DATA SHEET

IxChariot Pro – Active Network Assessment and Monitoring Platform

Network performance and user experience are critical aspects of your business. It is vital to understand customers' perception of your website, application, and network services. NOT knowing impacts your revenue stream.

Ixia's IxChariot Pro continually measures network performance and service status. If there is an issue, IxChariot Pro helps you identify it, quantify it, and ultimately resolve it – before your customers experience it.

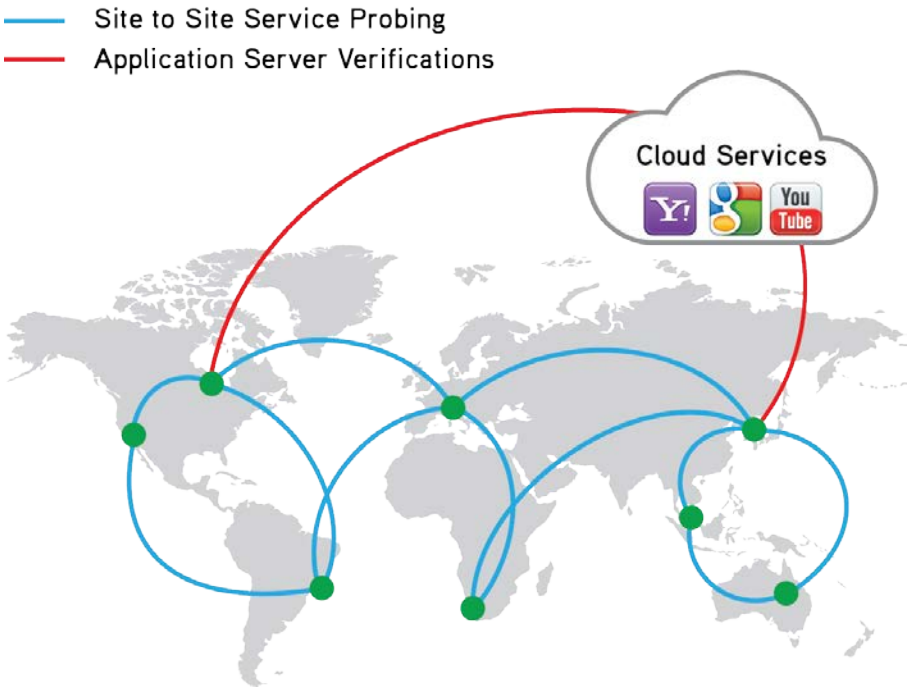


Figure 1 – IxChariot Pro Deployment

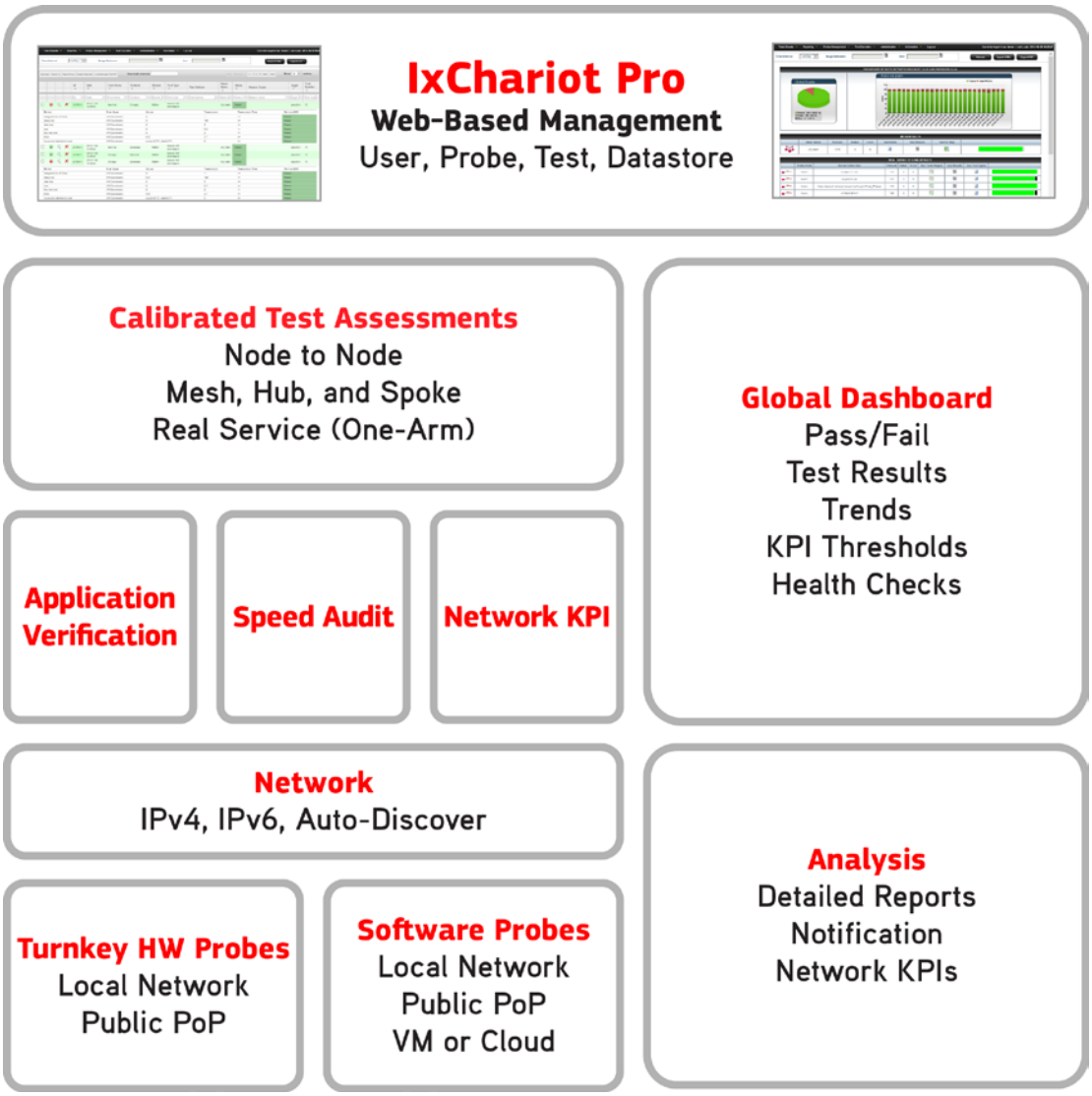
Key features

- IxChariot Pro brings Ixia advanced network and application testing technology into live networks
- Designed for network assessments and active monitoring for field and production networks, IxChariot Pro will help in day-to-day operations of complex network and application environments
- Industry-leading library with 100's of application tests enables assessment of network throughput, class of service, unified communications, and much more
- Be in control of the performance of your entire network and services with cost-effective endpoint probe distribution that delivers expansive network coverage
- Green-light your services with pre-launch assessments by emulating real application traffic up to line rate for any network scenario to see how it perfoms
- Be a troubleshooting wonder by firing off quick validation tests with clear demarcation points to almost instantly find network and application issues
- Proactively detect problems with continuous monitoring of QoE and QoS, so you always know that your network is meeting SLA and quality standards

IxChariot Pro Quick Feature Overview

- Web-based platform for multi-user access, test scheduling, data storage, and real-time analysis
- Deploy probes with turnkey hardware or software probes for virtual infrastructure
- Inject real traffic into the network continuously based on schedules, between nodes or in a mesh
- Conduct distributed tests with on-premises or off-premises (i.e., cloud servers)
- Verify fixes put in place in real-time with Pass/Fail
- Find network or application faults quicker with interval testing throughout the day, the week, the month
- Track services and network trends proactively based on time-of-day, day-of-week of services

IxChariot Pro Solution Components



How Does IxChariot Pro Work?

IxChariot Pro workflow

IxChariot Pro combines software and hardware active traffic probes that generate different traffic types.

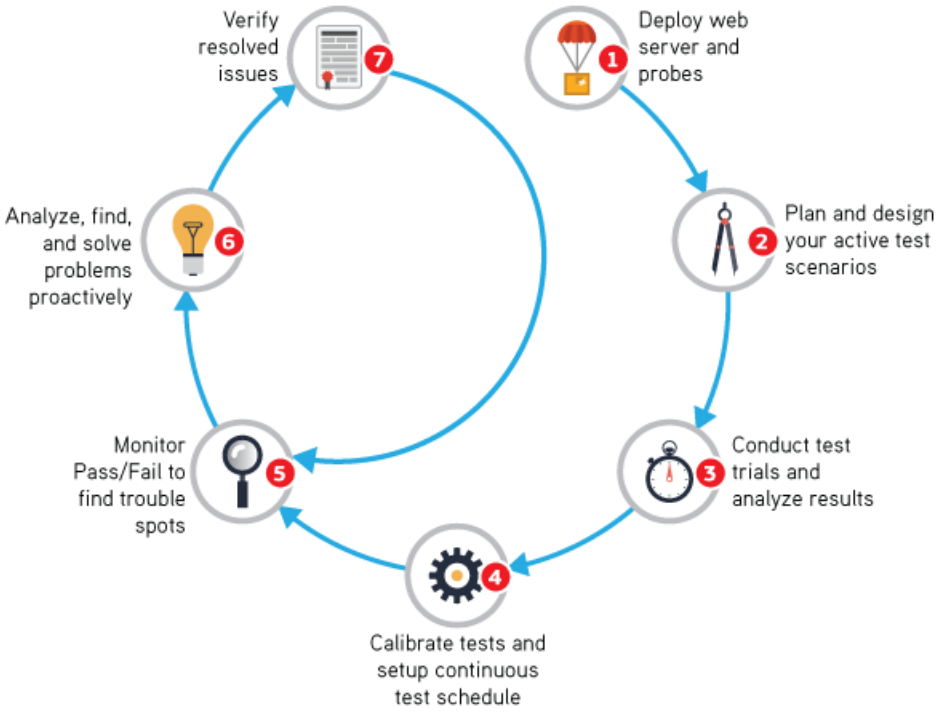


Figure 2 – IxChariot Pro Use Workflow

Analyze, find, and solve problems proactively

- Don't wait for customer traffic to reveal issues
- Rapidly identify problems using visual interface
- Find faults or identify transition problems by running node-to-node tests
- View details of errors or issues on failed tests using intuitive drill-down feature
- Analyze and compare to other paths – historical results help identify if a

Deploy web server and probes

- Deploy IxChariot Pro web server in central locations
- Strategically-deploy software and hardware probes to cost-effectively reach any network location:
  - Customer premises
  - Remote sites and head offices
  - Network aggregation points (PEs)
  - Core network, MPLS routers
  - Data centers
  - Virtual machines and servers

Hardware Probes

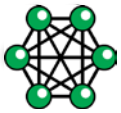
Software Probes

Features	Details
Central web-based management server	Installed on Microsoft Server Operating System – web-based access for operations and administration
Software installation probes	Support for Windows, Linux, Mac OS, Android, iOS, Unix, bootable USB dongle, etc.
Web-based active probes	Supported with SpeedAudit plugin
Hardware probes	xr100 and xr1000 probes
Probes auto-discovery	Central server automatically detects new probe install and discovers IP addresses
Probe advanced configurations	Supports VLAN, advanced routing, IPv6, etc., allowing easy integration with any network topology

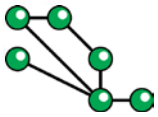
Plan and design your active test scenarios

- Define test topology with node-to-node or mesh with hub and spoke
- Build large topology test (full mesh) with one click

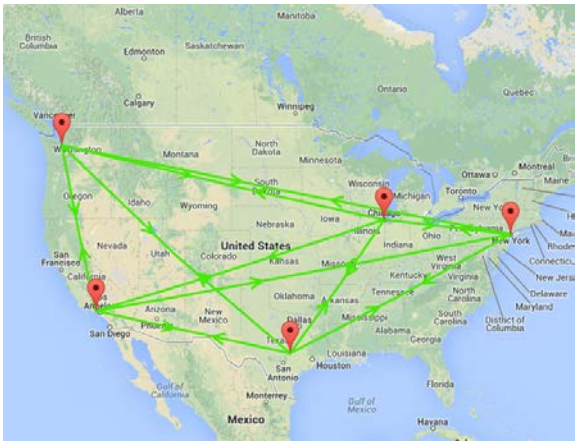
Hub and Spokes



Full Mesh Topology



Custom Topology



Select test types among default pre-calibrated tests in IxChariot Pro library

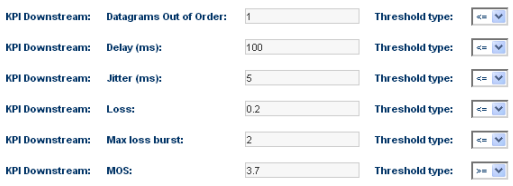
IxChariot Pro supports a variety of service level agreement (SLA) objectives – from pure network L2 bandwidth availability verification to advanced metrics such as one-way delay/jitter/loss on specific network path.

SLA can also be defined as application-specific key performance indicator (KPI):

- Mean opinion score (MOS) for voice
- Media delivery index (MDI) for video streaming
- Server response time for transactional applications, etc.

See supported *IxChariot Pro Test Types* section for full test details. IxChariot Pro offers a lot of flexibility for customizing specific tests, traffic mixes, multiple class of service (COS) testing, etc.

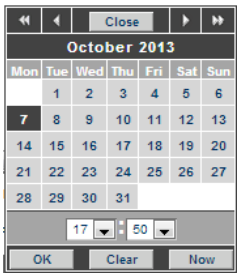
Create target thresholds for different tests



- Adjust applications, test variables, and thresholds based on trial data to match expectations of the network and its performance
- **Thresholds** are the baseline to decide if tests are passing or failing
- Setting up correct thresholds is essential for understanding the test results and making sure that the right level of information is in the database
- Default test thresholds are pre-configured in the system

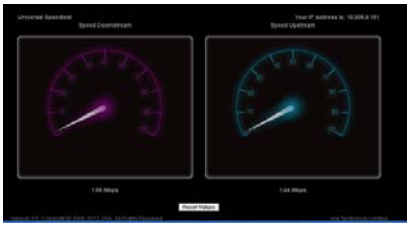
Define your active test schedules

- Schedule new tests over time to continuously inject instrumented traffic in the network. Verify continuous 24/7 lines or full topology.
- Define on-demand or scheduled tests. Define time to start your test, interval between tests, tests duration, and time to stop test. Allows running continuous proactive monitoring of tests.



Use SpeedAudit web-based testing technology to get quick available bandwidth diagnostic

SpeedAudit tools running from the hardware or virtual probes measures network throughput, latency, and packet loss from a simple web browser.

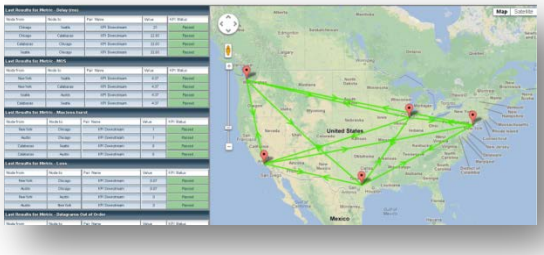


Features	Details
Feature-rich test types	More than 30 pre-calibrated tests covering unified communications, voice, video streaming, TCP- and UDP-based bandwidth tests and application testing
Test bandwidth	Use endpoint-based test on software and hardware probe combinations, or use the SpeedAudit module for easy diagnostics on available bandwidth
Web-based advanced speed test	SpeedAudit module allows running a quick diagnostic from a simple web browser against reference servers; verify end users' key throughput, delay, and loss metrics with a simple click
Topology testing	Covering node to node, one-arm real service, complex mesh, or hub and spoke topologies
Threshold setting	Threshold pre-calibrated and configured globally, can be tuned per test definition
Test schedules	Define schedules with test duration, test interval, verify 24/7, run batch test every night/week/month

Analyze results

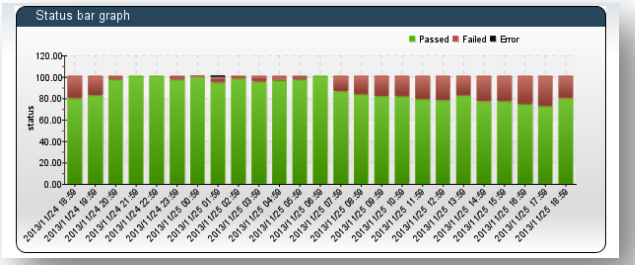
Run tests and investigate results

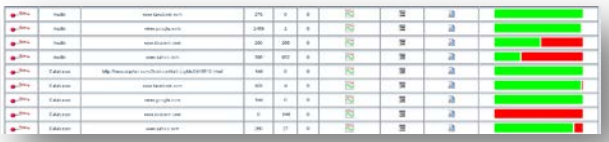
- Use different result levels and granularity to get quick and efficient results and understanding
- Ensure every team member can get to the data required with simple Pass/Fail or detailed test reports



- See results in real time in geographic dashboard

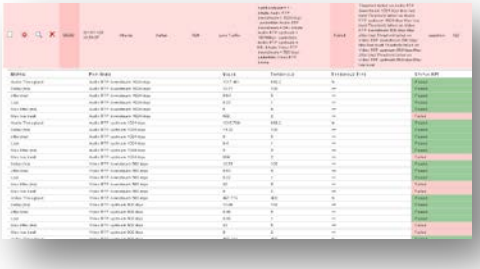
- Run your test and look at single instance results or group of tests results

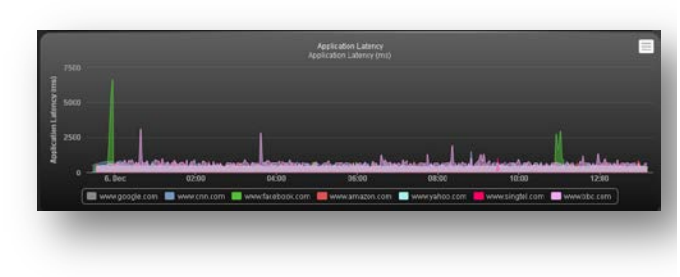




- Quickly identify problematic links

- Look at specific tests and get understanding of results





- Run trend reports and analyze network behaviors

- Export and send reports via email to share results between teams

Features	Details
Real-time dashboards	Show results in real time in geographic or trend dashboards views
Result drill-down capabilities	Get global snapshot of historical data per topology, path, and test types, and drill down into results
Simplified result presentation	See results in visual Pass/Fail format; allow any user to get a quick understanding of current network/application health
Results details	Each test result is stored with a set of KPIs and threshold results
Results comparison	All tests are stored in database for user-defined retention period and can be compared for test execution and replay

Monitor Pass/Fail for trouble spots

- Activate alarms on critical paths
- Get notified by email, SNMP traps, customized notifications

Run reports

- Reporting engine allows creation of reports and dashboards based on the results stored in the database
- Schedule daily automatic reports to follow critical networks
- Receive automatic emails with comprehensive reports

Report Type	Description
KPI dashboard	For selected time period dashboard, based on filtered criteria; contains pie chart on PASS/FAIL/ERROR and statistics on metrics
Metric trend report	For selected time period dashboard, based on filtered criteria: per metric and pair type trend report.
Last 3 days dashboard	Last 3 days dashboard (yesterday, day before, 2 days before), on filtered criteria; contains pie chart on PASS/FAIL/ERROR and statistics on metrics
Last 3 period dashboard	From current date, last 3 periods based on time selection (last hour, last day, etc.) dashboard, on filtered criteria; contains pie chart on PASS/FAIL/ERROR and statistics on metrics
Top 10 dashboard	Ranking of top 10 and worst 10 results per metric, based on selected criteria
Metric trend report	For selected time period dashboard, based on filtered criteria: per metric and pair type trend report
Full report	Combination of result, dashboard, and trend report
Per-path summary report, trend, and complete	Per path PASS/FAIL dashboards, trend, and complete dashboards + trend
Site reports	Per site report (using probe or probe group)
Test results list	Test results on filtered criteria
KPI report value	Test results with metrics on filtered criteria

Features	Details
Alarms per test	Each test can be configured with a specific set of alarms, supporting emails, and SNMP traps, as well as some customized script for OSS integration
Comprehensive set of reports	Allows flexible reports creation to understand network health and trends
Automatic report creation	Allows automatic scheduling of reports to generate automatic data mining
Send automatic reports by emails	Generate reports automatically and receive them in regular intervals in emails; open on computer or smartphone and look at your network sanity in a quick glance

IxChariot Pro Test Types

IxChariot Pro node-to-node testing

Capabilities

- Application-based TCP, UDP, or RTP flows in different traffic classes and VLANs
- Voice and video quality assessment
- Can be executed on hardware or software probes

Benefits

- Efficient troubleshooting and localization of problems
- Monitor end-user experience over time for SLA compliance
- Evaluate QoS functions in the network

IxChariot Pro mesh testing

Capabilities

- Run any traffic available in node to node in a complex topology
- Supports full mesh or point to multipoint (hub and spokes) topologies

Benefits

- Monitor end-user experience over time over a full network

Name	Description	Options	Metrics
Network KPI downstream	Test network delivery KPI with low foot print (100kbps) and 50 packets per second - from E1 to E2 direction	N/A	One-way delay (ms), jitter (ms), packet loss (%), voice MOS score, and packet loss burst
Network KPI – bidirectional	Network KPI from E1 to E2 and from E2 to E1	N/A	Per path: one-way delay (ms), jitter (ms), packet loss (%), voice MOS score, and packet loss burst
Voice – bidirectional	Voice test from E1 to E2 and from E2 to E1	Voice codec: G711 or G729	One-way delay (ms), jitter (ms), packet loss (%), voice MOS score on path
Voice N pairs – bidirectional	Test voice quality from E1 to E2 and E1 to E2 with possible G711 or G729 codecs - with multiple voice pairs (up to 100)	• Voice codec: G711 or G729 • Number of pairs (1-20)	Per path average one-way delay (ms), jitter (ms), and packet loss (%), voice MOS score on path, packet loss burst, and total throughput
Video	Define a video stream from E1 to E2 with defined bit rate and MPEG2 or customizable codec	Generated bitrate	One-way delay (ms), jitter (ms), packet loss (%), video MDI scores (Media Delivery Index, Delay Factor) on path
Traffic Mix	A combination of HTTP download, voice, and video test to assess capability of the line to sustain quality with multiple services running	Generated bitrate (video)	Combination of metrics for HTTP, voice, and video
TCP throughput 1 stream	One TCP stream - generates throughput with defined packet size and bitrate, from E1 to E2	Generated bitrate	Throughput (kbps) Upstream and Downstream
TCP throughput N streams	one TCP stream - generates throughput with defined packet size and bitrate in multiple streams from E1 to E2	• Generated bitrate • Number of Pairs (1-20)	Throughput (kbps) Upstream and Downstream

Name	Description	Options	Metrics
TCP throughput bidirectional	Bidirectional TCP throughput - with defined packet size and bitrate; TCP throughput is generated concurrently	Generated bitrate	Throughput (kbps) Upstream and Downstream
TCP throughput advanced	TCP throughput between E1 and E2	Generated bitrate, TCP send buffer size, file size, sockets size, source/ destination ports	Throughput (kbps) Upstream or Downstream
TCP optimized window size	TCP throughput between E1 and E2; optimized Window size will be calculated according to delay, throughput, and probe type	• Generated bitrate • Expected one way delay • File size	Throughput (kbps) Upstream or Downstream
UDP throughput	One UDP stream - generates throughput with defined packet size and bitrate - from E1 to E2	Generated bitrate	Throughput (kbps) - packet loss
UDP throughput bidirectional	Bidirectional UDP throughput - with defined packet size and bitrate; UDP throughput is generated concurrently	Generated bitrate	Throughput (kbps) - packet loss Upstream and Downstream
UDP throughput advanced	UDP throughput between E1 and E2	• Generated bitrate • File size • Send buffer size • Source/destination ports	Throughput (kbps) Upstream or Downstream
Microsoft Lync test	Microsoft Lync Unified Communication traffic; includes combination of audio and video streaming traffic	Generated bitrate audio and video; DSCP setting for each traffic type and packet size	Upstream/Downstream loss, jitter, delay, throughput, loss bursts (max consecutive packet loss), max jitter
Office 365 Exchange Send/Receive	Microsoft Office 365 Exchange traffic	Number of users – global bitrate send/receive emails, average email size send/receive	Email transaction average time (send and receive), total throughput
HTTP test	E2 downloads web pages (customizable sizes) from E1	N/A	Throughput (kbps) Upstream and Downstream

Node-to-node other test types

Any test from the extensive IxChariot testing library can be imported through a GUI by an IxChariot Pro administrator.

- Over 150 application tests available:
  - Citrix and Microsoft remote desktop
  - Oracle, SAP, and SQL Server
  - Microsoft Exchange and Lotus Notes
  - Kazaa, Bittorrent, etc.
  - Real Media, NetMeeting, etc.
  - HTTP, FTP, DNS, NNTP, POP, Telnet, etc.
  - AIM, ICQ, MSN Messenger, Yahoo Messenger
  - FPS and RTS games and more
- VoIP calls: voice codec emulation, including G.711, G.723, G.726, and G.729, AMR (narrow and large band).

- Video Streams – Multicast, Unicast, MPEG2 and MPEG4, SD and HD Built-in tool to build your own application from network recording.

IxChariot Pro real service testing

Capabilities

- Verify availability and KPIs from web sites
- Measure application response time
- Measure response times of servers and network elements
- Evaluate real service behaviors on the network

Benefits

- Continuous monitoring of services
- Understand impact of applications and network on service delivery chain
- Real service testing is performed between the testing probe (acting as a client) and a server on the Internet; the probe will access the service and compute key performance indicators for the test

Name	Description	Metrics
HTTP test	Download HTTP pages with HTML only or with all options	Download time, download size, download bitrate, connection time, time to first byte
ICMP test (ping)	Send ICMP requests to IP address or URL; configurable options are: • Ping request interval • Ping request count • Ping packet size	Packet loss. Round trip delay (avg./max/min), standard deviation
DNS test	DNS test inputs: • URL for test • DNS server used to resolve the name (can use the default one configured on the probe)	Availability, response time
FTP test	FTP server test with login, password, and download file	Download file from server, response time, and transfer rate
Traceroute	Traceroute to IP address or URL	Report on route to reach destination
HTTP advanced test	Download HTTP pages	• Max time and average time to first byte • Download rate and time • File size, number of files
YouTube test	Download YouTube video	• Video download bitrate and download time • Video duration and required bitrate • Video size and name