



ixía

Worldwide Education Services

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Ixia helps enterprises, service providers, and government agencies accelerate and secure application delivery



Training — The Key to Successful Ixia Deployments

Today's IP networks and supporting devices are complex. The skills needed to use an end-user network device are very different from the skills required to test the same device. IP network testing requires a different way of thinking – about scale, about performance, about protocol conformance, and about stress.

Test equipment must be flexible and powerful to test state-of-the-art equipment. Though Ixia® test platforms offer a number of hardware interface options and software applications with similar capabilities and interfaces, each is designed to tackle a different aspect of IP network testing and uses different concepts and paradigms.

To get the most from your Ixia test platform, you need the formal training provided by Ixia's Worldwide Educational Services. Training can be especially valuable to those new to Ixia equipment and applications specifically, or to IP testing in general. Better-trained technicians can answer more of their own questions and take additional diagnostic steps toward resolving device-under-test and test-

application problems, reducing calls to Ixia support and speeding deployment of products and services. Training benefits include:

- More rapid, higher return on your Ixia test platform investment
- Fast track to Ixia application proficiency – producing more productive testers
- Shorten product and service development cycles because your test professionals will get it right the first time
- Proficiency to employ more of the features and capabilities of Ixia's products, resulting in more thoroughly-tested products
- Develop confidence and self-esteem, increasing employee morale

Ixia training options are continually updated to coincide with the latest test application releases. Continued use of Ixia training allows your staff to move to new product releases seamlessly.

Training at Your Convenience

Ixia offers a flexible range of training and certification courses. Education options include:

Self-paced online learning — a variety of free online courses allowing users to learn the basics of leveraging a variety of Ixia test solutions.

Instructor-led training — for comprehensive instruction and hands-on lab experience. Options for instructor-led training include:

- **Training at Ixia facilities** located throughout the US. A variety of classes are offered to aid in achieving various skill levels and certifications.

- **On-site training at customer locations** offering the ultimate in convenience, personalized training and service. Classes are scheduled upon request on a first-come, first-serve basis, preferably for a minimum of four students.

This brochure provides an overview of course offerings available for individual Ixia solutions. For more information on these or additional training needs, contact Training@ixiacom.com.



Ixia Specialist / Certification Courses

Ixia's specialist courses cover a variety of concepts and use Ixia software and hardware. Students who pass the certification exam will receive a certificate that authenticates their status as a specialist.

- **IxNetwork Specialist Certification** – a comprehensive BootCamp-style course that teaches the student how to effectively use IxNetwork with real world use cases of router and switch testing.
- **IxLoad Specialist Certification** – a comprehensive BootCamp-style course that teaches the student how to effectively use IxLoad with real world use cases of L4/7 device testing.
- **Ixia BreakingPoint Specialist Certification** – a comprehensive course that teaches the student how to operate and configure BreakingPoint for all types of traffic, configure tests using all of the test components, configure Network Neighborhoods and device under test profiles, and understand how to best generate and use reports.
- **IxVeriWave™ Specialist Certification** – a comprehensive BootCamp course that covers the use of IxVeriWave applications for Wi-Fi testing. (Check for availability).

Online E-Learning Training

Online training provides our classes at your location. Online training offers you just the training you need, when you need it, and exactly where you need it. Ixia provides four online E-Learning classes of our most popular Introductory Instructor-Led Training courses:

- Introduction to Ixia
- Introduction to IxLoad
- Introduction to IxNetwork

Introduction to Ixia

Course Code 985-1001

Length: 1 day

Level: Basic

Prerequisites: None

Synopsis: This course introduces the Ixia test platform together with IxExplorer™, Ixia's L2-3 data application, and QuickTest, which provides pre-built test applications. An overview of the Ixia test platform is presented, followed by hands-on labs that focus on the capabilities and features of IxExplorer. Learn how transmitted frames are formatted, instrumented, and varied, along with receive-side capabilities for filtering, capturing, and statistical analysis. After gaining experience with IxExplorer, the student is introduced to QuickTest, where the functions of IxExplorer are put to use in running complete test algorithms.

Objectives

Upon successful completion, students will be able to:

- Describe Ixia product functionality
- Navigate IxExplorer's graphical user interface
- Set up and execute layer 2 and layer 3 tests for a DUT
- Capture and analyze IxExplorer traffic
- Measure latency and jitter in received traffic
- Check the data integrity of received traffic
- Contrast basic vs. advanced IxExplorer streams
- Describe the workflow of an QuickTest RFC2544 test

Introduction to IxNetwork

Course Code 985-1002

Length: 1 day

Level: Basic

Prerequisites: Introduction to Ixia, assumes a basic knowledge of routing and switching protocols

Synopsis: This course introduces the IxNetwork test application for the performance and functional testing of L2-3 devices and networks. The course focuses on the use of control plane and data plane testing using the OSPF/ BGP routing protocols. After an IxNetwork product overview, the student will participate in hands-on lab exercises designed to demonstrate the capabilities, features, and measurement techniques of IxNetwork for the above protocol using the Wizard and learning how to make changes using the Grid. The student also learns how to send L2/3 Traffic over the configured protocols using the traffic wizards. The student will also be introduced to the Ingress and Egress tracking capability within the traffic configuration and learn how to verify QoS policy configured in the DUT.

Labs include:

- Lab 1: Chassis/port allocation and configuration
- Lab 2: Protocol configuration using the Wizard with additional fine-tuning over the Grid
- Lab 3: Using the Basic Traffic Wizard
- Lab 4: Using the Advanced Traffic Wizard and Ingress/ Egress Tracking
- Lab 5: Creating traffic using Quick Flow Groups

IxNetwork Specialist BootCamp/ Certification

Course Code 985-2002

Length: 3 days

Level: Intermediate

Prerequisites: Attendees should complete the online E-Learning classes for both Introduction to Ixia and Introduction to IxNetwork

Synopsis: This BootCamp-style class will prepare the student with the necessary skills to effectively use their IxNetwork system when they get back to their own lab. The first day provides the foundation knowledge of how to configure and analyze BGP and OSPF tests using the latest version of IxNetwork. The second day quickly dives into the more advanced features of IxNetwork, including testing real devices and spending a majority of the time

understanding the results. On the third and final day, the students will fully explore the more complex modules within IxNetwork and learn how to work with the product's automation framework. There will then be a review, followed by the IxNetwork Specialist Certification Exam.

Objectives

Upon successful completion, students will be able to:

- Effectively use IxNetwork in their environment
- Navigate IxNetwork's new NextGen Protocol Framework
- Capture and analyze IxNetwork traffic using the built-in protocol analyzer.
- Create summary and detailed IxNetwork reports using the new IxReporter and IxReporter Designer
- Test the functionality, performance, and scalability of:
 - OSPF networks
 - BGP networks
 - L2 VPNs
 - L3 VPNs
 - IPv6 networks
 - IP Multicast networks
- Automate IxNetwork with Macro Recorder and Test Composer
- Test the functionality, performance, and scalability of OpenFlow devices and explore Software Defined Networking (SDN)
- Run IxNetwork's QuickTest with RFC2544 and RFC2889
- Perform Data Center tests using IxNetwork's new IxCloudPerf QuickTest
- Learn how to collaborate with IxNetwork's Resource Manager

IxNetwork Specialist Certification Exam

Length: 1 hour

Level: Intermediate

Synopsis: This one-hour assessment consists of multiple choice and true/false questions that assess the student's competencies related to the learning objectives in the IxNetwork BootCamp class. Ixia will present an IxNetwork Specialist certification to individuals who achieve a passing grade on this exam.

Introduction to IxLoad

Course Code 985-1003

Length: 1 day

Level: Basic

Prerequisites: Introduction to Ixia

Synopsis: This course is an introduction to L4-7 testing with the IxLoad test application. The student will gain expertise at configuring, running, and analyzing performance tests for upper-layer protocols, including HTTP, FTP, VoIP using SIP, and multicast or unicast video over IP using RTSP signaling.

Objectives

Upon successful completion, students will be able to:

- Describe IxLoad product test features and capabilities
- Differentiate IxLoad from other Ixia products
- Use IxLoad to test an SLB network device by generating L4-7 data traffic with HTTP and FTP applications
- Use IxLoad to test a network for voice quality by generating SIP traffic
- Use IxLoad to test a network for video quality by generating both multicast video and video on demand
- Use IxLoad to generate DDoS Ping of Death traffic and test its impact on a web server

IxLoad Specialist BootCamp/Certification

Course Code 985-2003

Length: 3 days

Level: Intermediate

Prerequisites: Attendees should complete the online E-Learning classes for both Introduction to Ixia and Introduction to IxLoad

Synopsis: This BootCamp-style class will prepare the student with the necessary skills to effectively use their IxLoad system when they get back to their own lab. The first day provides the foundation knowledge of how to configure and analyze voice, video, and data tests using the latest version of IxLoad. The second day quickly dives into the more advanced features of IxLoad, including testing real devices and spending a majority of the time understanding the results. On the third and final day, the students will fully explore the IxAttack™ module within IxLoad and learn how to properly perform security tests

and analysis. There will then be a review followed by the IxLoad Specialist Certification Exam.

Objectives

Upon successful completion, students will be able to:

- Effectively use IxLoad in their environment
- Navigate IxLoad's graphical user interface and configure multiple real-world scenarios
- Emulate a complete multiplay user environment by running data, voice, and video services simultaneously
- Capture and analyze IxLoad traffic including quality of experience (QoE) and voice quality scores via mean opinion scores (MOS)
- Create summary and detailed IxLoad reports using IxReporter and IxReporter Designer
- Data – perform server load balancer (SLB) test with HTTP and FTP
- Voice – generate real SIP calls and analyze their voice quality
- Video – emulate multicast IPTV and video on demand (VoD) IPTV subscribers
- DDoS – use Ping of Death attack on a web server
- Storage – perform iSCSI, NFS, and CIFS testing against a storage device
- IPsec – use IxLoad's new QuickTest functionality to run several RFC type tests against an IPsec GW
- HTTP Live Streaming – use IxLoad to emulate Apple's HLS media streaming specification to test a media server
- Security testing – use IxLoad's IxAttack to test network security appliances
- Learn how to collaborate with IxLoad's new Resource Manager

IxLoad Specialist Certification Exam

Length: 1 hour

Level: Intermediate

Synopsis: This one-hour assessment consists of multiple choice and true/false questions that assess the student's competencies related to the learning objectives in the IxLoad BootCamp class. Ixia will present an IxLoad Specialist certification to individuals who achieve a passing grade on this exam.

IxVeriWave Specialist BootCamp/ Certification

Course Code 985-2301

Length: 3 days

Level: Intermediate

Prerequisites: None

Synopsis: This BootCamp-style class will prepare the student with the necessary skills to test Wi-Fi networks and devices using the IxVeriWave WaveTest platform. The course begins by covering the hardware and software that make up the WaveTest environment. This includes a detailed overview of the different chassis models, wave blades, and software applications provided for wireless testing. To ensure everyone is starting with the same foundation, we will get everyone up to speed with wireless technologies. From here, we will move into benchmark and RFC testing using the WaveApps application using both Ethernet and SISO cards and the provided access points (AP's). Each student will be provided their own test bed for realistic lab scenarios. Several labs are provided to allow students an opportunity to configure, run, and analyze test scenarios. The first part of day 2 will cover triple-play test scenarios using WaveQoE and will provide a variety of labs to tests several triple-play scenarios with WaveQoE. A section on troubleshooting will follow by analyzing a variety of Wireshark captures to show what students should be looking for when troubleshooting their own tests environments. A demonstration of real-time testing with WaveDynamix will follow. The beginning of the third day will be focused on automating your IxVeriWave environment and tests using the ATA hardware. There will then be a review followed by the IxVeriWave Specialist Certification Exam.

Objectives

Upon successful completion, students will be able to:

- Understand the hardware and software components that make up WaveTest
- Understand the fundamentals of wireless technologies
- Discuss wireless testing methodologies
- Run benchmark or RFC tests (such as throughput and loss) with WaveApps
- Analyze the results of these tests through statistical analysis and report analysis
- Test triple play scenarios (such as home, hospital, or retail networks) using WaveQoE
- Analyze the results using statistic views and generated reports
- Analyze a variety of Wireshark captures to identify problems for troubleshooting
- Understand real-time testing with WaveDynamix

IxVeriWave Specialist Certification Exam

Length: 1 hour

Level: Intermediate

Synopsis: This one-hour assessment consists of multiple choice and true/false questions that assess the student's competencies related to the earning objectives in the IxVeriWave BootCamp class. Ixia will present an IxVeriWave Specialist certification to individuals who achieve a passing grade on this exam.

BreakingPoint Systems Specialist Certification

Course Code 985 - 2501

Length: 3 days

Level: Intermediate

Prerequisite: None

Synopsis: This course provides students with the basic knowledge necessary to develop simulations of enterprise infrastructures, Internet infrastructures, and people interactions, and create tests using security exploit traffic. Students will learn how to use Ixia BreakingPoint components to develop and run tests, use reports, export trace files, and develop simulations using application protocols with request and response messages.

Objectives:

The course includes the following learning modules, along with labs and a certification exam:

- Hardware and Administration

- Network Neighborhood
- Preparing to Run a Test
- Bit Blaster
- Routing Robot
- Session Sender
- Stack Scrambler
- Strike List
- Security
- Super Flows
- Client Simulator
- Application Simulator
- Device Under Test Profiles
- Recreate
- Certification Exam



Cyber Range Training

Course Code 985-2503 - 3 days

985-2504 - 5 days, includes all of 985-2503, and an additional 2 days of hands-on Operational Scenarios, described below

Level: Advanced

Prerequisites: Students should have a good understanding of TCP/IP and traffic flows. In addition, students may be working with routers, switches, firewalls, and IDS/IPS devices, and security information event management (SIEM), so should have a working knowledge of these products. Students will take on roles of managing the network and security devices during the class, so should have an understanding of these roles.

Synopsis: This course will give students an understanding of offensive and defensive cyber security methods. Students will gain knowledge and skills in reacting to a myriad of cyber security and application traffic flows. Students will be put through Operational Scenarios that include malicious and non-malicious traffic in a safe, secure environment.

Objectives:

Upon successful completion, students will be able to:

- Determine best practices for defensive cyber security mechanisms
- Build a Cyber Range to use as a continual learning tool
- Understand cyber security attacks and how they affect network and security devices
- Configure the Ixia BreakingPoint system to run application and security traffic
- Create Operational Scenarios

Day 1:

- Cyber Range Fundamentals
 - Overview of a Cyber Range and different environments that include Cyber Range Security Operations Center, Cyber Range penetration testing tools, and Cyber Range integrated with a Learning Management System (LMS)
- Network Neighborhood
 - Overview of Network Neighborhood and how to model operational environments
 - Setting up different Network Neighborhoods to include switch, router, and core (virtual) router environments
 - Labs to learn how to setup basic Network Neighborhoods
 - Labs to setup country- and region-specific Network Neighborhoods

- Super Flows
 - Describe what flows, Super Flows, and Application Profiles are and how to build them
 - Super Flow test cases to describe different protocols and how they can be used to build specific application traffic
 - Labs to build Super Flow traffic, as well as putting the Super Flows into an Application Profile

Day 2:

- Critical Infrastructure Servers
 - Building simulated critical infrastructure servers and the traffic being generated
- Client Simulator
 - Overview of Client Simulator test component
 - Adding Super Flows to Client Simulator scenarios
 - Labs to create and run Client Simulator Super Flows previously created
- Application Simulator
 - Overview of Application Simulator test component
 - Adding Application Profiles to Client Simulator scenarios
 - Labs to create and run Application Simulator using different Application Profiles
- Strike List
 - Vulnerability detection and reporting
 - Strike List overview
 - Strike List terms
 - Default Strike Lists
 - Fuzzers
 - Labs to configure Strike Lists
- Security
 - Security test component configuration
 - Adding Strike Lists to Security scenarios
 - Evasion Profiles
 - Labs to configure Security test scenarios

Day 3:

- Session Sender
 - Session Sender test component configuration
 - Session Sender test phases
 - What constitutes a session
 - Labs to create Session Sender test scenarios



Image Source: US Air Force

- Stack Scrambler
 - Stack Scrambler test component configuration
 - Header fields that can be modified
 - Labs to create Stack Scrambler traffic flows
- Reconnaissance Activities
 - PING sweeps
 - Port scans
- IP Layer Attacks
 - ICMP flood
 - ICMP flood with fragments
 - ICMP flood from different clients to different targets
- Transport Layer Attacks
 - UDP flood
 - UDP flood with fragments
 - UDP flood from different clients to different targets
 - TCP SYN flood
 - TCP SYN ACK flood
 - TCP PUSH flood
 - TCP Session attack (all of these can be done multiple times with different Evasion profiles)
- Introduction to Application Layer Attacks, Malware and CVE Attacks

Day 4:

- Application Layer Attacks
 - DNS based attacks
 - HTTP fragmentation attacks
 - Excessive Verb (POST)
 - Excessive Verb (GET)
- Malware
 - Run a mix of the over 35,000 pieces of live malware in different combinations depending on the targets
- CVE attacks
 - Run a mix of over 6000 pieces of CVE attacks

Day 5:

- Review the skills learned throughout the first four days of class
- Practice those skills using the equipment that has been gathered for the customer's specific requirements
- Spend additional time designing customer specific scenarios using techniques learned during the week
- Run through those scenarios with a qualified Cyber Range Instructor available as a guide and mentor

Cyber Range Training is offered at Ixia's Cyber Defense Academy™ or on-site at your location.

Who Is Ixia?

Ixia provides the industry's most comprehensive converged IP network validation and network visibility solutions. Ixia is a public company (NASDAQ: XXIA) operating in over 30 countries worldwide. Equipment manufacturers, service providers, enterprises, and government agencies use Ixia's solutions to design, verify, and monitor a broad range of wired, Wi-Fi, and 3G/LTE equipment and networks.

Ixia's test solutions emulate realistic media-rich traffic and network conditions so that customers can optimize and validate the design, performance, and security of their pre-deployment networks. Ixia's intelligent network visibility platforms provide clarity into physical and virtual production networks for improved performance, security, resiliency, and application delivery of cloud, data center, and service provider networks.

Ixia's Network Test and Visibility Solutions

IxNetwork/IxN2X® tests IP routing and switching devices and broadband access equipment by providing traffic generation and emulation for the full range of network protocols: routing, MPLS, L2/3 VPNs, Carrier Ethernet, broadband access, and data center bridging

IxLoad quickly and accurately models high-volume video, data, and voice subscribers and servers to test real-world performance of multiservice delivery and security platforms

IxCatapult® emulates a broad range of wireless access and core protocols to test wireless components and systems and, when combined with IxLoad, provides an end-to-end solution for testing wireless service quality

IxVeriWave employs a client-centric model to test Wi-Fi and wireless LAN networks by generating repeatable large-scale, real-world test scenarios that are virtually impossible to create by any other means

BreakingPoint® provides global visibility into emerging threats and actionable insight that can be used to harden the overall resiliency of devices, infrastructure and applications

Net Optics™ taps and network packet brokers provide total application and network visibility solutions that deliver real-time network intelligence for peak performance in network monitoring and security

Net Tool Optimizer™ (NTO) achieves complete network visibility with the easiest drag-and-drop control panel in the industry

Test Automation offers simple, comprehensive lab automation to help test engineering teams create, organize, catalog, and schedule execution of tests

Innovative Hardware chassis and load modules that power Ixia applications with plug-and-play configuration of technology-specific protocols, interfaces, performance, impairment, and load density for 1/10/40/100GE, ATM-POS, and Fibre Channel networks



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