

VirtualWisdom® Performance Probes for Line-rate Wire Data Monitoring



Key Challenges Addressed

VirtualWisdom Performance Probes are hardware devices that are part of the industry's most comprehensive infrastructure performance monitoring and analytics platform, VirtualWisdom.

Hardware Probes Enable High Fidelity Monitoring

- Storage arrays in your SAN can collect statistics, but they cannot monitor over a per-second granularity. Doing so would impact their primary function which is to provide on-demand storage capacity to applications. Offloading the monitoring function to a dedicated appliance allows the storage array to stay focused on its primary function – serving data.
- An event that occurs for a few milliseconds but impacts the SLA of your business-critical application would be lost to software monitoring solutions as they rely on sampling.
- As VirtualWisdom Performance Probes work at the protocol level, the solution is agnostic to the storage or SAN vendor. This enables a consistent single pane-of-glass view across multi-vendor SAN and storage to identify root-cause of infrastructure issues impacting your application SLA.

VirtualWisdom Fibre Channel SAN Performance Probe



VirtualWisdom Fibre Channel SAN Performance Probe

- Monitor every application conversation from the initiator to the target LUN
 - Up to 24 ports of 4/8/16G Fibre channel in a 1U chassis appliance, reporting at 1 sec resolution.
 - Benefit from histograms that provide sub-second visibility into application conversations using metrics for R/W latency including Exchange Completion Time (ECT), R/W ratios and R/W IO size.
 - Identify credit starvation by keeping track of buffer credits and the number of unacknowledged frames that can be in flight between a source and destination
 - identify low level physical layer errors as well as higher level SCSI

- Identify delays at the host and storage level
 - Leverage over 400 metrics gathered and summarized at 1 sec, 10 sec and 1 min intervals.
 - An application conversation is a discrete communication between an initiator (host), the target (storage port) and the LUN number being accessed. VirtualWisdom tracks every conversation by taking 31 measurements per conversation per second.
 - A single Performance Probe can monitor 19,200 unique I/Os per second.
- Get to root-cause on issues that occur for only a few seconds
 - Leverage our machine learning based analytics which are designed to proactively optimize and prevent problems:
 - **Queue Solver** to troubleshoot flow control issues and understand the impact of different I/O queue depths across hosts. Queue depth refers to the number of I/O requests (SCSI commands) that can be queued at one time. the impact of different I/O queue depths across hosts. Queue depth refers to the number of I/O requests (SCSI commands) that can be queued at one time.
 - **Storage Port Balancer** to improve application performance by optimizing the load on storage ports on your Fibre Channel SAN attached storage.
 - **Trend Matcher** to get to root-cause of problems created by an entity that is several hops away from the location of an alarm. This level of machine learning based analytics is needed for cross domain correlation and actionable recommendations. This is because the traffic flow between entities could comprise thousands of micro transactions per second which converge and diverge at different nodes.
 - Deployed with passive TAPs which ensure that every I/O is monitored with zero performance impact on the infrastructure being monitored.

Connectivity

- SAN Link Interface: Connectivity to the TAP monitor outputs is provided by way of field-replaceable small form factor pluggable plus (SFP+) optical transceivers.
- SAN Link Capacity: ProbeFC-16G SAN Performance Probe monitors up to 12 or 24 concurrent Fibre Channel SAN Links operating at 4/8/16 Gbps speeds.
- VirtualWisdom Platform Connectivity: SAN Performance Probes connect to the VirtualWisdom Platform Appliance and transfer calculated SAN metrics for persistent storage, analysis, and display.

Deployment and Serviceability

- No physical or remote console access. Firmware maintenance, device configuration, and operational monitoring are all performed remotely via VirtualWisdom.
- Initial configuration and ongoing management are performed through a standard browser interface via a dedicated and directly connected Ethernet port (not a networked port).
- 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 Emissions Compliance

Safety

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

Emissions

- United States: FCC Part 15, Subpart B (Class A Device)
- Canada: ICES
- Europe: EN 55022
- Korean: KN 22

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	ProbeFC-16G-12	ProbeFC-16G-24
Height	1U, 1.75 in (4.45 cm)	1U, 1.75 in (4.45 cm)
Width	17.2 in. (43.7 cm)	Compute, Memory, Network, Disk I/O
Depth	<ul style="list-style-type: none"> • 28.2 in. (71.6 cm). • 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. 	<ul style="list-style-type: none"> • 28.2 in. (71.6 cm). • 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.
Weight	42 lbs. (19 kg) including rack rails and cable management system	45 lbs. (20.4 kg) including rack rails and cable management system
Rack Mounting	Sliding rack rails support 4 post racks with square, round, or topped holes with rail-to-rail depths of 26.5 in (67.31 cm) to 36 in (91.4 cm.) 1U, 25 in (61 cm) deep shelf kit available for alternate rack deployments.	CPU, Memory, Network, Disk I/O req and capacity, from LPAR to host to LUN

VirtualWisdom NAS Performance Probe



VirtualWisdom NAS Performance Probe

Safety

- Monitor **every application conversation** over 16 ports of 10 GbE line rate in a 2U form factor with support for SMB 2.0, NFSv3, iSCSI over TCP/IPv4
 - Identify why a storage array whose front-end CPU is operating at close to 100% is delivering only a fraction of the performance it can deliver on a 10GbE link
 - Identify root cause of metadata and login storms
 - Identify a noisy neighbor or rogue client impacting the performance of a business-critical application. This could be a legacy application migrated from bare-metal and local storage to a virtual machine (VM) with networked storage but using the same legacy logic to crawl the shared resource
 - Identify top N SMB or NFS conversations by input/output operations per second (IOPS)
 - Identify root cause of SMB or NFS hosts complaining about slow reads
 - Identify network flow control issues by monitoring for Ethernet Pause Frames
 - Identify performance issues caused at the storage or network level across multi-vendor SAN fabrics and storage systems
- Identify performance bottlenecks anywhere from compute down to NFS/SMB shares or iSCSI LUNs using **373 NFS metrics, 210 SMB metrics, 345 iSCSI metrics**
- Support for link aggregation and IEEE 802.1Q VLAN
- Metrics collected in different categories, for example, SMB metrics come under 3 categories:
 - **Health** (metrics such as Read/write errors, file create errors)
 - **Utilization** (metrics such as IOPs and total byte rate)
 - **Performance** (metrics such as read/write completion times, TCP window closes, pause frames)

- Best-practice alarms such as seasonal trend deviation alarms which fire whenever there is a deviation from your normal business cycle
- Deployed with passive TAPs which ensure that every I/O is monitored with zero impact on the infrastructure being monitored

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 GbE speeds or 40GbE speeds with Gigamon integration support for GigaVUE and Gigamon Traffic Aggregators.
- VirtualWisdom Platform Connectivity: The Performance Probe connects to the VirtualWisdom Platform Appliance via Gigabit Ethernet to transfer calculated SMB 2.0, NFSv3, iSCSI over TCP/IPv4 metrics for persistent storage, analysis, and display.

Deployment and Serviceability

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- Redundant hot-swappable power supply modules for high availability.
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Safety and Emission Compliance

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- Restriction of Hazardous Substances(RoHS)

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Humidity

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Mechanical	ProbeFC-16G-12
Height	2U, 3.5 in. (8.9 cm)
Width	17.2 in. (43.7 cm)
Depth	28.2 in. (71.6 cm) 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.
Weight	55 lbs (24.9 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	ProbeFC-16G-12
Input Voltage	100-240V AC
Input Frequency	50-60 Hz
Input Current	12/6A (RMS) @115/230V
Inrush Current	15/30A (max) @115/230V
Operating Power	750W (max)



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