DATA SHEET

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

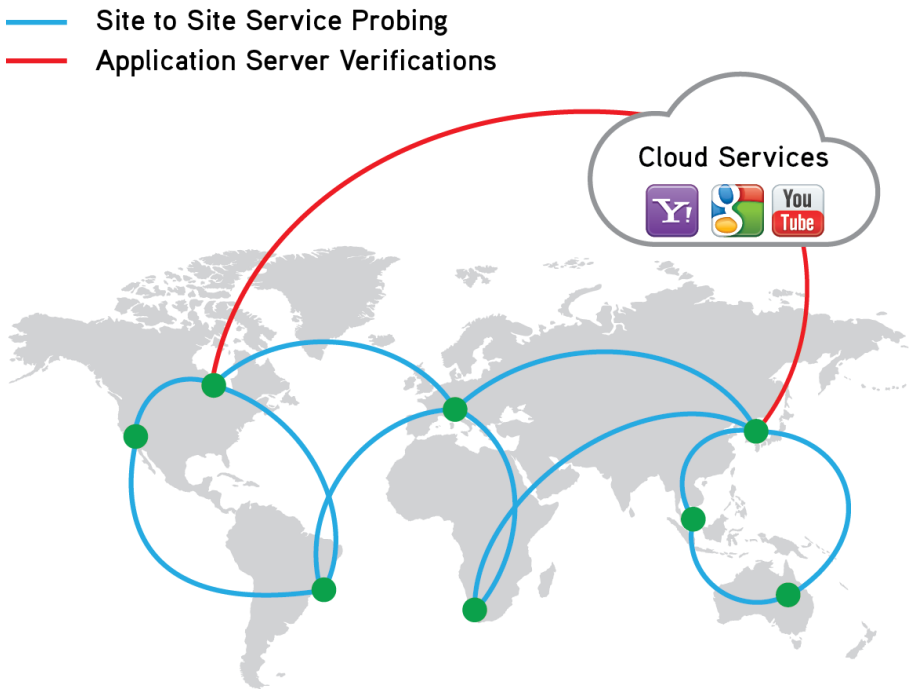


Figure 1 – Hawkeye Deployment

Key features

- Hawkeye brings Ixia advanced network and application testing technology into live networks
- Designed for network assessments and active monitoring for field and production networks, Hawkeye 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

Hawkeye Quick Feature Overview

- Web-based platform for multi-user access, test scheduling, data storage, and real-time analysis
- Deploy endpoints with turnkey hardware or software endpoints for virtual infrastructure
- Automatic endpoint configuration, install endpoints within complex network topologies including NAT and FW
- 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

Hawkeye Solution Components

How Does Hawkeye Work?

Deploy web server and endpoints

- Deploy Hawkeye web server in central locations
- Strategically-deploy software and hardware endpoints 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

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 problem is real or transient

XR2000 and XRPi2 Active Monitoring Endpoint

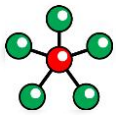
The plug-and-play XR2000 and XRPi2 endpoint works with the Hawkeye web-based management server to enable assessment and monitoring of network and application performance in only two clicks. The endpoint features easy setup and management for seamless integration into live network environments.

They can be installed behind NAT and FW and would automatically connect to Hawkeye management console to be ready to assess networks.

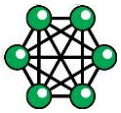
Features	Details
Central web-based management server	Installed on Linux Operating System – web-based access for operations and administration
Software installation endpoints	Support for Windows, Linux, Mac OS, Android, iOS, Unix
Hardware endpoints	XR2000, XRPi2
Endpoints auto-discovery	Central server automatically detects new endpoint install and discovers IP addresses
Endpoints advanced configurations	Supports VLAN, advanced routing, IPv6, etc., allowing easy integration with any network topology

Plan and design your active test scenarios

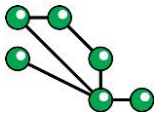
- Define test topology with node-to-node or mesh with hub and spoke
- Build large topology test (full mesh) with one click



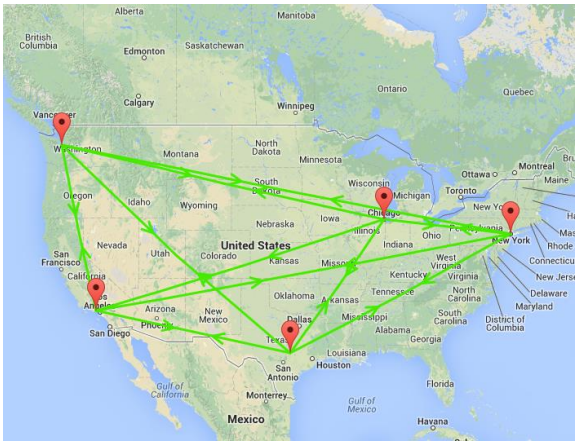
Hub and Spokes



Full Mesh Topology



Custom Topology



Select test types among default pre-calibrated tests in Hawkeye library

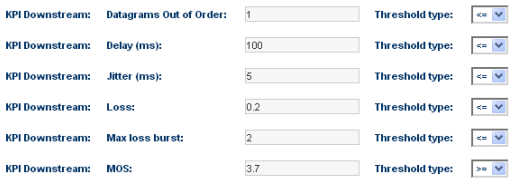
Hawkeye supports a variety of service level agreement (SLA) objectives – from pure network L2 bandwidth availability verification to advanced metrics such as one-way delay/jitter/loss on specific network path.

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.

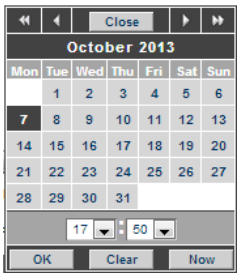
See supported *Hawkeye Test Types* section for full test details. Hawkeye offers a lot of flexibility for customizing specific tests, traffic mixes, multiple class of service (COS) testing, etc.

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



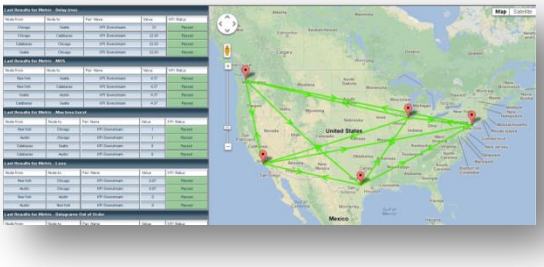
- Schedule new tests over time to continuously inject instrumented traffic in the network. Verify continuous 24/7 lines or full topology.
- Define on-demand or scheduled tests. Define time to start your test, interval between tests, tests duration, and time to stop test. Allows running continuous proactive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

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 endpoint combinations, or use the SpeedAudit module for easy diagnostics on available bandwidth
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

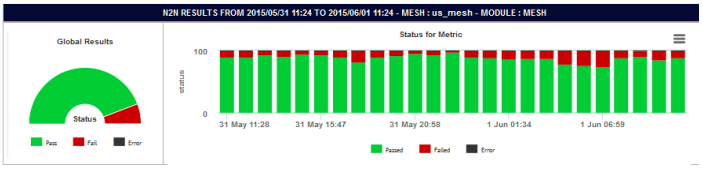
Run tests and investigate results

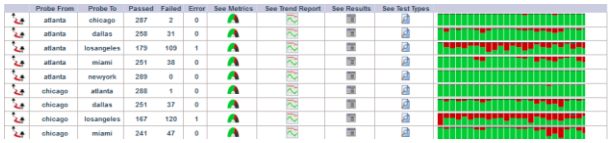
- Use different result levels and granularity to get quick and efficient results and understanding
- Ensure every team member can get to the data required with simple Pass/Fail or detailed test reports



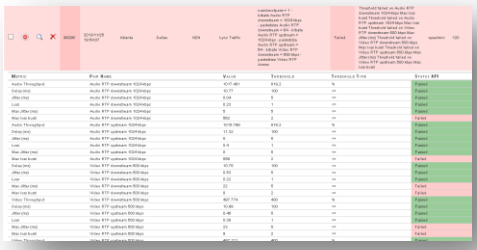
- See results in real time in geographic dashboard

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

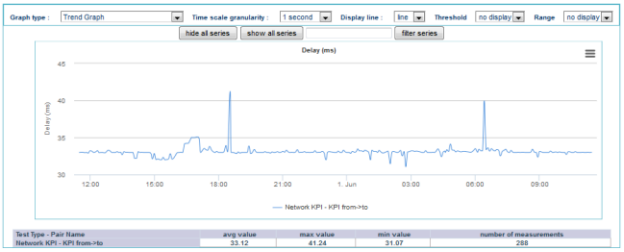




- Quickly identify problematic links



- 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
Metrics summary	Based on selected filters, displays the global results and per metric pass/fail statistics
Metrics trend	Based on selected filters, displays the global results and per metric pass/fail statistics and adds a trend report per selected metric
Last 3 period dashboard	From current date, Last 3 period 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 N dashboard	Ranking of worst 10 results per metric, based on selected criteria
Per path metric matrix	Displays a metrics per path with average/min and max, per test type and metric. It is particularly convenient for Mesh tests results investigation
Per path Status matrix	Results are presented into color codes with matrix for meshes. This is a simpler more visual way to display the results than per path metric matrix report
Paths Error/Fail Summary	This report displays the number of errors reported and numbers of failures reported with % of total tests.
Paths Error/Fail Summary per KPI	This report displays the number of failures reported with % of total tests per KPI and sort them based on maximum rates failing
Per path summary	Does a KPI summary report per path in selection
Per path trend	Does a KPI trend report per path in selection

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

Hawkeye Test Types

Hawkeye 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 endpoints.

Benefits

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

Hawkeye 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
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

Name	Description	Options	Metrics
TCP optimized window size	TCP throughput between E1 and E2; optimized Window size will be calculated according to delay, throughput, and endpoint 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

Hawkeye 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 endpoint (acting as a client) and a server on the Internet; the endpoint 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 endpoint)	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
YouTube test	Download YouTube video	• Video download bitrate and download time • Video duration and required bitrate • Video size and name

Ordering Information

Part Number	Description
920-2401	Hawkeye, 10 Endpoint Solution Bundle Includes: Hawkeye central management system (920-2410), 10 endpoint (sw or hw) registration & use (920-2421), 30 pairs node to node test license (920-2429), and 1 user seat license (920-2411)
920-2402	Hawkeye, 25 Endpoint Solution Bundle Includes: Hawkeye central management system (920-2410), 25 endpoint (sw or hw) registration & use (920-2422), 75 pairs node to node tests license (920-2430), 5 real services tests (requires XR2000 or XRPi2) 920-2451, and 2 concurrent user seat license (920-2412
920-2403	Hawkeye, 50 Endpoint Solution Bundle Includes: Hawkeye central management system (920-2410), 50 endpoint (sw or hw) registration and use (2x 920-2422) 150 pairs node to node test license (2x 920-2430) 10 real services tests (requires XR2000 or XRPi2) (2x 920-2451), and 2 concurrent user license (920-2412)
920-2404	Hawkeye, 100 Endpoint Solution Bundle Includes: Hawkeye central management system (920-2410), 100 endpoint (sw or hw) registration & use (920-2423), 300 pairs node to node tests license (920-2431), 25 real services tests (requires XR2000 or XRPi2) (920-2453) and 5 concurrent user license (920-2413)
920-2405	Hawkeye, 200 Endpoint Solution Bundle Includes: Hawkeye central management system (2x 920-2410), 200 endpoint (sw or hw) registration & use (920-2424), 1200 pairs node to node tests license (2x 920-2431), 50 real services tests (requires XR2000 or XRPi2) (920-2454) and 5 Concurrent user license (920-2413)
920-2406	Hawkeye, 400 Endpoint Solution Bundle Includes: Hawkeye central management system (2x 920-2410), 400 endpoint (sw or hw) registration & use (2x 920-2424), 1800 pairs node to node tests license (3x 920-2432), 100 real services tests (requires XR2000 or XRPi2) (920-2454) and 10 concurrent user license (920-2414)
940-0008	XR2000 Active Hardware Endpoint; integrated hardware endpoint for IxChariot OR Hawkeye; Licensed for 2 active test ports; AC unit. requires adjunct or previous purchase of IxChariot Floating Bundle (920-0055 through 920-0064) OR Hawkeye Bundle (920-2401 through 920-2406)
940-0040	XRPi2 Active Hardware Endpoint; integrated hardware endpoint powered by Raspberry Pi 2 Model B (940-0040), for use with either IxChariot OR Hawkeye. Licensed for one active test port; 5V AC unit. Requires adjunct or previous purchase of IxChariot Floating Bundle (920-0055 through 920-0064) OR Hawkeye Bundle (920-2401 through 920-2406)