aptixia IxNetwork™

As networking devices become increasingly complex, so must the analysis equipment designed to assess their performance. Such sophisticated analysis systems must support multiple powerful routing/bridging protocol emulations that are flexible, highly scalable, and easy to use. In addition, the analysis systems must be able to generate wire-rate traffic and automatically analyze thousands of traffic flows with comprehensive QoS analysis. As a leader in performance analysis solutions, Ixia's Aptixia IxNetwork meets these requirements and is specifically targeted for the performance and functionality testing of high-speed, high-capacity routers, switches and application servers.

IxNetwork offers users the flexibility to customize the application to meet a wide range of requirements for testing complex network topologies consisting of thousands of network devices. Millions of routes and reachable hosts can be emulated within the topology. IxNetwork also provides users with the ability to customize millions of traffic flows to stress the data plane performance. Sophisticated configurations can be created using powerful wizards and grid controls in the graphical user interface. With its enhanced real-time analysis and statistics, IxNetwork is capable of reporting comprehensive protocol status and detailed per-flow traffic performance metrics.

As network functions continue to be aggregated into devices, it becomes increasingly important to consider security and encapsulation protocols, such as NAC, PPP and L2TP. IxNetwork provides the ability to authenticate emulated clients and to establish broadband sessions. Traffic can then be encapsulated over the tunneling protocols.

## Key Features

- Emulation of Internet-scale routing topologies to determine scalability limits
- Simulation of network instabilities to characterize the performance of network convergence
- Easy-to-use Protocol Wizards to quickly and precisely set up complex topologies
- Powerful Traffic Wizard to create millions of traffic flows for validating emulated networks and hosts

- Realistic emulation of enterprise application traffic, including stateful TCP, HTTP, E-mail, Video, RTSP, Telnet and FTP. Now with voice and triple-play traffic and IPv4/IPv6
- Setup of and encapsulation through PPP sessions and L2TP tunnels
- Authentication utilizing 802.1x and Cisco Network Admission Control (NAC)
- Comprehensive routing and bridging protocol emulation with detailed control plane statistics
- Feature rich MPLS protocols and highly scalable MPLS applications (L2VPN, VPLS, L3VPN/6VPE, mVPN and more)
- Per-flow traffic statistics to allow detailed QoS analysis
- Flow Detective™ to find best and worst performing flows in real-time
- Built-in data-rate capture and analysis tools
- Powerful packet editor with over a hundred protocol templates
- Flexible Test Scheduler to dynamically flap emulated topology on-the-fly
- Use of industry standard RFC-based data plane tests, along with other automated testing
- Enhanced Tcl API allows complete automation of IxNetwork functions
- Support for host authentication through Web-based Authentication (WebAuth)

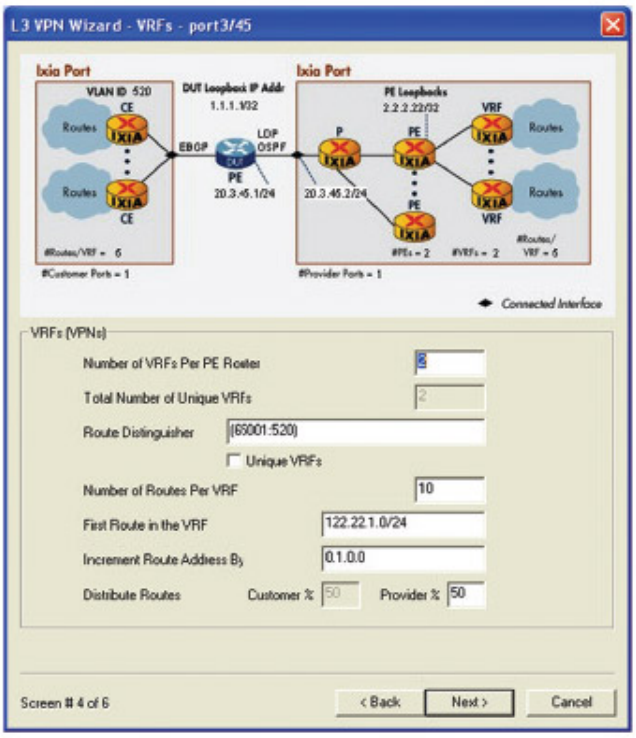
## Scalable Protocol Emulation

IxNetwork is designed to emulate a wide variety of bridging and routing protocols, using Ixia's port CPU-based test modules. With these modules, each test port supports an independent PowerPC running Linux and protocol state machines. 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 the line-rate traffic generation and QoS measurement capabilities, the CPU-based load modules verify the advertised topologies and networks for reachability and QoS performance.

## Easy-to-Use Protocol Wizards

The IxNetwork GUI facilitates the quick and easy configuration of routing/bridging protocol emulations. The protocol wizards provide a graphical-based, step-by-step process for initial setup of small to large scale test topologies across multiple Ixia and DUT test ports. The wizards significantly simplify the setup of complex network scenarios across multiple protocols at once. In addition, IxNetwork's spreadsheet GUI paradigm provides for the entry, editing, and viewing of large configurations across multiple test ports. Spreadsheet-like commands are

available to quickly scale a configuration or apply operations across multiple values. Once a network topology is created, it can be copied easily to any supported Ixia test port.




*Protocol Wizard*

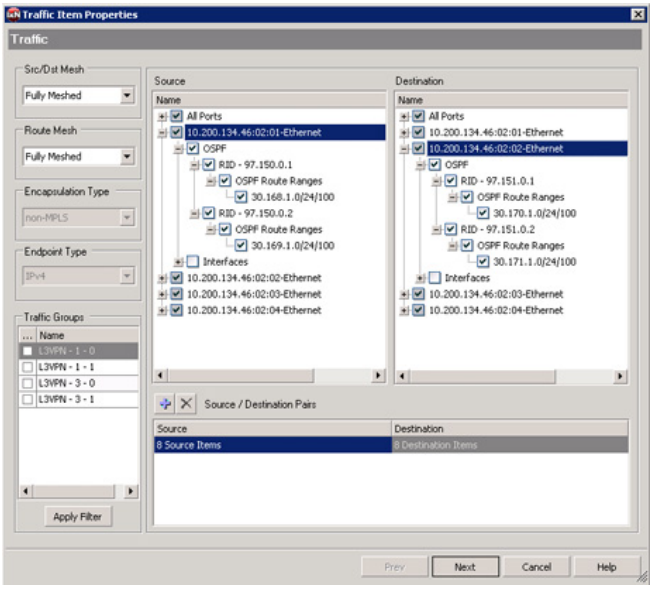
## Flexible Template Editor

The Template Editor extends the power of IxNetwork's traffic generators. While any packet's contents may be defined with the Packet Editor, the Template Editor allows the definition of new packet formats in a form that may be easily inserted and customized in the Packet Editor. A large number of templates are included, more are added with each new release and users may add custom templates of their own for their new and proprietary protocols.

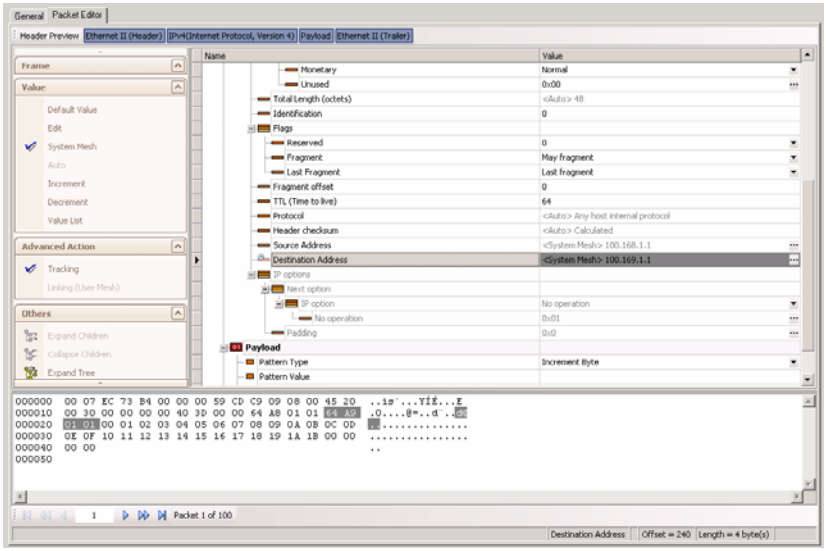
## Powerful Traffic Wizard

The traffic wizard provides great flexibility in setting up wire-rate traffic streams that validate every reachable network and host. The traffic wizard provides a step-by-step procedure for all traffic types, including IGP, BGP, STP, Multicast and MPLS VPN. All end point types are supported, including IPv6, IPv4, ATM, Frame Relay and PoS. End users can freely select which source and destination items will generate and receive traffic, how they will be mapped with each item (e.g., one to one or fully meshed), and how the flows will be generated between advertised routes (e.g., one to one or fully meshed). The traffic wizard will then automatically create fully meshed traffic streams between all participating end points and reachable networks behind them.

The final step of the traffic wizard is to set up the receive ports to track traffic flows with detailed QoS measurements of packet loss, throughput, and latency. The flow tracking can be based on one or two MAC addresses, IP addresses, TOS/DSCP, MPLS labels, or custom fields. Optionally, a Packet Designer is available for customizing each traffic stream with a specific traffic template, packet header fields, payload, or additional layers of protocols. For example, IPv6 over IPv4 or TCP/IP over GRE types of packet streams can be quickly created with IxNetwork's powerful Packet Designer. In addition, Packet Designer allows users to increment and decrement field values to create traffic flows, and to track traffic flows at receiving ports.



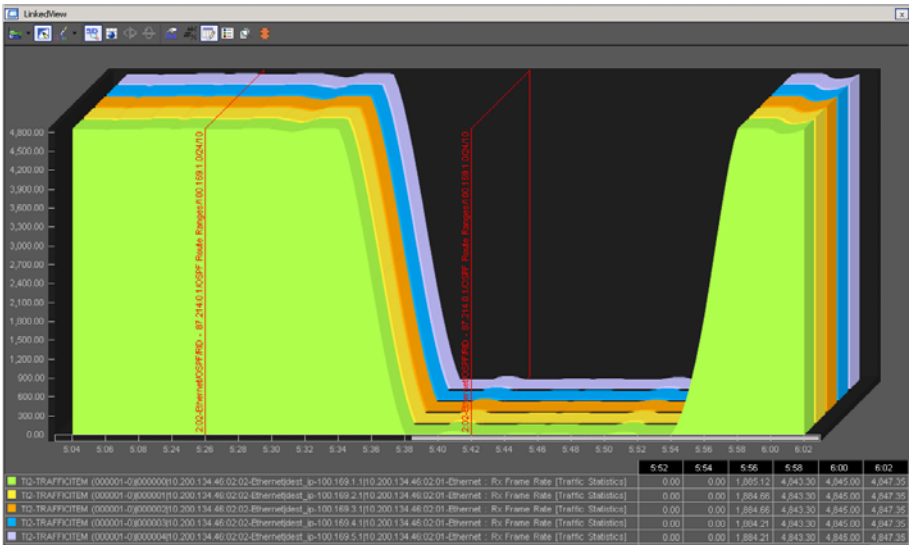

*Traffic Wizard*



*Packet Editor*

## Real-time Result Analysis and Logging

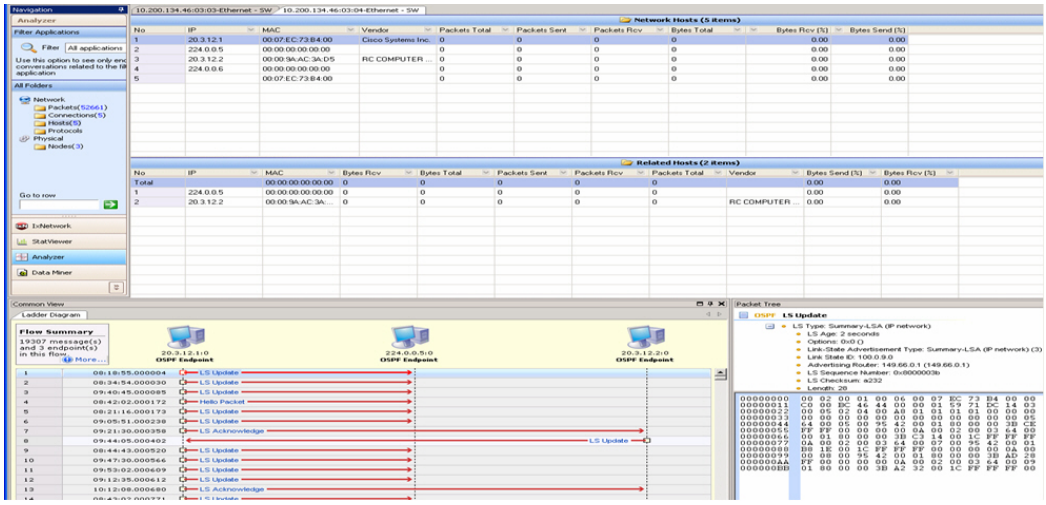
IxNetwork automatically takes real-time measurements to validate test results using various statistics, including protocol state transition and counters, per port traffic measurement, and per flow QoS measurement. The real-time statistics can be presented in grid format with instant numeric counts, or in a graphical line chart that can track changes over a period of time. The detail test result can also be logged in CSV files for long term trend analysis.



*Per-flow Traffic Statistics*

## Built-In Data Capture and Analysis

Internet protocols are complex – multi-protocol emulations of them even more so. IxNetwork includes a built-in capture 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.



*Analyzer*

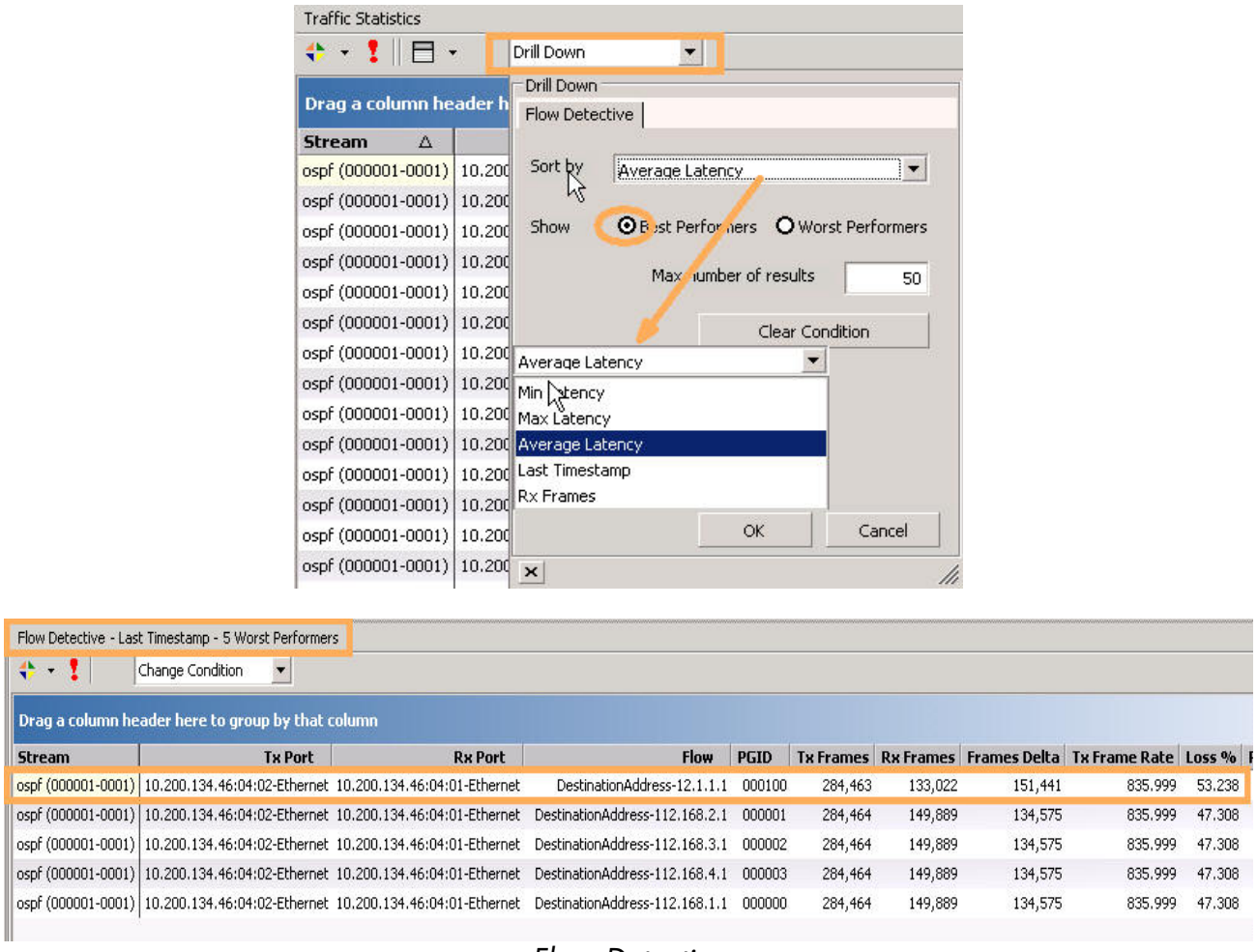
## Flow Detective™

In order to fully test routers and other complex network devices, many data flows involving unique combinations of source/destination MAC/ATM/IP addresses, VLANs and QoS settings are required. The combinations often number into the tens of thousands. When these flows are applied to a Device under Test (DUT), device problems show up as slight changes in latency, delay and received packet counts. It's impossible in most cases to page through hundreds of screens of statistics; simplistic sorting of results is also ineffective. Most test equipment vendors must resort to post-test analysis – an inefficient and time consuming operation.

IxNetwork's unique Flow Detective™ allows you to display, in real time, the best or worst performing flows for up to 128,000 flows! Best/worst performers can be determined based

on minimum, maximum or average latency, last received packet timestamp or received packet count.

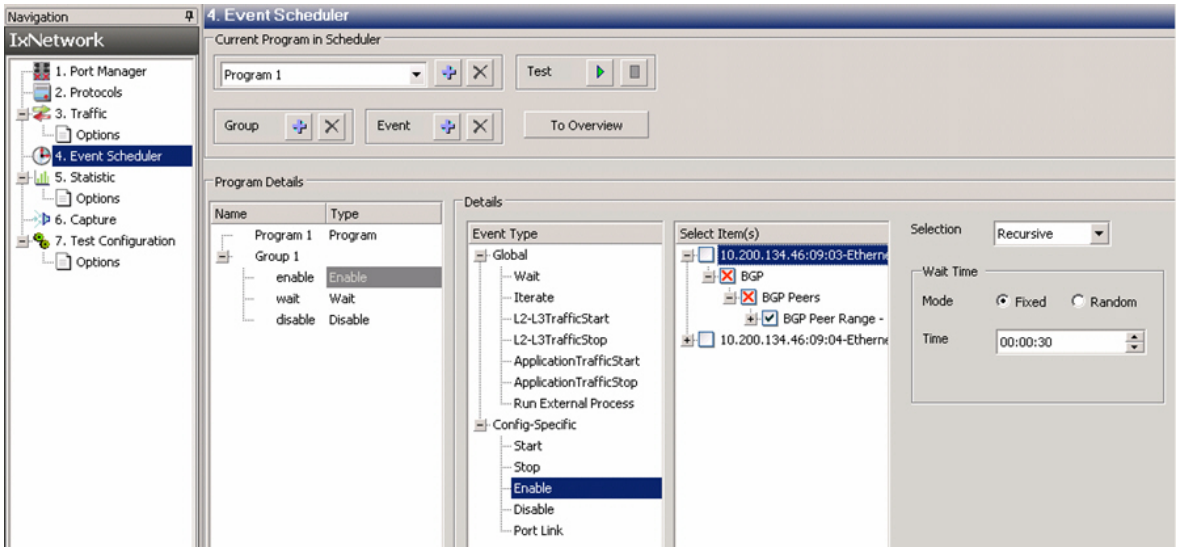
The result is that problems immediately bubble up to the top. Problems can be identified on the spot, or further flow refinement can be performed on the fly to further isolate problem areas. The bottom line: high productivity.




*Flow Detective*

## Flexible Event Scheduler

In order to inject instability into the emulated topology, IxNetwork integrates an extremely flexible Event Scheduler, which helps users design a sequence of events which withdraw or advertise routes, enable or disable adjacencies, turn on or off interface link, start or stop traffic generator, etc. Multiple events can be grouped together and executed numerous times. A wait timer can be used to introduce delay between events. With the flexible capabilities of Event Scheduler, users can create a complex sequence of events that can effectively flap any advertised topology with dynamic time intervals.

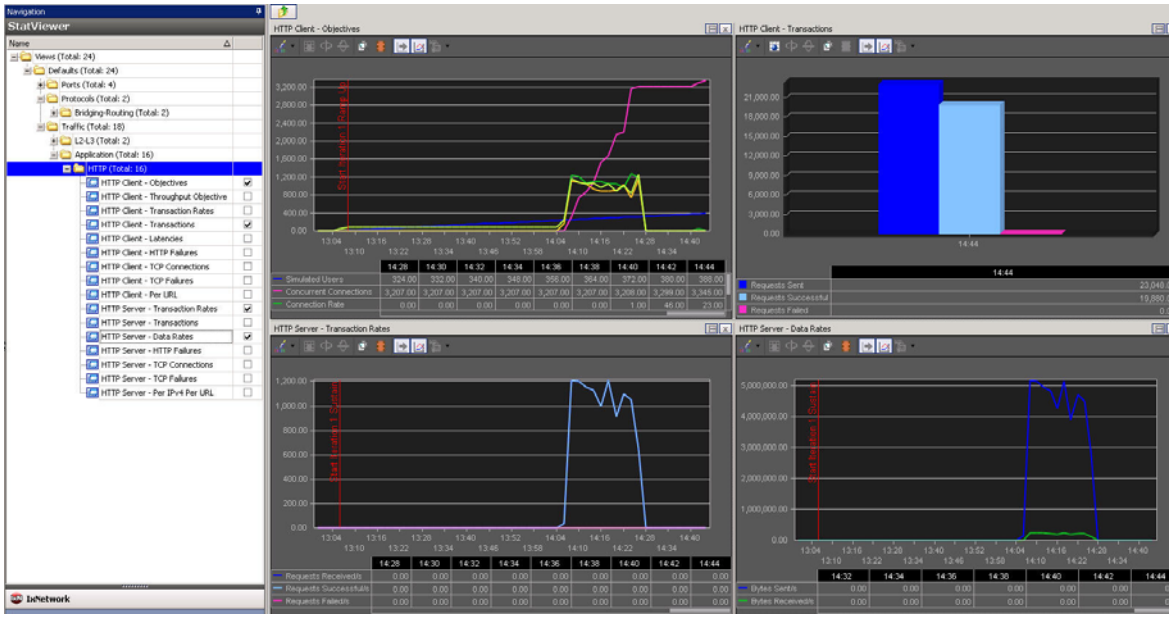



*Event Scheduler*

## Realistic Emulation of Enterprise Application Traffic

NEMs have learned that traditional stateless packet forwarding tests will not identify problems associated with customer's real-life enterprise applications. IxNetwork has seamlessly integrated the L4-L7 emulation provided by its IxLoad test application. The end result is the realistic emulation of L4-L7 enterprise application traffic over advertised L2-L3 topologies. For example, with this feature, IxNetwork can emulate both HTTP clients and severs over the subnets advertised by emulated OSPF routers behind Ixia ports. Test engineers now have the ability to simultaneously control the scaling of L2-L3 emulated topology and enterprise applications, including HTTP, TCP, FTP, E-Mail, RTSP, Voice, Video, triple-play, RTSP, and

Telnet. All protocols support IPv4 and IPv6 addressing. The traditional stateless traffic generation can also be used to apply more load on the device under test.



*HTTP Real-time Measurement*

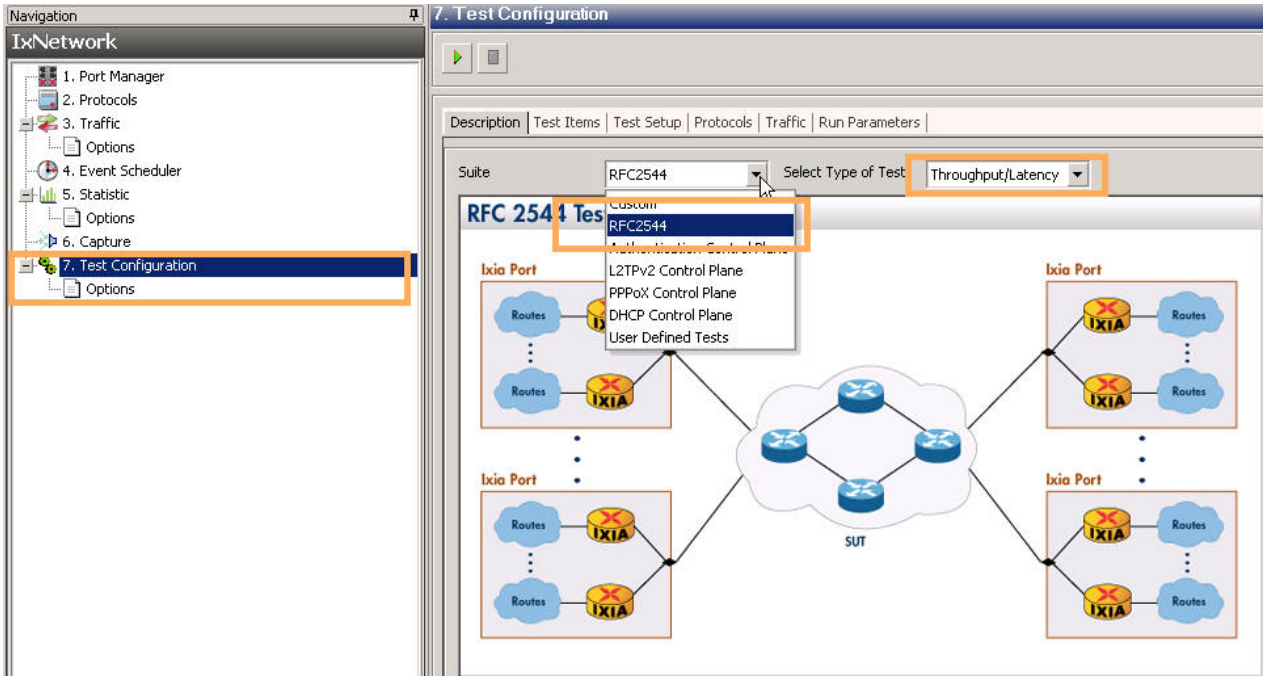
## Integrated Security and Broadband

The functionality previously available in Ixia's IxAuthenticate [link to IxAuth spec sheet] is now a part of IxNetwork. Authentication using layer 2 protocols (802.1x with or without NAC) and layer 3 (EAP over UDP with NAC and Web-based Authentication) may now be performed on thousands of emulated interfaces. The setup rate and capacity of network devices can be immediately measured with included control plane tests. Authenticated, emulated sessions may be used for any type of data plane tests – constructed with the traffic wizard and integrated data plane tests.

The functionality previously available in Ixia's IxAccess [link to IxAccess data sheet] product is also now a part of IxNetwork. PPP and L2TP sessions and tunnels may be established with all supported encapsulations: PPPoE, PPPoA, PPPoEoA, L2TPoE and L2TPoA. Setup rate and capacity can be measured with included control plane tests and data of any type may be sent through established sessions and tunnels. Broadband aggregation devices may be fully characterized and tested with IxNetwork's built-in facilities.

## Integrated Tests

An important requirement of network device characterization is the ability to measure throughput, latency, frame loss and back to back rates as defined in RFC 2544. IxNetwork now integrates these functions from its Aptixia IxAutomate product. Automated tests use the traffic flows set up by the Traffic Wizard to perform their tests, varying rates and sizes as necessary. IxNetwork's Test Automation may also be used to perform runs of any duration, or to perform custom variations of frame size, frame rate and throughput measurement.




*Test Automation*

## Enhanced Tcl API

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 run, the IxNetwork GUI watches the execution – providing real-time statistics and state information.

## Specification

## Protocol Configuration

| | | | |
|---|---|---|---|
| **Emulation Protocols** | BFD, BGP, BGP+, ISISv4/v6, OSPFv2/v3, EIGRP, RIP, RIPng, LDP, RSVP-TE, L2 MPLS VPN, VPLS, L3 MPLS VPN, 6VPE, IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSM, Multicast VPN, Multicast VPNv6, STP/RSTP/MSTP, PVST+/RPVST+, PPPoX, L2TPoX, 802.1x, Cisco NAC, Cisco WebAuth<br>(see individual datasheet for detail specification) | | |
| **Protocol Wizards** | L2 VPN/VPLS | Configured Protocols | LDP, RSVP-TE, LDP-extended or MP-iBGP, OSPF, ISIS |
| | | Configured Topologies | Emulate single or multiple Ps, each with multiple PEs and VCs |
| | | Protocol Scaling | No. of ports, emulated Ps and PEs per port, emulated VCs per PE |
| | | Configured VC Type | Ethernet, Ethernet VPLS, VLAN, Frame Relay, ATM/AAL5, ATM/X Cell, ATM VCC, ATM VPC, PPP, HDLC, CEM, IP |
| | | Configured PW Type | Like-to-Like or PW internetworking |
| | L3 VPN/6VPE | Configured Protocols | Provider Side: LDP, RSVP-TE, OSPF, ISIS, M-BGP<br>Customer Side: E-BGP, RIP, RIPng, OSPF, ISIS, EIGRP |
| | | Configured Topologies | Provider Side : emulate one or more P, PEs, VRFs and VPN routes<br>Customer Side : emulate CE with routes |
| | | Protocol Scaling | No. of ports, emulated Ps and PEs per port, emulated VRFs per PE, emulated IPv4 |

| | | | |
|---|---|---|---|
| | | | and IPv6 VPN routes per VRF, emulated CE per port |
| | RSVP-TE | Configured Protocols | RSVP-TE, OSPF-TE |
| | | Configured Topologies | Configure Ixia ports to test DUT as Tunnel Head, Tunnel Tail or Transit |
| | | Protocol Scaling | No. of ports, RSVP-TE neighbors, IP end points per port, tunnels per IP end point. |
| | | Configured Options | Resource Affinities, ERO, TSpec |
| | 6PE | Configured Protocols | Provider Side: OSPF, ISIS, LDP, RSVP-TE, M-BGP Customer Side: OSPFv3, ISISv6, BGP+, RIPng |
| | | Configured Topologies | Provider Side : emulate Ps, PEs, CEs with IPv6 routes Customer Side : emulate CE with IPv6 routes |
| | | Protocol Scaling | No. of ports, emulated Ps and PEs per port, emulated CEs per PE, emulated IPv6 routes per CE, emulated CEs per port |
| | OSPF | Configured Protocols | OSPF |
| | | Configured Topologies | Emulate OSPF routers with network ranges and routes |
| | | Protocol Scaling | No. of ports, routers per port, routes per router, n x m network ranges |
| | OSPFv3 | Configured Protocols | OSPFv3 |
| | | Configured Topologies | Emulate OSPFv3 routers with routes |
| | | Protocol Scaling | No. of ports, routers per port, routes per router |

| | | | |
|---|---|---|---|
| | ISIS | Configured Protocols | ISISv4, ISISv6 |
| | | Configured Topologies | Emulate ISIS routers with open interface metrics, network ranges and routes |
| | | Protocol Scaling | No. of ports, routers per port, routes per router, n x m network ranges |
| | BGP | Configured Protocols | BGP, BGP+ |
| | | Configured Topologies | Emulate BGP peers with routes |
| | | Protocol Scaling | No. of ports, peers per port, routes per peer |
| | Multicast | Configured Protocols | IGMPv1/v2/v3, MLDv1/v2, PIM-SMv4/v6, PIM-SSMv4/v6, ISIS, OSPF |
| | | Configured Topologies | Emulate multicast receivers or sources. Test SUT (System Under Test) as RP + PIM routers, or First Hop Multicast Router |
| | | Protocol Scaling | No. of ports, PIM routers per port, sources per router, receivers per port, group addresses per port, triggered hello delay per PIM interface |
| | Multicast VPN | Configured Protocols | PIM-SM, PIM-SSM, M-BGP, OSPF, LDP, RSVP-TE |
| | | Configured Topologies | Provider side: emulate provider network with remote multicast sources or receivers<br>Customer side: emulate customer multicast network with sources or receivers. |
| | | Protocol Scaling | No. of ports, P and PE |

| | | | |
|---|---|---|---|
| | | | routers per port, MVRFs per PE, sources per MVRF, group addresses per MVRF |
| | STP | Configured Protocols | STP, RSTP |
| | | Configured Topologies | Emulate STP/RSTP bridges |
| | | Protocol Scaling | No. of ports, bridges per port, interface per bridge, MAC addresses per port |
| | MSTP | Configured Protocols | MSTP |
| | | Configured Topologies | Emulate MSTP bridges |
| | | Protocol Scaling | No. of ports, bridges per port, MSTIs per bridge, VLANs per MSTI, interface per bridge, MAC addresses per port |
| | PPPoX | Configured Protocols | PPPoE, PPPoA, PPPoEoA |
| | | Configured Topologies | Emulate BRASs, Access Concentrators, Network Servers; PPPoX clients and servers, IPv4/IPv6 clients and servers; Support range flap as few as single session |
| | | Protocol Scaling | No. of ports, client sessions, server sessions, per session statistics |
| | L2TP | Configured Protocols | L2TPoE, L2TPoA, PPPoE, PPPoA, PPPoEoA |
| | | Configured Topologies | Emulate L2TP Access Concentrators (LAC), L2TP Network Servers (LNS); PPPoX clients, L2TP clients and servers, IPv4/IPv6 clients and servers; Support range flap as few as single session |

| | | | |
|---|---|---|---|
| | | Protocol Scaling | No. of ports, client sessions, client tunnels, tunnel interfaces, sessions per tunnel, server sessions |
| | DHCP | Configured Protocols | DHCPv4, DHCPv6 |
| | | Configured Topologies | DHCP clients |
| | | Protocol Scaling | No. of ports, clients |

## Traffic Wizard

| | | |
|---|---|---|
| **Traffic Types** | IPv4, IPv6, MPLS multi-labels, Ethernet, VLAN, 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, Fully Meshed | |
| **Routes Mapping between Peering Ports** | One-to-One, Fully Meshed | |
| **Traffic Profile** | Frame Size | Fixed, Random, Increment, IMIX distribution, Weight Pairs, Quad Gaussian distribution |
| | Desired Speed | % Line Rate, Packets/Sec, Bit Rate |
| | Payload Pattern | Increment Byte/Word, Decrement Byte/Word, Repeat, Fixed, User Defined |
| | QoS | TOS, DSCP |
| | Dynamics | Traffic supports Gratuitous ARP, Auto Re-ARP on cable re-connect |
| **Packet Error Injection** | Bad CRC, No CRC | |
| **Per-Flow Traffic Tracking** | One or two fields mapped onto QoS (TOS/DSCP), VLAN, Source MAC Address, Destination MAC Address, Source IP Address, Destination IP Address, MPLS Label, Streams | |
| **Real-Time Flow Detective** | Single out best/worst 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 | |

| | | |
|---|---|---|
| | 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 |

## Event Scheduler

| | | |
|---|---|---|
| **Programs** | Add or delete programs. Each Program consists of multiple Groups | |
| **Groups** | Add or delete Groups. Each Group consists of a sequence of Events | |
| **Events** | Add or delete Events. Each Event consists of Action, Items and Attributes | |
| | Action | Start/Stop protocols, Enable/Disable items, Turn On/Off port link, Start/Stop Traffic, Wait, Iterate, Run External Process |
| | Items | Ports, Protocol Interfaces, Routers, Route Ranges, Peers, Adjacencies, VRFs, Multicast Ranges (Join/Prune), Multicast Source Register Ranges, ATM VPI/VCI, External Process |
| | Attributes | Recursive/Non-Recursive Selection, Wait Timer Duration |

## Application Traffic Support

| | |
|---|---|
| Application Types | FTP, TCP, HTTP1.0/1.1, Voice, Video, IMAP, POP3, SMTP, RTSP, Telnet |
| Addressing | IPv4 and IPv6 |
| Test Objectives | Simulated Users, Concurrent Sessions, Connection Rate, Transaction Rate, Throughput |
| Supported L2/L3 Topologies | IPv4 Routes, MPLS tunnels, L3 MPLS VPN Routes (not including Video) |

## Test Automation

| | |
|---|---|
| Test Types | RFC 2544, Control Plane for DHCP, PPP, L2TP and Authentication, Custom |
| RFC 2544 Tests | Throughput and Latency, Frame Loss, Back to Back |
| Control Plane Tests | Session setup rate, session capacity |
| Custom Tests | Continuous run, fixed duration run, stepped, throughput |

## Supported Test Modules

| Module Type | Supported Function | Module Part Number |
|---|---|---|
| 10G Ethernet | Control Plane Testing | LSM10G1-01, LSM10GXL6-01(LAN), LSM10GXL6-02 (LAN/WAN), LSM10GXM3-01, LSM10GXMR3-01, LM10GE700F1-P, LM10GE700F1B-P, LM10GULF-P, LM10GUPF- |

| | | |
|---|---|---|
| | | XFP |
| | Stateless Data Plane Test | LSM10G1-01, LSM10GXL6-01(LAN), LSM10GXL6-02 (LAN/WAN), LSM10GXM3-01, LSM10GXMR3-01, LSM10GL1-01 |
| | Application Traffic | LM10GE700F1-P, LM10GE700F1B-P, LSM10G1-01, LM10GXM3-01 |
| 10/100/1G Ethernet | Control Plane Test | LM1000STXSxxx, LM1000TXS4xxx, LM1000STXR4, OLM1000STXS24, LM10000SFPS4xxx, ALM1000T8, ELM1000ST2, CPM1000T8, LSM1000XMV4 LSM1000XMS12, LSM1000XMSR12, LSM1000XMV16, LSM1000XMVR16 |
| | Stateless Data Plane Testing | LM1000STXSxxx, LM1000STXxxx, LM1000TXS4xxx, LM1000STXR4, OLM1000STXS24, OLM1000STX24, LM1000SFPS4xxx, LSM1000XMV4, LSM1000XMS12, LSM1000XMSR12, LSM1000XMV16, LSM1000XMVR16 |
| | Application Traffic | LM1000STXS4xxx, LM1000TXS4xxx, LM1000SFPS4xxx, ALM1000T8, CPM1000T8, LSM1000XMS12, LSM1000XMV16 |
| OC192 SONET | Control/Stateless Data Plane Testing | MSM10G |
| OC48 SONET | Control/Stateless Data Plane Testing | MSM2.5G |
| OC3/12 SONET/ATM | Control/Stateless Data Plane Testing | LM622 |

## Product Ordering Information

### 930-1999
Aptixia IxNetwork, Base Software, Layer 2-3 Performance Test Application, Supports Traffic Generation and Analysis; Includes Media Kit

### 930-2001
Aptixia 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 930-1999; Includes Media Kit

### 930-2002
Aptixia 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 930-1999 and 930-2001 Optional Software Bundle, IPv4 Routing Protocols; Includes Media Kit

### 930-2003
Aptixia IxNetwork, Optional Software Bundle, MPLS VPN; Includes 930-2006 Layer 3 MPLS/VPLS Support, 930-2014 RSVP-TE Emulation, 930-2015 LDP Emulation; REQUIRES 930-1999 and 930-2001 Optional Software Bundle, IPv4 Routing Protocols; Includes Media Kit

### 930-2004
Aptixia IxNetwork, Optional Software, Multicast Emulation includes IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSMv4/v6, and Multicast VPN support; REQUIRES 930-1999; Includes Media Kit

### 930-2005
Aptixia IxNetwork, Optional Software, BGP4 Emulation; REQUIRES 930-1999; Includes Media Kit

### 930-2006
Aptixia IxNetwork, Optional Software, BGP4 Emulation with additional Layer 3 MPLS/VPN & Multicast VPN Support; REQUIRES 930-1999 and 930-2005 BGP4 emulation; Includes Media Kit

**930-2007**
Aptixia IxNetwork, Optional Software, BGP4 Emulation with additional IPv6 support; REQUIRES 930-1999 and 930-2005 BGP4 emulation; Includes Media Kit

**930-2008**
Aptixia IxNetwork, Optional Software, OSPFv2 Emulation; REQUIRES 930-1999; Includes Media Kit

**930-2009**
Aptixia IxNetwork, Optional Software, OSPFv3 Emulation; REQUIRES 930-1999; Includes Media Kit

**930-2010**
Aptixia IxNetwork, Optional Software, IS-IS Emulation; REQUIRES 930-1999; Includes Media Kit

**930-2011**
Aptixia IxNetwork, Optional Software, IS-IS Emulation with additional IPv6 support; REQUIRES 930-1999 and 930-2010 IS-IS emulation; Includes Media Kit

**930-2012**
Aptixia IxNetwork, Optional Software, RIPv2 Emulation; REQUIRES 930-1999; Includes Media Kit

**930-2013**
Aptixia IxNetwork, Optional Software, RIPng IPv6 Emulation; REQUIRES 930-1999; Includes Media Kit

**930-2014**
Aptixia IxNetwork, Optional Software, MPLS RSVP-TE Emulation; Includes Media Kit

**930-2015**
Aptixia IxNetwork, Optional Software, MPLS LDP Emulation includes Layer 2 MPLS VPN and VPLS support; REQUIRES 930-1999; Includes Media Kit

**930-2017**
Aptixia IxNetwork, Optional Software, STP/RSTP Emulation; REQUIRES 930-1999; Includes Media Kit

**930-2018**
Aptixia IxNetwork, Optional Software, MSTP Emulation; REQUIRES 930-1999 and 930-2017 STP/RSTP Emulation; Includes Media Kit

**930-2019**
Aptixia IxNetwork, Optional Software, PVST+/RPVST+ Emulation; REQUIRES 930-1999 and 930-2017 STP/RSTP Emulation; Includes Media Kit

**930-2020**
Aptixia IxNetwork, Optional Software, EIGRP Emulation; REQUIRES 930-1999; Includes Media Kit

**930-2021**
Aptixia IxNetwork, Optional Software, Application Traffic Support; REQUIRES 930-1999 Base Software 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)

**930-2022**
Aptixia IxNetwork, Optional Software, RFC2544 and Custom Integrated Tests over Advertised Topologies; REQUIRES 930-1999 Base Software

**930-2023**
Aptixia IxNetwork, Optional Software, BFD emulation for use with OSPF, BGP, or ISIS; REQUIRES 930-1999 Base Software AND 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

**930-2024**
Aptixia IxNetwork, Optional Software, PPP and L2TPv2 emulation; REQUIRES 930-1999 Base Software. Operates with Optional Software 930-2027 Generic Control Plane Tests.

**930-2025**
Aptixia IxNetwork, Optional Software, 802.1x emulation;
REQUIRES 930-1999 Base Software. Operates with Optional Software 930-2027 Generic Control Plane Tests.

**930-2026**
Aptixia IxNetwork, Optional Software, Layer 2/3 Cisco NAC emulation;
REQUIRES 930-1999 Base Software; Operates with Optional Software 930-2027 Generic Control Plane Tests

**930-2027**
Aptixia IxNetwork, Optional Software, Control Plane Tests for PPP/L2TPv2, 802.1x, NAC;
REQUIRES 930-1999 Base Software

**930-2028**
Aptixia IxNetwork, Optional Software, Web Authentication emulation; REQUIRES 930-1999 Base 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