JDSU Network Analyzer 10 Gigabit Ethernet Analysis Solution

Wireline Protocol Test

Key Features

- Decreases operational costs and accelerates network problem diagnosis and resolution by accessing virtually any network, running any protocol, from anywhere, by anyone, at any time
- Supports real-time measurements in any Ethernet 10/100/1000 Mbps and 10 Gigabit environments
- Capture 100% of network traffic at 10 Gbps
- Extensive data and voice measurements, including full protocol analysis
- Advanced packet analysis and statistics, packet jitter, loss and latency

Applications

- Expert Analyzer graphs
- TCP connection analysis
- Multi-segment jitter, latency, packet loss
- Encapsulation discovery
- Protocol commentator
- Protocol statistics
- Node discovery
- Baselining
- Protocol vitals
- Connection statistics
- User-define decoding
- IPV6 protocol analysis
- Active tests

Network Analyzer

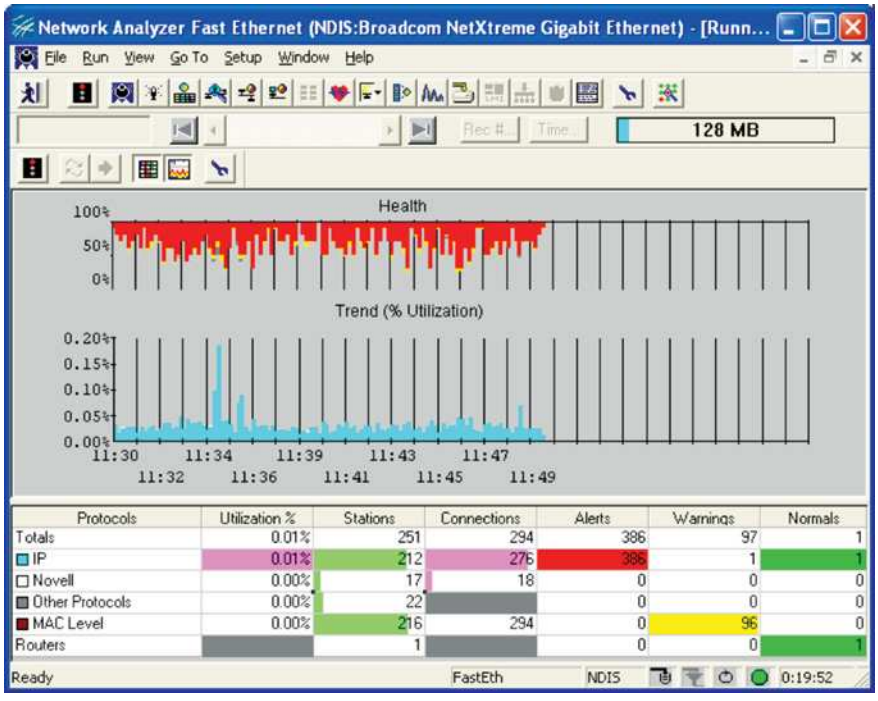
The Network Analyzer software enables network professionals to maintain and optimize voice and data services quickly over next-generation networks. It also decreases operational costs and accelerates network problem diagnosis and resolution by accessing virtually any network, running any protocol, from anywhere, by anyone, at any time.

The JDSU proven network troubleshooting solution adds 10 Gigabit Ethernet support to help you meet and exceed your customer satisfaction objectives. Reduce start-up time and eliminate costly training by utilizing a tool that your technicians can immediately use to solve more network problems, more quickly.

Hit the ground running with the easy-to-use JDSU 10 GigE Network Analyzer:

- Power – Capture 100% of network traffic at 10 Gbps. Advanced Ethernet packet capture and processing means you will never miss the network problem.
- Breadth – Extensive data and voice measurements, including full protocol analysis provides you with the right information to make effective decisions.
- Depth – Advanced packet analysis and statistics, packet jitter, loss and latency, extensive front-end capture filtering, and full remote control ensure you solve problems the first time.

The Network Analyzer, in conjunction with the J6872A 10 GigE Interface, provides an expert network testing and troubleshooting solution that supports real-time measurements in any Ethernet 10/100/1000 Mbps and 10 Gigabit environments.



The JDSU Network Analyzer expert solution identifies problems by severity to prioritize troubleshooting and ensure quick problem isolation.

The J6865A Network Analyzer 10 Gigabit/Gigabit Ethernet Software

Extensive wireline protocol test capabilities include:

- Test over 10 Gigabit Ethernet or 10/100/1000 Mbps Ethernet interfaces
- Solve network problems quickly and effectively with the Expert Analyzer
- Anticipate network problems using performance statistics and vitals
- Analyze critical full-duplex server or backbone links
- Obtain comprehensive network statistics
- Decode 500+ protocols across all seven OSI layers
- Test in IPv4 and IPv6 (or mixed IPv6 and IPv4) environments
- Navigate easily with the graphical user interface
- Generate LAN traffic on a 10 Gbps link or on 10/100/1000 Mbps Ethernet links
- Analyze MPLS for troubleshooting converged networks
- J6865A is the base software used with the 10 GigE/GigE Blade interface
- Runs on the PC or server hosting the Blade interface
- Provides real-time or off-line analysis, allowing previously captured and saved LAN data from any Network Analyzer hardware platform to be re-analyzed using the full features available on-line for captured data

Guided troubleshooting allows you to:

- Get continuous feedback on key network issues
- Identify problems by severity to prioritize troubleshooting
- Isolate faults quickly without extensive protocol knowledge, using drill-down sequences
- Get extensive on-line help to explain problems and recommend solutions

Information for understanding network issues allows you to:

- Select only the required data with flexible capture and display filters
- Focus on troubleshooting the network and not on configuring the instrument with the auto-encapsulation mechanism, including support for GRE and GTP tunneling. Automatic detection, with measurements reported on the highest IP layer.
- Understand traffic patterns with Connection Statistics
- Identify MAC and network nodes through use of Node Discovery
- Export statistics to the Report Center for long-term trend analysis and more in-depth analysis

Advanced Measurements and Active Tests

Network Analyzer has a wide range of specialized capabilities that help you solve network problems. Over the next few pages, the following capabilities are described in detail:

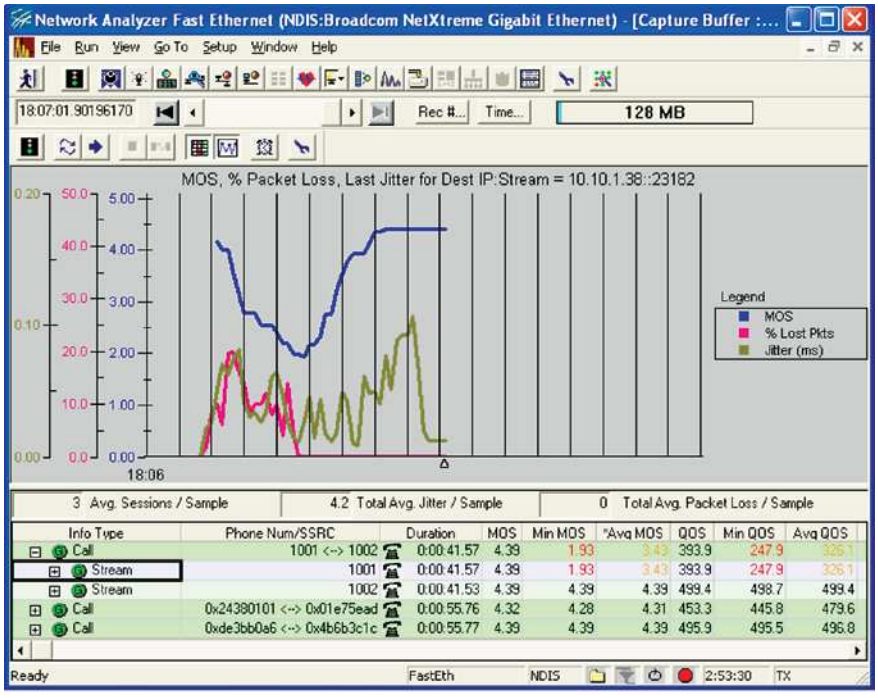
- Expert Analyzer graphs utilization and health over time, provides summary information on connections, protocols and network events of interest.
- Data Filtering allows you to focus on the important data and make efficient use of the capture buffer.
- TCP Connection Analysis lets you analyze TCP connections and quickly identify delay and retransmission issues.
- Multi-segment jitter, latency and packet loss identifies the source of packet degradation across a network.
- Encapsulation Discovery allows the analyzer to find the higher layer data regardless of the lower layer encapsulation, including support for tunneled GRE and GTP traffic.
- Protocol Commentator provides detailed list of network events on connections and on nodes.
- Protocol Statistics provide detailed view of the active protocols on the network, including utilization statistics, number of errors and average frame size.
- Node Discovery provides a list of node physical addresses, names, network addresses and events that have occurred on each node.
- Baselining lets you see how the network is changing over time.
- Protocol Vitals provide a list of every node on the network, showing utilization and data link layer (DLL) errors.
- Connection Statistics provide a detailed view of every active connection including the protocols used and the problems encountered.
- Decodes display the contents of every packet on the network in summary, detailed or hex format.
- User-Defined Decoding allows the expert user to define proprietary decodes.
- IPv6 Protocol Analysis is fully supported for all measurements and analysis.
- Active Tests allow you to generate traffic, copy from the buffer for edit, playback, PING, and ARP.

Add On Software Licenses

J6844A Telephony Network Analyzer

The Telephony Network Analyzer simplifies and expedites the resolution of quality and signaling problems in IP telephony networks. It provides simple and precise diagnostics of VoIP Quality of Service (QoS) through non-intrusive measurements, including the voice quality measurement Mean Opinion Scores (MOS). It also provides simplified troubleshooting of call signaling and control through embedded expert analysis of VoIP protocols. This powerful tool offers advanced VoIP signaling and service quality troubleshooting capabilities including:

- Non-intrusive voice quality measurements using breakthrough predictive MOS technology for passive voice clarity MOS scoring
- VoIP analysis on MPLS and IPv6 networks
- Simple analysis that exposes the impairments to voice quality
- RTCP and RTP voice session sorting and prioritization for easy drilldown to problem areas
- H.323, MGCP and SIP commentators
- Precise measurements of IP network performance for VoIP services
- Diagnostics for troubleshooting and identifying problems at the root cause



The JDSU Telephony Network Analyzer provides MOS and network impairments over time that affect the quality of service.

J6766A MPLS Analysis

The Network Analyzer captures and decodes MPLS signaling and data protocols in real-time and at full-line rate. Network Analyzer can filter single or up to six MPLS stacked labels.

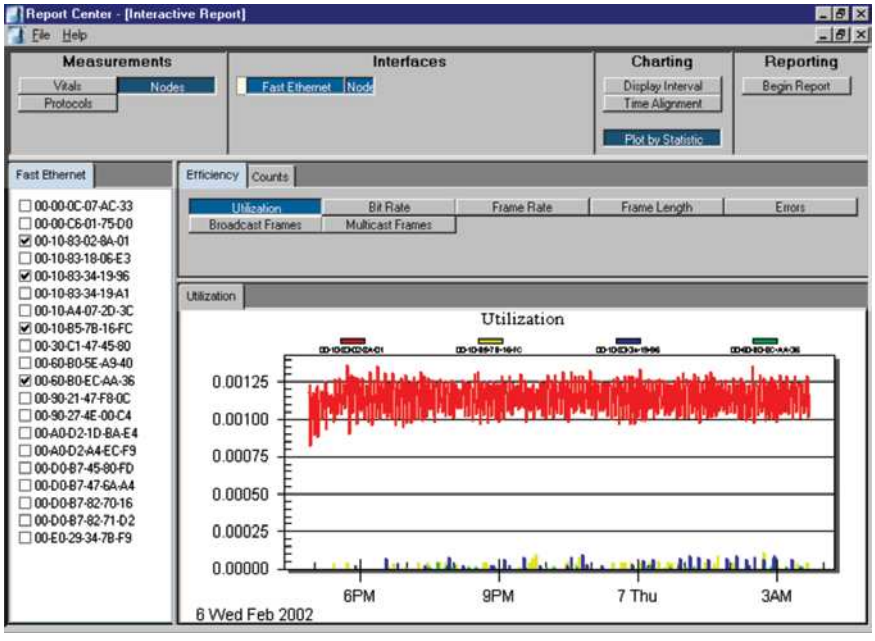
The J6766A MPLS Analysis software keeps track of the different class priorities in an MPLS network specified by the Experimental and QoS bits. In addition, the measurement analyzes the MPLS payload and detects the DiffServ priorities of the IP packet transported by a MPLS frame.

Key MPLS measurements include:

- MPLS CoS analysis
- DiffServ analysis
- Routing and MPLS decodes
- MPLS Protocol filtering
- LSP statistics
- VoIP performance on VPNs

J6848A Report Center

The JDSU Report Center helps network professionals visualize, analyze, document, and present vast arrays of network data with ease and flexibility. Network Analyzer lets you collect statistical information over long periods and export it to the J6848A Report Center to generate management-level reports. Armed with these reports, you can easily identify network trends and plan for future network requirements. The two most important measurements for this feature are the Protocol Vitals and the Connection Statistics measurements. The use of this high quality, high-resolution data is unique to Report Center, and results in a level of network analysis previously unattainable with conventional tools.



The JDSU Report Center: Automate reports for network characterization, troubleshooting and reporting.

10 Gigabit/Gigabit Ethernet Blade Interface Data Acquisition and Analysis Hardware

J6872A 10 Gigabit/Gigabit Ethernet Interface

The JDSU 10 Gbps/Gbps Ethernet Interface provides advanced Ethernet packet capture and processing for the JDSU diagnostic and protocol test solutions -Network Analyzer and Signaling Analyzer. Because you can capture all the data all the time under any network load, you'll never miss a network problem. The J6872A is a next-generation design utilizing advanced field programmable gate arrays and content addressable memory. Extensive packet filtering, slicing, tagging and indexing provide you the power to effectively solve more network problems, more quickly.

J6872A 10 Gigabit Ethernet/Gigabit Ethernet Blade Interface:

Physical Characteristics	
5 Ethernet access and test ports:	2 ports support: 10 Gbps, 1 Gbps, 100 Mbps or 10 Mbps 3 ports support: 1 Gbps, 100 Mbps, or 10 Mbps Network Analyzer can monitor a single Ethernet network at a time. Use two ports when the network is tapped for full duplex monitoring or a single port when connected to a SPAN port Supports multi-mode fiber, single-mode fiber and RJ-45 Connector types: SFP and SFP+
PCI-Express version 1.1	Bus Type: x8 Lane PCI Express, operable in x8 and x16 slots
Weight:	0.34 kg, (0.75 lb)
Dimensions:	107 (h) x 18 (w) x 312 (d) mm (4.2 x 0.7 x 12.3 inches) (Full height, Full Length)
Power Consumption:	45 Watts maximum
Power Requirements:	12 volts, 3.5 amps; 3.3 volts, 1.0 amps

PC requirements for the Network Analyzer software are:	
Operating systems:	Windows Server 2003, Windows Server 2008, Windows XP or Vista
Processor speed:	2.33GHz dual core or better
Memory:	4GB or greater
Disk space:	160GB or better

J6872A 10 GigE/GigE Blade Interface

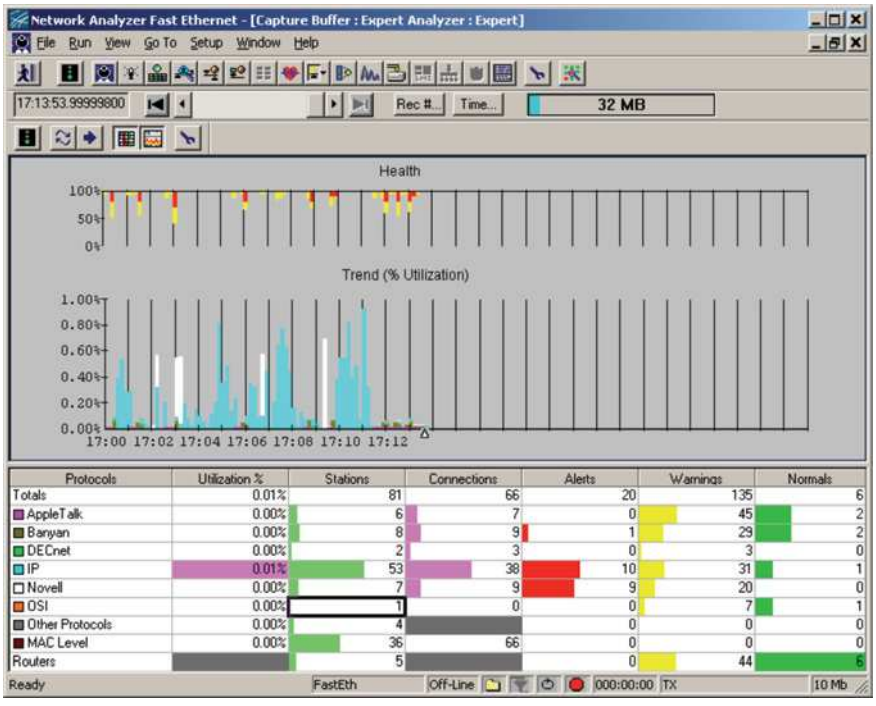
For detailed information on the 10 GigE/GigE Blade Interface hardware, please see the J6872A 10 Gigabit/Gigabit Ethernet Interface data sheet.

Expert Analyzer

No matter what your traffic level is, this solution transforms data into meaningful diagnostic information, constantly monitoring the traffic on your network. Expert Analyzer reduces thousands of frames to a handful of significant events. It watches continuously for router misconfigurations, slow file transfers, inefficient window sizes, connection resets, and a variety of other problems. It does this for each protocol stack you have running (including IPv6); all in real-time as events actually occur. Event types include:

- Alert events which indicate a serious network problem, such as "zero time to live" in IP.
- Warning events that highlight a configuration or performance problem in the network, such as "connection refused" in Oracle, then list all possible reasons for the refusal.
- Normal events which give information on normal network transactions, such as "OSPF router identified" and provide statistics on the IP and MAC addresses as well as the number of OSPF routers identified.

Additional drill-down capabilities enable you to focus on the data, discover the source of the problem and find a recommended solution.

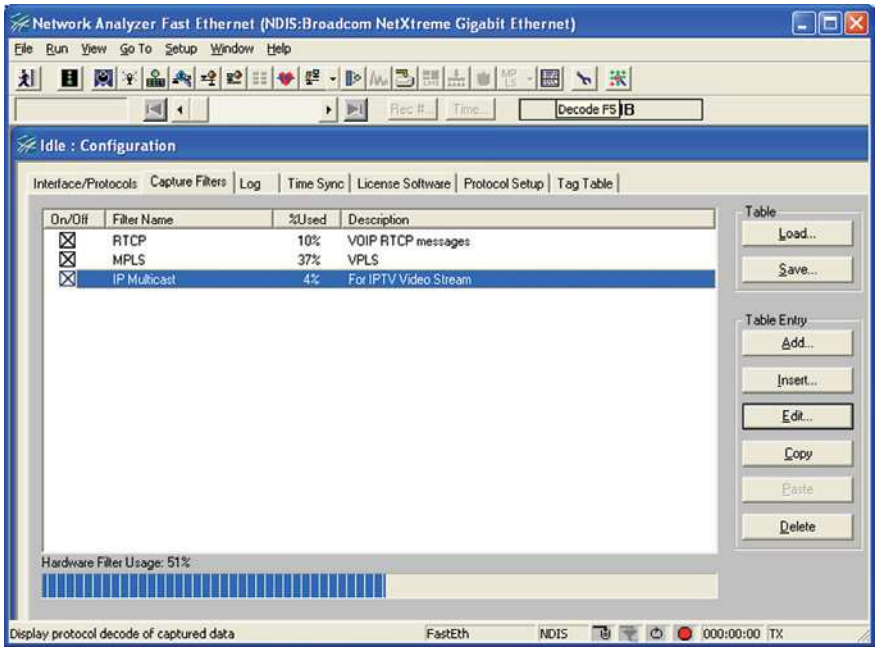


The JDSU Expert Analyzer summarizes network conditions in a simple screen, with drill-down capabilities for major details.

Data Filtering

The J6872A 10 GigE/GigE Blade interface supports two types of data filtering to assist in troubleshooting and analyzing the large quantities of data generated on a high-speed link: capture and display filters. Hardware-based capture filters allow the user to specify which data the instrument should store in the capture buffer or analyze in real-time. Software-based display filters let the user specify which captured frames should be shown on the display.

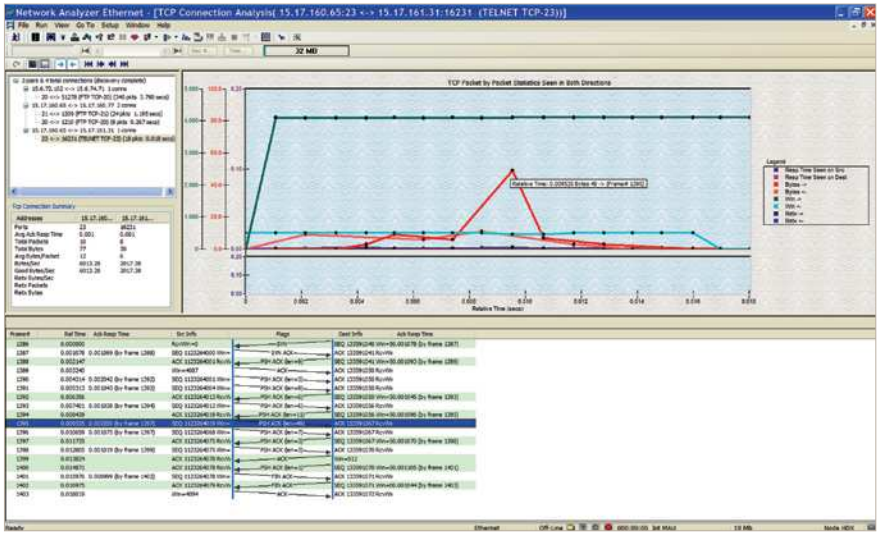
The data acquisition system has sophisticated hardware capture filters so that capture memory is used with maximum efficiency, avoiding the capture of vast amounts of data of no interest. These capture filters consist of 32 simultaneous hardware protocol filters, each 256 bytes wide.



Easy to setup filters for all protocols including VoIP and MPLS capture

TCP Connection Analyzer

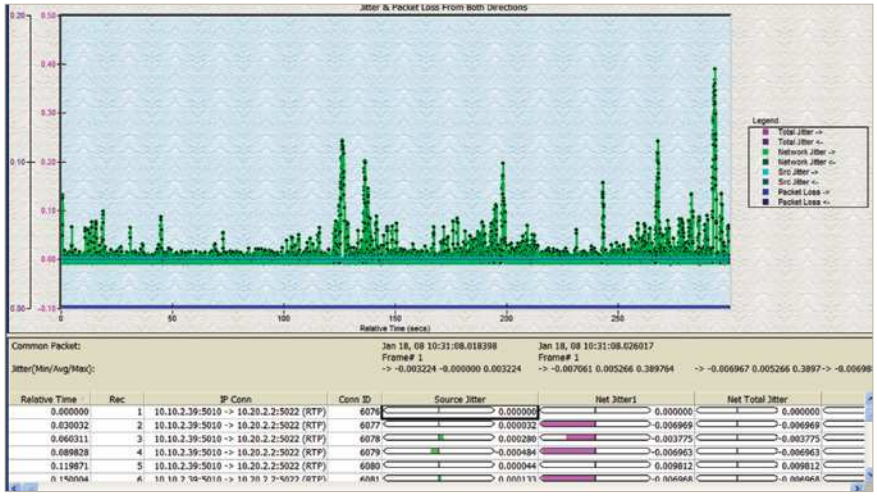
You can now easily analyze TCP connections and quickly identify TCP issues by utilizing the TCP Connection Analyzer measurements to analyze TCP connections and provide key performance indicators. With this measurement, you can examine TCP flow control, messaging, response times, window sizes, retransmissions, payload statistics and other TCP characteristics.



Use the JDSU TCP Connection Analyzer to quickly identify TCP connection issues.

Multi-segment Jitter, Latency, and Packet Loss

You can now quickly identify degradation points across a network. Use the IP multi-segment jitter measurement to detect and report jitter, packet loss and latency across multiple Network Analyzer data capture files from a distinct communication path across a network. This measurement supports IP, ICMP, TCP, UDP and RTP networks.

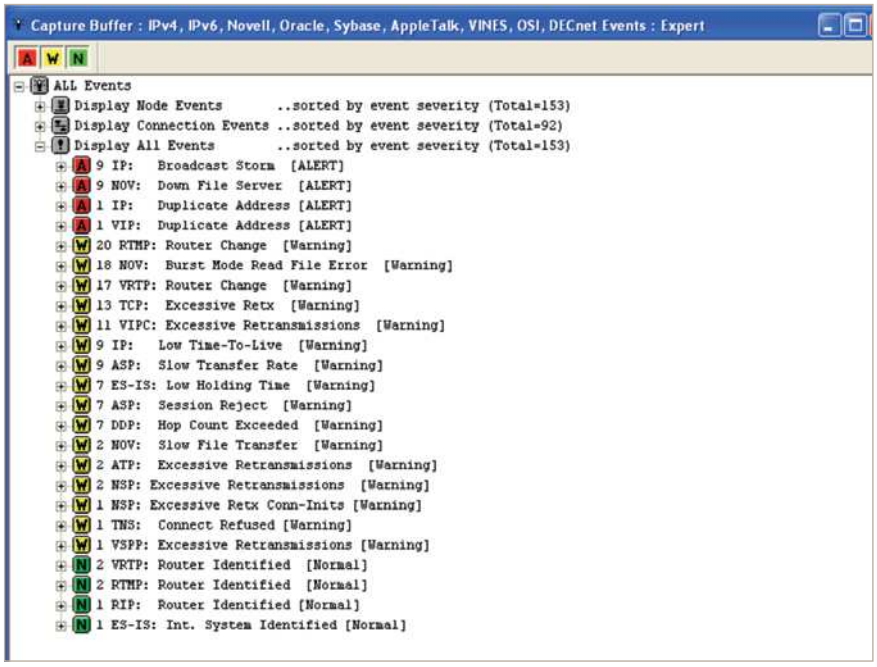


Quickly identify network degradation with the IP multi-segment jitter, latency and packet loss measurement.

Protocol Commentators

At the heart of the Network Analyzer is a series of "commentators", which perform real-time protocol state-following analysis of frames to detect anomalous protocol events. These events are logged and linked to the corresponding captured frames, making it easy for you to scroll through the capture buffer to see the events that led up to an anomalous event and then drill down into the event itself. Commentators for many different protocol families, including IPv6 and VoIP, are included.

One of the most important capabilities of the Protocol Commentators is the ability to detect potential problems in the network, and provide a recommendation to solve the problem. In addition, it provides an explanation of the actual problem and the technology behind it. You do not have to be a network expert to detect, understand and troubleshoot problematic networks.



Commentators allow you to automatically detect problematic issues in the network and obtain possible solutions to the problems

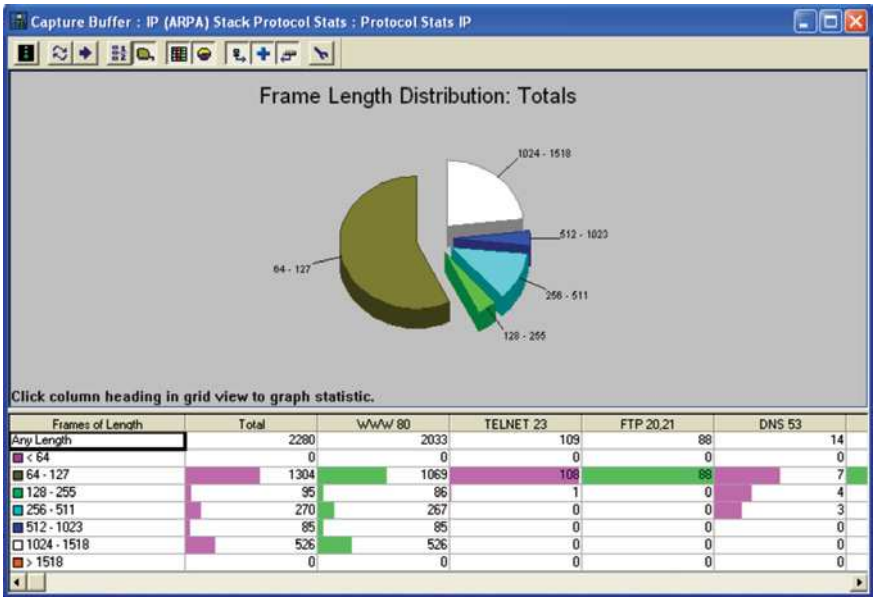
Protocol Statistics

To help understand variations of frame length and protocol usage over time, protocol and frame length statistics are gathered simultaneously for the network layer and the major protocol stacks. Network Analyzer displays these statistics in both tabular and pie chart format, showing percentage utilization or frame length distribution by protocol.

The data is displayed in a tabular or graphical format:

- % utilization
- Total number of frames and bytes
- Frames and bytes per second
- DLL (data link layer) errors
- Errors per second
- Average frame length

The statistics can be logged to a disk and may be exported in CSV format. This data can then be used to generate professional-quality reports with the J6848A Report Center software.



Frames of Length	Total	WWW 80	TELNET 23	FTP 20,21	DNS 53
Any Length	2280	2033	109	88	14
< 64	0	0	0	0	0
64 - 127	1304	1069	108	88	7
128 - 255	95	86	1	0	4
256 - 511	270	267	0	0	3
512 - 1023	85	85	0	0	0
1024 - 1518	526	526	0	0	0
> 1518	0	0	0	0	0

Frame length by protocol is one of the multiple ways to view the information.

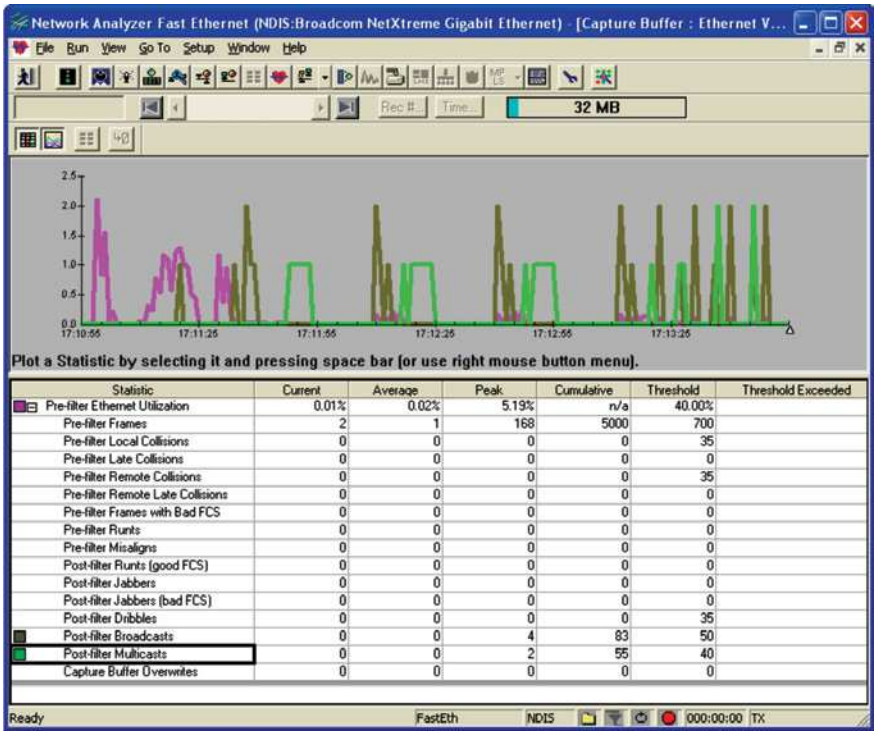
Node Discovery

Maintaining an up-to-date list of network nodes is key to managing many network problems as they occur. Network Analyzer provides an open node list that is automatically incremented as new discoveries are made by the node discovery algorithm. The node list displays MAC, network addresses and node names.

Protocol Vitals

While the Network Analyzer is decoding data, it is also gathering important information from the network. These network performance statistics can be accessed with just a click of the mouse and may be viewed simultaneously with the decoded data. The Protocol Vitals measurement provides a statistical picture of the lower layers and the various protocol stacks to show cumulative data and trends over time. You can use these statistics to identify problems or assist in optimizing your network configuration.

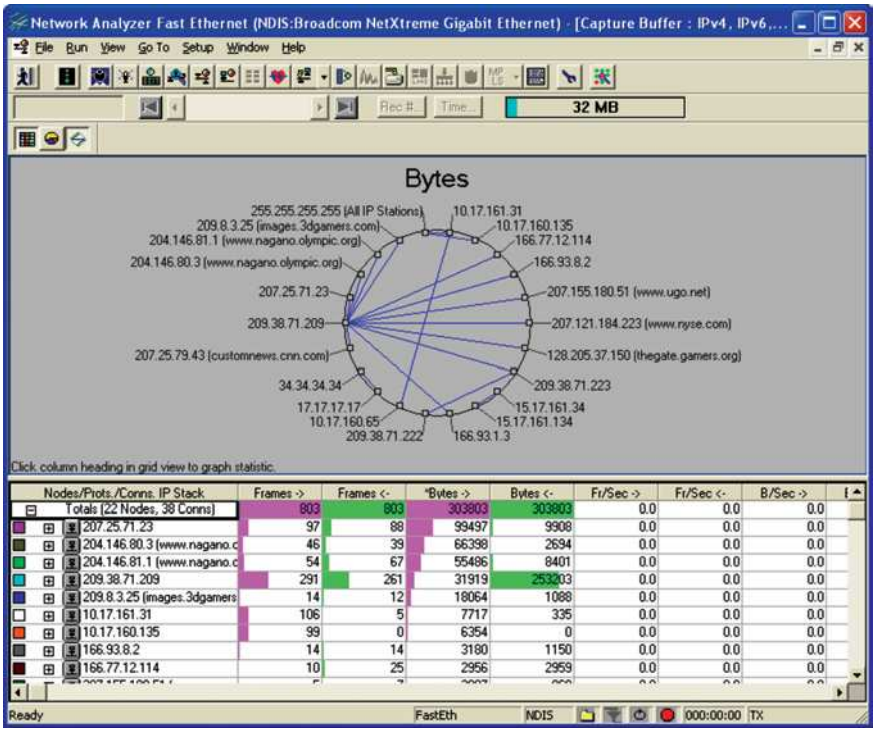
The Protocol Vitals measurement graphs current and maximum utilization in real-time and provides current, average, peak and cumulative values in tabular format of the following parameters: number of frames, runts, collisions, jabbers, dribbles, broadcast frames, multicast frames, misaligned frames and bad FCS counts.



JDSU Protocol Vitals allow you to examine traffic before and after applying filters

Connection Statistics

Users report many network problems in terms such as, "I cannot connect to a printer" or "The connection to the network is very slow." To resolve these kinds of problems, you need to view the activity on a particular station or specific connection.



Obtain visibility of group conversations by node, protocol, connection, etc.

To identify who is using the bandwidth and how the bandwidth is used, Network Analyzer provides numerous connection statistics. By simply clicking on a busy node, you will immediately see to whom the node is talking most often and what protocol is used.

The display shows by column:

- Total frames and bytes to or from a node
- Frames or bytes per second to or from a node
- Utilization to or from a node
- Total retransmissions to or from a node
- Retransmissions per second to or from a node
- Low window to or from a node
- Source or destination port

IPv6 Protocol Analysis

Network Analyzer has extensive capabilities for IPv6 networks:

- Expert Analyzer and Commentators for IPv6 protocol families, including VoIP, help to quickly identify the root cause of existing problems
- Advanced measurements supporting IPv6 include Connection Statistics, Protocol Statistics, and Node Discovery
- Extensive capture and display filters for IPv6 protocol families and station addresses include IPv4 to IPv6 tunneling
- Also supported are VoIPv6 measurements and diagnostics, including MOS values

Traffic Generation and Packet Editing

Built into the Network Analyzer is a powerful traffic generator to add advanced traffic generation and intelligent packet or capture file-editing capabilities. Ideal for installation testing and support organizations, it provides the tools you need to thoroughly test, simulate and troubleshoot a network device or problem. Network Analyzer provides intelligent packet and capture buffer file editing for full 7-layer customization of transmitted data. While you specify frame rate, burst count, or percent utilization, the software automatically calculates inter-packet gaps for various traffic loads, calculates the checksum and generates a CRC. You can quickly configure Network Analyzer to generate a single packet such as an ARP or PING to troubleshoot a production network and verify connectivity or to generate a series of packets to saturate a test network and test new equipment and configurations before network deployment.

Network Analyzer 10 Gigabit Ethernet Solution Components

Network Analyzer Software	J6865A	Network Analyzer 10 GigE/GigE Interface software
	J6865A-UYF1	One-year software update service
	J6865A-UYF3	Three-year software update service
Add-On Software	J6844A	Telephony Network Analyzer
	J6468A	Report Center
	J6766A	MPLS Analysis
Data Acquisition Platform	J6872A	0 Gigabit/Gigabit Ethernet Interface
	J6872A-10G	0 GigE/GigE Blade Interface
	J6872A-1GE	GigE Blade Interface
	J6872A-Upgrade	Upgrade License to upgrade Interface from GigE to 10 GigE
	J6758A-10SR	0 GBASE-SR short reach multi-mode SFP+
	J6758A-10LR	10 GBASE-LR long reach single-mode SFP+
	J6758A-1SX	SX multi-mode fiber optic GigE SFP
	J6758A-1LX	LX single-mode fiber optic GigE SFP
	J6758A-1TX	1000BASE-T GigE SFP

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