

# VirtualWisdom<sup>®</sup> NAS Performance Probe

Industry's most complete NAS monitoring probe to ensure the performance & availability of your Network Attached Storage Infrastructure

## Introduction

The VirtualWisdom NAS Performance Probe (ProbeNAS) is the industry's most complete real-time, full line-rate monitoring solution for NFSv3 environments. Working completely out-of-band, the NAS Performance Probe tracks every transaction on monitored NAS ports, and reports hundreds of metrics to provide comprehensive, accurate, and vendor agnostic monitoring at the protocol level. The Probe is offered in a 2U chassis with up to 16 x 10GE links.

ProbeNAS metrics are correlated with those from other VirtualWisdom Probes, persistently stored, and presented by the VirtualWisdom Platform Appliance—providing holistic and timely insight into the health, utilization, and performance of large-scale, heterogeneous, open-systems based infrastructures.

VirtualWisdom's best-in-class capabilities for deriving definitive and actionable insights from these comprehensive metrics deliver tremendous value across the entire IT infrastructure:

- **Proactive Monitoring:** VirtualWisdom provides early identification of emergent performance, health, and utilization issues, enabling rapid implementation of corrective actions to improve performance and availability and reduce operational risk.
- **Deep Diagnostics:** Detailed, time-coherent data helps to identify the root causes of even the most sporadic and complex performance and availability issues, so they can be definitively resolved and prevented.



*ProbeNAS*

## Product Features Summary

- Real-time, full line rate NAS traffic monitoring of up to 16 concurrent 10G ports
- Detailed I/O performance, health, and utilization measurements
- Link Aggregation (LACP, EtherChannel)
- Transmission, protocol, and network error detection
- Port and resource utilization and congestion reporting
- Out-of-band, vendor-agnostic operation
- Field-reversible airflow and replaceable cooling fans
- Hot-swappable redundant power supply modules
- Remote administration (includes firmware maintenance, configuration and monitoring)

- **Infrastructure Optimization:** Comprehensive insights into the relationships between workload, performance, and utilization that supports the optimal alignment of application demands with infrastructure capabilities. This delivers the required performance at the lowest cost and highest availability.
- **SLA Management:** The ability to measure and generate comprehensive histogram reports on I/O performance for every single packet facilitates the implementation of true performance-based SLAs, enabling tighter and more transparent alignment between infrastructure, application, and line of business groups.
- **Portal assignment flexibility:** The new Portal Assignment model improves configuration flexibility by allowing a NAS Performance Probe to be monitored by multiple VirtualWisdom Platform Appliances.
- **Hardware Investment Protection:** All VirtualWisdom and ProbeNAS enhancements will be made available to all existing NAS Performance Probe devices by applying the latest firmware. This ensures that customers will not be required to replace their existing Probe devices in order to take advantage of VirtualWisdom enhancements.

## VirtualWisdom Offers

- **Enhanced SLA Management:** The performance probes enable the creation of detailed histogram reports that provide real-time performance I/O workload distribution statistics for every single exchange. These innovative histogram charts allow the user to quickly demonstrate compliance with performance-based SLAs for every single transaction.
- **Enhanced Performance Management Metrics:** The NAS Performance Probe introduces a set of new NAS metrics in VirtualWisdom 5 that help users quickly identify and resolve performance problems. For example, Write Completion Times, Read Completion Times, Write /Read IOPS, Write/Read Sizes, etc. These help users pin point top talkers, from a bandwidth perspective, or even a commands-per-second perspective. Using this data, we can also model your daily workloads, and compare them day over day to look for deviations in expected loads.
- **Automatic Link Association:** The NAS Performance Probe observes SDF conversations and attempts to automatically place the device and switch links based on the observed conversations. This dramatically streamlines the install and configuration process and reduces the time-to-value.
- **One-Minute Summarization on Probe:** The NAS Performance Probe firmware allows the probe itself to calculate detailed one-minute summaries of all the performance probe metrics before sending them to the VirtualWisdom Platform Appliance for storage, data analysis, and presentation. Summarizing the metrics on the probe drastically improves the Platform Appliance scalability and reduces the network latency requirements—without losing the detail in the summary.

## Deployment

NAS Performance Probes are typically deployed on the links between storage ports and next-tier switches, or on both sides of fabric-based storage virtualizers. Connectivity to the live links is provided by traffic access points (TAPs), which use passive optical couplers to access the optical signal on both channels of the link. These are the identical TAPs which today powers the FC SANs in hundreds of our customers' datacenters around the world. A TAP diverts a small amount of the optical power on each channel to a full line-rate monitoring output for out-of-band access by the NAS Performance Probe. TAPs certified for compatibility with the Probe are available from both Virtual Instruments and a growing number of leading physical infrastructure providers.

## Monitoring and Metrics

Connected to the TAP monitor ports, the ProbeNAS analyzes all received traffic at the full-duplex 10Gb line rate. They report on hundreds of metrics per second per port, with details at link, channel, and source-destination-file levels. This set of high frequency, highly detailed metrics includes the following:

- **Calculated Metrics:** The NAS Performance Probe captures hundreds of unique, real-time metrics. VirtualWisdom then calculates additional metrics by correlating those with other data, including data from the switch and virtual machine probes, giving users greater insight into the performance of their infrastructure. These calculated metrics are developed by leveraging decades of Virtual Instruments' knowledge and expertise in infrastructure performance.

- **Health Optimization:** Metrics are monitored to identify transmission, exchange, or network-level errors and trends. Metrics included:
  - Loss of Sync / Loss of Signal
  - 10 Gigabit XGMII Error Counts
  - Packet Issues
    - Runt / Oversized
    - Duplicate / Out-of-Order / Fragment
    - CRC Error / IP Chksum / TCP Chksum
    - Minimum Time To Live (TTL) in Interval
    - TCP Window Close Alerts for flow control
  - Counters
    - TCP SYN flags
    - Non-IPv4 Packets
    - Non-TCIP Packets
    - Priority Flow Control Frames
    - Ethernet Pause Frames
- **Performance:** The ProbeNAS monitors the performance of every packet between each unique combination of source, destination and filesystem (SDF), calculating metrics by exchange type including completion time, and size. As with other VirtualWisdom metrics, these performance measurements can be flexibly aggregated by entity to enable monitoring of total I/O workload, type of I/O, and performance by business application, application tier, storage tier, or other logical grouping.
- **Utilization:** The amount and type of traffic on each link is monitored, providing direct observation of link and port-level utilizations and the fabric operating state. Metrics can be flexibly aggregated by VirtualWisdom to monitor the utilization of backplanes, control processors, and other critical device resources. Metrics included:
  - Transmitted / Received Packets
  - Transmitted / Received Bytes
  - Channel Utilization %
- **SFP Diagnostics:** SFPs are monitored and alarmed to include Receive Power (mW and Dbm)

- **Entities**
  - SDF Conversation
  - Source IP Address
  - Destination IP Address
  - Destination Ethernet Port
  - Monitored Link
  - Link Aggregation Group
- **Alarms**
  - NAS Histogram Performance
  - NAS Average Performance
  - NAS Procedure Rate
  - NAS Procedure Limit
  - NAS Link Errors
  - NAS Packet Errors
  - NAS Flow Control
- **Reports**
  - Trend
  - Top X
  - Time Comparison
  - Histograms
- **Template Reports**
  - Template – ProbeNAS Metrics
  - Template – NAS Performance
  - Template – NAS Optimization
  - Template – NAS Rogue Client
- **Analytics**
  - Event Advisor
  - Trend Matcher
  - Seasonal Trend
  - LDX-E Export

## Deployment and Serviceability

- Redundant hot-swappable power supply modules for high availability.
- Field-replaceable and reversible cooling fan modules support both front-to-rear and rear-to-front airflow.

## Safety and Emission Compliance

### Emissions

- United States: FCC Part 15, Subpart B (Class A Device)
- Canada: ICES

# Specifications

## Connectivity

- Link Interface: Connectivity to the TAP monitor outputs is provided via field-replaceable small form factor pluggable plus (SFP+) optical transceivers.
- Link Capacity: The NAS Performance Probe comes with 16 concurrent GigE Links operating at 10 Gbps speeds.
- VirtualWisdom Platform Connectivity: The ProbeNAS Performance Probe connects to the VirtualWisdom Platform Appliance via Gigabit Ethernet to transfer calculated NFSv3 metrics for persistent storage, analysis, and display.

- Europe: EN 55022
- Korean: KN 22

## Safety

- UL/EN/IEC 60950-1
- Restriction of Hazardous Substances (RoHS)

## Environmental


### Temperature

- Operating: +10 to +35° C (50° to +95° F), max gradation 10° per hour
- Non-Operating: -20 to +80°C, (-4° F to 176° F) max gradation 20°C per hour

### Humidity

- Operating: 20% to 80% non-condensing, max gradation 20% per hour
- Non-Operating: 5% to 95% non-condensing, max gradation 20% per hour

## Mechanical

ProbeNAS	
	 <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Front</span> <span>Back</span> </div>
Height	2U, 3.5 In. (8.9 cm)
Width	17.2 in. (43.7 cm)
Depth	27.1 in. (68.8 cm). Front face projects maximum 0.5 in (1.3 cm) from rack rails. Maximum fixed projection from front face 0.75 in (1.9 cm), from rear face 1.0 in (2.5 cm). Optional cable manager projects 4.5 in (11.4 cm) from front face.
Minimum Cable Bend Radius Allowance	4.5 in (11.4 cm) front and 3.5 in (8.9 cm) rear
Weight	48 lbs (21.8 kg) including rack rails and cable management system
Rack Mounting	Sliding rack rails support 4 post racks with square, round, or tapped holes with rail-to-rail depths of 26.5 in (67.31 cm) to 36 in (91.4 cm.) 1U, 24 in (61 cm) deep shelf kit available for alternate rack deployments.

## Electrical

	ProbeNAS
Input Voltage	100-240V AC
Input Frequency	50/60 Hz
Current Rating	7-3 A
Inrush Current	60/80 A @ 115/230V (25° C)
Typical Operating Power	750W (max)



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