

IxLoad Overview

Converged Multiplay Service Validation

Ensure Peak Performance and Qoe Through Powerful, Scalable, and Easy-to-Use Testing Solutions

Problem: Endangered Quality of Experience

In today's highly competitive landscape, organizations must meet stringent network quality requirements to deliver an exceptional customer experience. However, the growing variety of multimedia applications, and the increasing number of users are making it more difficult — and more costly — than ever to validate converged multiplay services and application delivery platforms. Without a reliable way to test these services, customer Quality of Experience (QoE) is at risk.

Solution: A Highly Scalable Solution for Faster QoE Insight

IxLoad delivers comprehensive performance testing to validate user QoE. It emulates web, video, voice, storage, VPN, wireless, infrastructure, and security protocols to create realistic scenarios. A modular system design allows **IxLoad** to scale with your infrastructure, while real-time QoE metrics enable you to quickly identify network degradations and isolate breaking points. Because **IxLoad** is as easy to use as it is effective, you do not have to be a protocol expert to achieve complete end-to-end service validation.

Highlights

- Measure key performance and QoE indicators for each application with scalable, stateful application emulations.
- Make rapid, data-driven decisions about competing products and technologies with Proof-of-Concept (PoC) testing.
- Right-size your investment through scale and capacity testing.
- Optimize SLAs by analyzing the impact of new rollouts and subscriber growth on existing services.
- Reduce test time and the learning curve with predefined templates that address common use cases, along with comprehensive analytics for faster, real-time insights into errors and QoE metrics.

Key Features

- Offers the industry-leading performance and scalability for HTTP, SSL, and IPsec
- Delivers end-to-end testing for converged wireless and wired application delivery infrastructures and services
- Provides real-time insight into Quality of Experience (QoE)
- Emulates fully integrated broadband network infrastructures with application traffic testing
- Serves as the only test solution on the market capable of modeling dynamic user behavior
- Achieves seamless application performance validation across physical and virtual networks

Specifications

Application Layer Protocols

IxLoad supports a wide variety of stateful protocols to emulate a complete multiplay user environment. It delivers a sophisticated subscriber modeling capability that enables users to model the dynamic nature of subscriber behavior. Keysight's purpose-built chassis and load modules empower **IxLoad** to generate city-scale traffic. Combined with comprehensive network support, advanced test timelines, and automatic goal-seeking, it enables users to fine-tune to test objectives. **IxLoad** enables users to thoroughly assess the performance of their service delivery networks and determine application-level performance—all within a single integrated solution.

Technology	Protocols
Web (client and server)	HTTP (1.0/1.1), HTTP/2, HTTP/3, SSLv3, TLS v1.0, TLS v1.1, TLS v1.2, TLS v1.3
File transfer	FTP, and TFTP Client and Server emulations
Email	SMTP, POP3, and IMAP Client and Server emulations
Storage	RoCEv2 requester and responder emulation, SMB1, SMB2, and SMB3 Client and Server emulations; NFSv3, NFSv4, and NFS 4.1 Client emulations; iSCSI over FoCE and Initiator and Target emulations.
Network access	IGMPv2/3, MLDv1/2, RTSP, RTP/UDP
Over the Top (OTT)	Adobe Flash Player, Microsoft Silverlight Player, Apple HLS Player, HTTP FLV Player, Adobe HDS, and MPEG DASH Client emulations
Voice	SIP, WebRTC, MGCP, H.248 (Megaco), Cisco SCCP (Skinny), RTP & SRTP,
SIP	Audio, Conversational Video, File Transfer (MSRP) – (only with SIP) and Fax over IP (T.38) (only with SIP)
Application Replay	TCP Client/Server emulation, AppReplay-Replays stateful and stateless captures to simulate emerging and propriety internet protocols
Application mixes	AppLibrary – A continually expanding and updated library of pre-defined application flows and application mixes of the most current internet applications

Sophisticated Subscriber Modeling

To closely model real-world device and network load, **IxLoad** uses a unique approach called subscriber modeling, which enables users to:

- Emulate multiple application services per subscriber or user, including service sequencing
- Model traffic usage over time for each application, using advanced timelines
- Simulate the temporal nature of subscribers dynamically connecting to and disconnecting from the network
- Control usage profiles — including websites visited, email servers used, transfer sizes, channel changing behavior, streaming content, protocol options, and more

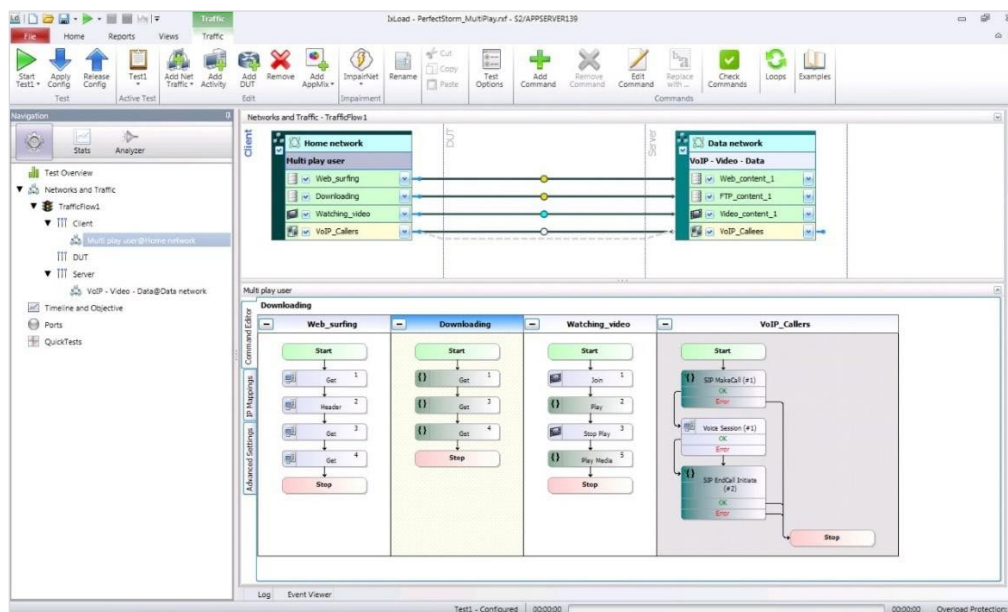


Figure 1. Emulates a complete multiplay user environment with realistic subscriber modeling

AppLibrary

In addition to the fully stateful protocols emulations, **IxLoad** includes AppLibrary — an extensive library of predefined application flows that simulate end-user interactions and devices. It accelerates and simplifies testing application performance testing with blended application mixes. AppLibrary leverages Keysight's Application and Threat Intelligence (ATI) to ensure flows remain current, with updates provided periodically.

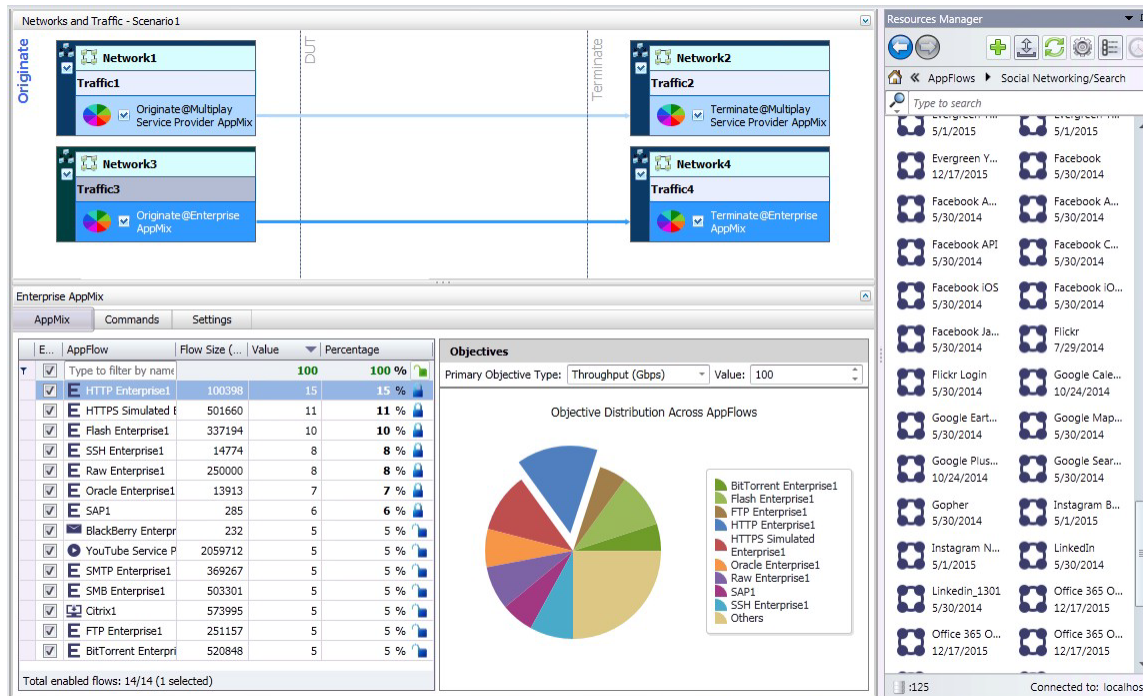


Figure 2. IxLoad AppLibrary Traffic Wizard

Quality of Experience Metrics

- **IxLoad** delivers an extensive real-time statistics viewer with predefined, customizable views.
- Provides protocol-level statistics for in-depth functional testing, as well as real-time, test-level statistics, which is ideal for scale testing
- Displays aggregate statistics hierarchically, with drill-down capabilities to network groups, application and activity-level, and port-level statistics
- Analyzes the QoE impact of services on per-user, per-IP, or per-VLAN basis
- Enables filtering of statistics by specifying conditions to isolate errors and failures
- Use CSV file exports for capturing individual result views or global results in real-time; an integrated CSV viewer allows for efficient viewing of large result files

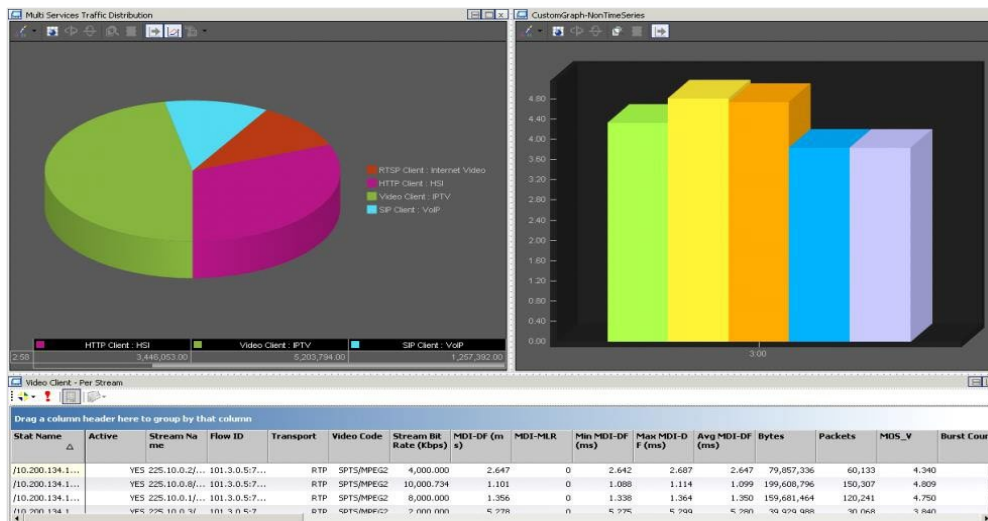


Figure 3. Highly visual statistic viewer

Resource Manager

A common pain-point for users was the lack of a collaboration tool to aid in incremental configuration building and knowledge sharing among team members. **IxLoad** Resource Manager addresses this need by serving as a central repository for saving, storing, and reusing various components of an **IxLoad** test. This enables multiple users and teams to share elements such as network, traffic, activity, and protocol settings, full configuration files, external files, and more.

Sharing resources across teams boosts productivity and saves valuable time. You can even use Resource Manager as a lightweight version control system, storing external files such as Device-Under-Test (DUT) configurations and topology diagrams so others can easily access the latest — or even earlier—revisions.

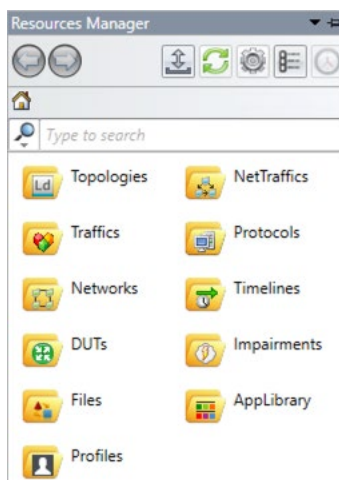


Figure 4. Resources Manager

Reports

IxLoad provides built-in reports that are visually rich and contain concise performance metrics at test, protocol, and port levels. Any report template can be customized, or you can create your own templates to share. It also includes IxReporter Designer Studio, which allows you to create new charts and analytics using all the raw metrics from **IxLoad** test results as well external sources.

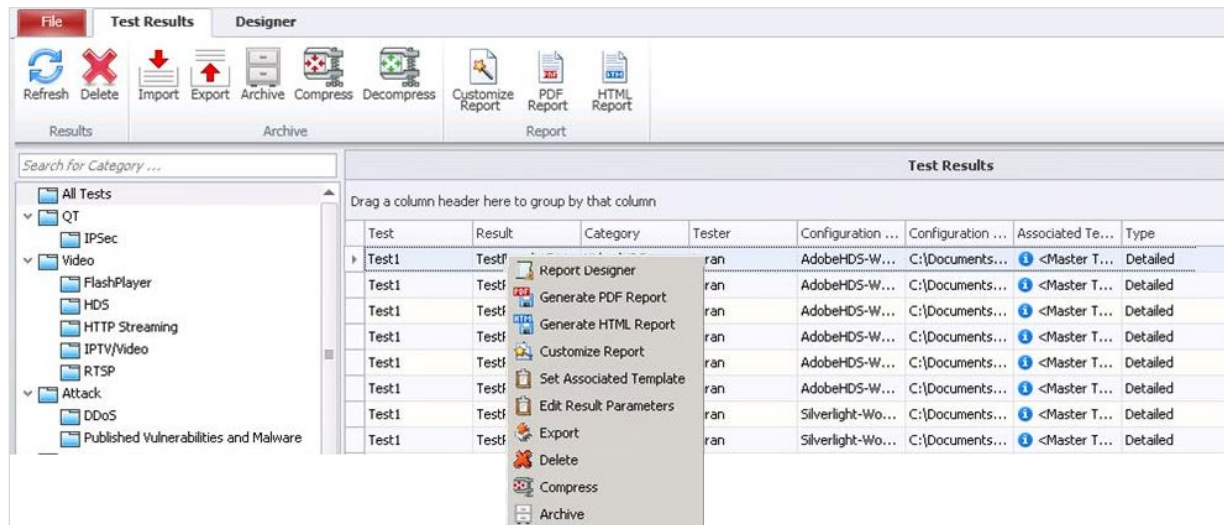


Figure 5. 1-click report generation in PDF and HTML

Built-In Data Capture and Analysis

Internet protocols are complex — and multi-protocol emulations even more so. **IxLoad** includes a built-in capture analysis tool: Analyzer. Analyzer is a sophisticated network analyzer with the ability to display protocol ladder diagrams. **IxLoad** allows you to trigger and filter control and data-plane packet captures based on user-defined packet fields. It also supports a circular buffer that enable users to see the most recent packets, even during long-duration tests.

Automation

IxLoad provides powerful GUI-based automation with the Test Composer and QuickTests components. It also offers a robust feature set for GUI-to-script and API-based automation. Test scenarios are created using the **IxLoad** step-by-step GUI, and then a single button-press, TCL, Python, or Perl test scripts are generated.

These scripts may be modified and combined in any way. When a script is executed, **IxLoad** GUI monitors the script execution — providing real-time statistics and state information.

Feature	Description
Quick test	• Easy-to-use, configurable, pre-packaged tests • Generate detailed reports of results • HTTP, TLS, and IPsec performance tests
Test composer	• GUI-based solution to automate test actions • Detailed control over test execution without Tcl expertise • Complete access to the Tcl API with easy UI
ScriptGen	• Provides an easy, one-click GUI-to-script generation
APIs	• One-click GUI to Tcl script conversion available (ScriptGen) • Complete access to and control over test configuration • Tcl, Python, Perl, RESTful APIs, ROBOT API

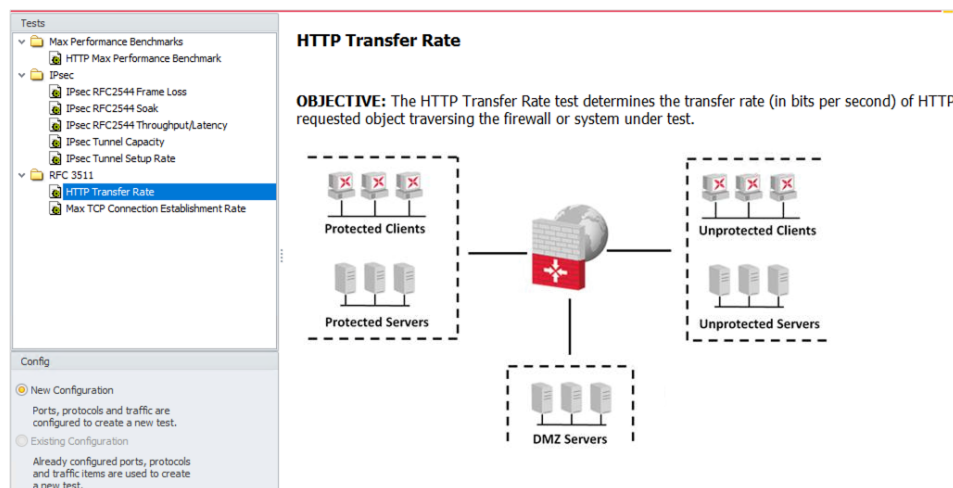


Figure 6. QuickTest end-to-end wizards

REST API Browser

Through the **IxLoad** REST API Browser, users can modify configuration parameters, add, update, or delete components to build or adjust test configurations — all from a web browser. Additionally, authoring automation scripts become more efficient, as it allows developers to easily identify the **IxLoad** embedded methods and internal parameter names by intuitively navigating the object structure of test configurations.

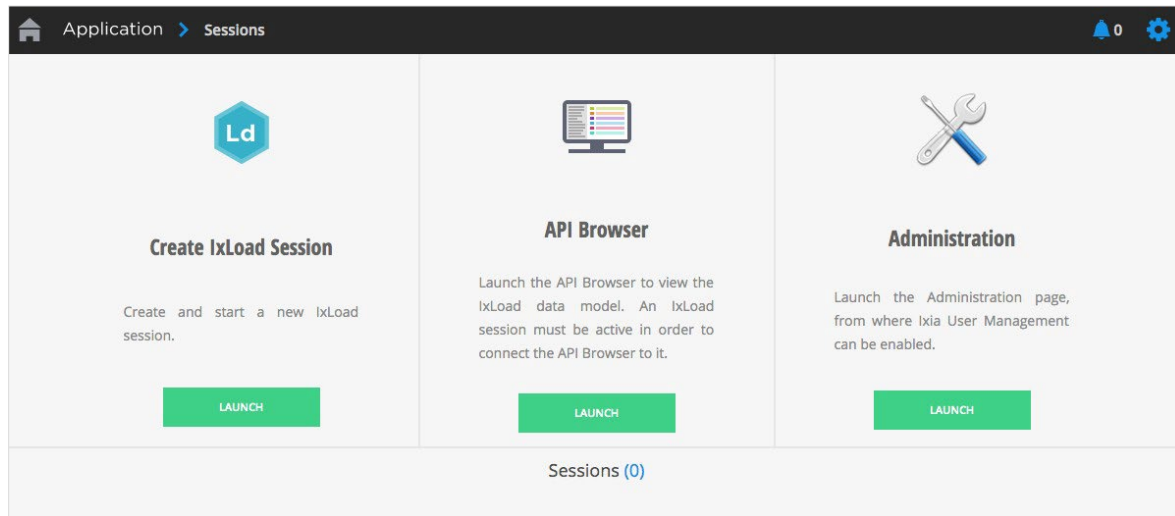


Figure 7. Any-time, any-where access to IxLoad through Web UI

Platform Options

Visit [Keysight.com](https://www.keysight.com) for More Information on IxLoad Platform Options

Virtual platform	• IxLoad Virtual Edition (VE)
Public cloud	• IxLoad on AWS • IxLoad on Azure • IxLoad on GCP • IxLoad on Oracle
Chassis / Controller	• APS-M1010 • XGS-12 HSL/SD/SDL chassis • XGS-2 HSL/SD/SDL chassis
Load modules	• CloudStorm Fusion 10GE, 25GE, 40GE, 50GE & 100GE • CloudStorm 10GE, 25GE, 40GE, 50GE & 100GE • CloudStorm-XP Fusion 10GE, 25GE, 40GE, 50GE & 100GE • CloudStorm-XP 10GE, 25GE, 40GE, 50GE & 100GE • PerfectStorm Fusion 10/1GE, 40GE, & 100GE • PerfectStorm 10/1GE, 40GE, & 100GE • Novus-NP 10G/1G/100M • Novus 10G/1G/100M • Novus 10G/5G/2.5G/1G/100M • Data center storage 10G/25G/40G/100G (RoCEv2 & HTTP only)
Appliances	• APS-ONE-100 • PerfectStorm ONE Fusion 10/1GE, 40GE, & 100GE • PerfectStorm ONE 10/1GE, 40GE, & 100GE • Novus ONE appliance • Novus ONE Plus appliance

IxLoad Technology Solutions

Visit [Keysight.com](https://www.keysight.com) for More Information on IxLoad Technology Solutions

- IxLoad Overview – Converged Multiplay Service Validation
- IxLoad Virtual Edition (VE) L4-7 Application Performance Testing
- IxLoad Data Test Solution
- IxLoad Video Test Solution
- IxLoad Voice Test Solution
- IxLoad IPsec and Network Access Test Solution
- IxLoad on AWS – Cloud Application Performance Testing
- IxLoad on Azure – Cloud Application Performance Testing
- IxLoad on GCP – Cloud Application Performance Testing
- IxLoad on Oracle – Cloud Application Performance Testing

Ordering Information

APS-100/400GE Licenses

Part Number	Description
941-0113	APS-M1010 Management Controller. Supports up to 10 x APS-ONE-100 Fusion Compute Nodes (941-0110). Note: APS-ONE-100 Compute Nodes are purchased separately.
941-0114	Ixia, APS-ONE-100, Compute Node for IxLoad with 4x100GE front I/O ports for the APS-M1010 Management Controller (941-0115). Requires 2 optional QSFP28 transceivers/cable assemblies to be ordered separately using QSFP28-SR4-XCVR (QSFP28 100GBASE-SR4 100GE pluggable optical transceiver, MMF (multimode), 850 nm, 100 m reach) or 942-0088 (QSFP28 passive, copper, Direct Attach Cable)
925-6201	Ixia, IxLoad-DATA Perpetual License Bundle for a single APS-ONE-100 appliance, floating license (per controller) (925-6201). The license enables IxLoad-DATA functionality on a single APS-ONE-100 appliance (compute node). It can be used with any single appliance managed by a management controller (APS-M1010 or APS-M8400). It includes an IxLoad Framework license and support for the DATA traffic activities (HTTP, HTTPS, DNS, AppReplay, FTP, IPsec). TAA compliance is determined by the hardware on which the license is enabled.

Chassis Licenses

Part Number	Description
925-3379	IxLoad Multiplay, Software Bundle, Layer 4-7 Performance Test Application Data-Video-Voice package. Includes: • Data: Enables support for HTTP, HTTPS, TCP Session, FTP, DNS, Mail (SMTP, POP3 and IMAP), Database, SSH, RADIUS, TFTP, Application-Replay, DHCP, LDAP, Telnet, Stateless-Peer and StreamBlaster emulations. • Video: Enables support for basic RTSP, IPTV (Multicast), Video-ADVANCED (VoD), Adobe Flash Client, Apple HLS Client, Microsoft Silverlight Client, Adobe HDS Client, and DASH Client emulations. Includes Video Quality VQMON engine for up to 10Gbps and TCP VQ Video quality for TCP video traffic for up to 10 Gbps. • Voice: Advanced VoIP SIP & RTP, Audio Codecs, VoLTE extensions, and Bulk SIP & MGCP. Includes: Voice Quality engine for up to 10Gbps, Video Quality engine for up to 10Gbps conversational video traffic. • ADVNET: Enables support for Advanced Access networking protocols such as DHCP for IP address acquisition, DHCP Server, PPP, L2TP and IPsec. • Storage: iSCSI, CIFSv1, CIFSv2 (SMB2), SMB3, NFSv3 Client, NFSv4 Client, NFS4.1 Client, Cloud Storage Client, DCBX, FCoE and FC; Note the FCoE and FC emulation is only supported on selected load modules. • Access: DHCP, PPP, L2TP, L2TP, IPsec, IPsec Performance Benchmarking QuickTest & SuiteB Cryptographic, 6RD, DSLITE and IPv6 SLAAC, 8021X, NAC and WEBAUTH. • Note: some of the features are available only on specific load modules.
925-3461	IxLoad AppLibrary Slot Bundle, Software Bundle, Layer 4-7 Performance Test Application; Enables support for AppLibrary on a single load module. It includes AppLibrary Slot Feature (925-3462) and Slot Subscription service (925-3460) to access new application flows for one year; Requires previous purchase of 925-3040 (IXLOAD Base) or higher bundle.
IxLoad bundles per technology (Data, Video, Voice, Access and VPN, Storage) are available.	

Appliance Licenses

Part Number	Description
925-6321	IxLoad Appliance Multiplay , Software Bundle, Layer 4-7 Performance Test Application. Enables IxLoad Data, Storage, Voice, Video and Access & VPN on PerfectStorm ONE and Novus ONE appliances. Includes: • 925-6121 IxLoad PerfectStorm ONE DATA & Storage • 925-6112 IxLoad PerfectStorm ONE VIDEO • 925-6113 IxLoad PerfectStorm ONE VOICE • 925-6117 IxLoad PerfectStorm ONE Access & VPN
925-6104	IxLoad Appliance Basic , Optional Software, Layer 4-7 Performance Test Application. Enables IxLoad Basic functionality on PerfectStorm ONE and Novus ONE appliances. Includes: HTTP, HTTPS, DNS, ADVNET-DHCP, WAP, Stateless Peer. Requires IxLoad Framework, 925-0001, which is free with adjoining software purchase.
925-3461	IxLoad AppLibrary Slot Bundle , Software Bundle, Layer 4-7 Performance Test Application; Enables support for AppLibrary on a single load module. It includes AppLibrary Slot Feature (925-3462) and Slot Subscription service (925-3460) to access new application flows for one year; Requires previous purchase of 925-3040 (IXLOAD Base) or higher bundle.
IxLoad bundles for appliances per technology (Data, Video, Voice, Access and VPN, Storage,) are also available	

Virtual Edition Licenses

See the [IxLoad Virtual Edition \(VE\) Virtualized Multiplay Services Testing datasheet](#) for the IxLoad-VE licenses.