet, REQUIRES pre-existing 930-1999 IxNetwork Base license OR new purchase of either IxNetwork Base PLUS (930-2056) or IxNetwork Base PREMIUM (930-2076)

**930-2601**

IxNetwork, Optional Software, Extended delay up to 600ms for EIM10G4S ImpairNet, REQUIRES 930-2600 Network Impairment Software

**930-2602**

IxNetwork, Optional Software, Packet Modification for ImpairNet, REQUIRES 930-2600 Network Impairment Software

**930-2603**

IxNetwork, Optional Software, Accumulate and Burst for ImpairNet, REQUIRES 930-2600 Network Impairment Software

**932-0101**

Analyzer, Base Software, Packet Capture and Analysis tools for IxLoad and IxNetwork

**932-0102**

Analyzer, Optional Software, Media (Audio/Video) Analysis tools for IxLoad and IxNetwork

**932-0200**

IxReporter - Designer with IxNetwork Templates, Optional Floating Client Software, Enables 5 concurrent client users

**BUNDLES****930-2044**

IxNetwork, Software Bundle, Test Composer DUT Control; Includes: 931-3921 Floating DUT CLI Integration - Advanced test automation using the DUT CLI interface, 931-3922 Floating DUT SNMP Integration - Advanced test automation using the DUT SNMP interface, and 931-3923 Floating DUT SYSLOG Integration - Advanced test automation using the DUT SYSLOG interface; REQUIRES 930-3900 Base Software

**939-9221**

IxVM 32-Port Bundle - IxNetwork Volume SW Package Tier 3 on the IxVM Platform, Includes all IxVM-supported IxNetwork IPv4/IPv6 Routing Protocols, Switching (Layer 2 Protocols), MPLS Protocols, Carrier Ethernet Protocols, Data Center Ethernet Protocols, Broadband/Authentication protocols on the IxVM platform; INCLUDES IxNetwork Base (930-8999)

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<sup>1</sup> Not all IxNetwork protocols are supported on IxVM.