Agilent Technologies LAN Advisor

Product Overview

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LAN Advisor

Isolate, Solve and Prevent Network Problems on Your Ethernet, Token-Ring or FDDI LAN

The LAN Advisor product suite from Agilent Technologies makes it easier than ever before to get top performance, reliability and up-time from your mission-critical networks. The LAN Advisor gives you the tools you need to isolate and solve network problems on 10/100/1000 Ethernet, 4/16 Token Ring or FDDI networks. With the LAN Advisor you can connect virtually anywhere in the network and capture the data you need to clearly understand what's going on and what is required to solve and prevent network problems.

Feature Highlights

Real-time Data Capture and Display of Network Health

- Overview of Network Health indicates when action is required
- Clearly indicates who is using the bandwidth and how it is being used
- Rapid identification and resolution of errors keeps the network up and running
- Network utilization by protocol shows overall network activity

Guided Troubleshooting

- Continuous feedback on key network issues
- Problems identified by severity to prioritize troubleshooting
- Drill-down sequences enable fast fault isolation without extensive protocol knowledge
- Intuitive Windows® 98 user interface enhances productivity
- Extensive on-line help explains problems and recommends solutions

Information for Understanding Network Issues

- Flexible filtering for selecting only the required data
- Connection analysis to understand traffic patterns
- Use of node names at MAC or network layers for easy identification of nodes
- Export statistics to the Advisor Reporter for long-term trend analysis

Performance Measurements

- Expert Advisor® – graphs utilization and health over time, provides summary information on connections, protocols and network events of interest
- Commentator – detailed list of network events on connections and on nodes
- Protocol statistics – detailed view of the active protocols on the network, including utilization statistics, number of errors and average frame size
- Node discovery – list of node physical addresses, names, network addresses and events that have occurred on each node
- Connection statistics – detailed view of every active connection including the protocols used and the problems encountered
- Network vitals – list of every node on the network, showing utilization and data link layer (DLL) errors
- Line vitals – overview of physical layer information such as utilization, collision rates and frame errors
- Decodes – display the contents of every packet on the network in summary, detailed or hex format
- Switch Advisor – Statistical analysis of MIB and RMON1 data including utilization and errors per switch port

Advanced traffic Generation and Packet Editing Functionality

- Active stimulus/response tests to troubleshoot a production network
- Test new equipment or configurations before deploying them in the network.

Agilent Advisor Reporter

- Extends the capabilities of the LAN Advisor into the world of baselining and benchmarking
- Uses information gathered by the LAN Advisor to produce high-quality, professional reports.

Step-by-step Instructions for Common Test Scenarios

- Numerous sample tests are provided in the LAN in Windows User's Guide

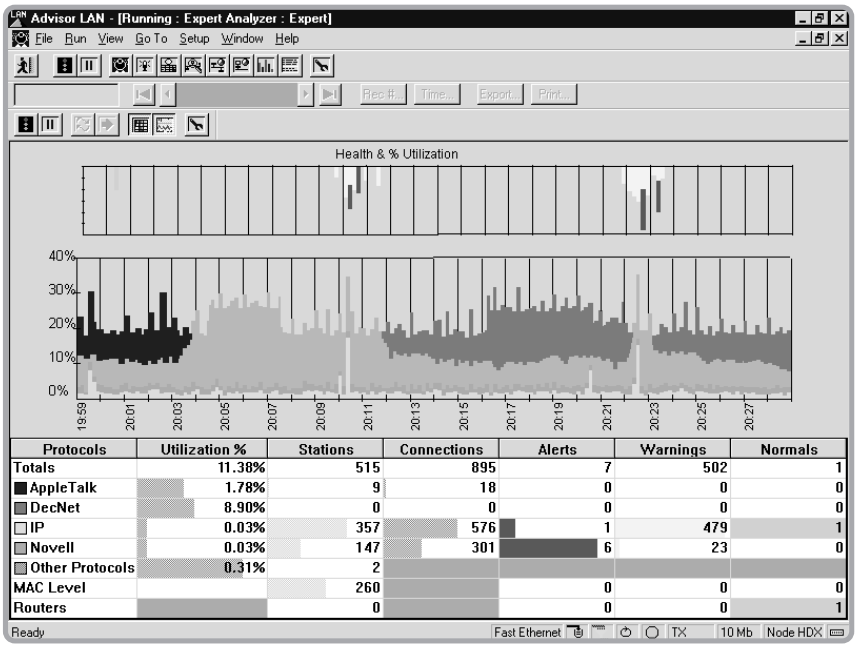
Off-line Advisor

- Allows you to run all the powerful measurements of the LAN Advisor, including the Expert Advisor on your own PC.

Expert Advisor

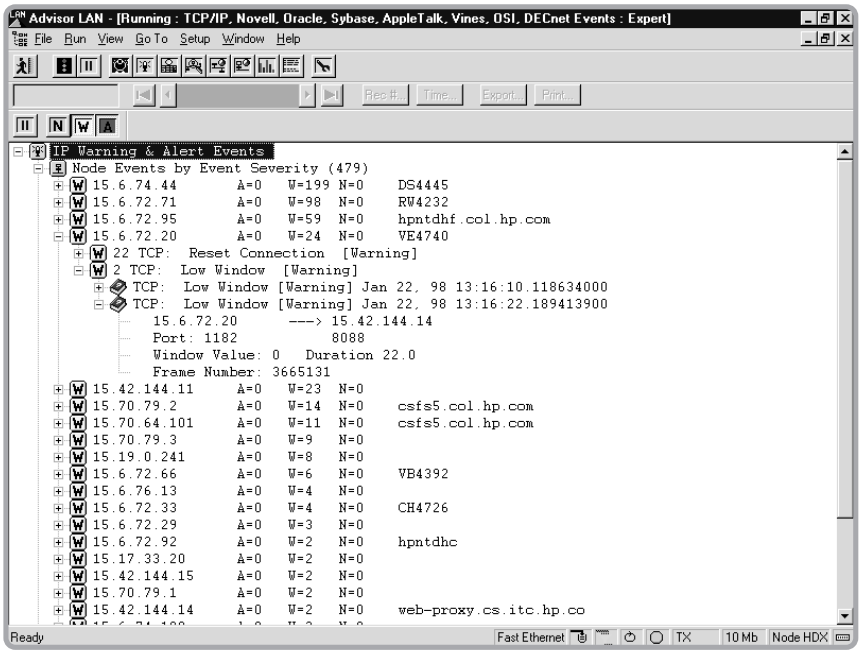
Quickly Isolate and Solve Problems with Guided Troubleshooting

Every LAN Advisor is equipped with an Expert Advisor, a tool that gives you an instantaneous view of the key issues and overall health of the network. Utilization and significant events are shown graphically by protocol. You can obtain further information by drilling down on items of interest to show, for example, the client-server connection with a slow file transfer rate. The Expert Advisor makes suggestions for resolving network problems and optimizing your configuration.



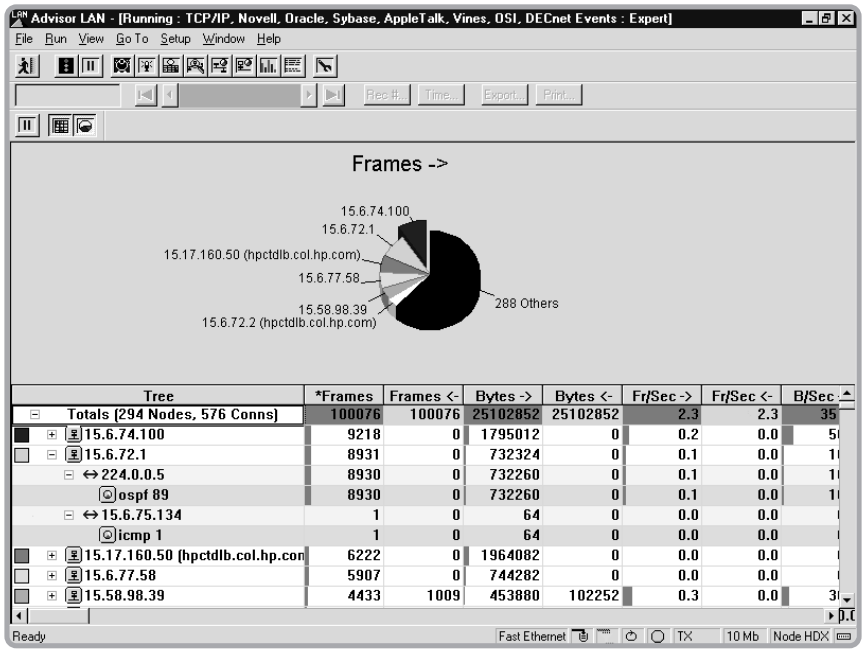
Transform Data into Meaningful Diagnostic Information — In Real Time

No matter what your traffic level, the LAN Advisor transforms data into meaningful diagnostic information, constantly monitoring the traffic on your network. The Expert Advisor reduces thousands of frames to a handful of significant events. It watches continuously for router mis-configurations, slow file transfers, inefficient window sizes, connection resets, and many other problems. It does this for each protocol stack you have running, all in real time — as events actually occur.



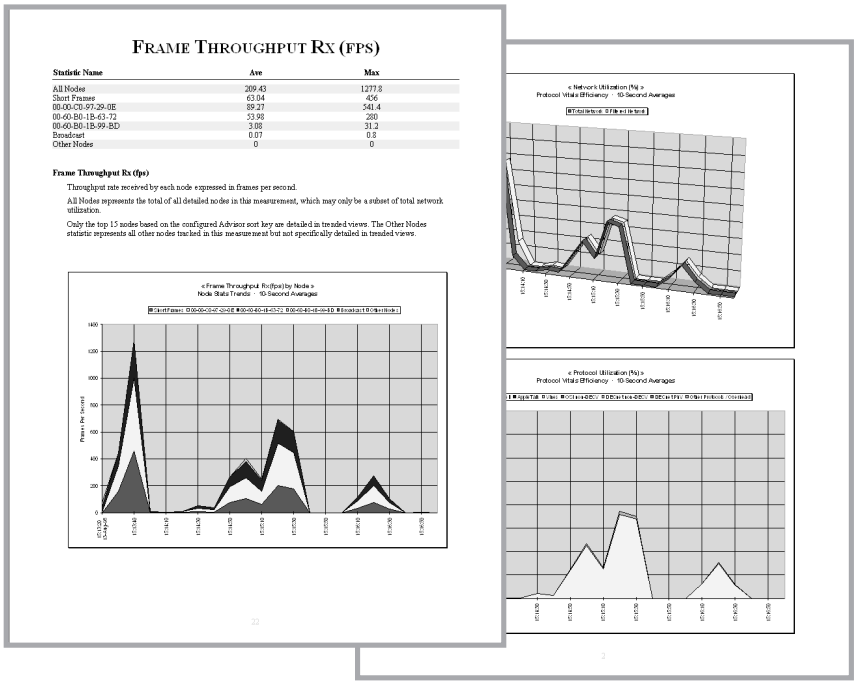
Understand all Layers of Network Traffic

A comprehensive suite of statistical measurements helps you understand the traffic on your network at all levels, from the MAC and network layers to the application layer. In addition, statistics for individual nodes and connections on a network are available to further characterize the traffic. You can set thresholds to alert you when a parameter is exceeded, or to stop a measurement so you can examine data in the capture buffer.



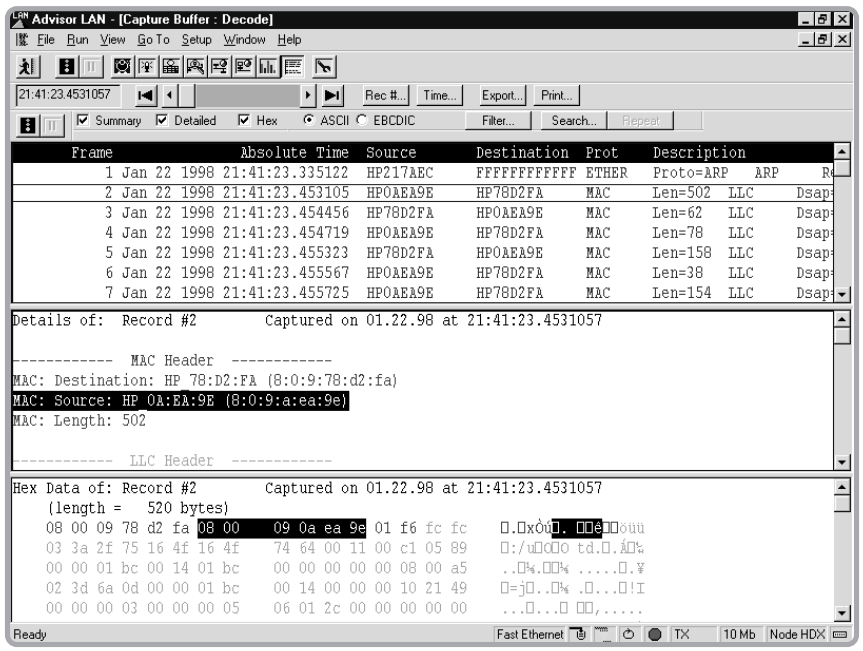
Analyze Long-term Trends So You Can Manage Your Network Proactively

The LAN Advisor lets you collect statistical information over long periods of time and export it to the Advisor Reporter software to generate management-level reports. Armed with these reports, you can easily identify network trends and plan for future network requirements.



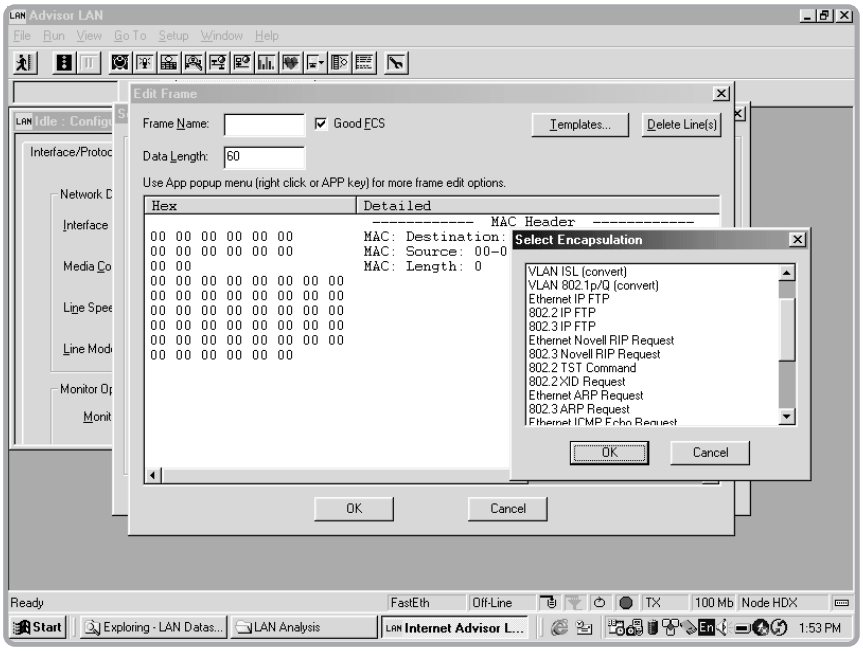
View the Details with Comprehensive Decodes

Many problems can be solved with the Expert Advisor without viewing the details of each frame. However, when you need them, there are more than 400 protocol decodes available to help interpret the protocol as they appear on the network. A detailed display shows the field-by-field protocol decode for every frame, while the summary display provides a single-line display of the key fields. A hexadecimal display is provided as well and shows easy correlation with the detailed display. For a complete list of decodes, see our web site at www.agilent.com/comms/onenetworks.



Advanced Traffic Generation and Packet Editing Functionality to Test the Network

Built into the LAN Advisor is a powerful traffic generator to add advanced traffic generation and intelligent packet or capture file editing capabilities. Ideal for those in manufacturing test and support organizations, it provides the tools you need to thoroughly test, simulate and troubleshoot a network device or problem.



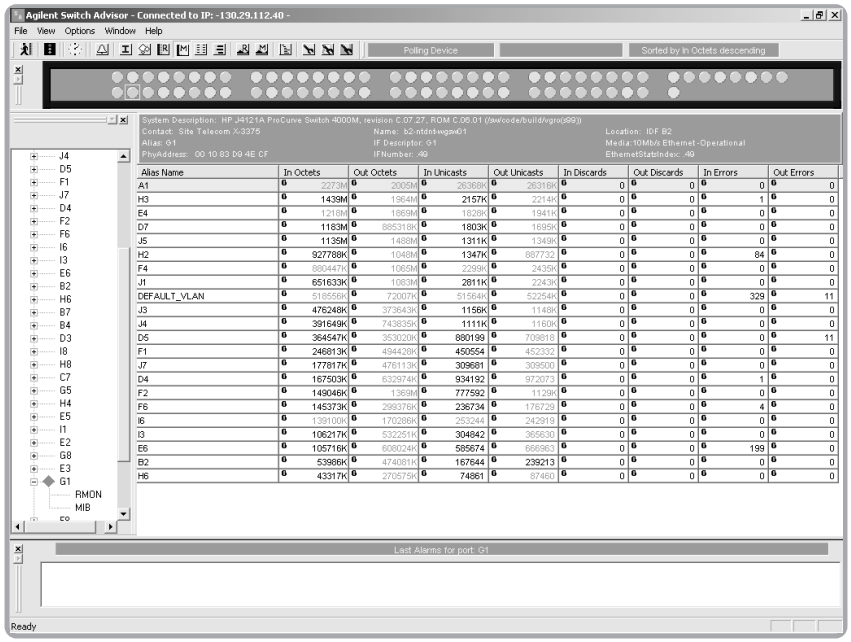
It provides intelligent packet and capture buffer file editing for full seven-layer customization of data to be transmitted. While you specify frame rate, burst count, or percent utilization, the software automatically calculates inter-packet gaps for various traffic loads, calculates the checksum and generates a CRC.

You can quickly configure a LAN Advisor 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. The multitasking capabilities of the LAN Advisor let you monitor the network while the traffic is generated.

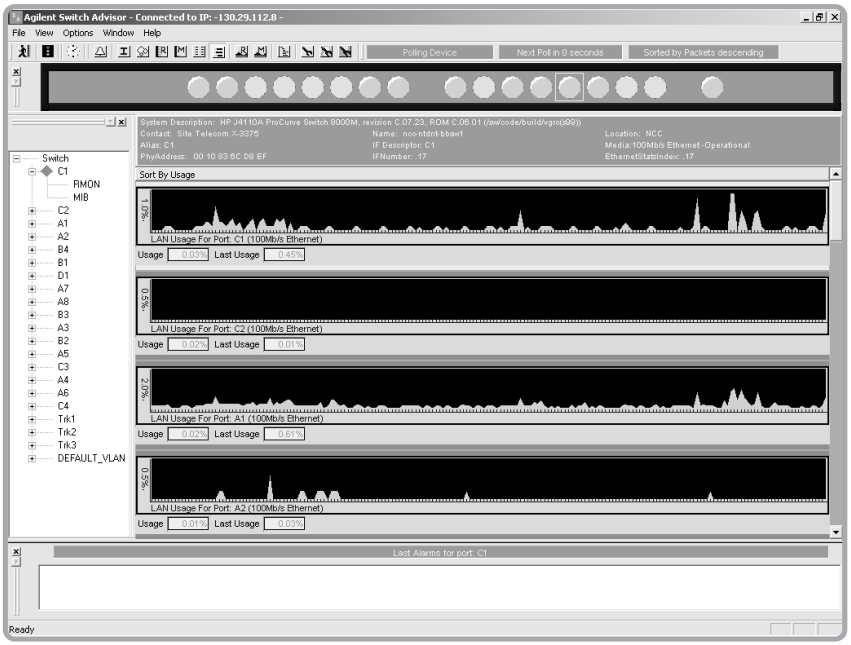
Switch Advisor

Remotely Gather Switch Statistics from Around Your Network

Trend switch port utilization and other vital statistics without leaving your chair. Discover switches and other Management Information Base (MIB) supported devices via user directed search or directly enter device management IP address and graphically view current port utilization levels. Switch Advisor sends SNMP messages over your network connection and gathers MIB data including utilization, packet information and errors.



This raw data is correlated and displayed on an easy to understand Graphical User Interface. Five separate views organize the switches data, allowing the user to concentrate on the data of interest, presenting pertinent statistical and graphical information needed to assess the health of the data being processed by the switch. Select which port to monitor via the "explorer" navigation menu or "clicking" on the port of interest.



Major Features

- Management - Displays System information including switch part number, location, designated name and site contact information. Displays each port number by customizable "Alias" name with Interface description, associated Media type and whether RMON capability is supported, per interface.

- MIB Statistics - Displays per port statistics including In/Out Octets, Unicasts, Discards and errors.

- Port Usage - Graphically displays switch-port utilization, per port, over time. Also, allows same measurements to be taken during a user-initiated test.

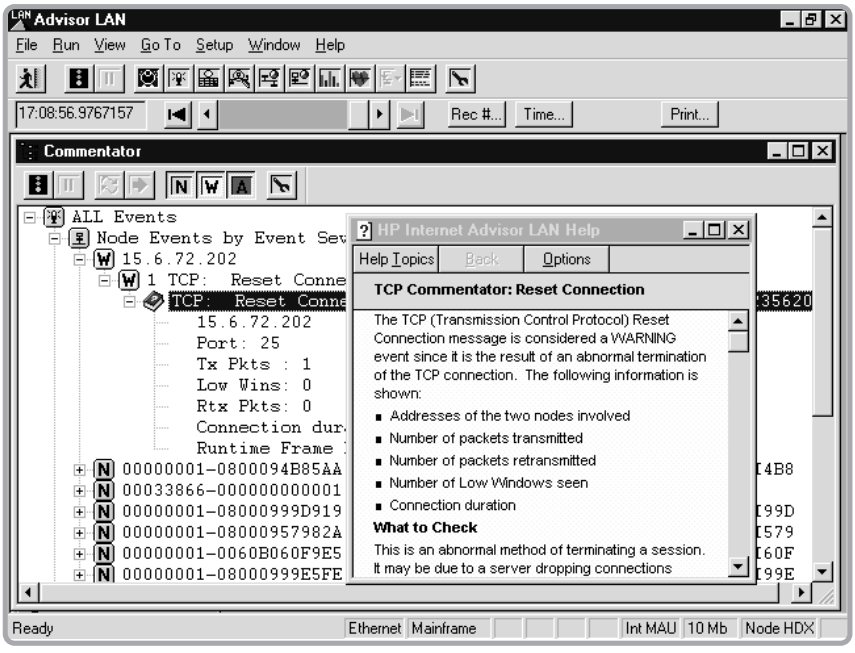
- Single Port Statistics - Displays per-port information including graphical representation of "In" and "Out" port utilization, Octets, Unicasts, Broadcasts, Discards, and Errors. Also, allows same measurements to be taken during a user-initiated test.

- MIB Browser - Allows user directed MIB data collection.

Built-in Measurement Help

All LAN Advisor measurements provide standard Windows help. In addition, you can retrieve explanations from the commentator events by double clicking on the event title in the commentator view. This will display a help screen with a description of possible causes, remedies, and other tutorial and event information.

Context-sensitive on-line help explains how to use the LAN Advisor to perform individual measurements. You'll also find tutorials on a variety of topics, from protocol decodes to advanced troubleshooting.



Logging

Measurement logging is available to store test results in a disk file. You can select logging for all the open measurements from a common dialog.

Freeze and Resume

All measurements support the freeze and resume function. Once "frozen," you can browse and navigate through the measurement. When you "resume" action, the measurements re-synchronize.

File Conversions

When you have captured a data trace on a NetMetrix Probe or on an analyzer other than the LAN Advisor and you need to examine it in much more detail, you can still take advantage of the powerful analysis capabilities of the Expert Advisor. Using the built-in conversion routines, data from most major manufacturers' analyzers can be converted to LAN Advisor-type data and analyzed with the Expert Advisor in the post-processing mode. Using the Off-line Advisor, you can even do this on your own PC.

Remote Access

All LAN Advisor applications are compatible with off-the-shelf Windows remote control packages such as pcAnywhere from Symantec Corp.

J3446E – 10/100/Mbps Ethernet Advisor Mainframe

Quickly Isolate Problems and Find Solutions with Guided Troubleshooting

The Agilent J3446E is a portable, PC-based, full-featured performance analyzer that helps you install, support and maintain 10/100Mbs Ethernet and, with the addition of optional undercradles, Gigabit Ethernet, 4/16Mbps Token Ring and FDDI local area networks. The J3446E Ethernet Advisor provides unequaled troubleshooting and performance analysis capability for today's high-speed networks. It features the Expert Advisor, a tool that gives you an instantaneous view of the key issues and overall health of the network, and an easy-to-use Windows 98 user interface that makes troubleshooting any network segment a simple point-and-click process. As such it helps you :

Feature Highlights

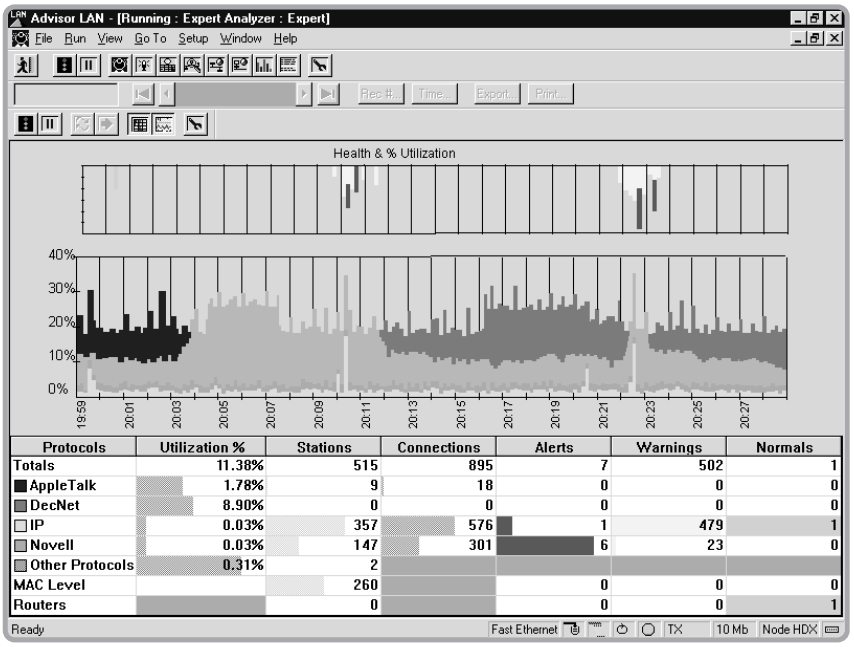
- Solve network problems quickly and effectively with the Expert Advisor
- Anticipate network problems using performance statistics and vitals
- Analyze critical full-duplex server links
- Obtain thorough information with comprehensive network statistics
- Decode the major protocols from layer 1 through layer 7
- Easy navigation with graphical user interface
- Off-line Advisor allows you to run all the powerful measurements of the Ethernet Advisor, including the Expert Advisor, on your own PC
- Switch Advisor gathers/views current statistics of MIB and RMON supported network devices, providing insight into utilization and errors

Expert Advisor

Troubleshooting Expertise at Your Fingertips

Expert Advisor provides continuous feedback on key network issues such as router mis-configurations, slow file transfers, inefficient window sizes, connection resets and many other problems. It reduces thousands of frames to a handful of significant events and sorts them into three categories:
Alert events that indicate a serious network problem, such as "zero time to live" in IP.
Warning events that highlight a configuration or a performance problem in the network, such as "connection refused" in Oracle; then list all possible reasons for the refusal.
Normal events that give information on normal network transactions, such as "file open or close" in Novell and provide statistics on the file transfer time.

Additional drill-down capability enables you to focus on the data, discover the source of the problem and find a suggested solution.

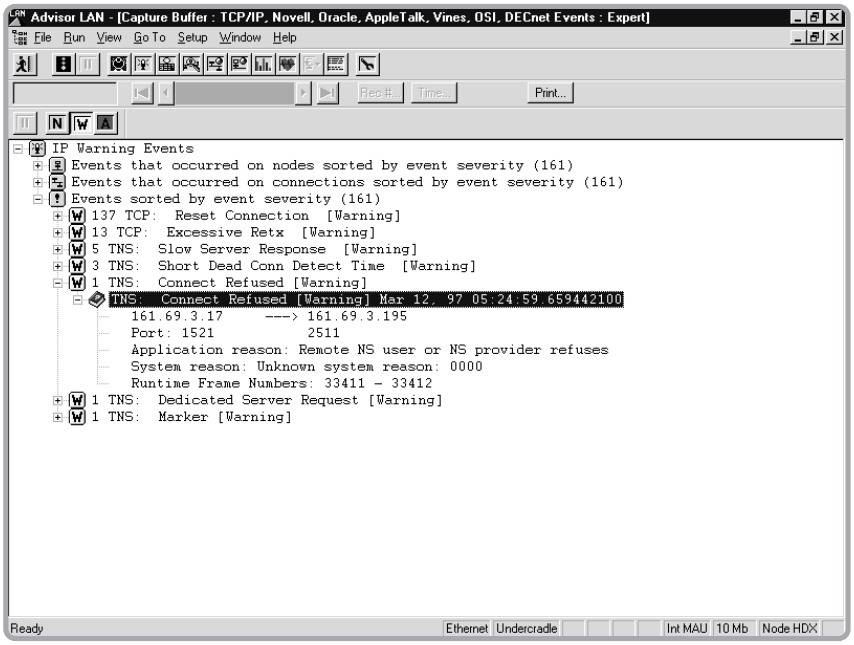


Protocols	Utilization %	Stations	Connections	Alerts	Warnings	Normals
Totals	11.38%	515	895	7	502	1
AppleTalk	1.78%	9	18	0	0	0
DecNet	8.90%	0	0	0	0	0
IP	0.03%	357	576	1	479	1
Novell	0.03%	147	301	6	23	0
Other Protocols	0.31%	2				
MAC Level		260		0	0	0
Routers		0		0	0	1

The Expert Advisor enables an instantaneous view of the key issues and overall health of your network. "Network Health" is a user-configurable representation of network's efficiency. Examples of network health problems include the occurrence of MAC layer errors and protocol commentator warnings or alerts. Utilization levels and significant events are shown graphically by protocol. Further information can be obtained by simply clicking on items of interest. Expert Advisor will show, for example, the client-server connection with a slow file transfer rate. Suggestions for resolving the problem or optimizing the configuration are provided via on-line context-sensitive help.

Protocol Commentators

At the heart of the Expert Advisor are a series of commentators, performing real-time analysis of frame sequences to detect protocol events. 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 the occurrence and view the details of the event itself.



All commentators run concurrently or can be defined separately for the major protocol stacks. A complete listing of events that are flagged by the commentators may be found in Appendix A.

Performance Analysis

Proactively Manage and Troubleshoot Your Network

Network management requires an in-depth understanding of the network behavior. To meet this requirement, you need a comprehensive set of analysis tools. The J3446E Ethernet Advisor has a set of powerful performance measurements available to help you proactively manage and troubleshoot your network. Combined with the Expert Advisor it makes troubleshooting the network as simple as using your mouse.

Protocol and Frame Length Statistics

To help understand variations over time of frame length and protocol usage, protocol and frame length statistics are gathered simultaneously for the network and the major protocol stacks. The Ethernet Advisor shows these statistics in both tabular and piechart format, showing % utilization or frame length distribution by protocol. Ethernet frame lengths are displayed in the following categories:

<64 bytes
64…..127 bytes
128…..255 bytes
256…..511 bytes
512…1023 bytes
1024…1518 bytes
>1518 bytes

Protocol statistics provide by protocol:

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

The statistics are logged to disk and may be exported in CSV format. This data can then be used to generate professional quality reports with the Advisor Reporter software (see index for more information on the Advisor Reporter).

Vitals

A Picture of Your Network's Health

While the Ethernet Advisor 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 Vitals measurements provide a statistical picture of the MAC layer 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 the configuration of the network.

Line Vitals

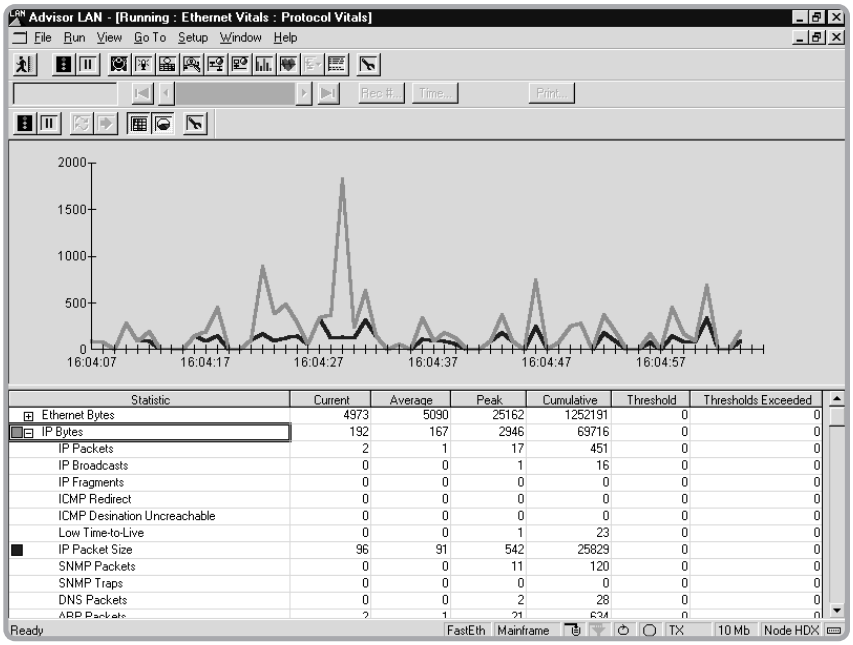
The Line Vitals measurement graphs current and maximum utilization in real-time and provides current and maximum values in tabular format of the following parameters:

- Utilization (%)
- Number of frames
- Local collisions
- Remote collisions
- Late collisions
- Remote late collisions
- Runts
- Frames with bad FCS
- Mis-aligned frames
- Multicast frames
- Broadcast frames

Protocol Vitals

Protocol vitals provide current, average, peak and cumulative values for a number of protocol specific parameters, along with user-configurable thresholds that you can set dynamically to automatically detect intermittently occurring events. The Ethernet Advisor shows protocol vitals for Ethernet, IP, Novell, Apple Talk, Banyan Vines, OSI and DEC DRP. Within each of these protocols, a wealth of protocol specific information is provided. For the MAC layer, for example, the Ethernet Advisor provides:

% Utilization	Runts
Total # of frames	Mis-aligned frames
Local collisions	Jabbers
Late collisions	Dribbles
Remote collisions	Broadcasts
Remote late collisions	Multicasts
Frames with bad FCS	



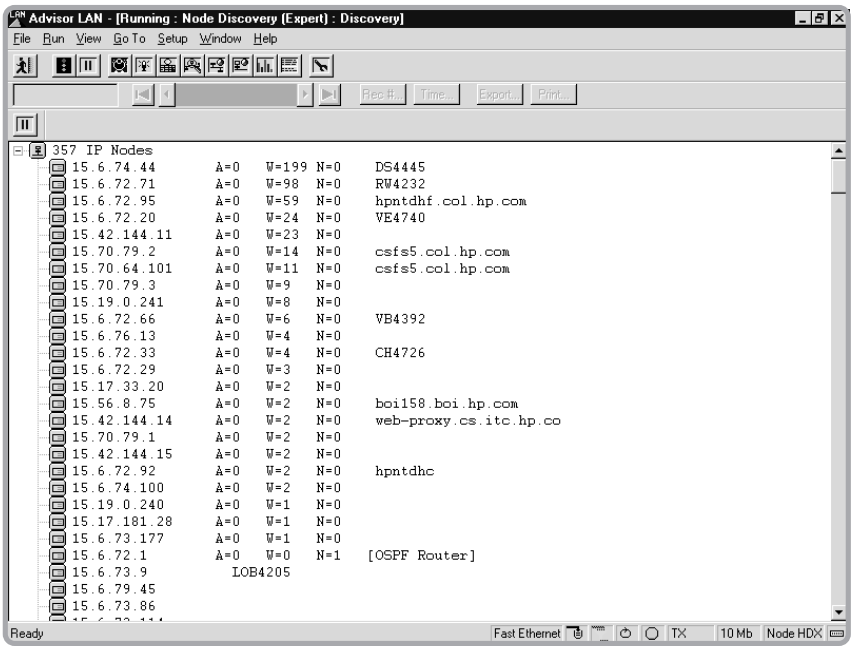
For complete specifications on all protocol vitals, see the Appendix B.

See who's using the bandwidth...

Node Discovery

Maintaining an up-to-date list of network nodes is key to managing many network problems as they occur. The Ethernet Advisor provides an open node list, that is automatically be incremented as new discoveries are made by the Expert Advisor or node discovery measurements. The node list shows MAC addresses, network addresses (IP, IPX, AppleTalk, DECnet, OSI CLNP) and node names.

Node statistics and connection statistics reports use the station and server node names extensively, making node identification easier and faster. As a result, the Ethernet Advisor provides useful clues such as “the connection between John Smith and server #1 generated 12 errors”.



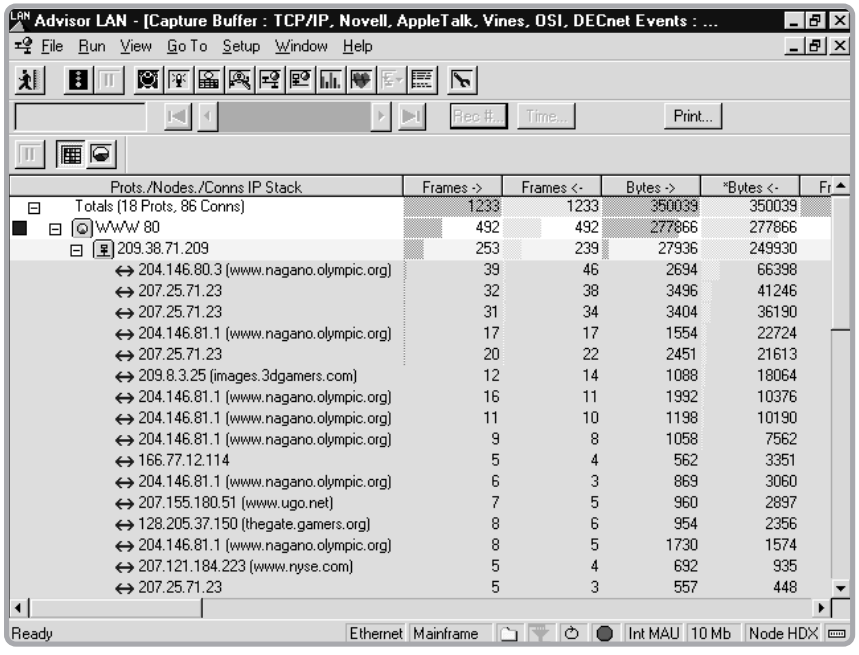
... and how is the bandwidth used.

Connection Statistics

Many network problems are reported by users 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.

To see who is using the bandwidth and how the bandwidth is used, the Ethernet Advisor provides numerous connection statistics. By simply clicking on a busy node, you will see immediately who the node is talking to 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



Right click on any column heading and select "Sort by this column" to sort the information for you by the chosen category. Data capture filters may be set while running these measurements, so that only a specific set of nodes is included.

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Many times you need to find out exactly what is happening at the MAC Layer. The Ethernet Advisor provides you with numerous MAC Node statistics to help you understand what is going on at that layer by providing insight into the following parameters:

Bytes transmitted	Frames transmitted
Bytes received	Frames received
Bytes transmitted per second	Frames transmitted per second
Bytes received per second	Frames received per second
Errors	% transmitted
Errors per second	% received
Broadcasts	
Broadcasts per second	
Multicasts	
Multicasts per second	

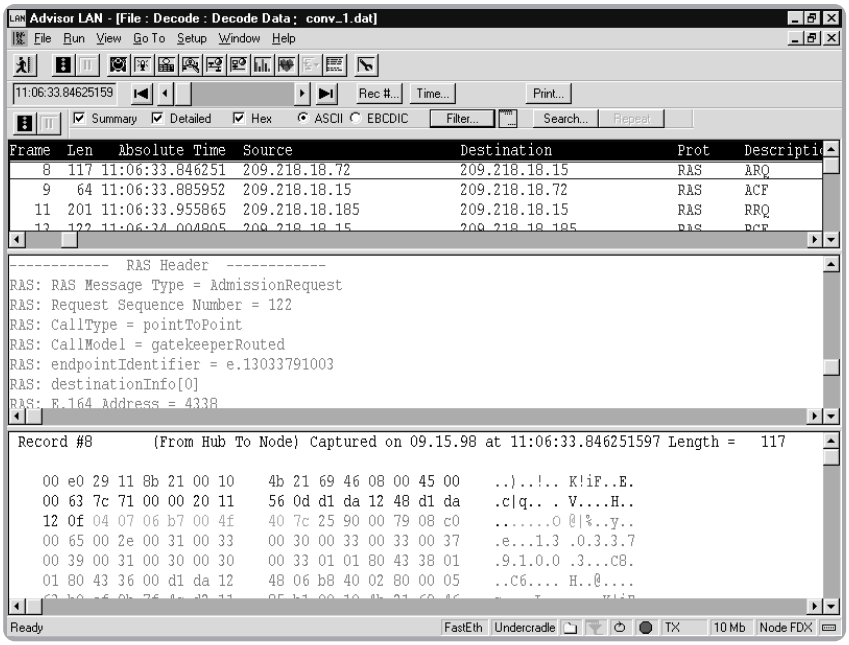
When you need to see all the details...

Decodes

You can solve many problems with the Expert Advisor without viewing the details of each frame. However, when you need them, there are more than 400 protocol decodes available to help interpret the protocol as they appear on the network. A detailed display shows the field-by-field protocol decode for every frame, while the summary display provides a single-line display of the key fields. A hexadecimal display is provided as well and shows easy correlation with the detailed display. Each frame has a timestamp that can be used for relative, absolute or delta timing measurements.

All major protocol stacks are supported, including:

• TCP/IP	• Sun	• XNS
• AppleTalk	• Banyan-Vines	• Microsoft® LAN Manager
• DECnet	• DECnet Phase IV	• XoIP
• IBM/SNA	• Media	• WAP
• Novell	• OSI	• and others



The Ethernet Advisor provides 7-layer decodes of all major protocols, including 802.1p, 802.1Q and 802.3x. Protocol decodes have a built-in protocol follower that will flag errors as they occur. A convenient "Go to next error" feature allows you to advance to the next errored frame in the capture buffer.

For a complete list of decodes, check our web at www.agilent.com/comms/onenetworks.

... or just some of it

Filters

The Ethernet Advisor supports two types of data filtering to assist you in troubleshooting and analyzing large quantities of data generated on a high-speed link: capture and display filters.

Hardware-based pre-capture filters are essential for targeted searches as they allow you to specify which frames the instrument should store in the capture buffer. Display filters let you specify which frames should be shown on the display.

Up to 16 hardware filters may be active at the same time; multiple active filters are logically ORed.

The Ethernet Advisor allows you to set up filters by frame attributes, such as
- frames with a bad FCS
- runts (collisions)
- jabbers
- dribbles

or on the data portion of the packet. When filtering by data, up to 64 bytes may be specified in the data field following the MAC source and destination addresses as filter criteria (or network layer for IP and IPX network filters).

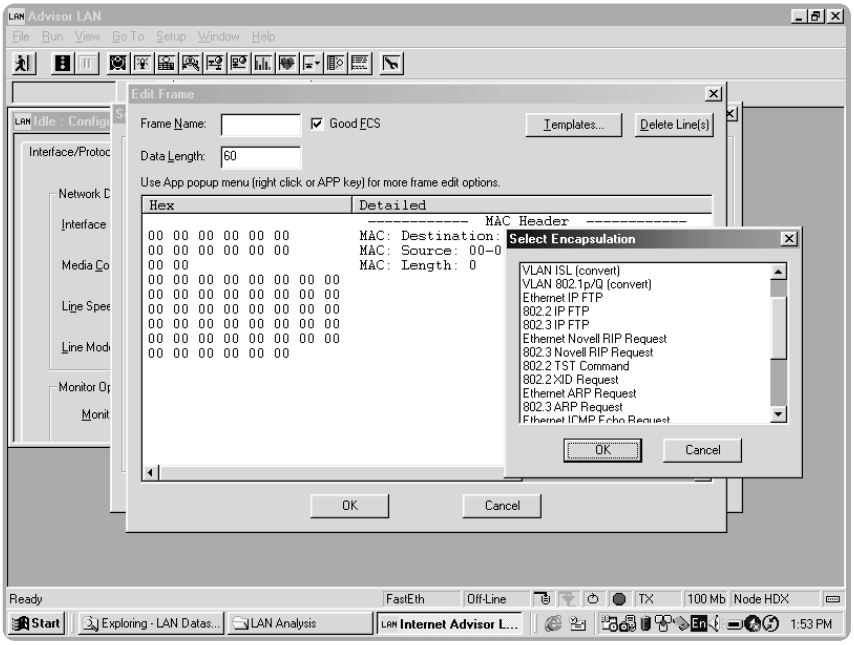
The Ethernet Advisor also provides filtering by VLAN (Cisco ISL or IEEE802.1p/Q), by protocol and by station. Once a filter condition has been met, you can stop data capture with the filter event at the start, in the center or at the end of the capture buffer.

When you need to duplicate a problem...

Traffic Generation and Active Tests

Built into the Ethernet Advisor is a powerful traffic generator that adds advanced traffic generation and intelligent packet or capture file-editing capabilities. Ideal for those in manufacturing test and support organizations, it provides the tools you need to thoroughly test, simulate and troubleshoot a network device or problem.

You can quickly configure the Ethernet Advisor to generate a series of packets to saturate a test network or a single packet such as an ARP or PING to troubleshoot a production network. The multitasking capabilities of the Ethernet Advisor lets you monitor the network while the traffic is transmitted over the network.



Frames from the capture buffer may be edited, then played back to duplicate hard-to-find problems. In addition, numerous message templates have been pre-defined for you. Detailed specifications for the traffic generator are provided below.

... or contact a node.

Active Tests

A number of pre-written response time measurements and other active tests are included with the Ethernet Advisor. These include:

IP Ping	Novell Network list
IP ARP	Novell View Nodes
IP RARP	Novell Nearest Server
IP Trace Route	Novell Server list
IP Active Net Discovery	Novell Node Ping
	Novell Server Ping

IP Active network discovery discovers IP addresses once you specify an IP subnet mask and optional DNS server address and other parameters. An inverse DNS lookup is performed on each IP address so that all IP station names are learned.

Traffic Generator Specifications

You will be able to define the following parameters:

Number of frames to be transmitted
Utilization: 1 to 100%
Frames per second
Average Frame Period (msec)
Inter-frame spacing (in bit times): 1 to 65535ms
Number of iterations: 1 to 65535 or continuous

Message length range: 1 to 5000 bytes

Frame copy:
Copy from another message
Copy from capture buffer
Frame formats:
Ethernet, IEEE 802.3
Number of user-defined bytes per message:
up to the maximum legal frame size
FCS selection:
Good or bad: automatically calculated
Errors:
Runts, jabbers, bad FCS

Technical Specifications

PC System:

- 400 MHz CPU with 256 MB of memory
- Monitor: 26.5-cm (10.4-in) diagonal active matrix TFT color SVGA
- 3-GB hard drive
- 1.4-MB, 3.5-inch floppy disk drive
- Two type I/II PCMCIA slots or one type III slot
- Built-in tracking device or external mouse
- 9-pin serial and 25-pin parallel port
- VGA or SVGA external monitor port
- Windows 98 OS
- Expansion slots provided via the undercradle

Network Interfaces

- 10/100Mb Ethernet:
- Auto-sensing 10/100 Ethernet ports for 10BaseT and 100 BaseTX
- A second RJ-45 port allows testing in switched Ethernet environments
- An AUI connector and an MII connector are provided for additional media

An optional slide-in module provides the network interface for 100 BaseFX Ethernet. It provides 2 SC type connectors for 1300nm multi-mode fiber connections.

Physical Specifications

Dimensions
31.11 W x 31.11 D x 9.84 H cm
(12.25 x 12.25 x 3.875 in.)

Weight
6 kg (14 lbs)

Temperature

Operating	5°C to 40°C
Non-operating	-25°C to 60°C

Regulatory Compliance

EMC:	European Union EMC Directive	
	IEC801-2, ESD Susceptibility	
	IEC801-3, Radiated immunity	
	IEC801-4, Electrical Fast Transient Immunity	
	CISPR11, Radiated and conducted Emissions	
Safety:	CSA 22.2 No. 1010-1	CE marked
	UL 3111	CSA marked
	IEC 1010-1	

J3444A – LAN Advisor 10/100 Ethernet Undercradle

Attach to the J2300E WAN Advisor to provide complete LAN/WAN/ATM performance analysis under one handle.

The J3444A provides the same comprehensive troubleshooting and performance analysis capabilities as the J3446E for 10/100 Mbps Ethernet networks in a different form factor. It is an "undercradle", designed to easily attach to the J2300E WAN/ATM Advisor to provide complete LAN/WAN/ATM performance analysis in an integrated package.

Feature Highlights

- Windows 98 User Interface makes network problem isolation and finding solutions easier and more efficient
- Expert Advisor lets you quickly drill down to the source of the problem.
- Network Vitals and Performance Statistics help anticipate many network problems
- Commentators provide visibility into and help solve network problems quickly and effectively.
- 7-layer decoding of all major protocol stacks gives complete insight into the data
- Traffic Generation allows for network testing and scenario replay

Since the J3444A is identical in performance to the J3446E LAN Advisor, please refer to the J3446E product information.

Technical Specifications

Network Interfaces

- Auto-sensing 10/100 Ethernet ports for 10BaseT and 100 BaseTX
- A second RJ-45 port allows testing in switched Ethernet environments
- An AUI connector and an MII connector are provided for additional media

Optional slide-in module for 100 BaseFX
- 2 SC type connectors
- 1300nm
- multi-mode fiber

Physical Specifications

Dimensions	31.11 W x 29.84 D x 4.44 H cm (12.25 x 11.75 x 1.75 in.)
Weight	2.1 kg (5 lbs)
Temperature:	
Operating	5° C to 40° C
Non-operating	-25° C to 60° C
Humidity	
Operating	20° C to 80° C non-condensing
Non-operating	10° C to 90° C non-condensin
Altitude	
Operating	to 15000 ft.
Regulatory Compliance	
EMC:	European Union EMC Directive IEC801-2, ESD Susceptibility IEC801-3, Radiated immunity IEC801-4, Electrical Fast Transient Immunity CISPR11, Radiated and conducted Emissions

J2901A – Gigabit Ethernet Undercradle

Easily analyze the large amounts of data generated by high-speed networks

High-speed networks like Gigabit Ethernet can generate large amounts of data that can easily overwhelm the analysis process. A full-duplex Gigabit Ethernet link can fill a 128-MB capture buffer in just half a second. Finding a problem in a large captured file or establishing statistically significant trends can become an all-day task, even using normal recursive search and filtering tools.

The Gigabit Advisor gives you an easy and efficient capability to manage the huge quantities of data so you can isolate and solve problems on networks deploying Gigabit Ethernet technology. The J2901A undercradle offers full-duplex analysis and simulation for Gigabit Ethernet networks. It operates in combination with either the J2300E WAN/ATM mainframe or with the J3446E 10/100 LAN Mainframe to provide complete 10/100/1000 MB Ethernet performance analysis and troubleshooting capability.

Feature Highlights

- Capture filters for more efficient use of buffer space
- Display filters for easier data analysis
- Expert analysis to clearly understand what's happening in the network
- Traffic generator for device testing
- Edit and playback to help recreate network problems
- Benchmark testing to measure delay, latency, throughput and frame loss
- Supports 1000Base SX and 1000Base LX

To help you troubleshoot and analyze the large quantities of data generated on a gigabit link, three key capabilities are required: packet slicing, hardware based filtering and event triggering.

Packet slicing allows you to capture only the critical header portion of the packet, slicing off the unwanted payload. By slicing off the payload, the capture process can be more than 100 times more efficient.

Hardware-based pre-capture filters are essential for targeted searches. Post-capture filters are useful to comb through large buffer capture files.

Slicing and filtering, combined with a configurable **event trigger**, make gigabit captures highly manageable. A capture can be started automatically to catch only the useful range of traffic surrounding the triggering event, thus pinpointing the problem, regardless of the volume of traffic that often masks the problem.

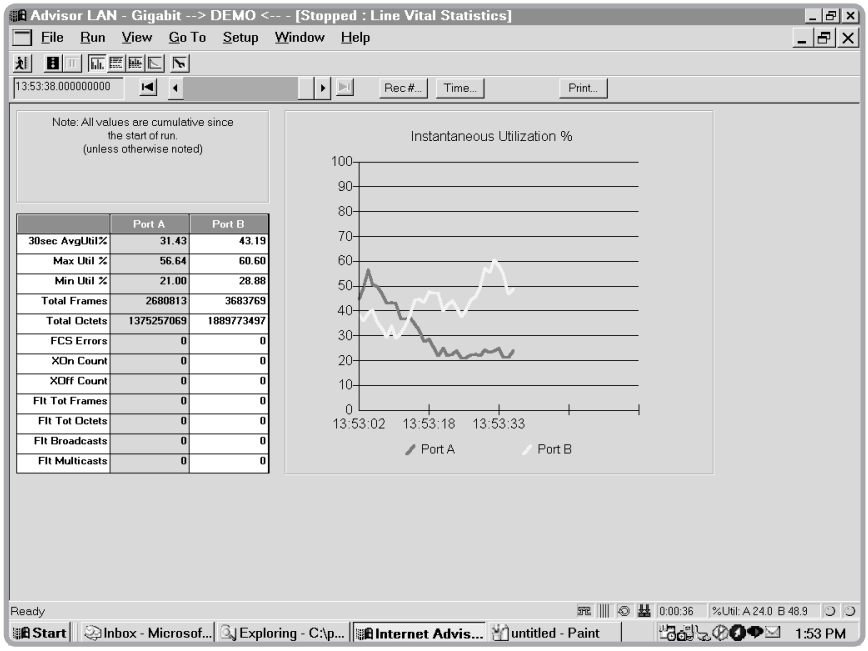
Expert Analysis

Due to the large quantity of data that needs to be processed by the Gigabit Advisor, the Expert Advisor and assisted troubleshooting are available in the post-processing mode only.

Performance Analysis

The Gigabit Advisor provides the following real-time statistics:

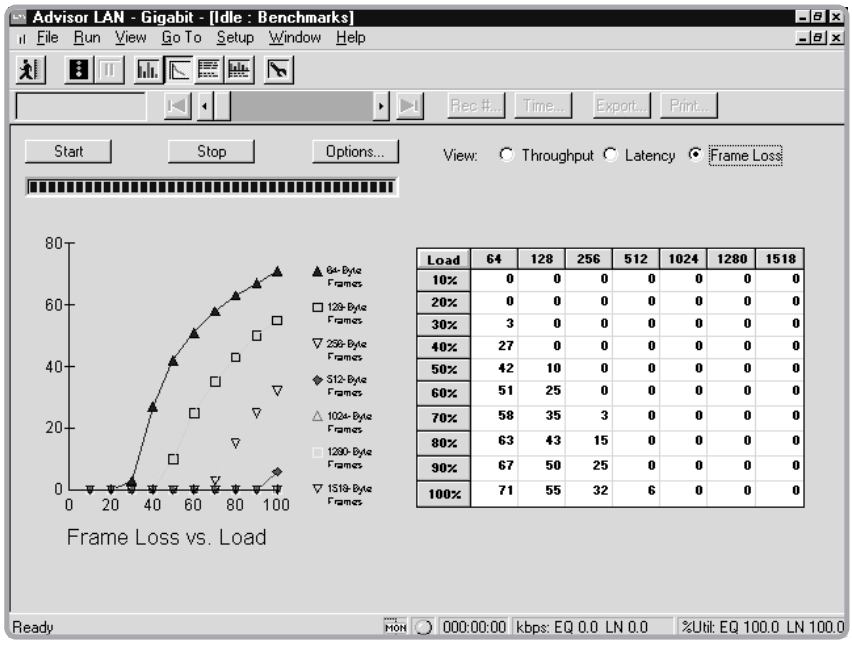
- Xon/Xoff count
- Frames: 0 to 100% utilization
- Octets: 0 to 100% utilization
- Utilization: maximum, minimum and average
- Error count
- Filtered frames
- Filtered octets
- Filtered broadcasts
- Filtered Multicasts



	Port A	Port B
30sec AvgUtil%	31.43	43.19
Max Util %	56.64	60.60
Min Util %	21.00	28.88
Total Frames	2680813	3683769
Total Octets	1375257069	1889773497
FCS Errors	0	0
XOn Count	0	0
XOff Count	0	0
Flt Tot Frames	0	0
Flt Tot Octets	0	0
Flt Broadcasts	0	0
Flt Multicasts	0	0

Benchmark Testing

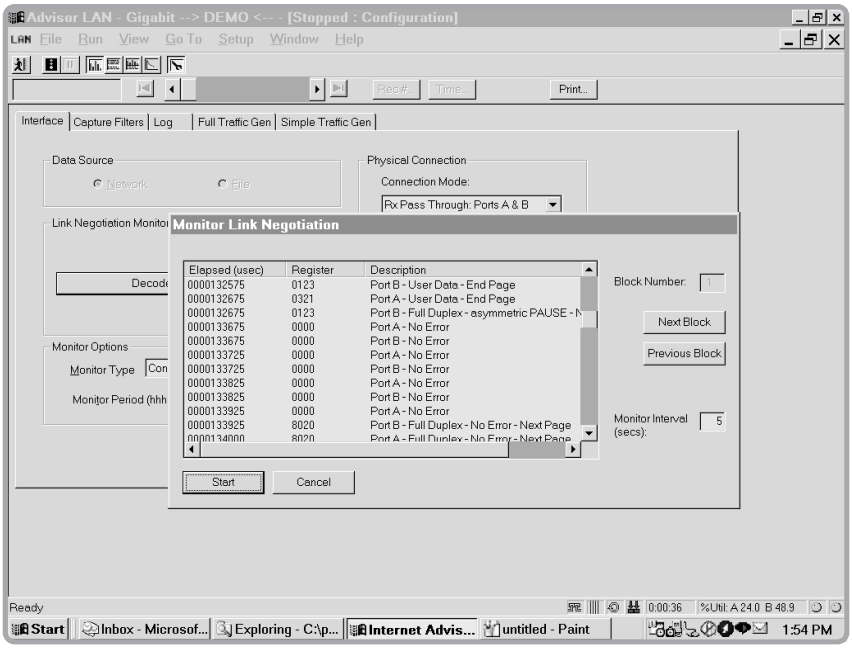
The benchmark testing application allows the Gigabit Advisor to be used as a tool to measure and display latency, throughput and frame loss based on RFC 1944 or RFC 2544. The results of the benchmark tests are displayed in a convenient, easy-to-read graph.



Link Negotiation Monitor

When two devices first start communicating on a Gigabit link, a number of parameters are passed back and forth to help establish the link. When these devices are produced by different manufacturers, the implementation of the link negotiation process may be slightly different and inter-operability problems will result. Since the link negotiation exchange is not in the classical frame format, special decoding capability is required to allow the link negotiation to be monitored. Your Gigabit Advisor is your tool of choice to monitor this exchange.

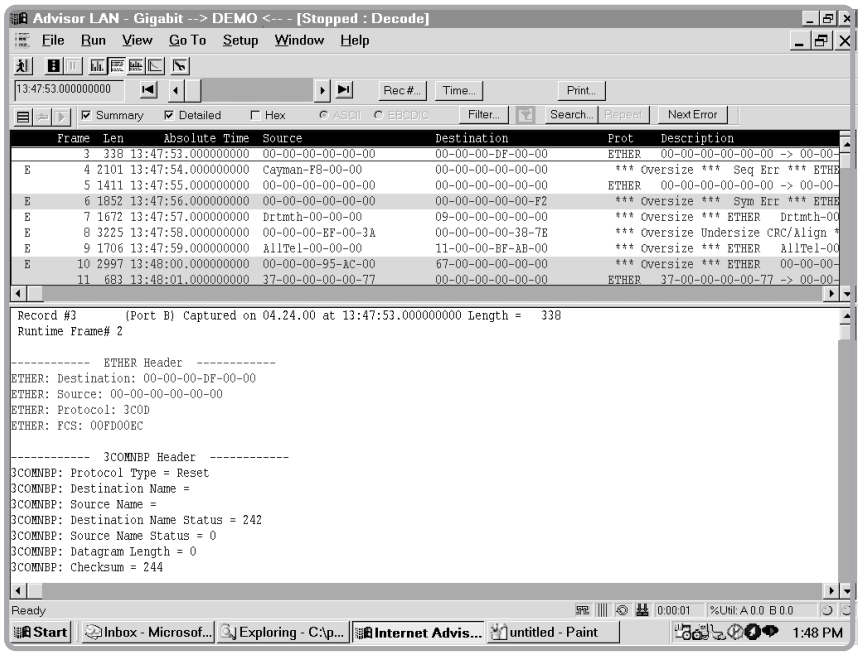
The link negotiation monitor built into the Gigabit Advisor allows you to follow the progress of the link setup. In pass-through mode, you can monitor auto-negotiation messages, decode base page, plus next pages, and display crucial timing information that will allow you to easily diagnose why a link may or may not be established.



While the link negotiation monitor is running, no other measurements are available.

Decodes

You can solve many problems with the Expert Advisor without viewing the details of each frame. However, when you need them, there are more than 400 protocol decodes available to help interpret the protocol as they appear on the network. A detailed display shows the field-by-field protocol decode for every frame, while the summary display provides a single-line display of the key fields. A hexadecimal display is provided as well and shows easy correlation with the detailed display. Each frame has a timestamp that can be used for relative, absolute or delta timing measurements.



The Gigabit Advisor provides 7-layer decodes of all major protocols, including 802.1p, 802.1Q and 802.3x. For a complete list of decodes check our website www.agilent.com/comms/onenetworks

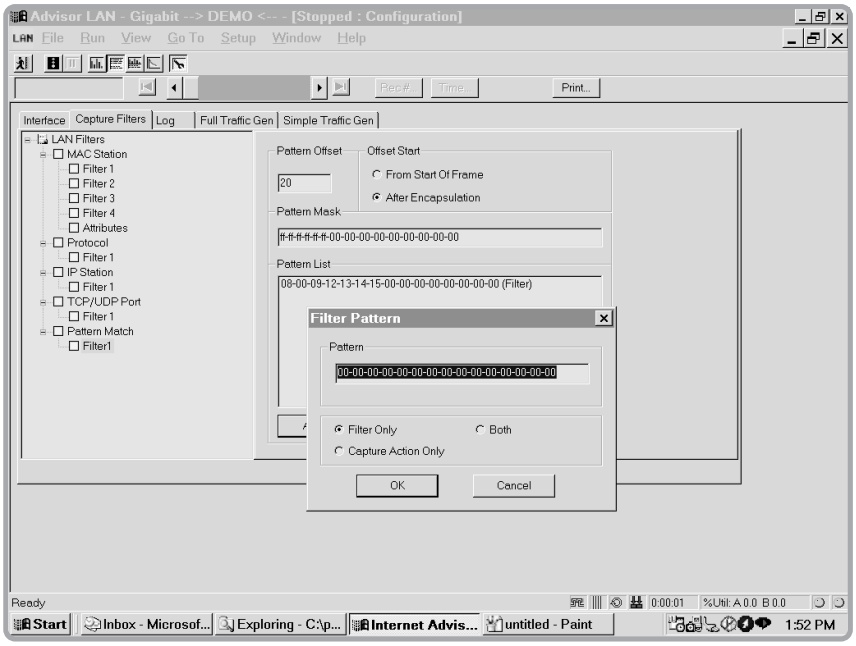
Filters

The Gigabit Advisor supports two types of data filtering to assist you in troubleshooting and analyzing large quantities of data generated on a high-speed link: capture and display filters.

Pre-capture Filtering

Hardware-based pre-capture filters are essential for targeted searches. The Gigabit Advisor provides powerful filtering capability, both real-time and post-capture. Filters may be defined:

- by copying from the buffer and pasting it into a filter
- by selecting from a node list or
- by entering the filter manually



All filters work in node mode as well as pass-through mode on both channels. Station filters may be defined as "to" and or "from":

- any MAC address
- any IP address with a bit mask
- any TCP, UDP port with a bit mask.

You can also filter on various errors, such as symbol, sequence, FCS and length errors, or on protocols like IP, Novell, ISO, Decnet, Banyon Vines, and Appletalk. Hardware capture filters may also be built from any 15-byte pattern with a 0-31 byte offset from the start of the frame or from an automatically determined encapsulation offset.

Main filter types (MAC, IP, port, protocol and pattern) are logically ANDed for very powerful filtering. Each filter type can have twenty individual entries, which are logically ORed together for very powerful and thorough filtering.

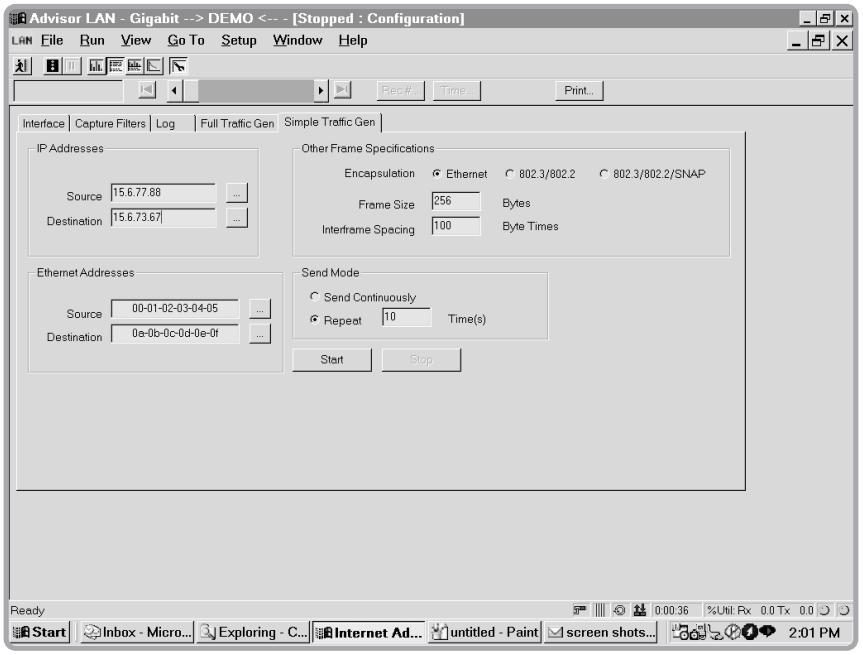
On any filter condition above the MAC layer, you can stop the data capture with the event at the start, in the center or at the end of the capture buffer.

Display Filtering

To make viewing and interpretation of the data even easier, the Gigabit Advisor also provides display filters. This will allow you to view the data by VLAN, by protocol type, by station, by network layer address and by a user definable data string.

Traffic Generation

Built into the Gigabit Advisor is a powerful traffic generator to add advanced traffic generation plus intelligent packet and capture file editing capabilities. Ideal for those in manufacturing test and support organizations, it provides the tools you need to thoroughly test, simulate and troubleshoot a network device or problem.



With the Gigabit Advisor traffic generator, each frame or pattern may be sent once (single shot) or in the automatic repeat mode with specified delay between each buffer (min. 1 usec). You can define the following parameters:

- % utilization: 1 to 100%
- Frame length:
  - fixed
  - increment
  - random from 20 to 10,004 bytes
- Number of frames to be transmitted
- Frame rate (frames per second)
- Duration
- Bad or good FCS
- MAC addresses – fixed, increment,
  random select from node list
  copy and paste from the buffer

- IP addresses – fixed, increment, random
- Inter-frame spacing:
  - 4105 byte times minimum
  - 32,000 byte times maximum

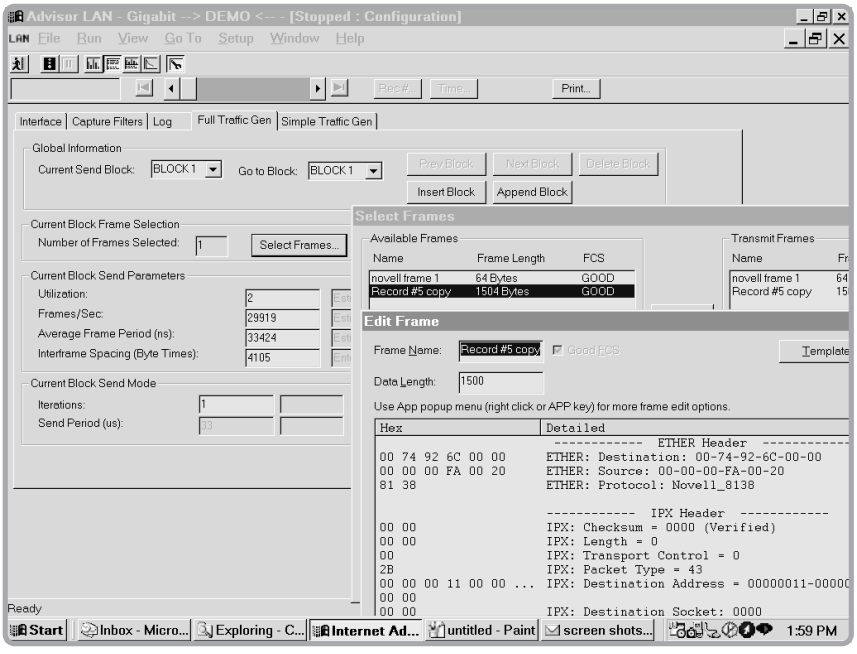
In addition, the traffic generator provides the capability to:

- send up to four blocks of 20 frames in single shot mode or continuously
- create frames via a decode-based editor with protocol assist
- select frames from a list of frame types, including most types of echo request, ARP request, mask request, and most common encapsulation combinations.
- copy from the buffer or a file and paste into a frame selection window for editing and/or retransmission.

Intelligent Edit and Playback

Edit and playback functions enable sequences of frames to be captured, then replayed onto the network, either directly or after editing the data or timing relationship between frames. You can modify packet contents (including CRC), delete packets, add packets, and modify inter-packet gaps. The data may be acquired from the capture buffer or from previously captured data files and you can define the following parameters:

- Maximum number of frames to play back (30k standard, 60k with option 001)
- Specify range of frames to playback – for example frame 4,001 to 20,500
- Edit one or many frames
- Send in same time relationship as received (approximate)
- Specify inter-frame delay or frame departure time (e.g. every 1 second or every 2 seconds, etc.), for entire range of frames to be sent or playback at user-defined scaleable rate, for example, one half the capture rate or twice the capture rate
- Specify approximate utilization.



The traffic generator functions in the node mode only and while it is running, no other measurements are available.

Technical Specifications

Operational Specifications

- 1000 Mbps full-duplex monitor and analysis
- Two SC connectors using GBIC technology
- Node or pass-through mode operation
- 1000Base SX, 850nm multi-mode standard
- 1000Base LX 1300nm multi-mode/single mode optional
- Pass-through operation latency: 103 – 125 bits (82.4 – 100 nsec)
- Receiver sensitivity (worst case): -17dBm SX; -19dBm avg. LX
- Minimum power output: -9.5dBm SX; -11.5dBm avg. LX

Capture System

- Capture buffer:
  64 MB per channel standard
  128 MB per channel with opt.001
- Capture frames up to 64 KB long; decode first 16 KB
- Capture and display runt frames
- Hardware time stamp: 16 nsec accuracy, 1 nsec resolution.

Physical Specifications

Dimensions	31.11 W x 29.84 D x 4.44 H cm (12.25 x 11.75 x 1.75 in.)
Weight	2.1 kg (5 lbs)
Temperature:	
Operating	5° C to 40° C
Non-operating	-25° C to 60° C
Humidity	
Operating	20° C to 80° C non-condensing
Non-operating	10° C to 90° C non-condensing
Altitude	
Operating	to 15000 ft.
Regulatory Compliance	
EMC:	European Union EMC Directive IEC801-2, ESD Susceptibility IEC801-3, Radiated immunity IEC801-4, Electrical Fast Transient Immunity CISPR11, Radiated and conducted Emissions

J2524A – FDDI Undercradle

User-friendly FDDI analysis with the power and flexibility to isolate even the stickiest network problems fast

The Agilent J2524A undercradle adds comprehensive FDDI testing capability to the J3446E LAN Advisor or J2300E WAN Advisor mainframes. This high-performance analyzer receives and decodes all frames on the network and can transmit any selected FDDI symbols or user-configured frames up to maximum FDDI line rates. Performance analysis measurements, decodes, protocol analysis, expert measurements and traffic generation all run simultaneously in real time to maximize your ability to diagnose and trouble-shoot FDDI networks. Whether you are troubleshooting a production network, designing a low-level interface that requires a powerful symbol editor, or designing a high-end system that requires high-level decodes, the Agilent FDDI Advisor gives you the tools to do the job effectively and with minimal effort.

Feature Highlights

- Network vitals help you anticipate many network problems
- Commentators help solve network problems quickly and effectively
- Full SMT decode of 6.2 and 7.2 frame types
- Comprehensive network statistics
- Traffic generator for device testing

Flexible connection methods: The FDDI Advisor can participate on the FDDI ring as a station (SAS, DAS, or concentrator), as a repeater or as a passive monitoring device with a fiber optic power splitter.

Quickly understand network status: Front-panel LEDs provide instant access to the FDDI link status and power measurements. These indicators supply information even when no measurements are running, indicating line state for both ports (idle, active, halt, master, noise, quiet).

Hardware-based counters provide accurate statistical information, no matter what the network load. Vital statistics provide FDDI status information at a glance, not only information on the presence or absence of claims, beacons and errors, but actual counts of those parameters as well as observed Token Rotation Tine (TRT). You can also set measurements thresholds, so critical network events can be flagged and logged for further analysis. Node card information provides insight into how many times the ring has been reset.

Real-time status icons show the configuration of the FDDI Advisor (DAS, SAS, DRP, DMP, etc.) and problems with the status of the connection, such as a wrapped or isolated ring.

FDDI Troubleshooting at Your Fingertips

Isolating a problem on an FDDI link or tuning the link for optimal performance can often mean searching through thousands of captured frames, most of which are irrelevant or insignificant.

The FDDI Expert makes this job much simpler by providing continuous feedback on key network issues and reducing the thousands of frames into a handful of significant events. Each event is described in complete details, time-stamped and rated in terms of severity:

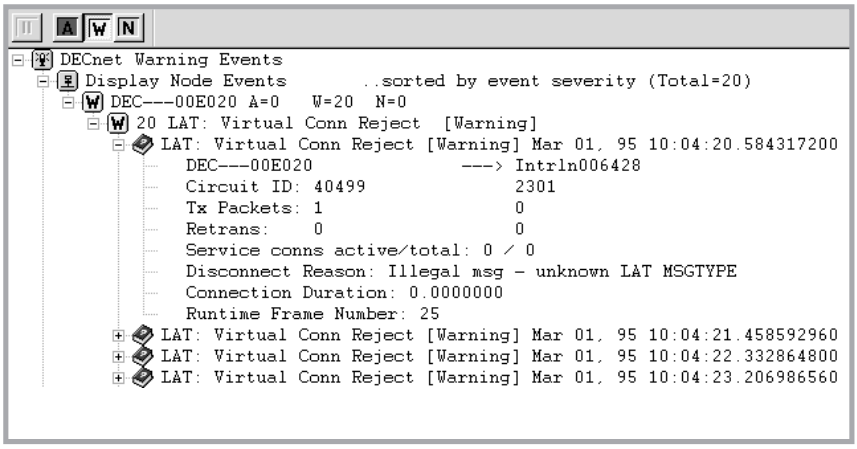
- **Alert events** that indicate a serious network problem
- **Warning events** that highlight a configuration or a performance issue
- **Normal events** that give information on common network transactions

Additional drill-down capability enables you to focus on the data to find the source of the problem and a suggested solution.

The Expert Advisor enables an instantaneous view of the key issues and overall health of your network. "Network Health" is a user-configurable representation of network's efficiency. Examples of network health problems include the occurrence of MAC layer errors and protocol commentator warnings or alerts. Utilization levels and significant events are shown graphically by protocol. Further information can be obtained by simply clicking on items of interest. Expert Advisor will show, for example, the client-server connection with a slow file transfer rate. Suggestions for resolving the problem or optimizing the configuration are provided via on-line context-sensitive help.

Protocol Commentators

At the heart of the FDDI Expert are a series of commentators that perform real-time analysis of frame sequences to detect protocol events. The FDDI commentators run simultaneously with all other measurements to provide easy access to information. Time-stamped events correlate the events to frames in the capture buffer. Context-sensitive help contains information on common causes of problems as well as information on how to fix these problems and prevent them from happening again.



All commentators run concurrently or can be defined separately for the major protocol stacks. A complete listing of events that are flagged by the commentators may be found in Appendix A.

Proactively Manage and Troubleshoot Your Network

To provide a clear insight into the performance of an FDDI link and to help you proactively manage and troubleshoot the network, an extensive and powerful set of performance statistics are provided for the FDDI Advisor. Combined with the commentators, it makes troubleshooting an FDDI network a simple point-and-click operation.

Protocol and Frame Length Statistics

To help understand variations over time of frame length and protocol usage, protocol and frame length statistics are gathered simultaneously for the network and the major protocol stacks. The FDDI Advisor shows these statistics in both tabular and piechart format, showing % utilization or frame length distribution by protocol. FDDI frame lengths are displayed in the following categories:

<64 bytes
64...127 bytes
128...255 bytes
256...511 bytes
512...1023 bytes
1024...2047 bytes
2048...4095 bytes
4096...4500 bytes
>4500 bytes

Protocol statistics provide by protocol:

% utilization
total number of frames and bytes
frames and bytes per second
DLL (data link layer) errors
Errors/sec and
Average frame length

The statistics are logged to disk and may be exported in CSV format. This data can then be used to generate professional quality reports with the Advisor Reporter software (see the index for more information on the Agilent Advisor Reporter).

Vitals

A Picture of Your Network's Health

While the FDDI Advisor 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 Vitals measurements provide a statistical picture of the MAC layer 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 the configuration of the network.

Line Vitals

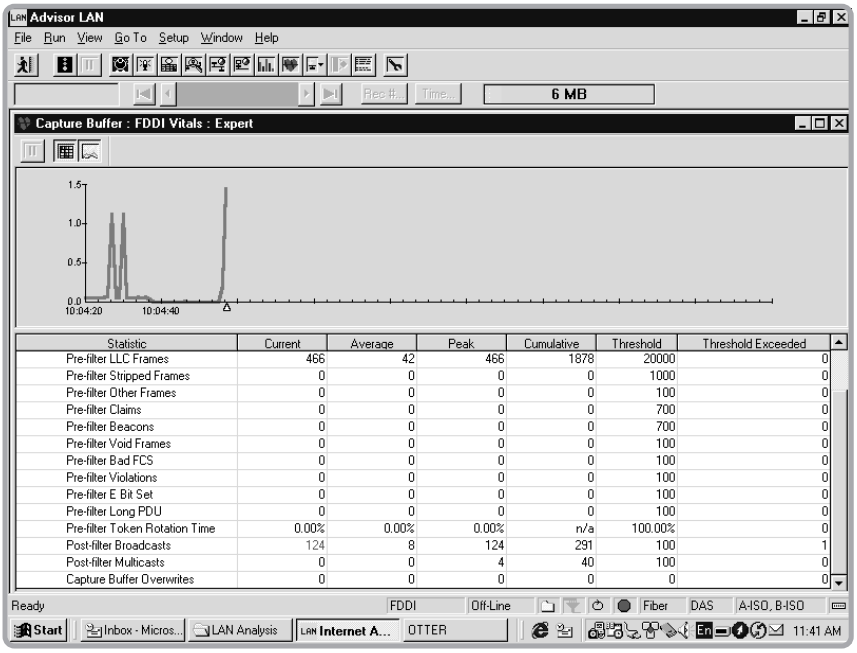
The Line Vitals measurement graphs current and maximum utilization in real-time and provides current and maximum values in tabular format of the following parameters:

- % Utilization
- Total frames
- Stripped frames
- Other frames
- Claims
- Bad FCS
- Beacons
- Frames with E-bit set
- Violations
- PDU too long
- Void frames

Protocol Vitals

Protocol vitals provide current, average, peak and cumulative values for a number of protocol specific parameters, along with user-configurable thresholds that you can set dynamically to automatically detect intermittently occurring events. The FDDI Advisor shows protocol vitals for the MAC layer, IP, Novell, Apple Talk, Banyan Vines, OSI and DEC DRP. Within each of these protocols, a wealth of protocol specific information is provided. For the MAC layer, for example, the FDDI Advisor provides:

- Percent utilization
- Total frames
- Tokens
- LLC frames
- Stripped frames
- Other frames
- Claims
- Beacons
- Void frames
- Frames with bad FCS
- Violations
- Frames with E-bit set
- Long PDU
- Token rotation time
- Broadcast frames
- Multicast frames
- Capture buffer overwrites



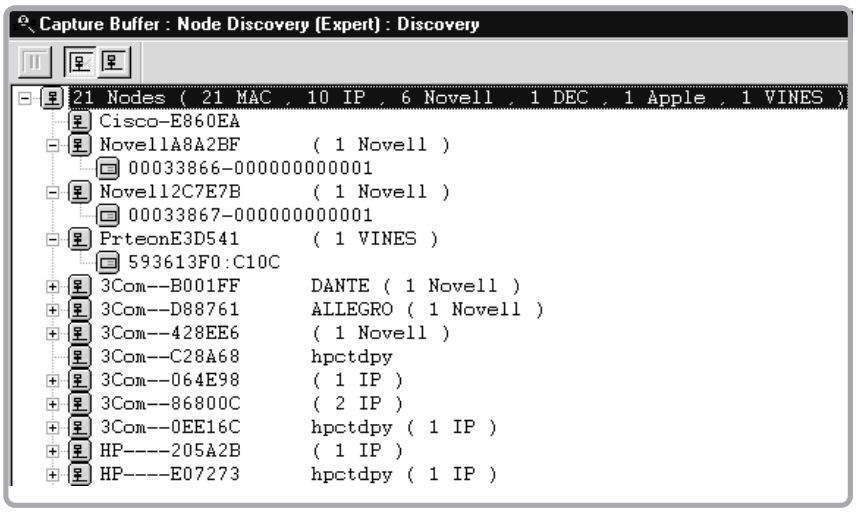
For complete specifications on all protocol vitals, see the Appendix B.

See who's using the bandwidth...

Node Discovery

Maintaining an up-to-date list of network nodes is key to managing many network problems as they occur. The FDDI Advisor provides an open node list, that will automatically be incremented as new discoveries are made by the Expert Advisor or node discovery measurements. The node list shows MAC addresses, network addresses (IP, IPX, AppleTalk, DECnet, OSI CLNP) and node names.

Node statistics and connection statistics reports use the station and server node names extensively, making node identification easier and faster. As a result, the FDDI Advisor provides useful clues such as “the connection between John Smith and server #1 generated 12 errors”.



... and how it's being used.

Connection Statistics

To see who is using the bandwidth and how the bandwidth is used, the FDDI Advisor provides numerous connection statistics. By simply clicking on a busy node, you will see immediately who the node is talking to 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

Right click on a column heading and select "Sort by this column" to sort the information for you by the chosen category. Data capture filters may be set while running these measurements, so that only a specific set of nodes is included.

MAC Node Statistics

Many times you need to find out exactly what is happening at the MAC Layer. The FDDI Advisor provides you with numerous MAC Node statistics to help you understand what is going on at that layer by providing insight into the following parameters:

Bytes transmitted	Frames transmitted
Bytes received	Frames received
Bytes transmitted per second	Frames transmitted per second
Bytes received per second	Frames received per second
SMT bytes received	SMT frames transmitted
SMT bytes received per second	SMT frames received
Errors	SMT frames transmitted per second
Errors per second	SMT frames received per second
Broadcasts per second	E-bit frames
Broadcasts per second	Code violations
Multicasts	Frames with bad FCS
Multicasts per second	Length error frames
% transmitted, % received, % SMT	

When you need to see all the details...

Decodes

You can solve many problems with the Expert Advisor without viewing the details of each frame. However, when you need them, there are more than 400 protocol decodes available to help interpret the protocol as they appear on the network. A detailed display shows the field-by-field protocol decode for every frame, while the summary display provides a single-line display of the key fields. A hexadecimal display is provided as well and shows easy correlation with the detailed display. Each frame has a timestamp that can be used for relative, absolute or delta timing measurements.

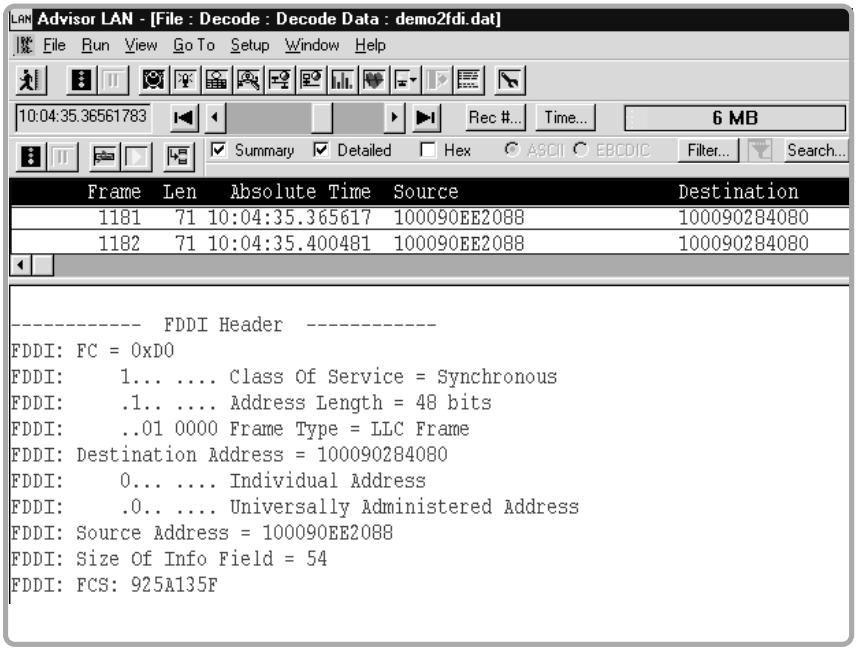
The full MAC layer decode shows:

Preamble length
Frame control field
Source and destination addresses
Frame status indicators include:

- Valid frame check sequence
- Error in preamble or frame length
- Error in info field or frame termination
- Receipt of specific violation symbols
- Count of symbols in control indicator field

Full SMT decode of 6.2 and 7.2 SMT frame types:

- Frame class and types
- NIF, SIF ECF, RAF, RDF, SRF, PMF, ESF
- Version, transaction and station ID
- Info field length and parameters



For the upper layers, all major protocol stacks are supported, including:

- TCP/IP
- AppleTalk
- DECnet
- IBM/SNA
- Novell
- Sun
- and others
- Microsoft LAN Manager
- Banyan-Vines
- DECnet Phase IV
- Media
- OSI
- XNS

The FDDI Advisor provides 7-layer decodes of all major protocols, including 802.1p, 802.1Q and 802.3x. Protocol decodes have a built-in protocol follower that will flag errors as they occur. A convenient "Go to next error" feature allows you to advance to the next errored frame in the capture buffer.

For a complete list of decodes, check our web at www.agilent.com/comms/onenetworks.

... or just some of it

Filters

The FDDI Advisor supports two types of data filtering to assist you with troubleshooting and performance analysis of large quantities of data generated on a high speed link: capture and display filtering.

Hardware-based pre-capture filters are essential for targeted searches, as they allow you to specify which frames the instrument should store in the capture buffer. Display filtering allows you to specify which frames should be shown on the display.

Up to 16 hardware filters may be active at the same time; multiple active filters are logically ORed.

The FDDI Advisor allows you to set up filters by frame attributes:

Frames with a bad FCS
Stripped frames
Frame error indicator
Copied frames
Format errors
Address recognized frames

or by the frame control byte:

Non-restricted Tokens
Restricted Tokens
Reserve (Async or Sync)
Voids

and on the data portion of the packet.

When filtering on the data, up to 64 bytes may be specified in the data field following the MAC source and destination addresses as filter criteria (or network layer for IP and IPX network filters).

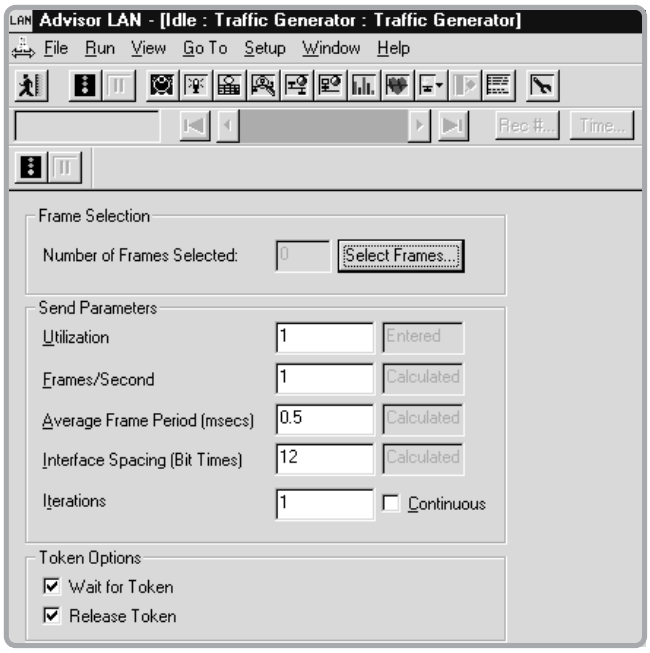
The FDDI Advisor also provides filtering by protocol and by station. Once a filter condition has been met, you can stop data capture with the filter event at the start, in the center or at the end of the capture buffer.

When you need to duplicate a problem...

Traffic Generation

Built into the FDDI Advisor is a powerful traffic generator that adds advanced traffic generation and intelligent packet or capture file editing capabilities. Ideal for those in manufacturing test and support organizations, it provides the tools you need to thoroughly test, simulate and troubleshoot a network device or problem.

You can quickly configure the FDDI Advisor to generate a series of packets to saturate a test network or a single packet such as an ARP or PING to troubleshoot a production network. The multitasking capabilities of the FDDI Advisor lets you monitor the network while the traffic is transmitted over the network.



Frames from the capture buffer may be edited, then played back to duplicate hard-to-find problems. In addition, numerous message templates have been pre-defined for you. Detailed specifications for the traffic generator are provided below.

... or contact a node

Active Tests

A number of pre-written response time measurements and other active tests are included with the FDDI Advisor. These include:

IP Ping	Novell Network list
IP ARP	Novell View Nodes
IP RARP	Novell Nearest Server
IP Trace Route	Novell Server list
IP Active Net Discovery	Novell Node Ping
	Novell Server Ping

Traffic Generator Specifications

The user will be able to define the following parameters:

Number of frames to be transmitted
Utilization: 1 to 100%
Frames per second: 1 to 40,000
Average Frame Period (msec)
Inter-frame spacing (in bit times): 1 to 65535ms
Number of iterations: 1 to 65535 or continuous
Token options:
  Wait for Token
  Release Token

Message length range
  1 to 5000 bytes

Frame copy
  Copy from another message
  Copy from capture buffer

Number of user defined bytes per message:
  Up to the maximum legal frame size

FCS selection:
  Good or bad FCS: automatically calculated

Errors:
  Claims and beacons

Technical Specifications

Analysis system:
AMD 29030 at 20 MHz with > 26 MB of memory

FDDI chip set:
Motorola with 68332 processor for SMT
Data capture capability: >450,000 fps, 100% network load
Data transmit capability: >450,000 fps

Test Interfaces

Dual fiber MICs for A/S/M and B
DB-9 STP and RJ-45 UTP copper for CDDI applications
6 pin mini DIN compatible with AMP-Lytel bypass switch

Status Indicators

Front panel LEDs: current line state, A and B ports
(idle, active, halt, master, noise, or quiet)

Status Icons Information

Station type (DAS, SAS, etc.)
CMT port status for both ports:
(OK, ISO [isolated], or WP [wrapped])

Physical Specifications

Dimensions	31.11 W x 29.84 D x 4.44 H cm (12.25 x 11.75 x 1.75 in.)
Weight	2.1 kg (5 lbs)
Temperature:	
Operating	5° C to 40° C
Non-operating	-25° C to 60° C
Humidity	
Operating	20° C to 80° C non-condensing
Non-operating	10° C to 90° C non-condensing
Altitude	
Operating	to 15000 ft.
Regulatory compliance	
EMC:	European Union EMC Directive IEC801-2, ESD Susceptibility IEC801-3, Radiated immunity IEC801-4, Electrical Fast Transient Immunity CISPR11, Radiated and conducted Emissions

J2307A – Token Ring Undercradle

Windows 98-based performance analysis for 4/16Mbps Token Ring networks

The Agilent J2307A undercradle adds comprehensive 4/16Mbps Token Ring testing capability to the J3446E LAN Advisor and J2300E WAN Advisor Mainframe. The high-performance analyzer receives and decodes all frames on the network and can transmit any standard or user-defined Token Ring frame up to maximum Token Ring line rates. Many of the performance analysis measurements, decodes, protocol analysis, expert measurements and traffic generation can run simultaneously in real time to maximize your ability to diagnose and troubleshoot Token Ring networks. Whether you are troubleshooting a production network or designing and optimizing a test network, the Token Ring Advisor provides you with the tools to do the job effectively and with minimal effort.

Feature Highlights

- Solve network problems quickly and effectively with the Expert Advisor
- Drill down capabilities allow you to pinpoint performance problems and Expert Advisor recommends corrective action
- Anticipate network problems using performance statistics and vitals
- Obtain complete network information with comprehensive network statistics
- Decode the major protocol stacks from layer 1 through layer 7
- Stress test the network with a powerful traffic generator
- User-friendly GUI simplifies the troubleshooting process

The Token Ring Advisor makes it easier and more efficient for you to isolate and solve problems on your Token Ring local area networks. You can connect anywhere in the network, capture exactly the data you need, then clearly see and comprehend the actions you need to take. You'll be able to find it, and fix it fast, like never before.

Token Ring Expert

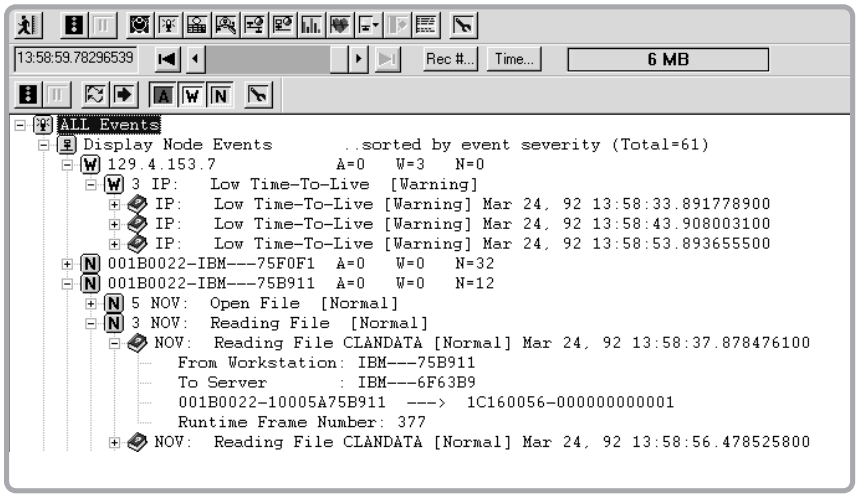
Troubleshooting Expertise at Your Fingertips

Isolating a problem in a Token Ring network or tuning the network for optimal performance can often mean searching through thousands of captured frames, many of which may be irrelevant or insignificant.

The Token Ring Expert makes the job much simpler by providing continuous feedback on key network issues and reducing the thousands of frames into a handful of significant events. Each event is described in complete details, time-stamped and rated in terms of severity:

Alert events that indicate a serious network problem
Warning events that highlight a configuration or a performance issue
Normal events that give information on common network transactions

Additional drill-down capability enables you to focus on the data to find the source of the problem and a suggested solution. No matter what the traffic level, Token Ring Advisor transforms data into meaningful diagnostic information, constantly monitoring the traffic on your Token Ring local area network.



The Expert Advisor enables an instantaneous view of the key issues and overall health of your network. "Network Health" is a user-configurable representation of network's efficiency. Examples of network health problems include the occurrence of MAC layer errors and protocol commentator warnings or alerts. Utilization levels and significant events are shown graphically by protocol. Further information can be obtained by simply clicking on items of interest. The Expert Advisor will show, for example, the client-server connection with a slow file transfer rate. Suggestions for resolving the problem or optimizing the configuration are provided via on-line context-sensitive help.

Protocol Commentators

At the heart of the Expert Advisor is a series of commentators that perform real-time analysis of frame sequences to detect protocol events. Token Ring Commentators run simultaneously with all other measurements to provide easy access to information. Time-stamped events correlate the events to the relevant frames in the capture buffer. Context-sensitive help gives you information on common causes of problems, as well as information on how to fix these problems.

All commentators run concurrently or can be defined separately for the major protocol stacks. A complete listing of events that are flagged by the Token Ring commentators may be found in Appendix A.

Proactively Manage and Troubleshoot Your Network

Network management requires an in-depth understanding of the network behavior. To meet this requirement, you need a comprehensive set of analysis tools. The Token Ring Advisor has a set of powerful performance measurements available to help you proactively manage and troubleshoot your network. Combined with the commentators, it makes troubleshooting a Token Ring network as simple as using your mouse.

Protocol and Frame Length Statistics

To help understand variations over time of frame length and protocol usage, protocol and frame length statistics are gathered simultaneously for the network and the major protocol stacks. The Token Ring Advisor shows these statistics in both tabular and piechart format, showing % utilization or frame length distribution by protocol. Token Ring frame lengths are displayed in the following categories:

<64 bytes
64.....127 bytes
128.....255 bytes
256.....511 bytes
512...1023 bytes
1024...2047 bytes
2048...4095 bytes
4096...8191 bytes
8192...16383 bytes
>16383 bytes

Protocol statistics provide by protocol:

% utilization
total number of frames and bytes
frames and bytes per second
DLL (data link layer) errors
Errors/sec and
Average frame length

Vitals

A Picture of Your Network's Health

The statistics are logged to disk and may be exported in CSV format. This data can then be used to generate professional quality reports with the Advisor Reporter software (see the index for more information on the Agilent Advisor Reporter).

While the Token Ring Advisor 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 Vitals measurements provide a statistical picture of the MAC layer 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 the configuration of the network.

Line Vitals

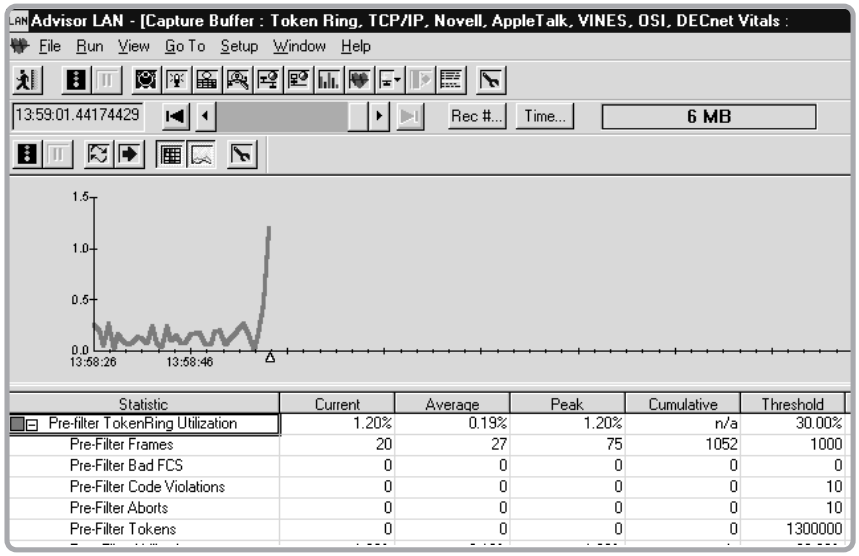
The Line Vitals measurement graphs current and maximum utilization in real-time and provides current and maximum values in tabular format of the following parameters:

% Utilization
Total frames
Bad FCS frames
Code Violations
Receiver Congestion
Burst, Line and Soft Errors
Beacons
Claim Tokens
Ring Purges

Protocol Vitals

Protocol vitals provide current, average, peak and cumulative values for a number of protocol specific parameters, along with user-configurable thresholds that you can set dynamically to automatically detect intermittently occurring events. The Token Ring Advisor shows protocol vitals for the MAC Layer, IP, Novell, Apple Talk, Banyan Vines, OSI and DEC DRP. Within each of these protocols, a wealth of protocol specific information is provided. For the MAC layer, for example, the Token Ring Advisor provides:

Percent utilization
Total frames
Bad FCS frames
Code Violations
Aborts
Tokens
Receiver Congestion
Burst, Line and Soft Errors
Beacons
Claim Tokens
Ring Purges
Broadcast frames
Function Address frames
Capture buffer overrides



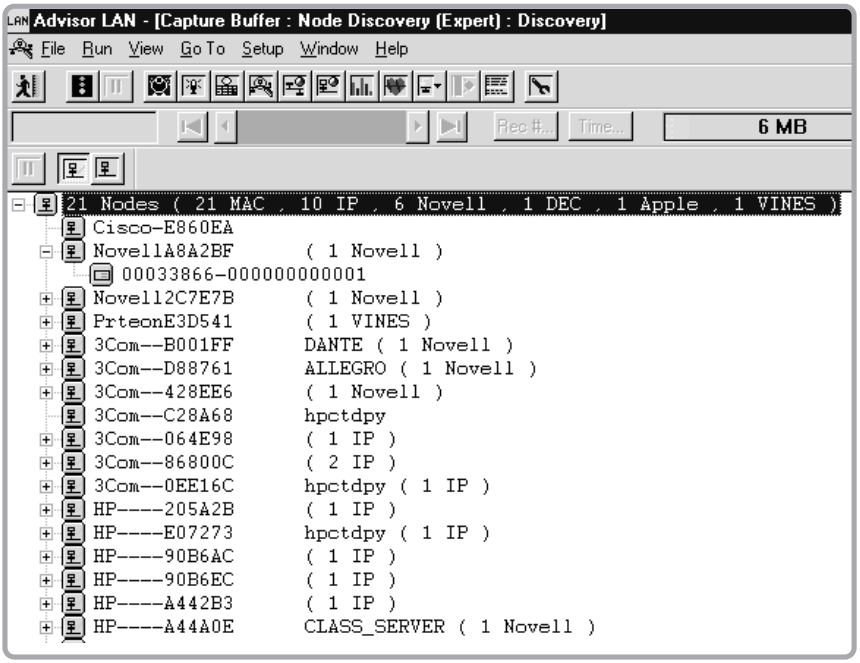
For complete specifications on all protocol vitals, see Appendix B.

See who's using the bandwidth...

Node and Station Discovery

Maintaining an up-to-date list of network stations is key to managing many network problems as they occur. The Token Ring Advisor provides an open station list that is automatically incremented with new discoveries made by the Expert Advisor or the node discovery measurements. The node list shows MAC addresses, network addresses (IP, IPX, AppleTalk, DECnet, OSI CLNP) and node names.

Node statistics and connection statistics reports use the station and server node names extensively, making node identification easier and faster. As a result, the Token Ring Advisor provides useful clues such as “the connection between John Smith and server #1 generated 12 errors”.



... and how it's being used.

Connection and Node Statistics

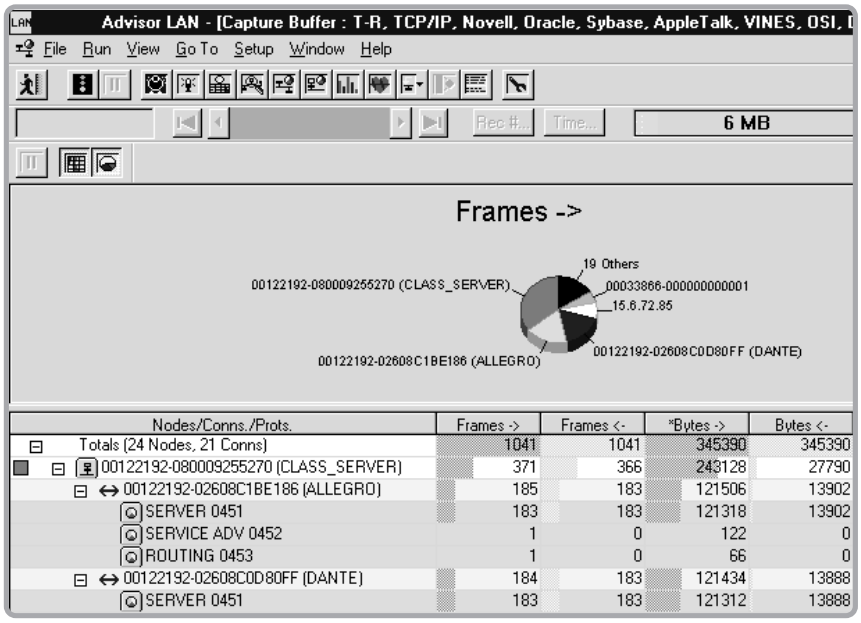
Many network problems are reported by users in terms such as, "I cannot connect to a printer" or "The connection to the network is very slow." To resolve these kinds of problems, you need to view the activity on a particular station or specific connection.

To see who is using the bandwidth and how the bandwidth is used, the Token Ring Advisor provides numerous connection statistics. By simply clicking on a busy node, you will see immediately who the node is talking to 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

Right click on a column heading and select "Sort by this column" to sort the information for you by the chosen category. Data capture filters may be set while running these measurements, so that only a specific set of nodes is included.



MAC Node Statistics

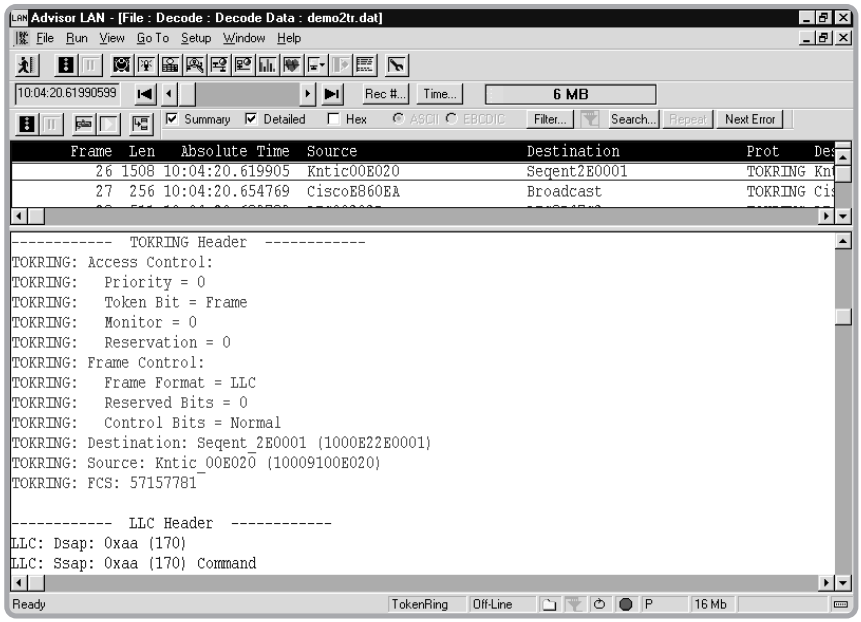
Many times you need to find out exactly what is happening at the MAC Layer. The Token Ring Advisor provides you with numerous MAC Node statistics to help you understand what is going on at the MAC layer by providing insight into the following parameters:

Bytes transmitted	Frames transmitted
Bytes received	Frames received
Bytes transmitted per second	Frames transmitted per second
Bytes received per second	Frames received per second
Errors	% transmitted
Errors per second	% received
All Station Broadcasts	Function Address frames
All Station Broadcasts per second	Function Address frames per second
Source Route Broadcasts	Source Route frames transmitted
Source Route Broadcasts per second	Source Route frames received

When you need to see all the details...

Decodes

You can solve many problems with the Expert Advisor without viewing the details of each frame. However, when you need them, there are more than 400 protocol decodes available to help interpret the protocol as they appear on the network. A detailed display shows the field-by-field protocol decode for every frame, while the summary display provides a single-line display of the key fields. A hexadecimal display is provided as well and shows easy correlation with the detailed display. Each frame has a timestamp that can be used for relative, absolute or delta timing measurements.



Token Ring-specific decodes for the MAC and LLC layer include 802.2, Token Ring/ 802.5 and TLAP (TokenTalk Link Access Protocol).

For the upper layers, all major protocol stacks are supported, including:

- TCP/IP
- AppleTalk
- DECnet
- IBM/SNA
- Novell
- Sun
- and others
- Microsoft LAN Manager
- Banyan-Vines
- DECnet Phase IV
- Media
- OSI
- XNS

The Token Ring Advisor provides 7-layer decodes of all major protocols, including 802.1p, 802.1Q and 802.3x. Protocol decodes have a built-in protocol follower that will flag errors as they occur. A convenient "Go to next error" feature allows you to advance to the next errored frame in the capture buffer.

For a complete listing of available protocol decodes, please consult our website at www.agilent.com/comms/onenetworks

... or just some of it

Filters

The Token Ring Advisor supports two types of data filtering to assist you with troubleshooting and performance analysis of large quantities of data generated on a busy link: capture and display filtering.

Hardware-based pre-capture filters are essential for targeted searches, because they let you specify which frames the instrument should store in the capture buffer. Display filtering lets you specify which frames should be shown on the display.

Up to 16 hardware filters may be active at the same time; multiple active filters are logically ORed.

The Token Ring Advisor allows you to set up filters by frame attributes:

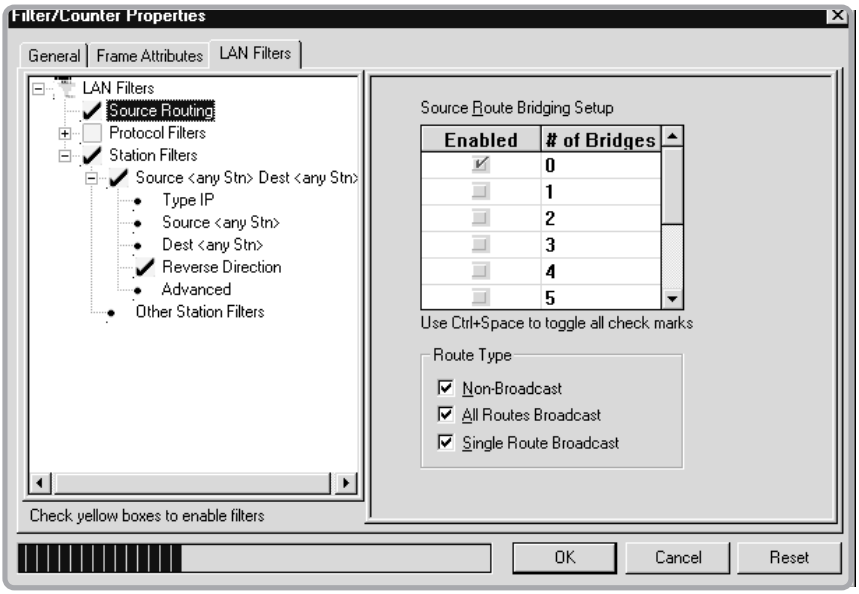
Code Violations
No end delimiter
Abort frames
Frames with bad FCS
Frames with E-bit set
Frames with I-bit set

or by the frame access and control byte:

Tokens
Frame priority (0-7)

and on the data portion of the packet. When filtering on the data, up to 64 bytes may be specified in the data field following the MAC source and destination addresses as filter criteria (or network layer for IP and IPX network filters).

The Token Ring Advisor also provides filtering by source routing, by protocol and by station. Once a filter condition has been met, you can stop data capture with the filter event at the start, in the center or at the end of the capture buffer.



When you need to duplicate a problem...

Traffic Generation and Active Tests

Built into the Token Ring Advisor is a powerful traffic generator that adds advanced traffic generation and intelligent packet or capture file editing capabilities. Ideal for those in manufacturing test and support organizations, it provides the tools you need to thoroughly test, simulate and troubleshoot a network device or problem.

You can quickly configure the Token Ring Advisor to generate a series of packets to saturate a test network or a single packet such as an ARP or PING to troubleshoot a production network. The multitasking capabilities of the Token Ring Advisor lets you monitor the network while the traffic is generated and transmitted over the network.

Frames from the capture buffer may be edited, then played back to duplicate hard-to-find problems. In addition, numerous message templates have been pre-defined for you. Detailed technical specifications for the traffic generator are provided below.

... or contact a node.

Active Tests

A number of pre-written response time measurements and other active tests are included with the Token Ring Advisor. These include:

IP Ping	Novell Network list
IP ARP	Novell View Nodes
IP RARP	Novell Nearest Server
IP Trace Route	Novell Server list
IP Active Net Discovery	Novell Node Ping
	Novell Server Ping

Traffic Generator Specifications

The user will be able to define the following parameters:

Number of frames to be transmitted
Utilization: 1 to 100%
Frames per second
Average Frame Period (msec)
Inter-frame spacing (in bit times): 1 to 65535ms
Number of iterations: 1 to 65535 or continuous

Message length range:
1 to 4,100 bytes (4 Mbps)
1 to 18,000 bytes (16 Mbps)
Frame copy:
Copy from another message
Copy from capture buffer
Frame formats:
MAC, LLC
Frame priority:
0 to 7

Number of user-defined bytes per message:
Up to the maximum legal frame size
FCS Selection:
Good or bad FCS: automatically calculated

Technical Specifications

Analysis System

AMD 29030 at running 16 MHz with 16 MB of memory

Test interfaces

Token Ring:
DB-9 at 4 or 16 Mbps

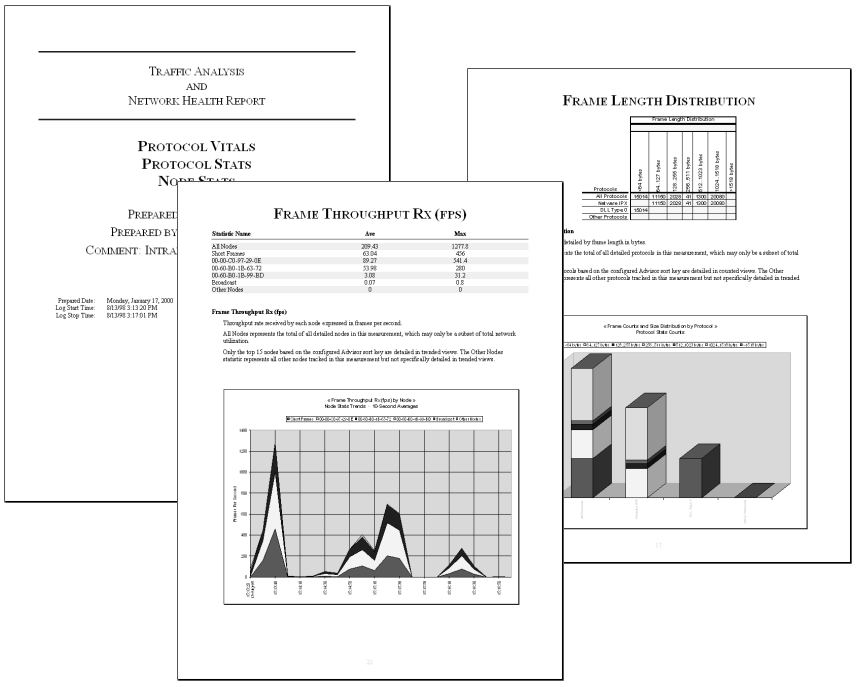
Physical Specifications

Dimensions:	31.11 W x 29.84 D x 4.44 H cm (12.25 x 11.75 x 1.75 in.)
Weight	2.1 kg (5 lbs)
Temperature:	
Operating	5° C to 40° C
Non-operating	-25° C to 60° C
Humidity	
Operating	20° C to 80° C non-condensing
Non-operating	10° C to 90° C non-condensing
Altitude	
Operating	to 15000 ft.
Regulatory compliance	
EMC:	European Union EMC Directive IEC801-2, ESD Susceptibility IEC801-3, Radiated immunity IEC801-4, Electrical Fast Transient Immunity CISPR11, Radiated and conducted Emissions

J3307A – Agilent Reporter

Professional reports with the click of a mouse

Agilent Advisor Reporter extends the capabilities of the Advisor into the world of network baselining and benchmarking. More than just a powerful troubleshooting tool, the Advisor is capable of gathering an unparalleled array of LAN, WAN, and ATM statistics. Advisor Reporter taps into this data and automatically presents it in meaningful tables, charts, and fully formatted reports.



A Wide Range of Applications

Advisor Reporter makes quick work of sifting through large quantities of network data. With this ease of reporting, you will find yourself using your Advisor for a much wider range of tasks than you expected from a protocol analyzer. Here are just a few of Advisor Reporter's many potential applications:

Baselining

- Quickly visualize and isolate difficult to spot network problems
- Document healthy networks for future reference when problems arise
- Identify and solve developing problems before they become real problems
- Balance your bandwidth for maximum efficiency
- Stay ahead of the capacity planning curve
- Cost-justify network component upgrades

Benchmarking

- Choose the right components for a specific network environment.
- Fine-tune configuration parameters of network components for optimal performance.
- Identify upper limits of network component performance

Productivity improvements

- Advisor Reporter can help you cost justify your decisions with documentation to back you up.
- It will help you understand what the network looked before and after a problem happened.
- Advisor Reporter helps you prioritize and plan changes to the network based on a real understanding of the network's dynamics.

Microsoft® Office 97/2000 Integration

A cornerstone of Advisor Reporter's heritage is complete integration into the Microsoft Office environment. This integration affords a degree of flexibility not achievable with other standalone applications. By keeping your data in Excel and Word compatible formats, you can use the full power of these applications to further manipulate your reports. Change data values, create new efficiencies, edit names, add balloon text or notes, even modify a complete report to work on your company's letterhead.

Ease of Use

Advisor Reporter comes with built-in AutoReport Profiles that make your first reports as easy to create as selecting a file, choosing which measurements to report on, and pressing the GO! Button. Before your eyes, Advisor Reporter creates data tables and charts in Microsoft Excel, or builds a fully formatted report in Microsoft Word, complete with a cover page and table of contents, inline statistics and glossary definitions for each measurement, and a wide range of embedded charts.

Advisor Reporter is so easy to use it can create in minutes a report that used to take days to produce.

Customizability

Advisor Reporter does not sacrifice power for ease of use. Advisor Reporter can work in either Automated Reporting or Custom Reporting mode. With Custom Reporting, you are prompted through all table, chart, or report options step-by-step, allowing you to maintain control over all aspects of the reporting process.

If you want the power of Automated Reporting and the flexibility of Custom Reporting, try the AutoReport Editor. Its well-organized graphical interface allows you to build your own profiles for use with Automated Reporting. These profiles can include such information as header, footer and cover page text, charts to include in the report, and number or date formats for the tables.

Understanding

With all of the statistics Advisor Reporter produces, understanding specifically what they mean isn't left to chance. A complete glossary is generated as part of your reports that explains statistic by statistic what your looking at and how it was calculated. Nothing can be more frustrating than looking at a chart and not really knowing what it represents. Advisor Reporter makes it easy.

International Awareness

Advisor Reporter is internationally friendly. Although still displaying English text, Advisor Reporter supports non-English versions of Microsoft Office including most Western and Far East languages, including French, Spanish, German, Italian, Japanese, and more. Advisor Reporter recognizes the international settings of your Windows environment, even recognizing the default paper size for your printer (i.e. A4). Date, time, and number format options are also presented according to your country settings.

Supported Interfaces

10/100/1000 Ethernet, Token-Ring, FDDI

Supported Measurements

Protocol and line vitals
Combines vital statistics for Ethernet, Token-Ring or FDDI with TCP/IP, Novell, AppleTalk, Banyan VINES, OSI and DECnet into a single measurement. Individual Protocols can be turned on/off as desired.

Protocol statistics
This series of measurements provides a detailed breakout of individual protocol types, with specific configurations for:

- All protocols by DLL types and SAPs
- All protocols by major protocol stack
- AppleTalk protocols
- Banyan (VINES) protocols and ports
- Cisco ISL and 802.1q VLAN Ids
- DECnet protocols
- IP protocols and ports
- Novell (IPX) types and sockets
- OSI protocols

Advisor Reporter provides a wide variety of extremely flexible built-in chart formats. Many charts can be customized, allowing you to chart only the data fields you want. Most importantly, Advisor Reporter's built-in chart formats are designed to be user-friendly, preventing potential costly misinterpretation of network data.

J4618C – IP Telephony Analyzer

New medicine for todays IP Telephony networks

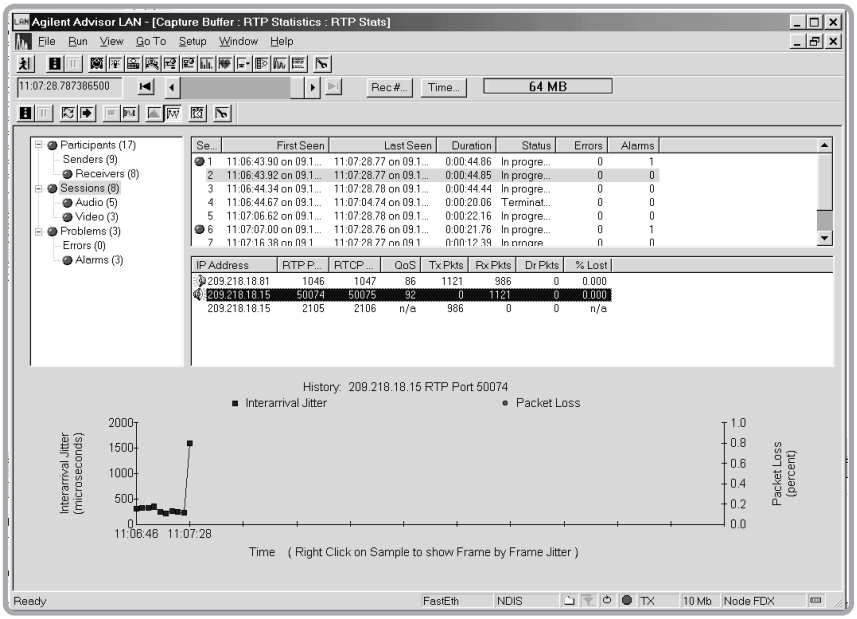
The Challenges for IP Telephony

Voice and video communications are inherently real-time applications. In order to achieve conversation over telecommunication networks, you must signal between the voice and video terminals to ensure both ends are active, responsive, and can agree on a common set of capabilities to communicate and exchange features. IP Telephony is a technology in its infancy and the industry faces at least two significant challenges. First, to ensure virtual connection is achieved across this connectionless packet IP network using new protocol standards, such as H.323; MGCP; MEGACO/H.248; or SIP. Second, is to transport packets over the IP network in a timely manner with high integrity, thereby ensuring acceptable voice and video quality. Engineers skilled in Voice and Fax over IP technology are working hard to overcome these problems. Challenges exist because of the following reasons:

- New signaling protocols such as MEGACO, SIP, and MGCP are far from complete, contain optional functionality, and are being revised at a fast rate. Interoperability problems between equipment suppliers often occur, especially as vendors adhere to different releases of the same standard or implement options not supported by the other party. Devices may not reset gracefully when unexpected behavior is encountered.

- Standards leave room for interpretation leading to connectivity or feature negotiation problems among different vendor systems.

- Voice traffic requires a minimum quality of service from the packet-switched network to allow acceptable speech quality. Error rate, packet loss, jitter, and delay must be measured and IP networks must be upgraded with mechanisms to ensure acceptable QoS.

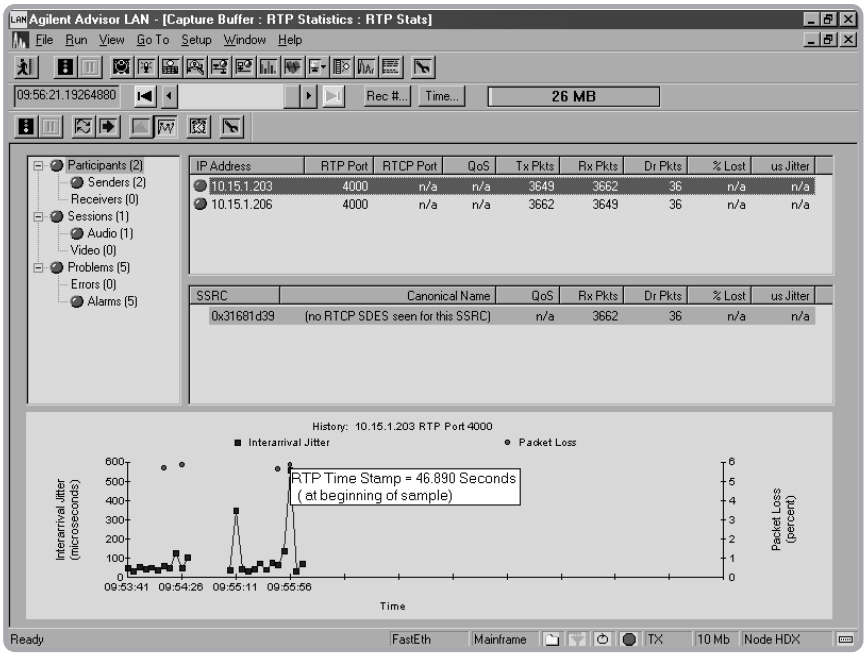


IP Telephony Analyzer

The Agilent IP Telephony Analyzer is a Windows based software solution that adds Voice over IP analysis to the Advisor. The IP Telephony Analyzer offers real-time troubleshooting for Voice over IP (VoIP) applications on LAN, WAN, and ATM networks. Expert analysis tracks each state of the VoIP call control and voice transport process and automatically detects errors and protocol anomalies.

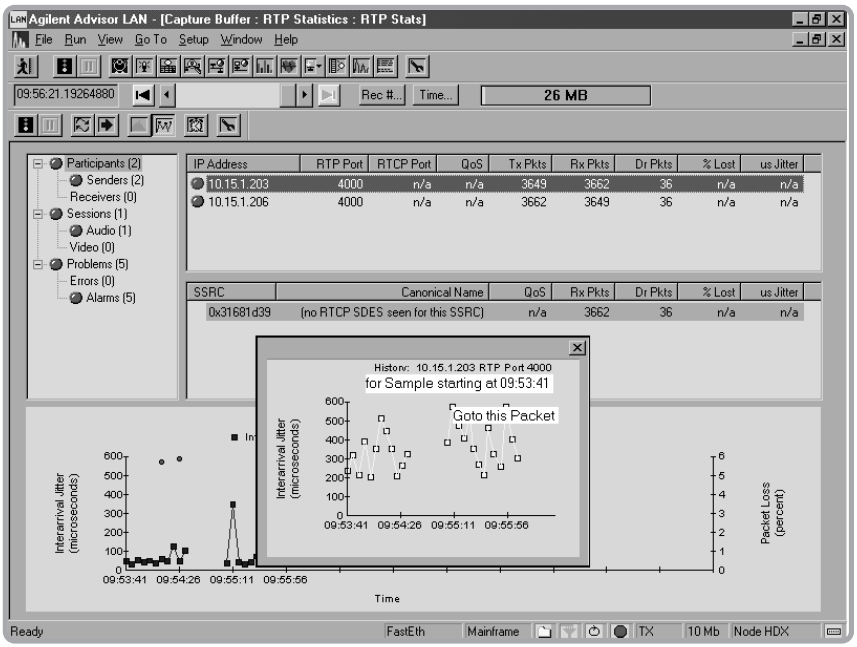
Packets using RTP to transport voice or video are analyzed for errors. Sessions and participants are identified, and packet loss and jitter are measured for each stream or conversation. Each session can be selected for audio playout through the Advisors' speakers. An automated feature allows instant drill down on the packets surrounding any point of high jitter or packet loss. In addition, detailed examination, packet by packet, is offered through clear and accurate decodes and real-time filtering. The IP Telephony Analyzer, analyzes the most extensive list of VoIP protocols in the industry today, augmented now with the addition of MEGACO/ H.248 Annex A and Annex B. RTP measurements; VoIP Expert analysis, packet decode and statistics are all measured simultaneously in real-time.

These analysis features allow users of Voice and Fax over IP networks and services to evaluate equipment such as gateways and gatekeepers and troubleshoot and optimize IP Telephony deployments. The IP Telephony Analyzer assists in identifying internetworking, interoperability, and performance problems. It is especially useful during multi-vendor network integration and performance assessment.



Feature Highlights

- Packet loss and jitter calculated for each individual RTP stream
- Audio played out from VoIP packets
- Listen to audio with jitter or de-jittered
- Graphs the distribution of RTP packet loss and jitter values and over time
- Comprehensive, real-time Expert Commentators for VoIP Signaling and Voice packet transport.
- Automatic drill down to suspect packets surrounding an IP impairment
- Export information on all RTP packets to a spreadsheet
- Call Detail Records for each call or part call
- Real-time decodes, filtering and analysis on LAN, WAN and ATM
- The most Extensive list of VoIP decodes available including recent drafts
- Simultaneous RTP and Expert analysis with decodes and statistics



Voice Packet Analysis

The IP Telephony Analyzer allows a network engineer to select a voice conversation for replay through the speakers of the Agilent Advisor. Of course, like all features with the Agilent Advisor, this is available in real-time. The user can select to hear both directions or solely the forward or backward direction. The user can also select to hear the voice raw - with the jitter captured at that point in the packet network or with the jitter removed as would be experienced on the listeners side of the gateway after the de-jitter buffer.

Playout of the audio allows a network engineer to isolate the cause of bad voice quality within the VoIP network. In some instances, listening to the audio is the only way to diagnose a problem. For example, an end user may complain of echo but when a network engineer listens to the audio he or she discovers the problem is background noise being fed in, even when the parties are speaking.

Packet loss and jitter for each RTP session is measured in real-time. The time of arrival of each packet is recorded and a comparison made with the time stamp and sequence number contained in the RTP header. Using this method, an accurate measurement of jitter and packet loss introduced up to that point in the network can be made. A simple right mouse click on any point on the graph gives the resolution of the measurement. Results are tabulated and graphed, then made available for export to external analysis tools, such as spreadsheets. The user can 'click' on a jitter peak or a lost packet and the Advisor moves to the decode display, placing the cursor on the packet before the event. This innovative feature allows the user to troubleshoot surrounding the causes of the IP impairment with ease and speed.

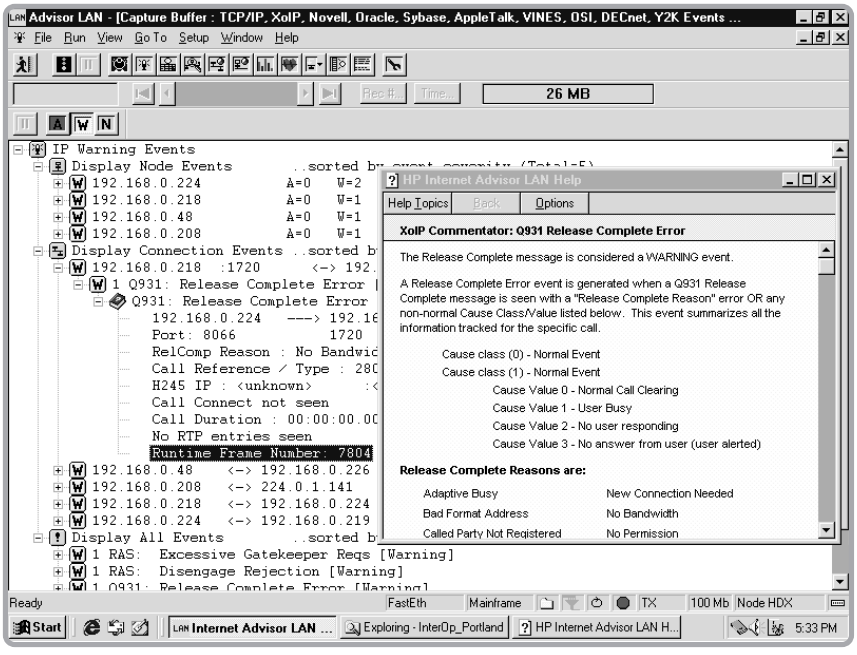
A log stores complete information on all errors or events exceeding a user-defined threshold. This allows unattended monitoring with the confidence that details of all alarms will be available to the network engineers when they return to the monitor to review the logging session. Alarms can be set on packet loss with fine or coarse granularity, allowing for detailed analysis of media gateway behavior or long term operational network base-lining.

Jitter and packet loss distribution are graphed in addition to plotting these quantities over time. This allows an engineer to verify correct settings of the de-jitter buffer and to trim delay from the voice path.

Voice packets can be captured on WAN, LAN, and ATM interfaces, and replayed through the application to reexamine the analysis.

This software package also contains the VoIP Expert Commentators for H.323. The VoIP Expert Commentators intelligently analyze every stage of the call process and inform the user of all errors and notable events. Further, the IP Telephony Analyzer delivers clear, accurate, color-highlighted decodes and real-time filters to select only those signaling or voice packets of interest. The most extensive list of Voice and Fax over IP protocols in the industry is supported.

The Value in Using the IP Telephony Analyzer and Expert Commentators in Operational VoIP Networks



Expert Commentators

The IP Telephony Analyzer is used to measure the level of impairments introduced by an IP network so that An assessment can be made whether acceptable speech quality can be expected over that network or whether poor speech quality is due to the IP network performance. In an operational network, it is vital to isolate the cause of poor voice or video transport. Such poor quality may be due to packet impairments in the IP routers or over- utilization of VoIP gateways. Measurement of packet loss, packet loss ratios, and jitter are an essential part of isolating the causes of poor voice quality in the IP network.

VoIP Expert Commentators

Automatically detects Errored Call Set-Up and Tear Down. For example:
- Unreachable Destination
- User busy
- Resources unavailable
- Inter-working error

Generates Alarms for non-Standard Protocol Behavior. For example:
- Invalid message
- Unknown data type

Warns of Errors. For example:
- Open Logical Channel Reject
- No bandwidth
- Resource unavailable
- Security denial
- Transport QoS not available

Measures Gatekeeper Performance. For example:
- Alarms on excessive requests
- Alarms on long response times

Alerts the user to slow IP network and VoIP device performance. For example:
- Long call set up times
- Missed sequenced and duplicate RTP packets

Draws attention to VoIP device incompatibility. For example:
-Terminal capability set reject or release

Call Detail Records

The VoIP Expert Commentators produce a record of all H.323 calls monitored. Comprehensive information is logged regarding each call including:

- Call Set up Time
- Call Duration
- Call Clear Cause
- Terminal Capabilities Negotiation
- Payload Type
- Number packets sent
- IP and UDP addresses

Decodes for All VoIP Protocols

The IP Telephony Analyzer delivers clear, accurate, color, highlighted decodes and real-time filters to pick out only those signaling or voice packets of interest. The most extensive list of Voice and Fax over IP protocols in the industry is supported. These include:

- H.323 version 3; comprising: H.245, H.225.0 (Q.931 and RAS)
- H.261 and H.263 for video conferencing
- IETF SIP, SAP and SDP
- SGCP from Bellcore
- MGCP 1.0 - RFC 2705
- NCS - PacketCable Network-Based Call Signaling Protocol Specification

  (PKT-SP-EC-MGCP-I02-991201)
- T.38 for real-time Fax over IP
- RTP and RTCP for transport of voice packets over IP
- MEGACO RFC 3015 Also known as ITU-T H.248 (Annex A and B)
- H.323 v3; Annex E, F and H.225.0 Annex G
- SCTP from IETF SIGTRANS Working Group

This analysis can be performed in real-time or post-process, capturing data from LAN, WAN, or ATM interfaces. The IP Telephony Analyzer has a track record for being first to market with new VoIP protocols, so your investment is protected and you can depend on your test equipment to keep pace with your VoIP innovations.

- Capture filters select only the defined packets for storage to the capture buffer. Packets can be filtered into the buffer for the following VoIP protocols easily, using the GUI:

  - H.225.0 RAS
  - H.225.0 Call Signaling (Q.931/Q.932)
  - MGCP
  - SGCP
  - RTP
  - RTCP
  - SIP

- Packets in the capture buffer can be searched for by protocol. The cursor is placed over the packet once it is found.

- Once captured in the buffer, further filtering can select those packets to be displayed on the screen. This process is achieved using the display filters. Display Filters are available for the following VoIP protocols.

  - H.225.0 RAS
  - H.225.0 Call Signaling
  - RTP
  - RTCP
  - SIP
  - MGCP
  - SGCP (Q.931/Q.932)
  - H.245
  - H.450
  - SDP

J5425A – Switch Advisor

Efficiently scan across hundreds of collision domains to locate problems

The Agilent J5425A Switch Advisor provides the capability to monitor MIB and RMON statistics from any SNMP supported network-connected device, including switches and routers. Today's switched infrastructure solved yesterdays' problem of large collision domains, but introduced new trouble-shooting challenges: protocol analyzers report on the collision domain they're attached to, switched ports act like their own network, how do I manage hundreds and thousands of collision domains? Switch Advisor solves this problem.

Once connected to a device, a very powerful feature of the Switch Advisor is its ability to perform a "sort" of device ports in an ascending or descending order. This feature allows you to quickly examine the statistics of a multi-port device (multiple collision domains) and identify the top users of bandwidth. By performing a descending order sort on "collisions" or "errors", you can quickly examine hundreds of individual collision domains for the source of network problems.

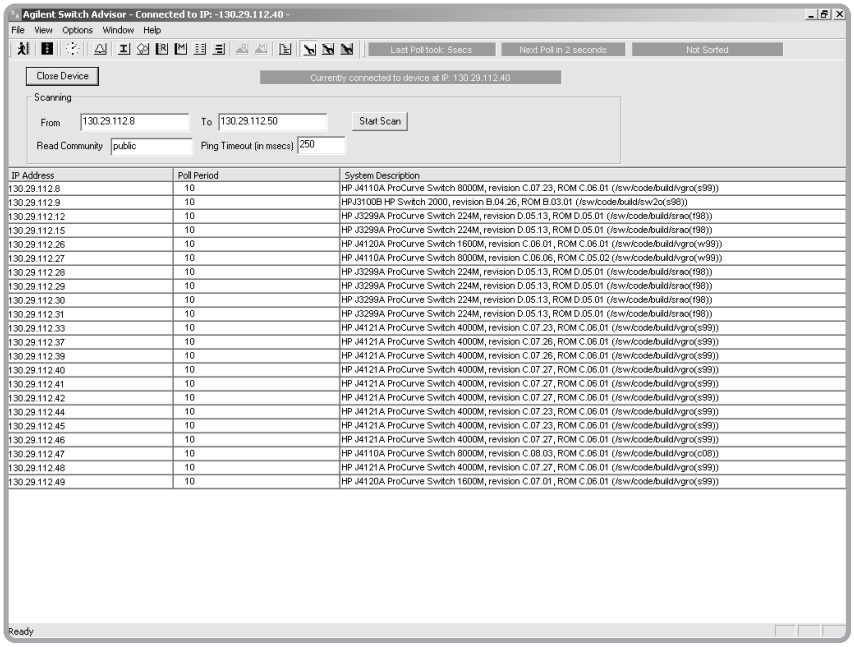
Switch Advisor can only be connected to one SNMP device at a time, but multiple instances of Switch Advisor is allowed. The number of simultaneous open sessions is only limited by your PC hardware (CPU, Memory).

Feature Highlights

- Discover all SNMP supported devices in your network
- Ascending/Descending sort on device port statistics
- Identifies top users/collision domains/errors depending upon MIB/RMON statistic sorted on.
- Last 30 minute utilization history graph (using default 10 second polling period)
- Comprehensive single port statistics
- Alarm any or all device ports with user defined thresholds
- Log device port MIB/RMON statistics, port status, Alarms (.csv file format)
- Multiple Switch Advisor Windows open simultaneously (one for each device actively monitored)
- Monitor all Manufacturer devices (device must support SNMP)

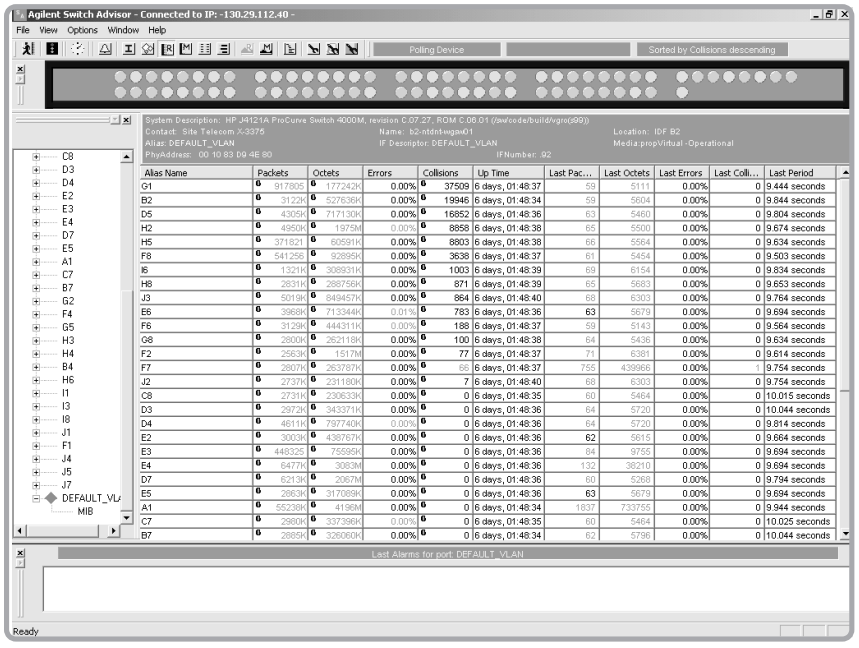
Discover all SNMP supported devices

Input an IP address range, sit back, and let Switch Advisor scan your network. New devices are installed everyday, but you may not be aware of it. You cannot troubleshoot a device that you do know is there.



Identify Where the Problem is Quickly

Open the RMON Statistics view and do a descending order sort of the switch ports to identify your top utilized ports, or sort on "collisions" to quickly locate which ports (collision domains) are causing problems.

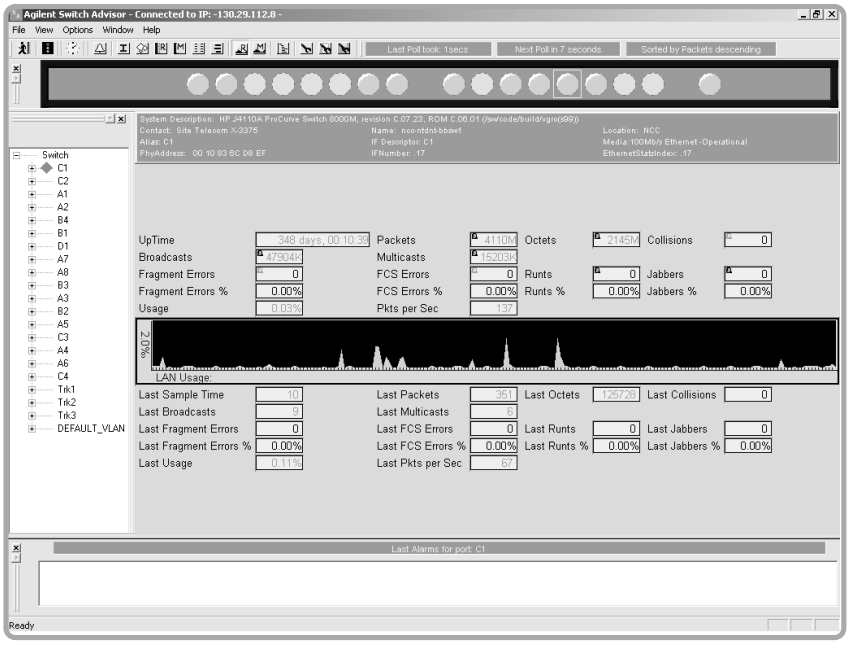


Comprehensive Overview of Port Health

Once you have located a port of interest with the RMON Statistics view, drill down to the Single Port Statistics view to determine the health and activity of individual ports. Statistics include:

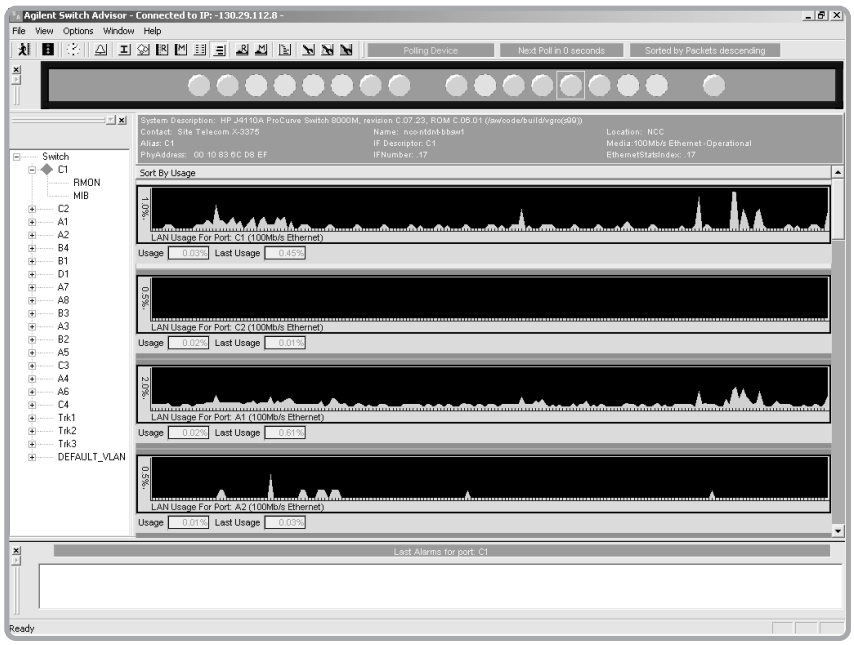
- Broadcast
- Multicast
- Octets
- Runts
- Jabbers
- Fragment and FCS errors
- Collisions
- Usage
- Packets per second

These statistics and others are reported both cumulatively and for the last polling period.



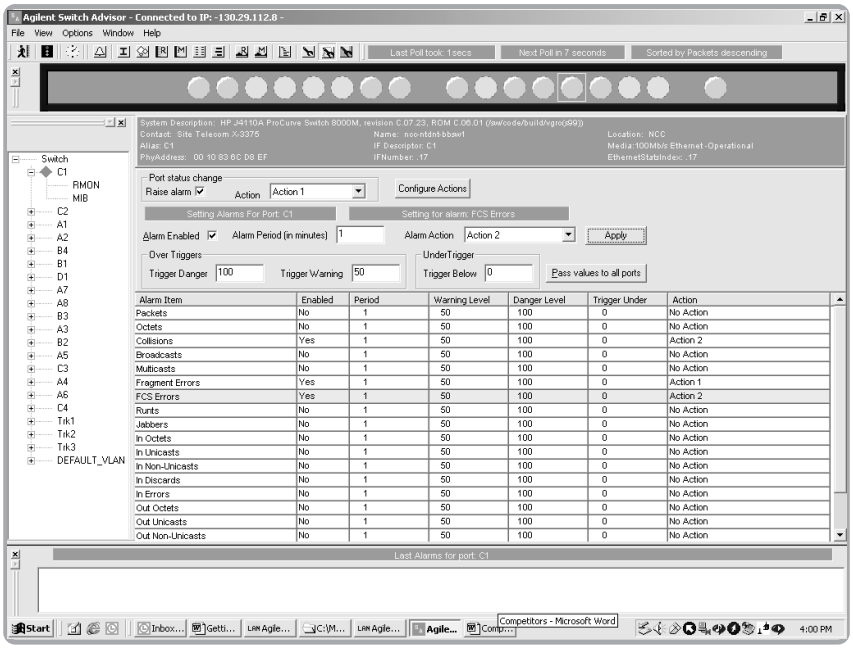
Quickly Assess Switch Efficiency

The Port Usage view graphically displays the last 30 minutes of Usage history (based on the default 10 second poll period) for device ports in the order of the last "sort". Quickly visualize the efficiency of any device and determine whether or not it is delivering the capacity necessary to support satisfactory response times to your users.



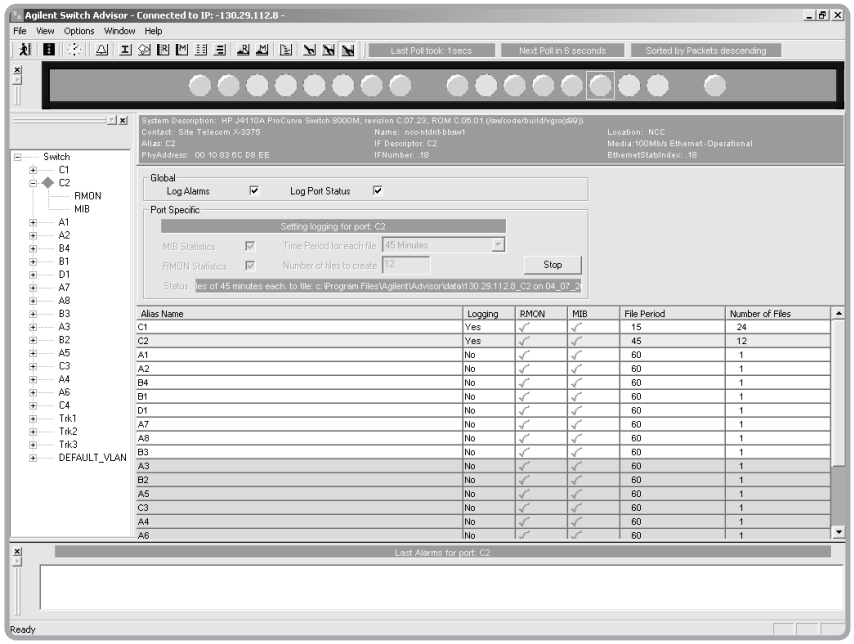
Alarm Suspect Ports

Switch Advisor vigilantly keeps watch over your network. Set alarms on individual or all ports. Customize fault thresholds to give you notice of network problems before they impact your users.



Create Log Files

Log port statistics including Alarms, Port Status, RMON, and MIB in any combination you need, creating individual files for the ports you select. The comma-separated variable files are in .csv format and ready for import into a spreadsheet for further analysis.



Technical Specifications

Your PC must be a Pentium class machine with a minimum of 64 Mbytes of RAM (128 Mbytes RAM for NT4 and Windows 2000), fitted with a LAN card running any one of the following operating systems:

- Windows® NT4
- Windows® 98
- Windows® 2000

Appendix A – Protocol Commentators

Commentators perform real-time analysis of frame sequences to detect protocol events. They are unique for each protocol. Following is a listing of the various events that are detected and commented on:

TCP/IP Commentator Events

IP: broadcast storm, low time-to-live, zero time-to-live, duplicate address
TCP: low window, excessive retransmission, close connection, open connection
RIP: router identified, routing information reply, routing information request
IGRP: router identified, router change,
RIP router change

OSPF router change, incorrect hello time, neighbor change, router identified

ICMP Network Commentator Events

Unreachable networks	Unreachable hosts
Protocol not supported	Unattainable port
Fragmentation needed	Bad source route
Destination network unknown	Destination host unknown
Source host isolated	Congested device
Time-to-live count exceeded	Fragment lost
Parameter problem	Required option missing

Destination network administratively prohibited
Destination host administratively prohibited
Network unreachable for type of service
Host configured with poor network route
Host configured with poor host route
Poor type of service and network route
Poor type of service and host route
Substantial subnet mask requests
Excessive ping and ping replies
Substantial timestamp requests

Novell Commentator Events

Connection request, connection reply
File: create, open, read, reading, writing, transfer rate, close

Create Service connection	Delay/busy server
Destroy service connection	Down file server
Watchdog request/reply packets	Failed reply packet

Negotiate buffer size
Transaction tracking
Routing information request/reply packets
Service advertising request/reply packets

OSI Commentator Events

CLNP low lifetime
CLNP zero lifetime
CLNP error PDU
TP error PDU
TP excessive retransmissions
TP low credit
TP low credit recovered
TP slow transfer
TP connection initiated, rejected, aborted, and closed
ES-IS redirect
IS-IS level 1 router hello
ES-IS int system identified
IS-IS level 2 router hello
ES-IS low holding time
IS-IS low holding time

AppleTalk Commentator Events

DDP hop count exceeded
DDP destination unreachable
ATP excessive retransmission
ASP session opened, rejected, closed, slow transfer rate
AFP login, logout
ADSP connection open, denied, closed, slow transfer rate, excessive retransmission, low window
RTMP router change, router identified
PAP open connection, close connection, printer busy
ZIP zone diameter exceeded

Banyan Vines Commentator Events

VIP low hop count
VIP duplicate address
VIP broadcast storm
VIPC excessive retransmissions
VSPP excessive retransmissions
VIPC connection closed
VSPP connection closed
VRTP router change
VSPP low window
VRTP router identified
VICP exception notification
VICP metric notification

DECnet Commentator Events

Level 1 and 2 router message
Router identified
Ethernet router hello message
High visit count
Level 1 and 2 change message
Return to sender packet
Duplicate network address
Incorrect hello timer
Excessive retransmitted connect initiates
Excessive retransmission
Excessive LAT retransmission
DAP slow file transfer
Connection initiated, rejected, aborted, and closed
Flow control stop and resume data messages
LAT virtual connection initiated, aborted, and closed
LAT service connection initiated, aborted, and closed
DAP file open/create, open error, close, and close error
DEC V low and zero lifetimes
DEC V connection initiated, rejected, closed, and aborted
CLNP and TP error PDUs
DEC V low credit and low credit recovered
DEC V excessive retransmission

Appendix B – Protocol Vitals

While the LAN Advisor is decoding data, it is also gathering important information from the network. Data gathered varies by protocol as outlined below:

TCP/IP Vitals

IP utilization
IP broadcasts
ICMP redirects
IP Low Time to live
IP Routing packets
SNMP Get/Set packets
DNS packets
TCP Low window frames
IP packets
IP fragments
ICMP unreachables
IP packet size
SNMP Trap
ARP packets
TCP Reset Connection frames

Novell Vitals

Novell utilization
IPX packets
IPX Local Tx rate
NCP Burst mode
IPX SAP frames
NCP Write request packets
IPX packet size
IPX Remote Tx rate
IPX RIP packets
NCP Read request packets
NCP Busy server (%)

OSI Vitals

OSI utilization (%)
OSI packet size
CLNP data messages
TP error messages
TP fragments
ISIS Hello's
ISIS Packets
OSI packets
CLNP error messages
CLNP low lifetime
TP low credit
ESIS ESH PDU's
ESIS ISH PDU's
ESIS Redirect PDU's

AppleTalk Vitals

AppleTalk utilization (%)
DDP Phase I packets
DDP high hop count
ADSP low window
ADSP Attention
NBP Broadcast Request
ATP Limited Buffer
RTMP Packets
DDP Phase II packets
DDP packet size
ADSP fragments
ADSP Close Connection
NBP Look-up ready
AARP Packets
ZIP Packets

Banyan Vines Vitals

VIP utilization (%)
VIP packet size
VIP Broadcasts
VIPC fragments
VSPP fragments
VSPP probes
VARP packets
VIP packets
VIP low hop count
VIPC probes
VIPC Datagrams
VSPP low window
VRTP packets
VRTP redirects

DECnet Vitals

- DRP utilization (%)
- LAT utilization (%)
- LAVC utilization (%)
- DRP packet size
- DRP routing control messages
- DRP high visit count packets
- DEC V packet size
- DEC V data messages
- TP error messages
- NSP retransmission connect initiates
- MOP utilization (%)
- DRP data messages
- DRP RTS packets
- NSP fragments
- DEC V utilization (%)
- CLNP error messages
- DEC V low lifetime messages
- DEC V low credit messages
- DEC V fragments

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