

# IxLoad Virtual Edition (VE)

## Virtualized Multiplay Services Testing

### Problem: The Many Unknowns of Virtualizing Applications, Networks, and Services

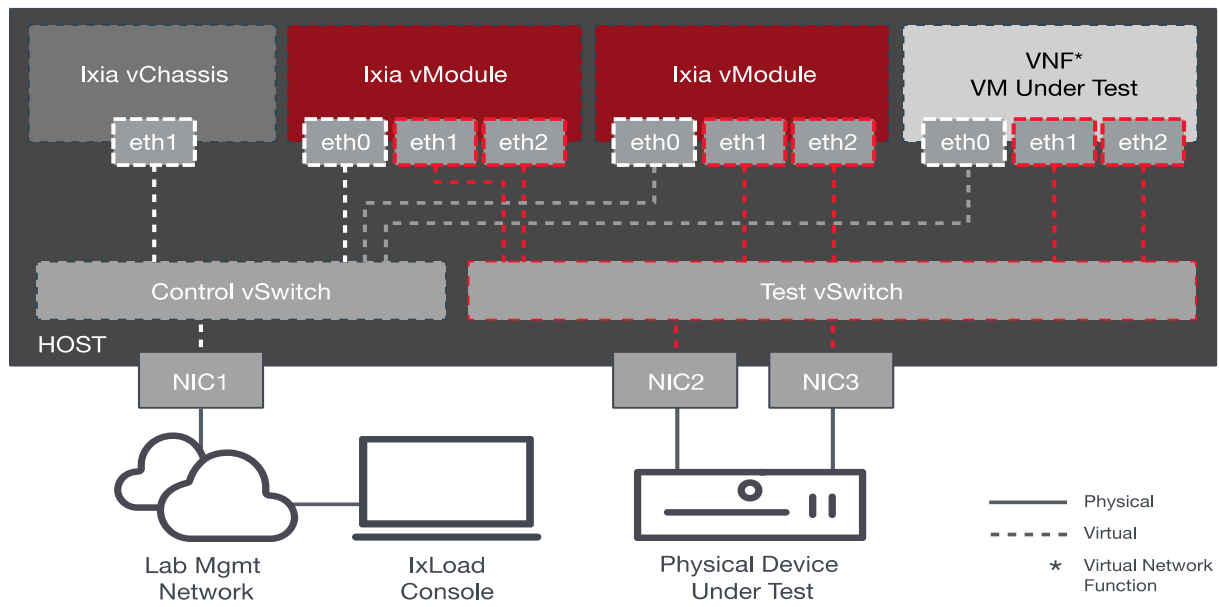
The next generation of networks need to adapt quickly and facilitate change. Strategies like Network Functions Virtualization (NFV) and Software Defined Networking (SDN) provide powerful flexibility gains by moving functions like customer premises equipment (CPE), load balancing, firewall security, evolved packet core (EPC), and integrated management systems (IMS) off from dedicated hardware onto virtualized servers. Virtualized Network Functions (VNFs) need to deliver the same or better performance than the traditional network. The customer quality of experience (QoE) is at risk unless the virtualized network applications are properly tested to ensure the functionality, performance, security, and reliability touted by the new technologies.

### Solution: A Highly Elastic, Portable, and Easy-to-Use Solution for Testing and Validation

IxLoad VE delivers comprehensive functional and performance testing to validate user QoE in physical and virtual networks. IxLoad VE emulates web, video, voice, storage, VPN, wireless, infrastructure, and encapsulation / security protocols to create realistic scenarios. It provides a flexible traffic generation and analysis solution to validate physical and virtual applications and networks. A modular system design enables the ability to deploy virtual test ports inside virtualized network devices and allows IxLoad VE to elastically scale with your cloud infrastructure. The real-time QoE metrics let you drill down to quickly identify network degradations and isolate breaking points. Because IxLoad VE is as easy to use as it is effective, you do not have to be a protocol expert or virtualization expert to achieve complete end-to-end service validation.

The IxLoad VE subscription model is aligned with enterprise project-based IT OpEx funding requirements. Acquire the tools quickly, scale up and scale down as project needs demand, and deploy anywhere with virtualization speed and simplicity.

Visit [www.keysight.com](http://www.keysight.com) for more information on the IxLoad VE product.



**Figure 1.** IxLoad VE deployment for both virtual and physical device testing

## Highlights

- Test the functionality / performance of application aware devices such as virtual firewalls, application delivery controllers, storage servers, and other application servers.
- Accelerate the time to market by conducting tests earlier in the development lifecycle. Automate the tests to be re-used across the virtual or hardware versions of IxLoad.
- Identify and isolate application performance issues in the data center by using flexible test tool deployment, which can be easily moved, changed, or scaled up / down.
- Assess how virtual machine mobility impacts application reliability and scalability. Run the tests during live migration to ensure minimum network downtime.
- Validate next generation 5G / NFV networks by testing within Private Clouds / Telco Clouds powered by OpenStack or VMware vCenter orchestration.
- Understand how network applications are affected by deployment within different Public Clouds such as Amazon AWS, Google Cloud, Microsoft Azure, or Oracle Cloud.
- Leverage subscription-based licensing that enables the flexibility of pay-as-you-grow OpEx model with different feature tiers available in multiple performance levels (such as 1G / 10G / 100G).



# Table of Contents

Key Features ..... 4

Specifications ..... 5

Qualified and Compatible Environments..... 6

Application Layer Protocols..... 8

Sophisticated Subscriber Modeling..... 9

AppLibrary ..... 9

Quality of Experience ..... 10

Resource Manager..... 10

Reports..... 11

Built-in Data Capture and Analysis ..... 11

Automation ..... 12

Technology Solutions..... 13

Ordering Information ..... 13

# Key Features

- Provides comprehensive protocol coverage across a large set of networking applications.
- Includes Data, Voice, and Video subscriber emulation along with the associated protocols.
- Enables end-to-end testing of converged wireless / wired application delivery infrastructures.
- Supports advanced subscriber modeling to create realistic scenarios for subscriber QoE testing.
- Finds the maximum performance via an internal goal seeking algorithm based on test objectives.
- Measures metrics like concurrent connections, connection rate, simulated users, or throughput.
- Hundreds of application traffic flows for Stateful L47 Traffic enabled by the AppLibrary engine.
- Powerful statistics engine with high level aggregated views as well as detailed drilldown views.
- Common IxLoad user interface and experience across both Hardware / Virtual products.
- Easy transition between Hardware / Virtual platforms through common configurations and scripts.
- Enables end-to-end testing from a single pane of glass across virtual and physical environments.
- Comprehensive hypervisor support for stand-alone platforms like VMware ESXi / KVM / Hyper-V.
- Comprehensive orchestration support in Private Clouds based on VMware vCenter / OpenStack.
- Comprehensive support for Public Clouds inside Amazon AWS / Google Cloud / Microsoft Azure.
- Includes Virtual Machines with Virtual Chassis / Virtual Load Module / Virtual Test Appliance roles.
- Provides software optimized for protocol emulation and traffic generation in virtual environments.
- Flexible all-inclusive subscription licensing model reduces startup cost and enables easier growth.
- Common License Server shared among IxLoad VE, IxNetwork VE, BreakingPoint VE, and others.
- Full automation capabilities with REST, TCL, Perl, Python, and Ruby API support.

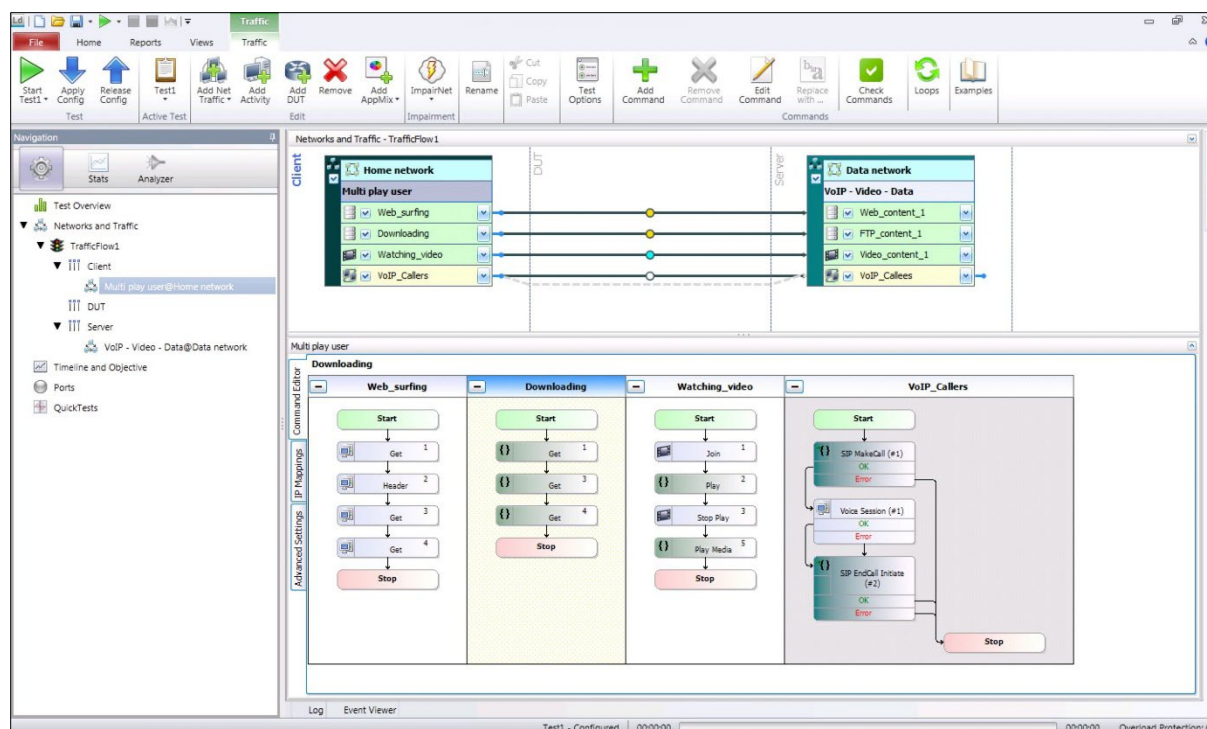


Figure 2. IxLoad emulates a complete multi-play user environment with realistic subscriber modeling

# Specifications

IxLoad VE features, functions, and capacities for the Virtual Chassis, Virtual Load Modules, and Virtual Test Appliance:

| Feature                           | Virtual Chassis                                            | Virtual Load Module                                       | Virtual Test Appliance                                    |
|-----------------------------------|------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| Maximum # of Virtual Ports        | 128                                                        | 32                                                        | 8                                                         |
| Maximum # of Virtual Load Modules | 32                                                         | N / A                                                     | 1                                                         |
| Maximum # of Simultaneous Users   | 32                                                         | 1                                                         | 1                                                         |
| Guest OS                          | Based on Debian 12.5 (Bookworm) / x86 64-bit               |                                                           |                                                           |
| Guest Kernel                      | Linux 6.1.0 Stock                                          | Linux 3.10 Custom                                         | Linux 3.10 Custom                                         |
| vCPU                              | 2 vCPU – Minimum<br>2 vCPU – Default<br>512 vCPU – Maximum | 2 vCPU – Minimum<br>2 vCPU – Default<br>16 vCPU – Maximum | 2 vCPU – Minimum<br>2 vCPU – Default<br>16 vCPU – Maximum |
| Memory                            | 4 GB RAM                                                   | 4 GB RAM                                                  | 4 GB RAM                                                  |
| Disk                              | 8 GB                                                       | 4 GB                                                      | 8 GB                                                      |
| Management IPv4                   | Yes                                                        | Yes                                                       | Yes                                                       |
| Management IPv6                   | N / A                                                      | N / A                                                     | Yes                                                       |
| Login via Web UI                  | admin / admin                                              | N / A                                                     | admin / admin                                             |
| Login via SSH                     | admin / admin                                              | admin / admin                                             | admin / admin                                             |
| IxLoad Web UI                     | N / A                                                      | N / A                                                     | N / A                                                     |

IxLoad VE distribution and packaging format for **Private Cloud** platforms with **Manual Deployment Scenario** (by using the platform specific tools for deploying the Virtual Edition products):

| Platform          | Virtual Chassis | Virtual Load Module | Virtual Test Appliance | Virtual Windows Client |
|-------------------|-----------------|---------------------|------------------------|------------------------|
| VMware ESXi       | OVA             | OVA                 | OVA                    | N / A                  |
| VMware vCenter    | OVA             | OVA                 | OVA                    | N / A                  |
| KVM / stand-alone | QCOW2           | QCOW2               | QCOW2                  | N / A                  |
| KVM / OpenStack   | QCOW2           | QCOW2               | QCOW2                  | N / A                  |
| Microsoft Hyper-V | VHDX            | VHDX                | VHDX                   | N / A                  |
| Docker Containers | N / A           | N / A               | N / A                  | N / A                  |

IxLoad VE distribution and packaging format for **Private Cloud** platforms with **Automatic Deployment Scenario** (by using Deployment Wizard for creating large scale deployments with ease):

| Platform          | Virtual Chassis | Virtual Load Module | Virtual Test Appliance | Virtual Windows Client |
|-------------------|-----------------|---------------------|------------------------|------------------------|
| VMware ESXi       | SH              | SH                  | N / A                  | N / A                  |
| VMware vCenter    | OVA             | OVA                 | N / A                  | N / A                  |
| KVM / stand-alone | SH              | SH                  | N / A                  | N / A                  |
| KVM / OpenStack   | N / A           | N / A               | N / A                  | N / A                  |
| Microsoft Hyper-V | N / A           | N / A               | N / A                  | N / A                  |
| Docker Containers | N / A           | N / A               | N / A                  | N / A                  |

IxLoad VE distribution and packaging format for **Public Cloud** platforms with **Cloud Deployment Scenario** (by using the platform specific tools for deploying the Virtual Edition products):

| Platform        | Virtual Chassis | Virtual Load Module | Virtual Test Appliance | Virtual Windows Client |
|-----------------|-----------------|---------------------|------------------------|------------------------|
| Alibaba Cloud   | N / A           | N / A               | N / A                  | N / A                  |
| Amazon AWS      | N / A           | N / A               | AMI                    | AMI                    |
| Google Cloud    | N / A           | N / A               | QCOW2                  | QCOW2                  |
| Microsoft Azure | N / A           | N / A               | VHDX                   | VHDX                   |
| Oracle Cloud    | N / A           | N / A               | QCOW2                  | QCOW2                  |

## Qualified and Compatible Environments

IxLoad VE is designed to work best when used in a qualified environment. Our recommendation is to always use one of the qualified versions of the virtualization platforms.

IxLoad VE is also compatible with different other environments. In case there are issues encountered in these environments, Keysight will make reasonable efforts to address them, but cannot guarantee specific outcomes or results. In such rare cases, the proposed solution is to use a qualified environment.

| Category                           |                            | Qualified                                                                                                              |                                      | Compatible                                                                                                                             |            |
|------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------|
| Hypervisor and Host OS             |                            | VMware vSphere ESXi 7.X<br>VMware vSphere ESXi 8.X                                                                     |                                      | VMware vSphere ESXi 6.X                                                                                                                |            |
|                                    |                            | KVM over CentOS 7.X<br>KVM over CentOS 8.X<br>KVM over CentOS Stream                                                   |                                      | KVM over RHEL 7.X<br>KVM over RHEL 8.X                                                                                                 |            |
|                                    |                            | KVM over Rocky Linux                                                                                                   |                                      | Microsoft Hyper-V over Windows Server 2016<br>Microsoft Hyper-V over Windows Server 2019<br>Microsoft Hyper-V over Windows Server 2022 |            |
|                                    |                            | KVM over Ubuntu 18.04 LTS<br>KVM over Ubuntu 20.04 LTS<br>KVM over Ubuntu 22.04 LTS                                    |                                      | KVM over Ubuntu 14.04 LTS<br>KVM over Ubuntu 16.04 LTS                                                                                 |            |
|                                    |                            |                                                                                                                        |                                      |                                                                                                                                        |            |
|                                    |                            |                                                                                                                        |                                      |                                                                                                                                        |            |
| Management and Orchestration       |                            | VMware vCenter 7.X<br>VMware vCenter 8.X                                                                               |                                      | VMware vCenter 6.X                                                                                                                     |            |
|                                    |                            | OpenStack Zed (vanilla distribution)                                                                                   |                                      | Other OpenStack-based platforms (vanilla distributions)<br><br>Other OpenStack-based platforms (vendor-specific distributions)         |            |
| Public Cloud                       |                            | Amazon Web Services Marketplace<br>Google Cloud Platform<br>Microsoft Azure Marketplace<br>Oracle Cloud Infrastructure |                                      | N / A                                                                                                                                  |            |
| Network Connection and vNIC Driver | Virtual Switch             | VMware vSwitch                                                                                                         | 1G → 400G                            | vmxnet3                                                                                                                                | HV vSwitch |
|                                    |                            | KVM Linux Bridges                                                                                                      | 1G → 400G                            | virtio                                                                                                                                 | 1G / 10G   |
|                                    |                            | KVM Open Virtual Switch                                                                                                | 1G → 400G                            | virtio                                                                                                                                 | hv_netvsc  |
|                                    |                            |                                                                                                                        |                                      |                                                                                                                                        |            |
|                                    | PCI-PT                     | Intel 350                                                                                                              | 1G                                   | igb                                                                                                                                    | Cisco VIC  |
|                                    |                            | Intel 5xx                                                                                                              | 10G                                  | ixgbe                                                                                                                                  | 1G / 10G   |
|                                    |                            | Intel 7xx                                                                                                              | 10G / 25G / 40G                      | i40e                                                                                                                                   | enic       |
|                                    |                            | Intel 8xx                                                                                                              | 10G / 25G / 50G / 100G               | ice                                                                                                                                    |            |
|                                    |                            | Mellanox ConnectX-4                                                                                                    | 10G / 25G / 50G / 100G               | mlx5                                                                                                                                   |            |
|                                    |                            | Mellanox ConnectX-5                                                                                                    | 10G / 25G / 50G / 100G               | mlx5                                                                                                                                   |            |
|                                    |                            | Mellanox ConnectX-6                                                                                                    | 10G / 25G / 50G / 100G / 200G        | mlx5                                                                                                                                   |            |
|                                    |                            | Mellanox ConnectX-7                                                                                                    | 10G / 25G / 50G / 100G / 200G / 400G | mlx5                                                                                                                                   |            |
|                                    |                            | Mellanox BlueField-2                                                                                                   | 10G / 25G / 50G / 100G / 200G        | mlx5                                                                                                                                   |            |
|                                    |                            | Mellanox BlueField-3                                                                                                   | 10G / 25G / 50G / 100G / 200G / 400G | mlx5                                                                                                                                   |            |
|                                    | SR-IOV                     | Intel 350                                                                                                              | 1G                                   | igbvf                                                                                                                                  | Cisco VIC  |
|                                    |                            | Intel 5xx                                                                                                              | 10G                                  | ixgbev                                                                                                                                 | 1G / 10G   |
|                                    |                            | Intel 7xx                                                                                                              | 10G / 25G / 40G                      | iavf                                                                                                                                   | enic       |
|                                    |                            | Intel 8xx                                                                                                              | 10G / 25G / 50G / 100G               | iavf                                                                                                                                   |            |
|                                    |                            | Mellanox ConnectX-4                                                                                                    | 10G / 25G / 50G / 100G               | mlx5                                                                                                                                   |            |
|                                    |                            | Mellanox ConnectX-5                                                                                                    | 10G / 25G / 50G / 100G               | mlx5                                                                                                                                   |            |
|                                    |                            | Mellanox ConnectX-6                                                                                                    | 10G / 25G / 50G / 100G / 200G        | mlx5                                                                                                                                   |            |
| Mellanox ConnectX-7                |                            | 10G / 25G / 50G / 100G / 200G / 400G                                                                                   | mlx5                                 |                                                                                                                                        |            |
| Mellanox BlueField-2               |                            | 10G / 25G / 50G / 100G / 200G                                                                                          | mlx5                                 |                                                                                                                                        |            |
| Mellanox BlueField-3               |                            | 10G / 25G / 50G / 100G / 200G / 400G                                                                                   | mlx5                                 |                                                                                                                                        |            |
| Virtual Switch Model               | Virtual Standard Switch    | (on VMware)                                                                                                            | Hyper-V Virtual Switch               |                                                                                                                                        |            |
|                                    | Virtual Distributed Switch | (on VMware)                                                                                                            | (on Microsoft Hyper-V)               |                                                                                                                                        |            |
|                                    | Linux Bridges              | (on KVM)                                                                                                               |                                      |                                                                                                                                        |            |
|                                    | Open Virtual Switch        | (on KVM)                                                                                                               | Linux Bridges                        |                                                                                                                                        |            |
|                                    | Open Virtual Switch        | (on OpenStack)                                                                                                         | (on OpenStack)                       |                                                                                                                                        |            |

\* Performance acceleration of encrypted traffic requires a physical CPU with AES-NI / AVX / AVX2 instruction sets.

\* Performance acceleration of encrypted traffic requires a physical CPU with AES-NI / AVX / AVX2 instruction sets.

# Application Layer Protocols

IxLoad VE delivers a wide variety of fully stateful protocols to emulate a complete multi-play user environment. It delivers a sophisticated subscriber modeling capability that enables users to replicate the dynamic nature of subscriber behavior. The Virtual Chassis / Virtual Load Modules / Virtual Test Appliance empower IxLoad to generate city-scale traffic. This, along with comprehensive network support, advanced test timelines, and automatic goal-seek fine-tuning to meet test objective, enables users to comprehensively assess the performance of their service delivery networks and determine application-level performance with a single integrated solution.

| Technology                          | Protocols                                                                                                                                                                                               |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Web</b>                          | HTTP (1.0 / 1.1 / 2.0), SSLv2 / SSLv3, TLS v1.0 / TLS v1.1 / TLS v1.2 / TLS v1.3 Client and Server emulations                                                                                           |
| <b>Data</b>                         | DNS Client and Server emulations<br>LDAP Client emulation<br>RADIUS Client emulation                                                                                                                    |
| <b>File Transfer</b>                | FTP / TFTP Client and Server emulations                                                                                                                                                                 |
| <b>Email</b>                        | IMAP, POP3, SMTP Client and Server emulations                                                                                                                                                           |
| <b>Storage</b>                      | SMBv1, SMBv2, SMBv3 Client and Server emulations;<br>NFSv3, NFSv4, NFS 4.1 Client emulations;<br>iSCSI Initiator and Target emulations;<br>Cloud Storage OpenStack Swift Client emulation               |
| <b>IPTV / VOD</b>                   | IGMPv2 / IGMPv3, MLDv1 / MLDv2, RTSP, RTP / UDP                                                                                                                                                         |
| <b>Over The Top (OTT)</b>           | Adobe Flash Player, Adobe HDS, Apple HLS Player, Microsoft Silverlight Player, MPEG DASH Client emulations                                                                                              |
| <b>Voice</b>                        | SIP, WebRTC, RTP / SRTP, Audio, Conversational Video                                                                                                                                                    |
| <b>Network Access</b>               | DHCPv4 / DHCPv6, PPPoE, IPsec, GTP / eGTP, Diameter                                                                                                                                                     |
| <b>Security</b>                     | Published Vulnerabilities and Malware, IPsec VPN                                                                                                                                                        |
| <b>TCP / UDP and Replay Traffic</b> | Application Replay TCP Client / Server emulation                                                                                                                                                        |
| <b>Application Mixes</b>            | Hundreds of AppLibrary flows inside Application Library – 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 VE uses a unique approach called subscriber modeling. It enables users to emulate multiple application services per subscriber or per user while including service sequencing. It also models the traffic usage over time for each application (with advanced timelines) and simulates the temporal nature of subscribers connecting and disconnecting from the network in a dynamic manner. This results in a complete control of the usage profile such as websites visited, e-mail servers used, transfer sizes, channel-changing behavior, streaming content, and protocol options.

## AppLibrary

In addition to the fully stateful protocol emulations, IxLoad includes AppLibrary which is an extensive library of pre-defined application flows that simulate end-user interactions and devices. It speeds and simplifies testing application performance with blended application mixes. AppLibrary uses Keysight Application and Threat Intelligence (ATI) research center to ensure the flows are current and are updated monthly.

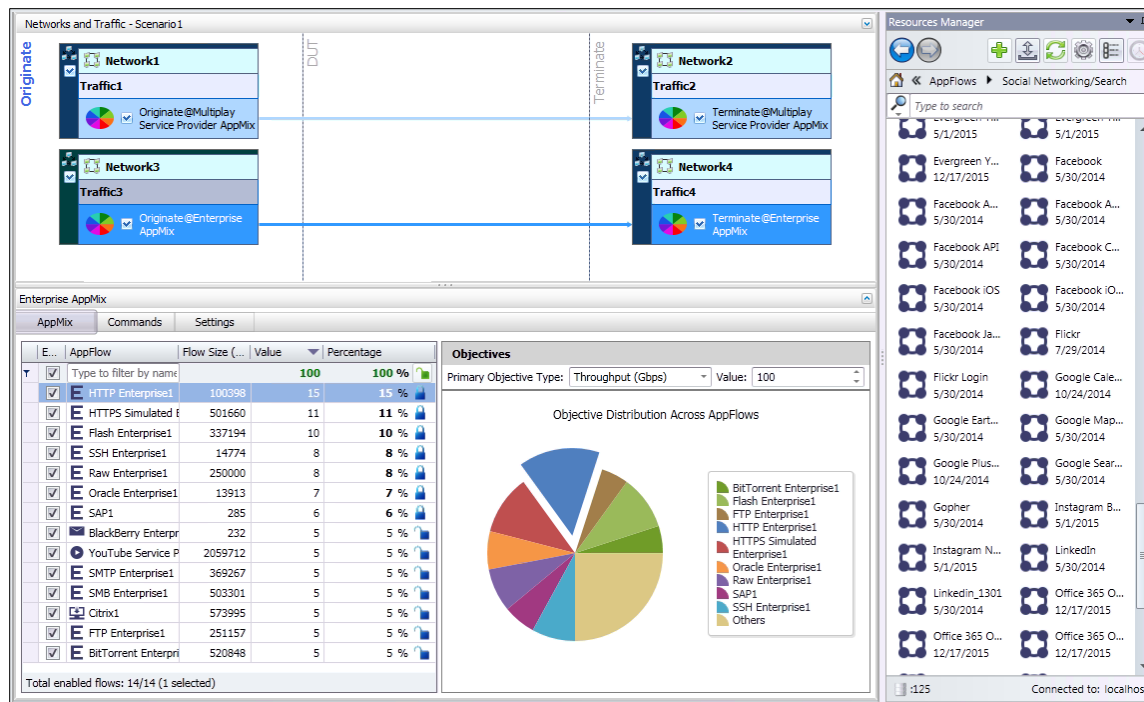


Figure 3. IxLoad AppLibrary Traffic Wizard

# Quality of Experience

IxLoad delivers an extensive real-time statistics viewer with pre-defined customizable views. It includes protocol-level statistics for in-depth functional testing as well as real-time test-level statistics ideally suited to scale testing. The aggregate statistics are displayed hierarchically and enable the ability to drill-down to network groups, application / activity-level, and port-level statistics. This allows the operator to analyze the QoE impact of services on per-user / per-IP / or per-VLAN basis or to set filters on statistics by specifying conditions to isolate errors and failures. Lastly the CSV files can be used to capture a single result view or at the global level to capture all results in real-time and an integrated CSV viewer enables viewing of large-result files.

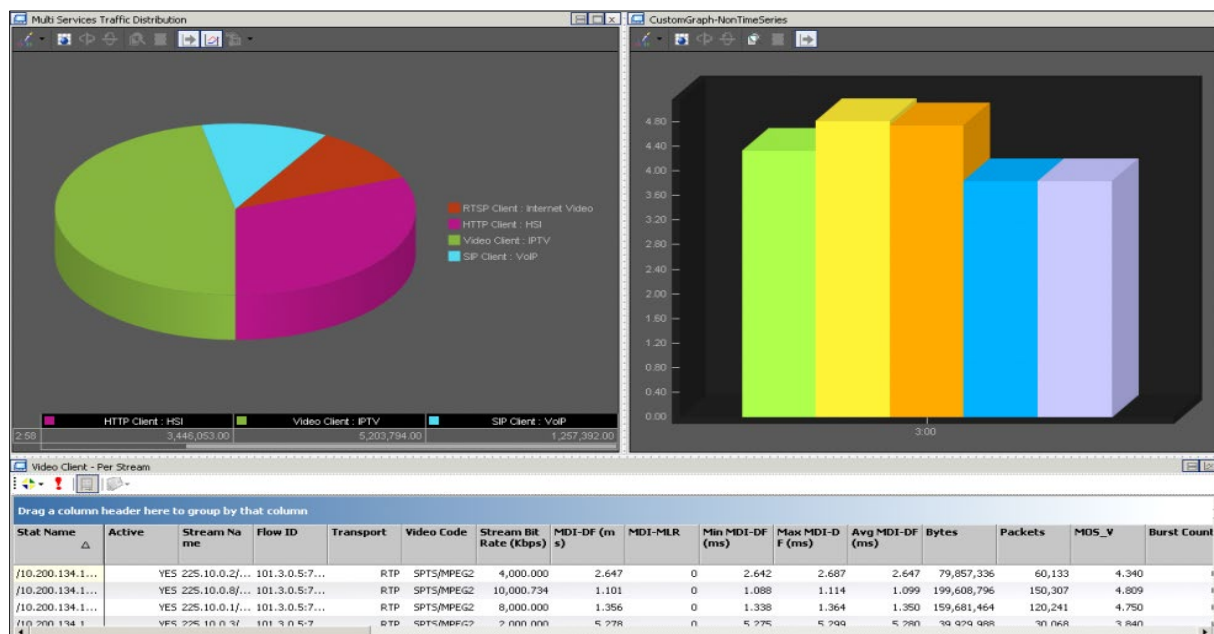


Figure 4. Highly visual statistic viewer

## Resource Manager

A common pain-point for users was the lack of a collaboration tool to aid in incrementally building configurations and sharing the expertise of different team members. IxLoad Resource Manager is a central repository used to save, store, and reuse the various components of an IxLoad test. This allows multiple users and teams to share the different components of a test like network, traffic, activity, and protocol settings, full configuration files, external files, and more.

Sharing of resources between teams increases productivity and saves precious time. You can even use Resource Manager as a light-weight version control system, storing external files like DUT configuration files and topology diagrams so others know where to access the latest (or even an earlier) revision.

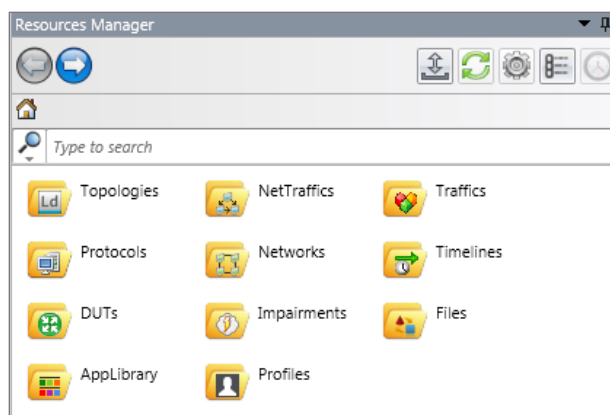


Figure 5. Resource Manager

## Reports

IxLoad provides built-in reports that are visually rich and contain concise performance metrics at test, protocol, and port level. Customize any report template or create your own templates that you can share. It also includes IxReporter Designer Studio to create new charting and analytics by using all the raw metrics from IxLoad test results as well as from external sources.

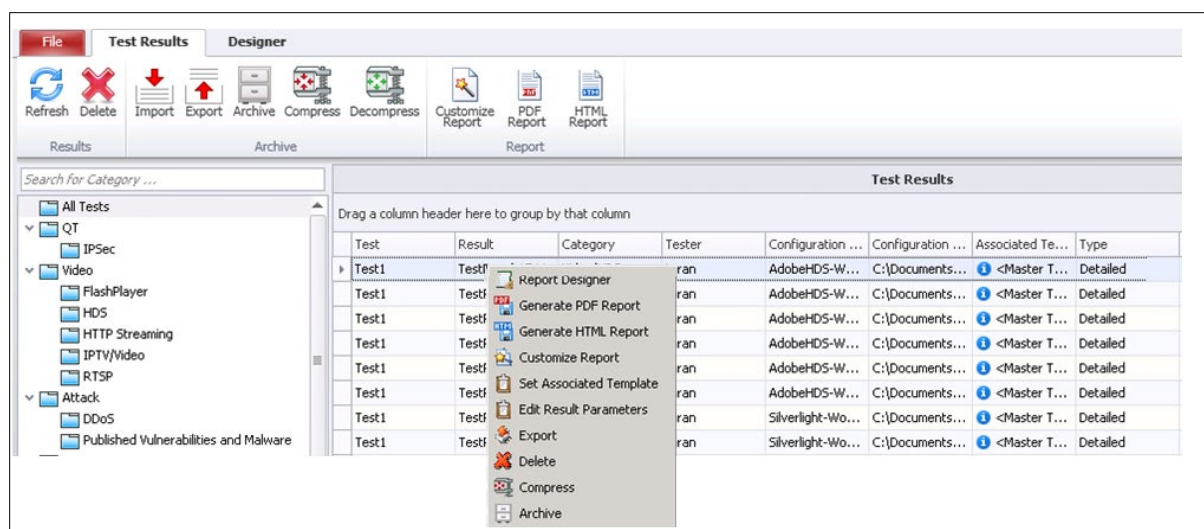


Figure 6. One-click report generation in PDF and HTML

## 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 called Analyzer. The Analyzer module is a sophisticated network analyzer, with the ability to display protocol ladder diagrams. IxLoad allows you to trigger and filter control-plane and data-plane packet captures based on user-defined packet fields. It also supports circular buffers that enable users to see the most recent packets, even if the test is configured to run for a very long duration.

# Automation

IxLoad provides powerful GUI-based automation with the Test Composer and QuickTests components. It also has a robust feature set for GUI-to-script and API-based automation. Test scenarios are set up by using the IxLoad VE step-by-step GUI, and then a single button-press generates the test scripts. Scripts may be modified and combined in any fashion. When the script is run the IxLoad GUI watches the execution and provides real-time statistics and state information.

| Types         | Test requirement | Detail                                                                                                                                                                  |
|---------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QuickTest     | Scalability      | Easy-to-use, configurable, pre-packaged tests<br>Generate detailed reports of results<br>HTTP, SSL, and IPsec performance test only                                     |
| Test Composer | Regression       | GUI-based solution to automate test actions<br>Detailed control over test execution without Tcl expertise<br>Complete access to the TCL API with easy UI                |
| ScriptGen     | Regression       | Provides an easy, one-click GUI-to-script generation                                                                                                                    |
| APIs          | Functionality    | One-click GUI to TCL script conversion available (ScriptGen)<br>Complete access to and control over test configuration<br>REST, TCL, Perl, Python, and Ruby API support |

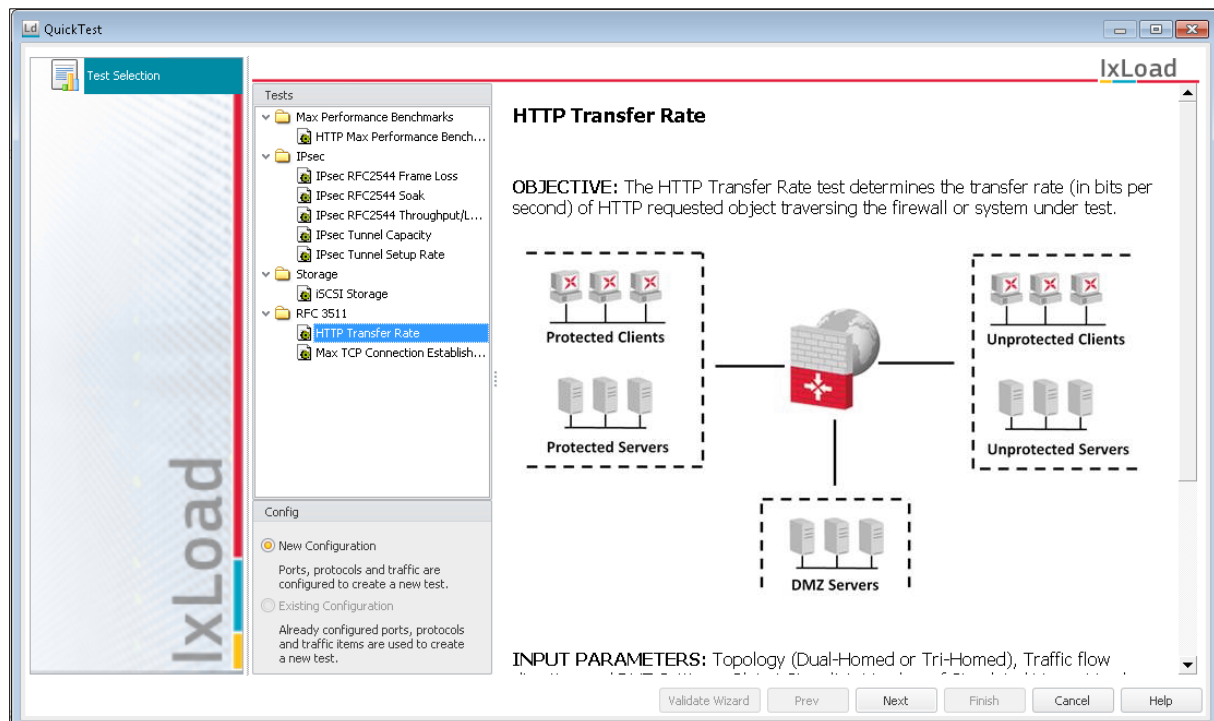


Figure 7. QuickTest end-to-end wizards

# Technology Solutions

Visit [www.keysight.com](http://www.keysight.com) for more information on IxLoad and Keysight virtualization solutions

---

IxLoad overview – Converged Multiplay Service Validation  
IxLoad Virtual Edition (VE) – Virtualized Multiplay Services Testing  
IxLoad Data Test Solution  
IxLoad Video Test Solution  
IxLoad Voice Test Solution  
IxLoad IPsec and Network Access Test Solution  
IxNetwork Virtual Edition (VE) – Virtualized Network Performance Testing  
BreakingPoint Virtual Edition (VE) – Virtualized Application and Security Testing  
Cloud Peak – Virtualized Infrastructure Benchmarking

---

## Ordering Information

### 939-9511

**IXIA IxLoad VE (Virtual Edition) Tier-1 1G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Network Access (IP, DHCP, PPPoE). Enables up to 1 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

### 939-9512

**IXIA IxLoad VE (Virtual Edition) Tier-2 1G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Network Access (IP, DHCP, PPPoE). Enables up to 1 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

### 939-9513

**IXIA IxLoad VE (Virtual Edition) Tier-3 1G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Video (DASH, Flash, HDS, HLS, IPTV, RTSP, Silverlight), Voice (RTP, RTCP, SRTP, VoIP SIP, VoLTE, WebRTC), Network Access (IP, DHCP, PPPoE, IPsec), IxLoad-AppLibrary, IxLoad-Attack Published Vulnerabilities Malware. Enables up to 1 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

## 939-9517

**IXIA IxLoad VE (Virtual Edition) Tier-1 1G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Network Access (IP, DHCP, PPPoE). Enables up to 1 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. TAA compliant.

## 939-9518

**IXIA IxLoad VE (Virtual Edition) Tier-2 1G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Network Access (IP, DHCP, PPPoE). Enables up to 1 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. TAA compliant.

## 939-9519

**IXIA IxLoad VE (Virtual Edition) Tier-3 1G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Video (DASH, Flash, HDS, HLS, IPTV, RTSP, Silverlight), Voice (RTP, RTCP, SRTP, VoIP SIP, VoLTE, WebRTC), Network Access (IP, DHCP, PPPoE, IPsec), IxLoad-AppLibrary, IxLoad-Attack Published Vulnerabilities Malware. Enables up to 1 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. 1-year subscription is included in the price for IxLoad-Attack and IxLoad-AppLibrary. TAA compliant.

## 939-9531

**IXIA IxLoad VE (Virtual Edition) Tier-1 10G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Network Access (IP, DHCP, PPPoE). Enables up to 10 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

## 939-9532

**IXIA IxLoad VE (Virtual Edition) Tier-2 10G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Network Access (IP, DHCP, PPPoE). Enables up to 10 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

## 939-9533

**IXIA IxLoad VE (Virtual Edition) Tier-3 10G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Video (DASH, Flash, HDS, HLS, IPTV, RTSP, Silverlight), Voice (RTP, RTCP, SRTP, VoIP SIP, VoLTE, WebRTC), Network Access (IP, DHCP, PPPoE, IPsec), IxLoad-AppLibrary, IxLoad-Attack Published Vulnerabilities Malware. Enables up to 10 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

## 939-9537

**IXIA IxLoad VE (Virtual Edition) Tier-1 10G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Network Access (IP, DHCP, PPPoE). Enables up to 10 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. TAA compliant.

## 939-9538

**IXIA IxLoad VE (Virtual Edition) Tier-2 10G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Network Access (IP, DHCP, PPPoE). Enables up to 10 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. TAA compliant.

## 939-9539

**IXIA IxLoad VE (Virtual Edition) Tier-3 10G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Video (DASH, Flash, HDS, HLS, IPTV, RTSP, Silverlight), Voice (RTP, RTCP, SRTP, VoIP SIP, VoLTE, WebRTC), Network Access (IP, DHCP, PPPoE, IPsec), IxLoad-AppLibrary, IxLoad-Attack Published Vulnerabilities Malware. Enables up to 10 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. 1-year subscription is included in the price for IxLoad-Attack and IxLoad-AppLibrary. TAA compliant.

## 939-9631

**IXIA IxLoad VE (Virtual Edition) Tier-1 100G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Network Access (IP, DHCP, PPPoE). Enables up to 100 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

## 939-9632

**IXIA IxLoad VE (Virtual Edition) Tier-2 100G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Network Access (IP, DHCP, PPPoE). Enables up to 100 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

## 939-9633

**IXIA IxLoad VE (Virtual Edition) Tier-3 100G (12-Months Floating Worldwide License, Keysight software support subscription).** Includes the following IxLoad protocols supported on IxLoad VE for the purchased term: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Video (DASH, Flash, HDS, HLS, IPTV, RTSP, Silverlight), Voice (RTP, RTCP, SRTP, VoIP SIP, VoLTE, WebRTC), Network Access (IP, DHCP, PPPoE, IPsec), IxLoad-AppLibrary, IxLoad-Attack Published Vulnerabilities Malware. Enables up to 100 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. Requires license term to be specified (must be purchased in multiples of years, list price is per unit per year). TAA Compliant.

## 939-9637

**IXIA IxLoad VE (Virtual Edition) Tier-1 100G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Network Access (IP, DHCP, PPPoE). Enables up to 100 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. TAA compliant.

## 939-9638

**IXIA IxLoad VE (Virtual Edition) Tier-2 100G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Network Access (IP, DHCP, PPPoE). Enables up to 100 Gbps throughput per unit and CC / CPS / SU / TPS scale limits as per the data sheet. TAA compliant.

## 939-9639

**IXIA IxLoad VE (Virtual Edition) Tier-3 100G (Floating Worldwide Perpetual License).** Includes the following IxLoad protocols supported on IxLoad VE: Data (Application Replay, DNS, FTP, HTTP, HTTPS, ICMP, LDAP, RADIUS, Stateless Peer, TFTP), Mail (IMAP, POP3, SMTP), Storage (CIFS, iSCSI, NFS, SMB), Video (DASH, Flash, HDS, HLS, IPTV, RTSP, Silverlight), Voice (RTP, RTCP, SRTP, VoIP SIP, VoLTE, WebRTC), Network Access (IP, DHCP, PPPoE, IPsec), IxLoad-AppLibrary, IxLoad-Attack Published Vulnerabilities Malware. Enables up to 100 Gbps throughput per unit and CC / CPS / SU / TPS

scale limits as per the data sheet. 1-year subscription is included in the price for IxLoad-Attack and IxLoad-AppLibrary. TAA compliant.

## P89030A

**WRLS IxLoad, floating license, Virtual Edition (VE) 1GE, TIER-4.** Includes the following IxLoad protocols supported on IxLoad VE: Data (HTTP, HTTPS, FTP, TFTP, DNS, DHCP, LDAP, Radius), Mail (IMAP, POP3, SMTP), Storage (SMB, NFS, iSCSI, Storage I/O), Voice (VoIP SIP, VoLTE), Video (DASH, Flash, HDS, HLS, IPTV VoD, MS IPTV, Silverlight), IPsec, IxLoad-AppLibrary and IxLoad-Attack Published Vulnerabilities and Malware (1-year subscription is included in the price for IxLoad-Attack and AppLibrary). Includes EPC and WiFi Offload protocols. Enables up to 1 Gbps throughput per unit.

## P89031A

**WRLS IxLoad, floating license, Virtual Edition (VE) 10GE, TIER-4.** Includes the following IxLoad protocols supported on IxLoad VE: Data (HTTP, HTTPS, FTP, TFTP, DNS, DHCP, LDAP, Radius), Mail (IMAP, POP3, SMTP), Storage (SMB, NFS, iSCSI, Storage I/O), Voice (VoIP SIP, VoLTE), Video (DASH, Flash, HDS, HLS, IPTV VoD, MS IPTV, Silverlight), IPsec, IxLoad-AppLibrary and IxLoad-Attack Published Vulnerabilities and Malware (1-year subscription is included in the price for IxLoad-Attack and AppLibrary). Includes EPC and WiFi Offload protocols. Enables up to 10 Gbps throughput per unit.

For more information, see:

<https://www.keysight.com/us/en/products/network-test/protocol-load-test/ixload-ve.html>