



205 Westwood Ave
Long Branch, NJ 07740
1-877-742-TEST (8378)
Fax: (732) 222-7088
salesteam@Tequipment.NET

voice
+
data

VoIP Performance Management

*From edge to core, nobody can manage
your VoIP performance in a converged
environment like Fluke Networks.*

Enterprise Performance Management Solutions



Fluke Networks Enterprise Performance Management Solutions help IT professionals responsible for enterprise-wide network performance meet internal SLAs, deploy and manage VoIP in a converged network, and deliver superior application performance to users. We help to answer critical management questions by providing network visibility with dashboard software and hardware so enterprises can maximize their IT investments.

Why are we different?

Fluke Networks offers a unique mix of portable and distributed hardware and software solutions that provide visibility from users to the core – desktop/phones throughout the LAN and across the WAN. Our solutions are designed with specific users and needs in mind from the frontline technician who must validate the physical cable as well as proper configuration between the phone and the call manager all the way up to the NOC where visibility, troubleshooting and management capabilities across the distributed enterprise are crucial to maintaining internal SLAs.



How we can help

Fluke Networks offers a complete knowledge base of resources like whitepapers, on-demand and live webinars, as well as documentation of best practices to help you get the most out of your IT resources. *Topics we cover include:*

- VoIP performance management for a converged network
- VoIP pre-deployment assessment
- VoIP management options: IP PBX enterprise management software
- Migrating to an MPLS based network
- VoIP basics for IT technicians
- Application performance management
- Understanding the true costs of application performance problems
- Service level management
- Effective change management through application performance monitoring
- Improve networked application performance through SLAs
- Managing network traffic for better application performance
- *And more...*



For more detailed information, visit us at www.flukenetworks.com/epm



Our mission is to help organizations deliver superior IT services to the business by maximizing the value of the infrastructure through best of breed solutions for delivering quality end user experience via proactive monitoring and management as well as reactive troubleshooting and recovery.

Fluke Networks VoIP Performance Management Solutions – a lifecycle approach

Fluke Networks VoIP best practices

Fluke Networks supports best practices and a lifecycle approach that allow you to measure infrastructure effectiveness in a converged voice and data environment, build out and transition new networks, and quickly zero in on application performance issues. Our edge-to-core visibility – from the phone that initiates the call, to the LAN and VLAN components, to the WAN core that routes the traffic between multiple locations all the way to receiving phone – gives network managers complete network visibility. All products showcased in this brochure provide insight into both the voice and data environment at various points throughout a distributed network – from users to the data center and points in between.

Fluke Networks VoIP Performance Management Solutions enable organizations to successfully deploy and manage VoIP to leverage its benefits without negatively impacting data performance within a converged network.

This is critical to enterprise performance as voice and data converge, since each has the potential to impact the other. Having network, application, and VoIP-specific analytics allows you to clearly see how data traffic is affecting call quality, and how VoIP traffic is affecting data quality.

Our solutions also apply to various steps in the assess, monitor, manage and optimize lifecycle approach – all key to successfully implementing VoIP in your organization.

Assessment

Is your infrastructure prepared to deploy and support VoIP? Without a complete assessment of your network infrastructure from LAN and WAN to desktops and phones, you run the risk of major performance issues – both with existing applications and with your VoIP rollout. *Your assessment should:*

- Baseline and monitor actual usage and performance prior to deploying VoIP and determine if the network should be modified to handle voice calls.
- Verify that all elements are communicating properly. Determine whether the call set-up time is acceptable. Verify voice quality, checking for jitter, latency, and dropped packets on individual phones and conversations.
- Show that each drop is active (wall jack, cable and switch ports are functional); each phone can receive power from the switch; each phone can communicate properly with network servers; and each switch port is configured properly.
- Establish a performance baseline for system availability and call quality.

Monitor

Does your VoIP call quality meet your goals? Do you have network visibility to address VoIP issues before they affect end-users? Once you have deployed VoIP, monitoring detailed actual traffic – both voice and data – is the next step to identifying, isolating and managing performance issues in a proactive manner. The key to proactive monitoring is to identify potential issues before performance is actually degraded.

Manage

Your management and troubleshooting strategy needs to be broad – giving you visibility from the edge phone to the WAN link, between remote locations, and from the core across the vista of your entire network. This is critical to identifying and isolating the cause of degradation to reduce the MTTR when seconds and minutes saved often go straight to the bottom line.

Optimize

Making the most of VoIP is an ongoing process that requires capacity planning and traffic management, baselining performance, and continuous improvement. Ultimately, it is a matter of visibility and control. For an IT manager with a converged network, the management information ranging from the edge-to-the-core is critical to making control decisions that improve performance.

STEPS FOR VoIP LIFECYCLE MANAGEMENT

Assessment



Ensure your network infrastructure can support VoIP.

Monitor



Make sure call quality meets goals.

Manage



Isolate and resolve issues.

Optimize



Track usage and identify trends.

Enterprise Performance Center

The Enterprise Performance Center is a web-based portal that provides customized reports and role-specific views for different groups in your organization, such as engineering, operations, and management to enable staff at all levels to:

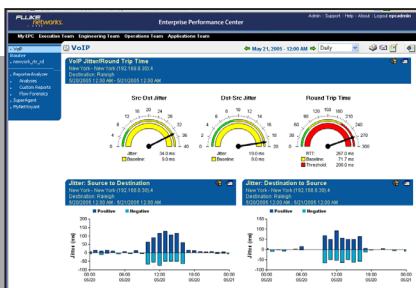
- Manage the convergence of voice, video and data
- Understand how changes affect network, voice and application performance
- Measure end user application response times
- Isolate performance problems to the application, server, or network
- Identify the applications and users consuming bandwidth, and when, including changes over time
- Leverage embedded data sources such as Cisco IOS NetFlow, IP FIX, RMON and IP SLAs

Enterprise Performance Center provides fast visibility into the worst performing networks, slowest servers, applications and most errored devices. Seamlessly combining a variety of critical performance metrics from numerous data sources, Enterprise Performance Center encourages the entire IT team to collaborate in delivering improved performance to the business.

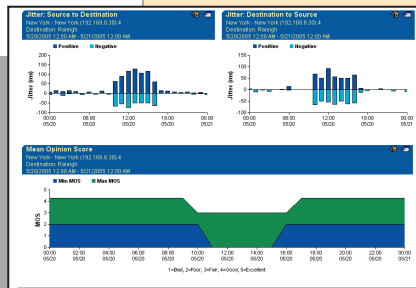
Unified network, application, and device performance management for converged environments in a web-based dashboard

Capabilities

- **Assessment** – Enterprise Performance Center utilizes embedded data sources which can help in determining where potential performance bottlenecks exist. IP SLAs can be used to simulate voice transactions from router to router to determine in advance what quality of service the WAN infrastructure will deliver.
- **Monitoring and measurement** – Enterprise Performance Center can help to quantify the volume of VoIP traffic on the network, who is using it and when. Historical views can be used for capacity planning and monitoring the growth of VoIP traffic across the network over time. Automatic performance baselines provide visibility into normal performance and aid in identifying performance problems before the end-users are impacted.
- **Troubleshoot** – If VoIP bandwidth consumption causes a change in the behavior of a business-critical application, Enterprise Performance Center provides the detailed data needed to quickly get to the root cause. If the performance characteristics of a server (such as a call manager) changes, automatic problem notifications and investigations occur, alerting the appropriate staff of the problem and providing them with the data they need to perform quick triage – while the problem is occurring.



EPC allows quick views to show deviation from norms, jitter source and MOS statistics to ensure complete visibility into VoIP quality.



LIFECYCLE **A M M O**

“Enterprise Performance Center is critical to understanding end-to-end performance for all the users of our network.”

Steve Rocco
Mine Safety Association

Visual UpTime® Select™

Visual UpTime Select is a unique system for monitoring and managing voice and data applications across an enterprise's infrastructure. By integrating the analysis of application performance with network performance, IT departments can take a holistic approach to managing application performance across the network. Visual UpTime Select's objective is to enable IT departments to measure the success in business terms based on the high performance of the mission-critical applications across all locations.

With Visual UpTime Select, you can improve network application integrity, as well as:

- Provide confidence to deploy business-critical applications – including VoIP.
- Improve business performance by increasing application availability and understanding the applications and network domains.
- Reduce operational costs by developing more efficient application performance solutions without having to add more bandwidth.
- Proactively access performance data from across the entire infrastructure to uncover unauthorized applications, bandwidth hogs, viruses, congestion areas and trends.
- Optimize bandwidth by allocating bandwidth to maintain application performance without exceeding budget.

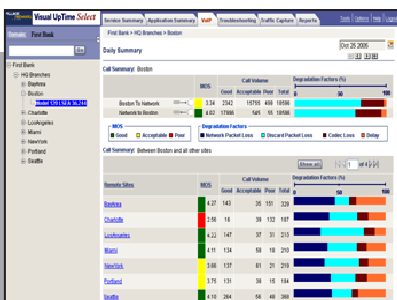
Customized software and hardware for managing network application performance

Capabilities

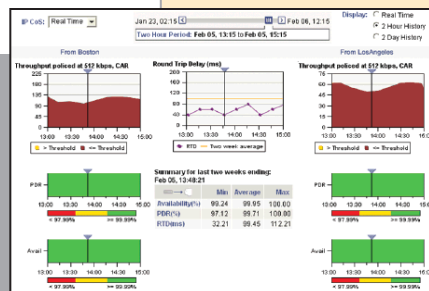
The Select VoIP module provides complete visibility into VoIP performance across the network. With Visual UpTime Select, you receive detailed per-site VoIP pre-assessment capability in addition to ongoing performance management with granular visibility of individual calls and the ability to pinpoint the cause of degradation from Layers 1-7.

The Select VoIP Module allows:

- **Assessment** – Select VoIP baselines existing usage and delivers extensive analysis by monitoring VoIP standards and setting customizable thresholds.
- **Monitoring and measurement of VoIP** – Visual UpTime Select provides a cost-effective solution for managing VoIP and data applications across the entire infrastructure. Select VoIP provides both per-call Mean Opinion Score measurements and internal network SLA measurements such as availability, packet loss, jitter and latency.
- **Troubleshooting VoIP performance problems** – Instead of just providing a Mean Opinion Score, Select VoIP can quickly identify, isolate and resolve poor performance at any site with real-time and historical troubleshooting capabilities. For site-specific problems, administrators can investigate sites in detail to discover VoIP performance decline. For intermittent problems, administrators can also go back in time to investigate individual calls in detail to determine the cause of poor performance.
- **VoIP reporting** – Select VoIP offers predefined reports for VoIP networks, from pre-deployment assessment reports to ongoing performance reports. Other reports highlight enterprise-wide issues such as sites with poor performance, changes in network performance and call volume distribution.



Monitor quality to identify degradation before end users are impacted.



Up-to-the-minute view of service level parameters including packet loss, delay and availability.

LIFECYCLE **A M M O**

"Once we began to use the full functionality of the product, we were instantly more productive and wanted all of our sites to be instrumented with Visual – yesterday."

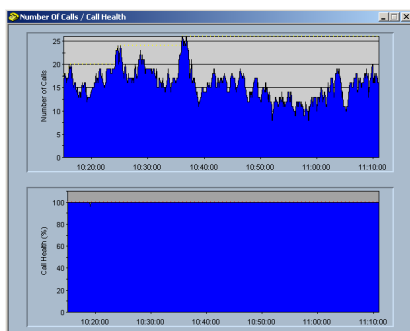
Doug Anderson,
Technical Analyst, AgriBank

OptiView™ Link Analyzer and Protocol Expert

Real time VoIP monitoring, diagnostics and Quality of Service (QoS) analysis in Protocol Expert and Link Analyzer make it easy to view your VoIP traffic in aggregate, by call or in detail by channel. QoS for VoIP is commonly assessed using a mean opinion score.

Link Analyzer and Protocol Expert provide quality of service scores for all VoIP traffic, each call (and each channel) in real-time. This makes it easy to monitor performance without having to rely on active testing and associate end point agents. A wide range of alerts and traps will also help you recognize degraded performance before end users.

If you do need to troubleshoot, Protocol Expert and Link Analyzer provide detailed packet analysis capabilities with support for the latest signaling protocols.



Call Volume/Health graph show real-time "state" of the application.

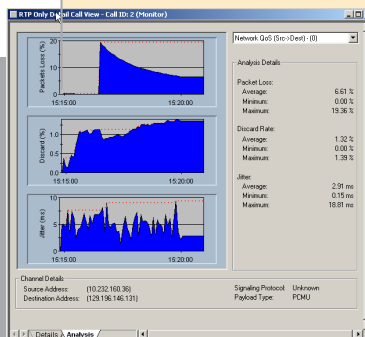


OptiView™ Link Analyzer

A hardware analyzer that provides real-time packet capture/analysis, QoS metrics and alerts

Capabilities

- At the highest level, an overall Call Volume Health report shows the current VoIP activity and quality being experienced. This quick view lets you instantaneously see the current "state" of the application and whether further investigation is warranted.
- Protocol Expert and Link Analyzer provide a call-by-call table showing important statistics like jitter, dropped packets and MOS scores for each call and each channel in that call. The sortable columns make it easy to view by callers, quality or time. Because calculations are made from the actual traffic and RTP statistics, a comparison can be made between what phone users are experiencing and observed performance at critical locations.
- Further drill-down analysis will show channel details for an individual call with QoS and statistical analysis broken down by the direction of the traffic flow. This is imperative when trying to isolate the location of impairment. While overall call grading is great for identifying when an issue is occurring, only this channel level of detail will help you isolate the direction to be investigated.
- For the data center managers, Protocol Expert and Link Analyzer have Etherchannel and 802.11 ad aggregated link analysis support. Today's larger data centers are utilizing aggregated gigabit links in order to gain up to 4Gbps of throughput for their enterprise applications. This is done by virtually connecting two full duplex gigabit links into a 4Gbps truck.
- For application analysis in this type of environment, two link analyzers can be controlled as if they were a single resource – capture filters, packet views, scheduled captures, configurations changes and start/stop commands are all applied simultaneously.
- Using two link analyzers provides you with the flexibility to later redeploy these products in a number of other configurations. If you have dual homed servers, asymmetric routing or redundant network paths, Protocol Expert and Link Analyzer will ensure visibility necessary to manage applications and end user satisfaction in these environments.



Protocol Expert's real time VoIP monitoring provides instantaneous measurements of QoS and call volume.

LIFECYCLE **A M M O**

OptiView™ Integrated Network Analyzer

The OptiView Series III Integrated Network Analyzer transforms the ordinary start-up screen into an information-rich network front page that simultaneously displays the results of multiple advanced network functions. With this level of expert automation, you get a comprehensive understanding of your network within seconds – gathering information at a glance that you'd have to drill down to get from an assortment of other tools.

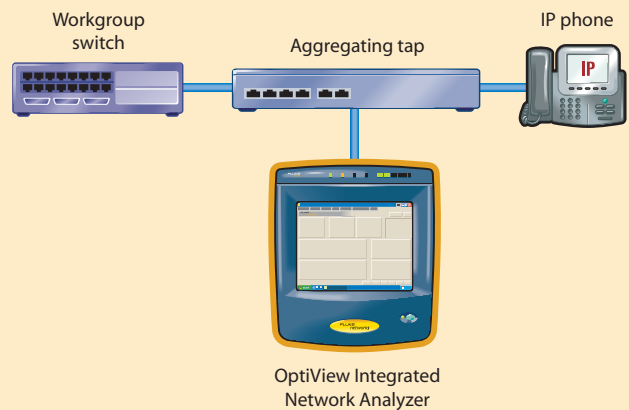
VoIP Analysis Option

H.323, SIP, MGCP, and SCCP are key industry quality standards that regulate VoIP communication. These standards address call control, multimedia management, bandwidth management, and interfaces between LANs and other networks. The OptiView VoIP option provides the capability of analyzing multimedia traffic over Ethernet-based networks, validates these QoS parameters presented by PSTN/IP Gateways, IP switches, and IPBXs, and offers a rich set of reported and calculated data to validate networks that carry the multimedia data.

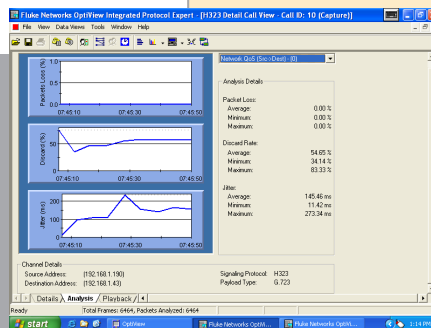
Portable analyzer for LAN, WAN VoIP and WLAN analysis, monitoring and troubleshooting.

Capabilities

- OptiView Series III VoIP option validates that the network is performing as it has been configured and helps you troubleshoot problems and provides graphical summaries of call jitter, dropped packets, and call set-up time to view network performance at a glance.
- Full protocol decodes and important QoS metrics in an easy-to-access graphical interface. Given the non-deterministic nature of IP, the measurement of the actual call traffic is an essential tool to ensuring network QoS.
- A portable solution to measure the QoS of all the existing calls and enables solving “real-world” call problems in a deployed environment.
- Full decode of multimedia protocols provides users with the ability to look at any captured packet and understand its contents.



OptiView™ Integrated Network Analyzer



By selecting the Analysis tab, you can see the phones involved in voice exchange, the signaling protocol and the CODEC being used.

LIFECYCLE **A M M O**

NetTool™ Series II Inline Network Tester

Verify, isolate, and document network connectivity and application port response problems faster than ever before with NetTool Series II and NetProve diagnostics. With a NetTool Series II inline tester, in seconds you can prove whether the network is at issue for latent applications by verifying connectivity to key network devices and service ports. If the network is at fault, NetProve diagnostics will isolate the source of the problem so you can fix it fast.

If it is not the network, NetProve diagnostics will identify which application port is slow to respond so you can dispatch the appropriate resource to correct the problem. This revolutionary new way to resolve connectivity and application port response issues is at least four times faster than conventional methods, resulting in improved productivity and happy users.

And NetTool improves IT staff efficiencies through improved workflow – simply create multiple catalogs representing various segments of your network. Within minutes, you can prove connectivity to up to 100 enterprise key devices and services.

Vision into network devices and application connectivity problems

VoIP testing and troubleshooting – capabilities

- The **Boot Log** displays key boot events such as DHCP address acquisition, DNS lookup of call servers and gateways, downloading of operating files, and call server registration. NetTool VoIP supports complete troubleshooting of the IP phone boot process including physical layer tests of structured wiring, patch cables, switch port configuration, VLANs and PoE pairs, voltage and current.
- The **VoIP Log** displays call control events, QoS configuration, and call quality metrics. The log records call setup, configuration, and tear down of a call in progress. As the call proceeds, the RTP configuration is displayed, including IP addresses and ports used, VLAN priority or Diff Serv and codec. Once the call is completed, the log displays the RTP quality metrics such as jitter and dropped packets.
- The **VoIP Monitor** feature tracks call quality in progress by measuring the RTP stream and displaying the number of frames, dropped frames, out of sequence frames and jitter. The monitor also displays RTCP endpoint information such as jitter and dropped packets. Statistics are available for both the phone side and the network side while a call is in progress. You can now see into VoIP calls by connecting between the IP phone and network and solve many problems without the need of a protocol analyzer. Diagnose phone boot-up problems, call control and measure key call quality metrics. NetTool Series II is compatible with IP phones employing either SIP, SCCP or H.323 call control protocols.

PoE measurements

Fully characterize your 802.3af Power over Ethernet (PoE) links prior to the roll-out of PoE services or the installation of powered devices. Use in single-ended mode to verify the PoE pairs, line voltage and current to ensure a successful deployment. Place a NetTool inline between a VoIP phone and PSE to troubleshoot PoE link configuration issues.



NetTool™ Series II
Inline Network Tester

VoIP Monitor	
Phone Network	
RTP frm	438 437
RTP drop	0 31
RTP jttr	1ms 2ms
RTP seqEr	0 0
RTCP frm	432 433
RTCP drop	0 28

VoIP Monitor tracks call quality.

VoIP Log	
SCCP CM:129.196.197.244	
OFF HOOK	
START TONE: Inside	
Keypad:	2
Keypad:	0
Keypad:	0
Keypad:	7

VoIP Log displays call control events.

LIFECYCLE **A M M O**

"The reliability of the measurement instruments as well as excellent sales support are the key reasons why we have repeatedly chosen Fluke Networks solutions."

Norbert Feichtinger
IT Manager, Engergie AG/Europe

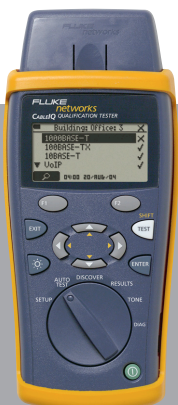
Cable IQ™ Qualification Tester

When you deploy VoIP or Gigabit Ethernet, you want to **make sure the existing cabling will support the bandwidth requirements of your new equipment.** Your cabling was certified, but moves, additions and changes may have rendered many links incapable of running desired speeds.

Copper qualification tester troubleshoots and qualifies cabling speed (10/100/1000/VoIP).

Capabilities

- CableIQ quickly reveals whether a link, including patch cords, is qualified for voice, 10/100BASE-T, VoIP, or Gig. Knowing your cabling's bandwidth capabilities before upgrading can prevent countless hours of future downtime and labor hours wasted on unnecessary troubleshooting.
- CableIQ's four-second autotest also clearly indicates with a check mark which speeds and applications the tested cable can run.



CableIQ™ Qualification Tester

Building: Office: 3	X
1000BASE-T	X
100BASE-TX	✓
10BASE-T	✓
VoIP	✓
04:00 20/AUG/04	

LIFECYCLE **A** **M** **M** **O**

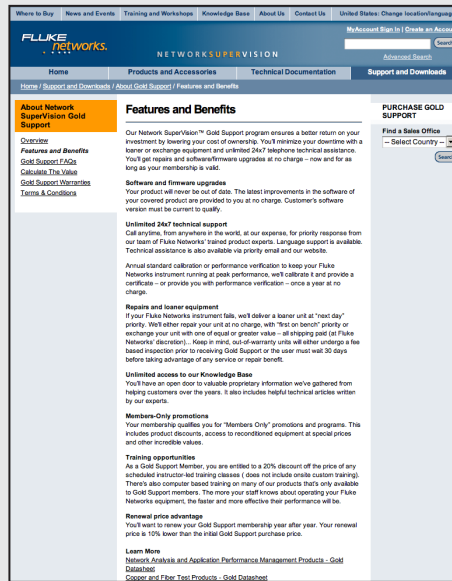
Fluke Networks Gold Service and Support

Support

Our Network SuperVision Gold Support plans give you exclusive services and 24/7 technical assistance. Sign up for our Gold Support plan and you'll enjoy outstanding privileges to protect and add value to your investment in Fluke Networks products.

Benefits include:

- Unlimited tech assistance seven days a week, 24 hours a day via phone or at our web site support center.
- No fee for repairs on covered items and overnight exchange/loaner units for uninterrupted service.
- Free software and firmware upgrades. Scheduled calibration and performance verification services.
- Unlimited web based training and discounted pricing on instructor-led and custom on-site training programs.
- Access to our extensive Knowledge Base library of operation and application related technical articles.
- "Members Only" special prices and promotions.



Some benefits are not available in all countries. See www.flukenetworks.com/goldsupport for more information.

Training, workshops and seminars

Fluke Networks offers training programs that help the performance and productivity of all IT professionals. Training courses and materials are offered in a wide range of formats – from hands-on classes taught by industry experts at our training sites or yours, to a wide variety of online training modules, seminars and training reference materials. For more details and a complete schedule of events, go to www.flukenetworks.com/training.

Technical assistance

Have a question? Need help troubleshooting a technical issue? Looking for knowledgeable advice on which Fluke Networks solutions will best meet your network analysis needs? The certified support technicians at our Technical Assistance Center are here to help. In the U.S. and Canada, call **1-800-283-5853**. From other countries, call **1-425-446-4519**.

History of innovation, powerful backing and global reach – a partner for life

Our history of innovation, product quality, and customer service began in 1948. Today, Fluke Networks is part of the Danaher Corporation, a Fortune 500 company and leading manufacturer of professional instrumentation, industrial technologies, and tools and components with revenues of more than \$9 billion (USD) annually and on a strong growth path. Our global reach of sales offices, laboratories, factories, home and retail environments crosses six continents and provides our customers with the peace of mind that they made the right choice in collaborating with Fluke Networks for all their Enterprise Performance Management needs.

Ensure a better return

When you partner with Fluke Networks, you get the support training and tools you need to grow your business. Our support programs give you access to technical expertise, product support and responsive service – anytime, anywhere. Plus, we have the training courses, technology seminars and tools to keep your skills at the highest level.

