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Solve networking problems faster with the HP 4972A.
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Protocol analysis

The use of local area networking is exploding as the many advantages of networked applications are realized.

With the large number of specialized vendors supplying these applications, a great number of protocols, algorithms and implementations interact to provide networked services. The potential for conflicts and incompatibilities is unavoidable in this complex environment, and problem resolution is often time-consuming.

The success of your business depends on reliable and efficient communication networks. Not only is it critical that network operability be maintained, but users also demand good response times from networked applications. In cost-sensitive organizations, systems must be configured for maximum utilization and interoperability, and routing problems and other throughput bottlenecks must be avoided.

A wide variety of tools is available to local area network managers. Third party network management systems provide valuable information on network topology and operability. Host resident system diagnostics help solve some problems in the single-vendor environment.

Protocol analysis tools are needed for troubleshooting problems and resolving inefficiencies on large, multiple-vendor local area networks.

The HP 4972A resolves problems quickly, and provides fundamental information to optimize networked systems and devices. The many powerful features of the HP 4972A may be used to:

- quickly isolate causes of specific problems, and verify their solutions
- identify addressing problems and system incompatibilities
- analyze system behavior and performance
- characterize the usage and efficiency of network systems and devices
- fully test network products prior to installation on the network.

Complex problems, involving many different protocols and operations, are resolved quickly with the broad range of functionality provided on the HP 4972A. Features of the analyzer include:

- comprehensive performance analysis (statistical) measurements
- protocol interpreters for protocols most common on Ethernet networks
- simultaneous transmit and receive capability
- flexibility for programming custom tests.

Graphic representation of network behavior helps uncover problems and inefficiencies. This matrix illustrates the flow of network traffic.

Response time measurements instantly yield clues that expedite problem isolation and suggest network improvements.
Managing TCP/IP and DECNnet networks

Network performance analysis measurements on the HP 4972A for TCP/IP and DECNnet make the underlying working of your network readily apparent. Optimizing system configuration for maximum efficiency of networked applications, recognizing marginal operating conditions, and evaluating network products are all easily accomplished when these tools are employed.

True end-to-end throughput measurements—encompassing all factors, including retransmissions and delays—are available in both graphic and tabular formats.

Understanding the behavior of networked applications is facilitated by the HP 4972A’s performance analysis measurements. Specific conversations are isolated and the frames are analyzed for connection statistics on end-to-end parameters. This forms the basis for intelligent decisions that will maximize network resources, as well as the productivity of its users.

Stimulus-response and custom tests provide unmatched flexibility and powerful capability through the softkey-driven programming menu on the HP 4972A. A test library, including many programs for solving common networking problems, is included to get you started.

This program from the utility disk identifies active stations on DECNnet networks.
Balancing resources of devices and systems across a network minimizes equipment requirements and improves performance for all users. Network congestion, and resulting poor response times, may be alleviated by modifying network topology or configuring local servers.

Downtime is minimized when network inefficiencies are discovered promptly. The HP 4972A helps make less than optimal configurations and implementation anomalies apparent before the network is rendered useless and panic sets in.

The busiest systems on the network are identified by these statistics on network layer addresses. Results may also be tabulated only on frames through a particular gateway or router.

This measurement from the DECnet network performance analysis application indicates a disproportionate number of routing messages, warranting further investigation.

Optimize performance of a TCP/IP or DECnet network with powerful upper layer statistics.
Solving problems and avoiding bottlenecks

Protocol interpreter applications for the HP 4972A present protocol header information (contained in each frame) in an easily understood manner. In addition, the protocol interpreters expedite frame-by-frame troubleshooting by:

- highlighting incorrect and invalid header field values
- presenting information in common and easily recognized formats
- substituting logical names for numeric values of addresses and services.

Network connectivity problems, that are often intermittent, are spotted instantly and effortlessly when autosequence tests are run on the HP 4972A. Alarms, set off when preset thresholds on utilization or errors are exceeded, may be used to trigger other statistical measurements to isolate the source of the problem.

The first measurement in the sequence, network summary, provides an overview of current network activity.

When an alarm is triggered, the node list statistics measurement records data that implicates the offending station.

This particular measurement sequence locates sources of unusually high error rates and identifies systems involved in broadcast storms.
Addressing problems are easily uprooted with the help of the name lists built into the HP 4972A and its applications. When logical names are assigned to numeric address values and then substituted into decoded frames, these problems surface quickly.

Physical and network layer address lists provide a means for replacement of numeric values with logical names.

Network performance degradations are made visible with the HP 4972A's analysis software, when network characteristics are profiled and then periodically monitored.

A large number of routing or error messages can be a warning sign for imminent problems.

Comparing current network conditions to archived results helps spot problems and inefficiencies.

Poor response times and communication failures resulting from the improper configuration of networked systems are resolved faster with the HP 4972A and its applications.

File attributes transferred by Sun Microsystem's NFS protocol may indicate a mismatch in the amount of data transferred and the block size of the stored file.
Network planning and installation

Trend analysis for a variety of network parameters is easily accomplished with the HP 4972A. Its fully configurable statistical measurements enable observation of network behavior over long periods of time—emulating a virtually unlimited capture buffer.

A twelve hour measurement of network bandwidth utilization suggests optimum times for system backups.

Interoperability problems are easily tackled with the protocol interpreters on the HP 4972A. Errors are highlighted, length fields from all layers are correlated and validated, commands are matched with responses, and data flow directions are indicated.

The ISO protocol interpreter also reassembles and resequences frames, and may be used to verify compliance with GOSIP or TOP profiles.

Rigorous testing of bridges and routers prior to installation can reduce network downtime and user frustration. Performance measurements on the HP 4972A allow you to monitor the performance of a device under simulated network conditions, quantifying its capabilities and limitations.

The background traffic generator may be used to stress test network devices while monitoring their performance.

Results you can count on distinguish productivity-enhancing tools from all others. From the HP 4972A's custom-designed data acquisition hardware, to the extensive quality assurance testing applied to all Hewlett-Packard test equipment, the HP 4972A is a LAN protocol analyzer like no other.
High-resolution display, full-sized keyboard and softkey-driven user interface make the HP 4972A very easy to use.
Specifications

HP 4972A LAN protocol analyzer

Operating characteristics
physical interfaces
—Ethernet/IEEE 802.3, 10 Mbps
—StarLAN (optional), 1 Mbps
capture buffer
—1 Mbyte memory can store over 2000 frames
receiver performance
—data captured at more than 14,000 frames/second
with full filtering capability
—32 microsecond timestamp resolution
transmitter capabilities
—up to 16 user-definable messages
—variable preamble lengths and frame check sequences
—data received simultaneously
information storage
—pre- or post-filtered capture buffer contents,
performance analysis (statistical) measurements,
and test setups may be stored in electronic or hard copy form
—frame data may be logged directly to disk
at 400 kbps, nominally
post processing
—stored frame data may be further tested and analyzed
filters and triggers
—capture conversations and/or protocol types
—up to 16 user-definable filters or triggers
—address, protocol field, data pattern, and error matching
timers and counters
—program controlled
—16 event or loop counters
—16 transaction or expiration timers
password restricted access
—independent passwords for viewing and transmitting data
automatic testing
—executes programs or measurements on power-up
LAN test library
—programs for active station testing
—filters for capturing specific message types
—various filters, programs and messages
coaxial cable test
—open or short conditions reported
tutorial
—self-paced training on analyzer capabilities
remote operation
—optional RS-232/V.24 interface
—HP 4972A or personal computer as the master unit
mass storage
—20 Mbyte internal Winchester disk
—600 Kbyte 3.5 in. floppy drive
—two additional drives supported via HP-IB
external displays
—high-resolution composite video output for
monochrome monitor
—optional high-resolution RGB video output for color monitor
compatible printers
—HP PaintJet, HP ThinkJet
—high-speed HP RuggedWriter, HP 293X series
—most ASCII printers

Physical specifications
weight (including cables)
—net 20.86 kg (46 lb)
—shipping 27.22 kg (60 lb)
dimensions (height x width x depth)
—19.58* x 42.55 x 56.52 cm
(7.71* x 16.75 x 22.25 in)
* add 7.62 cm (3 in) to height for pouch
operating temperature
—10 to 45 degrees C (50 to 113 degrees F)
storage temperature (without floppy disk)
—-20 to 60 degrees C (-4 to 140 degrees F)
power requirements
—-90 to 132 VAC, 180 to 264 VAC
—47 to 63 Hz single phase
power consumption
—200 watts typical
electromagnetic compatibility
—complies with VDE 0871/6.78 limit B
—licensed per FTZ 1046/84

Software applications

Network performance analysis applications
present condensed (statistical) information in both
graphical and tabular formats. Measurement times are
variable from 60 seconds to 999 days. Results may be
saved electronically or in hard-copy form. The basic
measurements available on these analysis packages
follow.

Ethernet network performance analysis (included
with HP 4972A)
network analysis
—utilization percentage, frames/second, or Kbytes/
second
—errors and collisions
—interframe timing and frame length
—frame analysis by filters matched
node analysis
—transmit and receive stats for active stations
—transmit and receive stats for logical connections
—matrix of activity between stations
transmit statistics
—background traffic generator will transmit random
or user-defined frames at specified utilization rate
—channel acquisition time
—station response time
automatic sequence
—programs statistical measurements
—trigger on thresholds exceeded (alarms)
—data logging to paper or disk
TCP/IP network performance analysis (HP 18222A)

- Connection analysis
  - Throughput rate and retransmissions
  - Response time
  - Packet and send window size
  - System activity
    - Frames and bytes to/from IP addresses
    - Network usage
    - IP frames and Kbytes
    - TCP port distribution

DECnet network performance analysis (HP 18225A)

- Connection analysis
  - Throughput rate and retransmissions
  - Response time
  - Frame size
  - System activity
    - Frames and bytes to/from DECnet addresses
    - Network usage
    - DECnet frames and Kbytes
    - Distribution of message types

Protocol interpreters decode header information for the protocols listed. Name lists provide substitution of logical names in the display of decoded frames. Many interpreters may reside in system memory, allowing frames from multiple protocol suites to be examined simultaneously.

TCP/IP protocol interpreter (HP 18221A)

- Protocols decoded
  - IP, ICMP, ARP, RARP
  - TCP, UDP
  - FTP, TELNET, SMTP
- Errors highlighted
  - Header checksums and invalid lengths
  - Logical name lists
  - IP addresses
  - TCP ports
- Direction of data flow indicated
- Commands matched with responses
- Detailed, summary or hexadecimal displays
- Test library
  - ARP stimulus/response test
  - ICMP Echo stimulus/response test
  - Various filters, programs and messages

DECnet protocol interpreter (HP 18224A)

- Protocols decoded
  - DRP, NSP, MOP
  - SCP, FOUND
  - DAP, CTTERM, LAT
- Errors highlighted
  - Header checksums and invalid lengths
  - Protocol violations
  - Logical name lists
  - DECnet addresses
  - Detailed, summary or hexadecimal displays
  - Test library

DECnet System ID stimulus/response test
- Various filters, programs and messages

Sun-NFS protocol interpreter (HP 18228A)

- Protocol headers decoded
  - RPC, PMAP
  - YP, NFS
- Errors highlighted
  - Header checksums and invalid lengths
  - Rejected frames
- Procedure calls matched with replies
- Detailed, summary or hexadecimal displays

XNS protocol interpreter (HP 18229A)

- Protocol headers decoded
  - IDP, RIP, ERR, ECHO
  - SPP, PEP
- Errors highlighted
  - Header checksums and invalid lengths
  - Logical name lists
  - Network, host and sockets
  - Detailed, summary or hexadecimal displays

ISO protocol interpreter (HP 18226A)

- Protocol headers decoded
  - ES-IS, CLNP
  - TP0, TP1, TP2, TP3, TP4
  - Session
- Errors highlighted
  - Header checksums and invalid lengths
  - Negotiated option violations
  - Profile compliance (GOSIP, TOP)
- Frames reassembled and resequenced
- Detailed, summary or hexadecimal displays

Ordering information

HP 4972A LAN protocol analyzer
- Includes Ethernet performance analysis and LAN test library
- Option 001—High resolution RGB color video outputs for 25 kHz external color monitor
- Option 002—Remote RS-232 interface
- Option 003—Katakana (JIS-8, EBCDIC)
- Option 005—StarLAN (1 Mbps) network interface
- Option 998—Rack mount

HP 18221A TCP/IP protocol interpreter
HP 18222A TCP/IP network performance analysis
HP 18223A XNS protocol interpreter
HP 18224A DECnet protocol interpreter
HP 18225A DECnet network performance analysis
HP 18226A ISO protocol interpreter
HP 18228A NFS protocol interpreter
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