



The Aptixia IxAutomate application offers a powerful, customizable test tool to automate the performance, scalability, and functional testing of network devices. IxAutomate provides a simple to use Graphical User Interface to configure custom automated test scenarios and analyze test results. Utilizing the capabilities of Ixia test hardware, such as wire-speed traffic generation, filtering, capturing, and statistics collection, IxAutomate provides a rich suite of pre-built tests based on industry standard RFCs and customer requirements. Test results are collected and presented with a flexible set of functions, including real-time graphs presenting test execution progress, formatted reports for detailed post-test analysis, color-coded indications of test trial pass/fail outcome, and detailed test execution logs. As a test harness, IxAutomate offers a plug-in architecture designed to easily add custom tests to the already substantial test library.

Specifications

Application Type	Client application executable on workstations running Microsoft Windows, UNIX, or Linux (command line only), TCL 8.3 or 8.4
Platforms	XM12, XM2, Optixia X16, Optixia XL10, IXIA 1600T, IXIA 400T, IXIA 250
Operating Systems	Microsoft Windows NT, 2000, 2003 Server and XP, Sun Solaris, Linux
Pre-built Test Suites	<ul style="list-style-type: none">• Triple Play: Scalability test, Simulates a combination of web, voice, and video traffic. Both connection and connectionless traffic can be selected for this test• RFC 3511: Layer 4-7 test suite, combines IxLoad with IxAutomate for TCP and HTTP performance testing• LACP: Link Aggregation Control Protocol; throughput and performance testing. Single port to LAG group, LAG group to

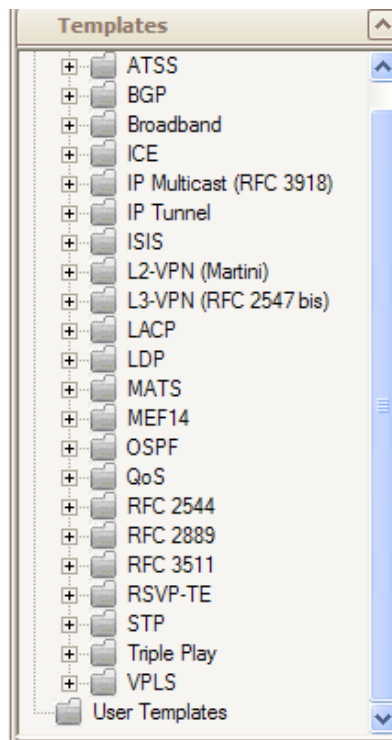
LAG group tests

- **MEF14 test suite:** designed to support the MEF14 specification and the Iometrix test plan: Bandwidth Profile per COS, Bandwidth Profile per Ingress UNI, Bandwidth Profile Rate Enforcement, CIR and EIR combined, FrameDelay_FrameDelayVariation_FrameLoss, Multiple Bandwidth Profiles at the UNI
- **RFC 2544:** Back-to-back, Throughput, Latency, Frame loss tests
- **RFC 2889:** Address cache size, address rate, Broadcast rate, Back pressure, HOL blocking, Frame error filtering, fully/partially/one to many/many to one mesh throughput tests
- **ATSS:** Random interval, Flow setup, IP error, Throughput, Layer2-layer3, Mixed IPv4/v6, Multiple frame size, Throughput NAT, Traffic tester, IP time to live, VLAN broadcast leakage, VLAN mesh tests
- **MATS:** Data integrity, Frame size verify, Gap checker, Pattern verify, Port loss, Random frame size, Sequence verify tests
- **IP Multicast (RFC3918):** Accumulated, Aggregated, Distributed, Group capacity, Group join delay, Latency, Mesh, Throughput NDR, Mixed class, Scale group, VLAN latency, Burdened Group Join Delay, Burdened Latency, Tunnel Throughput tests.
- **QoS:** Flow ratio, Many to one, One to many tests
- **IPv4/IPv6 Tunneling:** Tunnel capacity, Tunnel frame loss, Tunnel throughput tests
- **BGP:** Performance, Route capacity, Route convergence tests
- **OSPF:** Performance, Route capacity, Route convergence tests
- **ISIS:** Performance test
- **L2 VPN (Martini):** LDP egress performance, LDP IMix performance, LDP ingress performance, LDP partially meshed performance, Sessions scalability, Virtual circuits scalability tests
- **L3 VPN (RFC 2547 bis):** Performance and scalability test

	<ul style="list-style-type: none">• VPLS: Partially meshed throughput, Peer-to-peer throughput, Address cache, Address rate tests• LDP: Ingress and Egress partially meshed performance, Ingress and Egress performance, Transit performance tests• RSVP-TE: Label capacity, LSP cutover tests• STP/RSTP/MSTP: Convergence test• Broadband: Back-to-back, Throughput tests
Configuration	Multiple tabular views for parameter entry
Test Results	Real-time test traffic graphs, formatted PDF test reports, multiple CSV reports, and detailed test log
Customization	Tcl extension of tests via Custom User Code function
Multi-User	Login and logout for multi-user management of individual ports within each test
DUT Control	Ability to control/configure Device Under Test before, during and after each test. SNMP monitoring of pre-defined statistics.
User Defined Tests	Capability to integrate user defined test cases into IxAutomate framework with common test management and result presentation

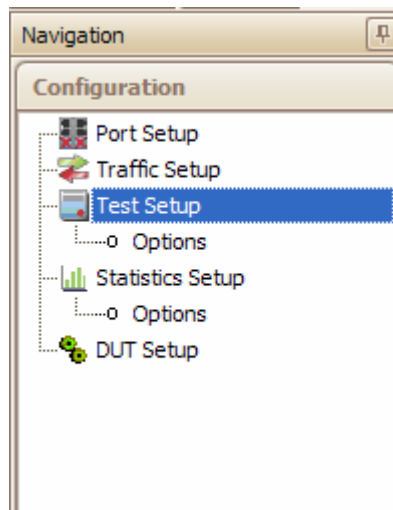
Application Structure

The IxAutomate interface is presented in a hierarchical tree, allowing easy navigation among tests. Templates can be easily browsed, with a diagram and description allowing the user to choose test(s) of interest. Upon selection, test templates are copied to a user test space where they are configured, customized, and executed.



Test Configuration

The standard Aptixia navigation structure is supported, with a step-by-step configuration flow for all tests:



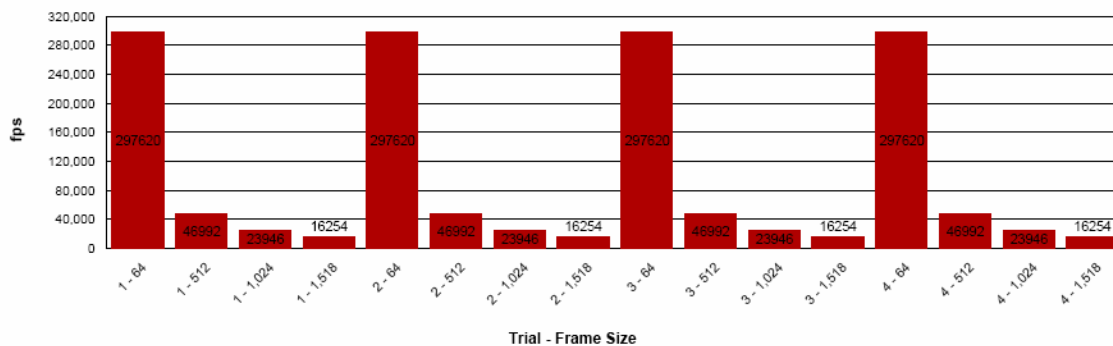
1. The Port Setup menu provides for the display and configuration of all test ports available for test execution. Physical layer properties are configured here.
2. The Traffic Setup menu contains information for specifying the traffic to be sent during the test, including parameters such as frame sizes, traffic mapping between ports, addressing, and packet content.
3. The Test Setup menu contains information regarding the test duration, number of trials, iterations, and other information specific to the selected test.
4. The Statistics Setup menu is used to define statistics that will be graphed by StatViewer and SNMP configuration for DUT monitoring.
5. The DUT Setup menu allows users to enter command files for configuring/monitoring the Device Under Test before, after and during each test and test iteration. In addition, a separate DUT log is maintained to help troubleshoot and track DUT configuration and requested statistics. DUT monitoring statistics are merged into the IxAutomate reports so that the user can see both the test run results and how the DUT behaved during the test- all in the same report.

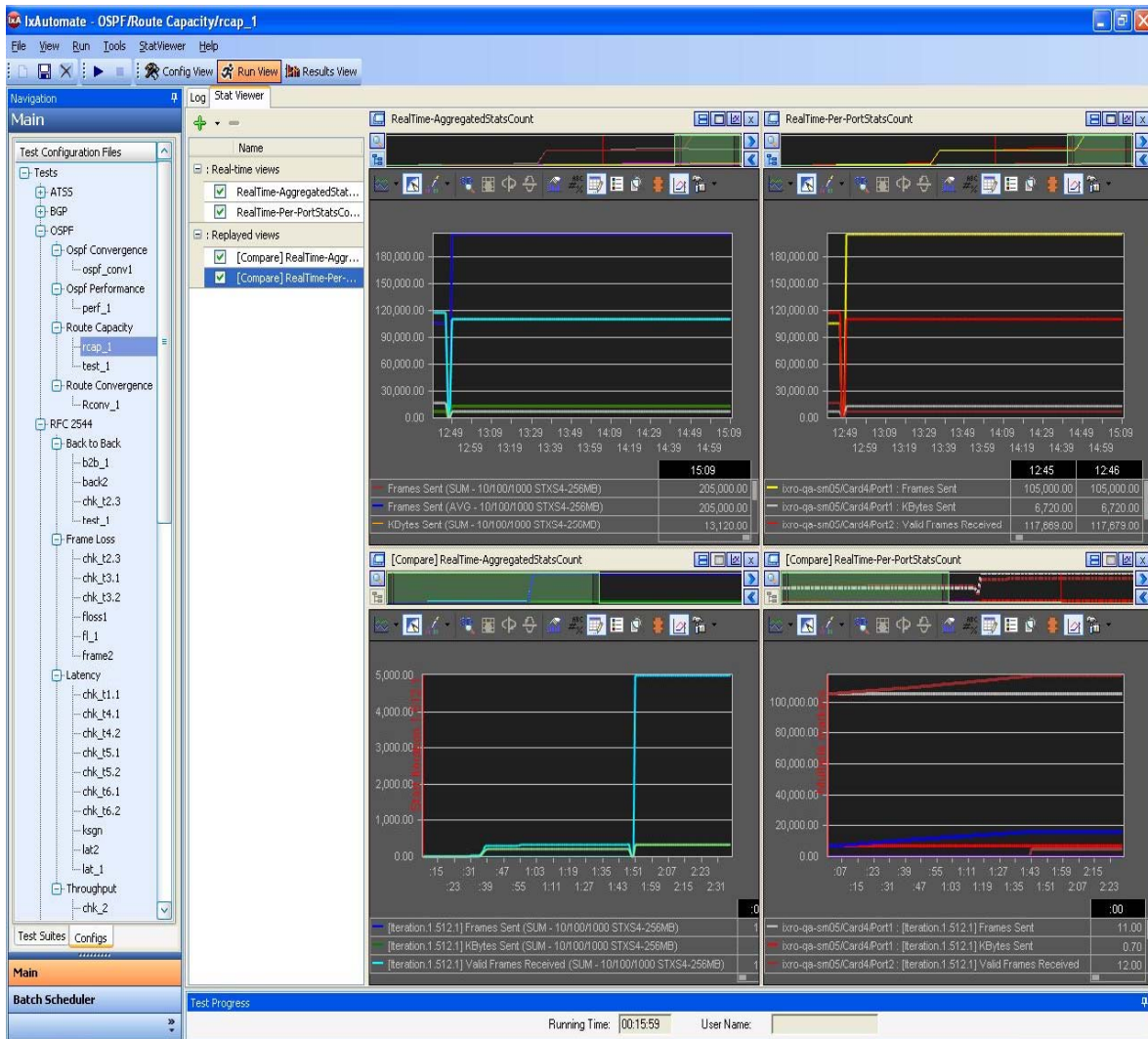
Aptixia StatViewer and Reporter

IxAutomate provides a number of ways for the user to track test progress and analyze test results. Aptixia StatViewer is designed to customize up to four graphing windows, each with the statistics you have selected. StatViewers Replay/Compare function lets you save graphs from past test runs, then compare them to newer runs of the same test. Reporter provides an easy to use wizard that lets you setup custom PDF reports designed with as much or as little detail as you require. All StatViewer graphs, CSV statistics, and test setup information can be selected.

RFC 2544 Throughput - Aggregate Graphs

Aggregate Throughput (in Frames/sec)

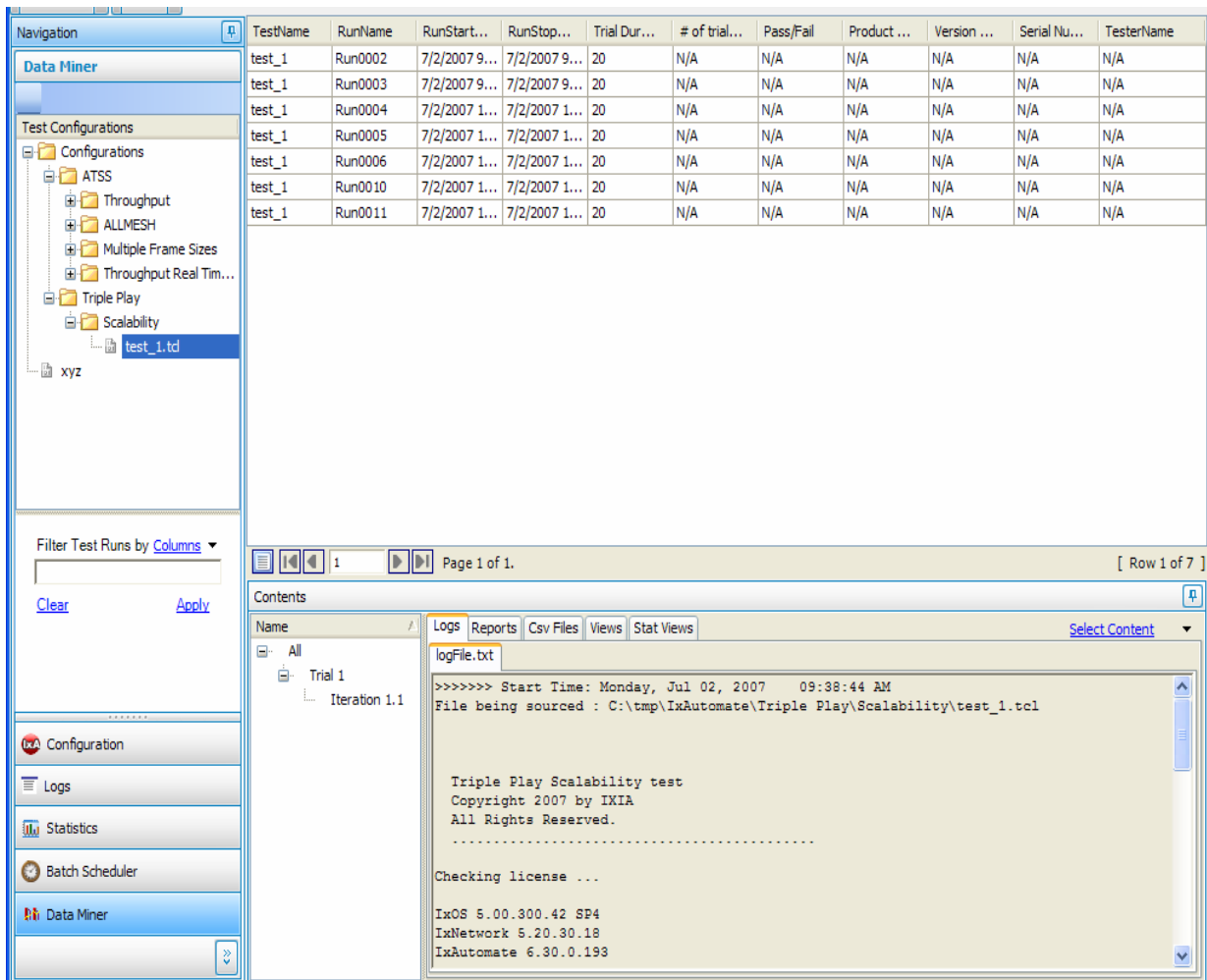




Data Miner

The Data Miner tool coordinates all past results for easy sorting and viewing. Upon starting a test, real time graphs appear to log the specific statistics you require. Upon test completion, results are stored on a per test-run basis. A color-coded indication of pass/fail (green/yellow/red) per trial is displayed based on user-defined criteria for the particular test, providing a quick view of the outcome of the test. Aggregate, per port, per iteration, and real-time test results are saved in CSV format that can be subsequently imported into other

applications for analysis. Custom formatted reports (using Reporter) can be created as PDF files displaying charts/graphs/tables of test results. Finally, a detailed text log of the real-time operations performed by the test is created, allowing for the most granular level of test analysis and troubleshooting. The log displays information such as port configuration at the data and network layers, transmission of MAC learning frames or ARP requests, when data is being generated, and when statistics are being collected.



The screenshot displays the IxAutomate interface. On the left is a 'Data Miner' navigation pane with a tree view of test configurations including 'Configurations', 'ATSS', 'Throughput', 'ALLMESH', 'Multiple Frame Sizes', 'Throughput Real Tim...', 'Triple Play', 'Scalability', and 'xyz'. The 'test_1.td' file is selected under 'Scalability'. Below the navigation pane are filters and buttons for 'Clear' and 'Apply'. The main area features a table of test runs:

TestName	RunName	RunStart...	RunStop...	Trial Dur...	# of trial...	Pass/Fail	Product ...	Version ...	Serial Nu...	TesterName
test_1	Run0002	7/2/2007 9...	7/2/2007 9...	20	N/A	N/A	N/A	N/A	N/A	N/A
test_1	Run0003	7/2/2007 9...	7/2/2007 9...	20	N/A	N/A	N/A	N/A	N/A	N/A
test_1	Run0004	7/2/2007 1...	7/2/2007 1...	20	N/A	N/A	N/A	N/A	N/A	N/A
test_1	Run0005	7/2/2007 1...	7/2/2007 1...	20	N/A	N/A	N/A	N/A	N/A	N/A
test_1	Run0006	7/2/2007 1...	7/2/2007 1...	20	N/A	N/A	N/A	N/A	N/A	N/A
test_1	Run0010	7/2/2007 1...	7/2/2007 1...	20	N/A	N/A	N/A	N/A	N/A	N/A
test_1	Run0011	7/2/2007 1...	7/2/2007 1...	20	N/A	N/A	N/A	N/A	N/A	N/A

Below the table is a 'Contents' pane with tabs for 'Logs', 'Reports', 'Csv Files', 'Views', and 'Stat Views'. The 'logFile.txt' file is selected, showing the following log content:

```

>>>>>> Start Time: Monday, Jul 02, 2007 09:38:44 AM
File being sourced : C:\tmp\IxAutomate\Triple Play\Scalability\test_1.tcl

Triple Play Scalability test
Copyright 2007 by IXIA
All Rights Reserved.
.....

Checking license ...

IxOS 6.00.300.42 SP4
IxNetwork 5.20.30.18
IxAutomate 6.30.0.193
    
```


SNMP Monitoring of DUT Statistics

Monitor important device statistics while during a test run. By selecting a set of MIB variables from the SNMP GUI, these variables can then be monitored and graphed while the test is running. A side by side comparison between test statistics and DUT monitoring statistics can be easily achieved. All statistics are then added to PDF reports.

Multi-User

IxAutomate is designed to allow multiple users to independently access individual test ports on Ixia Load Modules. This enables users to execute individual tests on the ports assigned to them without disrupting the tests being executed by other users on the system.

Customization

IxAutomate provides multiple methods to customize the test environment. The Tcl configuration scripts generated by IxAutomate can be run separately from the GUI via a Tcl command line. Scripts can be chained together to further automate test execution, and subsequently customized for special test requirements.

Automated Batch Scheduling

The Batch Scheduler tool allows the user to add multiple pre-defined tests into a single batch job. This batch can then be scheduled to run on a particular day of the week, or every day. The time of day is defined by hour and minute. Multiple batches can then be queued; each with a different start time.

Batch Editor

Setting Files Add Delete Up Down Generate PDF reports for all tests

Id	Category	Setting File
1	DTM Random Interval	C:\Program Files\Ixia\IxAutomate\Configs\ATSS\DTM Random Interval\aaaa.td

Scheduler

When Batch Scheduler Starts

Run Every Time Day of Month

Select Day

Monday Tuesday Wednesday Thursday Friday Saturday Sunday

Select Month

January February March April May June
 July August September October November December

User Defined Tests

A plug-in architecture allows for new test cases to be added to IxAutomate with ease and minimum coding by utilizing existing framework for test management and report presentation. A Plug-in Generator tool is available for custom test development. This software development kit is GUI based with an easy to understand workflow that helps insure all custom tests adhere to the IxAutomate architecture.

Product Ordering Information

928-0101

All in One software bundle

928-0102

RFC Benchmark Bundle: includes Framework GUI, RFC2544-IPv6 Benchmarking suite and RFC2889 suite

928-0103

Data Plane Bundle: includes Framework GUI, RFC2544, RFC2889, ATSS, MATS, Broadband, QOS, and Tunneling suites

928-0104

Routing/Switching Bundle: includes Framework GUI, BGP, OSPF, ISIS, and Bridging suites

928-0105

Bundled MPLS VPN test suites, includes: Framework GUI, LDP, RSVP-TE, L2VPN, L3VPN and VPLS suites

928-0200

IxAutomate Framework GUI

928-0201

RFC 2544-IPv6 Benchmarking Suite

928-0202

RFC 2889 Suite

928-0203

RFC 3511 Layer 4-7 Suite

928-0204

MEF14 Test Suite

928-0205

Triple Play Test Suite

928-0220

Advanced Tcl Script Suite

928-0221

Multiport Advanced Test Suite

928-0222

Broadband Test Suite

928-0223

Quality of Service Test Suite

928-0224

Tunneling Test Suite

928-0225

802.3ad Link Aggregation Test Suite

928-0240

BGP-4 Test Suite

928-0241

OSPF Test Suite

928-0242

ISISv4/v6 Test Suite

928-0243

IP Multicast (RFC 3918) Test Suite

928-0260

Bridging Test Suite

928-0280

LDP Test Suite

928-0281

MPLS RSVP-TE Test Suite

928-0282

L2 VPN (per Draft Martini) Test Suite

928-0283

L3 VPN (per RFC 2547 bis) Test Suite

928-0284

VPLS Test Suite

928-0290

Software Development Kit, Plug-in Generator, GUI based

This material is for informational purposes only and subject to change without notice. It describes Ixia's present plans to develop and make available to its customers certain products, features and functionality. Ixia is only obligated to provide those deliverables specifically included in a written agreement between Ixia and the customer.