

## VirtualWisdom FAQ

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## General

### Q: What is storage performance testing? How is it different than performance monitoring?

A: Storage performance validation and testing products, such as Load DynamiX Enterprise from Virtual Instruments, are used in a pre-production environment, by generating a load on the storage network and measuring performance, to optimize the performance, reliability, and cost-effectiveness of storage systems. Storage performance validation and testing replaces the guesswork in purchasing, deploying and configuring storage systems. The goal of storage performance validation products is to proactively avoid performance problems and optimize the cost/performance tradeoff.

Storage or infrastructure performance monitoring tools, such as VirtualWisdom, which can be software or hardware based, are used to monitor the performance and availability of production storage infrastructures. They are usually deployed in a persistent fashion and alert storage admins to failures or other potential performance issues after a problem has occurred. They are solutions that can help storage managers discover performance bottlenecks in the production environment. The best monitoring tools, like VirtualWisdom, can discover problems before users do and help avoid a great number of severe problems. The best tools include a full view of the I/O path from the virtual machine to the storage LUN or Filesystem. The best tools include intelligent analytics which, in addition to helping to avoid problems, help admins find the “needle in the haystack” when problems do occur.

### Q: How does VirtualWisdom work?

A: VirtualWisdom directly measures and monitors both the virtual and physical I/O infrastructure to provide an unprecedented view into what is happening to the SAN/NAS infrastructure in real-time. With the VirtualWisdom real-time dashboards and historical trending information, admins can immediately identify and resolve configuration or performance issues. This substantially improves the productivity of the IT team and can save enterprise organizations millions of dollars per year. VirtualWisdom is unique in that it has three different probes to provide a full cross-domain view of the infrastructure. There is the Virtual Server Probe software probe, which collects data from VMWare’s vCenter, Hyper-V or ProbeVM, the SAN Network Switch software probe, which collects SNMP/SMI-S performance, error, and utilization data from network switches, and the SAN and NAS Performance Probe hardware devices, which analyzes the Fibre Channel frames or IP packets for detailed transaction and latency data. Once a problem is found, as defined by an exceeded performance, error, or utilization threshold, an alert is automatically sent to the customer’s management system or directly to the vendor of the failing or failed device. Following that, it goes way beyond a simple correlation view; advanced analytics guide the admin to the source of the problem.

### Q: How is VirtualWisdom different from other monitoring solutions?

A: Infrastructure Performance Analytics is a new market space, as defined by VI and a number of market analysts. Being able to optimize the performance, availability and utilization of infrastructure across servers, network and storage is a critical ingredient to successfully running business-critical applications. Most IT admins are virtually blind to I/O performance. VirtualWisdom adds the missing leg of the stool to infrastructure optimization, I/O data. Today, virtualized servers are consolidated, optimized and load balanced based on CPU and memory utilization data. VMware, for instance, has a limited view of I/O performance or SAN/NAS I/O utilization, which comprise the missing 3rd leg of the “systems” stool (CPU, Memory, I/O). VirtualWisdom is a comprehensive, cross-domain SAN/NAS I/O and virtual infrastructure monitoring, measurement and analysis solution. VirtualWisdom is the 1st and only solution that directly measures, in real-time, actual I/O traffic across all components in a SAN/NAS (HBAs, NICs, network switches, cables, and storage arrays). VirtualWisdom measures this data, analyzes it, and correlates the I/O information with the virtual server information provided via VMware’s vCenter, and other hypervisors. With this correlated, real-time utilization and performance data, server consolidation ratios and the overall ROI of consolidation projects can be dramatically increased as load balancing and vMotion transfers can now be initiated and optimized based on actual I/O data, not just CPU and memory data. VirtualWisdom provides the required visibility into the I/O subsystem that is essential for virtualizing business-critical applications, like those based on Oracle or SAP, which tend to be very I/O intensive.

**Q: We are already using a monitoring tool; why would I need VirtualWisdom?**

A: For your mission critical applications. The ones which cannot slow down or go down.

Virtualization mgmt tools are very good at optimizing servers for VM deployments. SRM tools are designed to provide capacity related assistance for large SANs. Switch managers are very good at provisioning and configuration tasks. None are very good at optimizing application response time or finding network related bottlenecks, and you often are forced to use several tools for a complete end to end view. VirtualWisdom is an “expert” virtual administrator that works 24x7. It only alerts you if there is a problem in the infrastructure, and if there is, behind that dashboard is a complete set of tools to zero in on the problem

Do you ever get blamed for problems with no way to immediately prove innocence, and do you and your vendors still have trouble quickly finding and fixing problems?

At the end of the day, one thing is true. When VirtualWisdom is installed, no customer around the world has EVER had to bring in another company to find problems we can't find. On the contrary, at EVERY customer who brings us in to help optimize their SAN or NAS, ControlCenter, Tuning Manager, TPC, DCFM, CFM, BNA, or other SAN management products are already in use, and Virtual Instruments has been brought in to find problems that proved too difficult to find with these other tools. Large enterprises around the world like AT&T and T-Mobile, plus many financial institutions such as PayPal, e-Trade, Lloyds, MetLife, Fidelity and others continue to use VirtualWisdom and expand its use every year. Yet all of these enterprises already have a full complement of fine, general purpose IT management and monitoring tools

**Q: How are Virtual Instruments and Load DynamiX related?**

A: In early 2016, the two companies merged and took the name of the larger company. Virtual Instruments and Load DynamiX customers have continually asked for tighter integration between the two companies' products, and the merger responded to that demand. While the Virtual Instruments' VirtualWisdom platform analyzes the performance of the production infrastructure for IT operations, Load DynamiX delivers the storage workload acquisition, analysis and modeling capabilities IT engineering and architecture teams need. Together, the technologies offer the most advanced infrastructure instrumentation and performance analytics in the data center.

**Q: Who typically uses VirtualWisdom?**

A: First, there are the server platform or infrastructure/operations administrators/managers. These people are focused on server consolidation for cost-cutting; they're the traditional constituency of the hypervisor vendors. As virtualization has become more prevalent, however, the administrators of enterprise applications are finding themselves adopting the technology to improve the availability and flexibility of application platforms.

The second group, application owners, is very much a non-traditional constituency for hypervisor vendors, yet they're being drawn into the virtual world as virtual machines (VMs) proliferate out of development and test and into heavy-load and complex n-tier Web applications. How exactly are application owners different from server administrators? To start with, what application owners most want is application visibility – insight into the topology of the application's infrastructure components and real-time data on performance and availability. They don't care whether those applications are running in virtual or physical machines. They just need the data and mostly care about response time and data availability. If the app slows down, they want to know what is the cause of the problem. They also need to be able to communicate with the traditional VM management team.

The third and largest group is the storage engineer, administrators and managers, the traditional team charged with deploying switches and storage, and who worry most about availability, utilization, and performance of the storage network components. They quickly realize that VirtualWisdom is the only solution for proactively optimizing their production storage infrastructure.

**Q: Can you list some companies which use your products?**

A: VirtualWisdom is used by 46 of the Fortune 100, government agencies, and over 300 additional Global 2000 companies, including E\*Trade, Bank of America, GE, Unilever, AT&T, Lloyd's Banking Group,

IRS, UPS, Amadeus, HPE, and Morrisons. For further information on reference customers, contact your Virtual Instruments sales representative or reseller.

**Q: Why do customers use VirtualWisdom?**

A: VirtualWisdom is the industry's leading platform for IT Infrastructure Performance Analytics (IPA). It empowers data center operations professionals to deliver on the complex requirements of their application infrastructure. The platform provides insights into the performance and availability of the end-to-end server to storage infrastructure—across physical, virtual and cloud environments. It intelligently correlates and analyzes an unmatched breadth and depth of data, transforming it into answers and actionable insights. This enables IT teams to assure data availability, increase infrastructure utilization, and guarantee performance-based service level agreements (SLAs), increasing the value of the infrastructure.

**Q: How and where are Virtual Instruments products sold?**

A: Our products are sold and supported around the world by combination of direct and indirect sales channels, including large OEMs like EMC and HPE. For the name of a representative or reseller nearest you, please email [info@virtualinstruments.com](mailto:info@virtualinstruments.com)

**Q: How is VirtualWisdom licensed?**

A: VirtualWisdom SAN Switch and Performance Probes are essentially purchased and licensed by port. The base VirtualWisdom management platform is licensed by server. The Virtual Server probe is licensed by ESX host.

**Q: Do you offer professional services options?**

A: Yes. Virtual Instruments offers a variety of services that help customers augment their existing IT staff with highly trained infrastructure performance management specialists. Your organization can experience the complete functionality and benefits of VirtualWisdom and Load DynamiX Enterprise by utilizing Virtual Instruments Professional and Managed Services. We offer...

- Critical Infrastructure Audits, which include delivery of best practices, baseline reporting, advanced analysis and alert investigation.
- The Managed Services and PROWisdom programs offer customers a dedicated and knowledgeable team of Virtual Instruments subject matter experts (SMEs). Managed Services deliver monthly health, utilization and performance reports, track progress against key KPIs and help customers proactively manage their Virtual Instruments environments.
- VlaaS is a flexible deployment of the VirtualWisdom platform delivered as an operating expense or subscription. VlaaS is delivered and designed around the characteristics of your environment. All Virtual Instruments software and hardware devices can be deployed in the customer or service provider data center (or both) without incurring upfront capital expenses.
- Finally, Virtual Instruments professional services can be used for emergency troubleshooting. If you have a critical infrastructure problem that requires immediate deep I/O expertise, you can utilize our Emergency Troubleshooting Service on a daily basis.

**Q: How can I see a demonstration of VirtualWisdom?**

A: Go to <http://www.virtualinstruments.com/request-demo/> and request a live demo. Or watch for a local IT event and stop by and see us.

**Q: How do customers cost-justify VirtualWisdom?**

A: When deploying VirtualWisdom, payback is typically within a year as problem resolution times and trouble tickets are dramatically reduced and unnecessary SAN/NAS purchases are eliminated. If the business impact of an outage can be quantified and is significant, then payback can be almost immediate as a single avoided outage may more than pay for the cost of a full VirtualWisdom deployment. We also offer a pay as you go model, so you can deploy VirtualWisdom for your most critical applications and SAN/NAS links first and easily grow over time. Contact your VI representative or reseller and we can generate a specific benefits analysis to fit your needs.

**Q: Are there industry analysts who follow Virtual Instruments?**

A: Yes, Virtual Instruments is well-known by nearly every storage industry analyst. Analysts at Gartner, 451 Research, IDC, Storage Switzerland, Demartek, Evaluator Group, Taneja Group, Storage Strategies Now, Neuralytix and others know our products and the unique value that our products bring to our customers.

**Q: What is your relationship with storage and technology vendors?**

A: Virtual Instruments solutions are available from, or used worldwide through Virtual Instruments OEM partners, which include leading storage, server and data center providers including EMC, HP and HDS. By leveraging Virtual Instruments solutions these partners deliver best in class storage and infrastructure solutions to a wide range of customers.

**Q: Is VirtualWisdom a software or a hardware solution?**

A: It is both. The VirtualWisdom platform is composed of a fully integrated combination of software and hardware probes, Traffic Access Points (TAPs), and the VirtualWisdom Platform Appliance. The hardware component is unique in the industry and allows you to see things that literally no other product or service can help to you see. And the software analytics component goes far beyond the monitoring correlation engines you're used to seeing. In the Products section of this FAQ, we'll dive deeper.

## VirtualWisdom Use Cases

**Q: Can I use VirtualWisdom to reduce the time to issue resolution?**

A: Troubleshooting - Reduce Mean Time to Problem Resolution. VirtualWisdom is the only product that can monitor and send an alert about storage access times, congestion, link errors, packet issues, and SCSI errors, and generate trend reports and analytics that show the behavior of a heterogeneous SAN/NAS, over time. This information helps to expedite troubleshooting and allows the SAN/NAS manager to prove whether the problem is in the SAN/NAS or elsewhere, such as the application or server. This simple first step often speeds troubleshooting by days, weeks, and sometimes even months.

**Q: Can I use VirtualWisdom to alert me before an unplanned event?**

A: Reduce unplanned downtime. Proactively monitoring the SAN/NAS by setting alarms and running daily reports results in prevention of SAN/NAS issues thereby reducing unplanned downtime. Even displaying the dashboard on a NOC screen will prevent many issues. Most problems that impact users are compound issues. Being able to effectively address potential issues via correlations, even before user or actual problems arise provides an optimal process of ensuring SAN/NAS health.

**Q: Can I use VirtualWisdom to gain visibility into infrastructure performance issues?**

A: Reduce performance problems. Avoiding performance problems is accomplished by monitoring the SAN/NAS with the complete set of VirtualWisdom probes, including the SAN/NAS Performance Probe and TAPs. Proactively monitoring the SAN/NAS by setting alarms and running daily reports results in prevention of SAN/NAS performance issues, much like avoiding more serious downtime issues.

**Q: Can I use VirtualWisdom to ensure SLA compliance with my customers?**

A: Take back control of your IT infrastructure. VirtualWisdom provides historical and real-time performance dashboards, helping to focus problem identification and resolution in heterogeneous SAN/NAS environments to maintain SLA compliance. VirtualWisdom is unique in its ability to not only capture metrics that show adherence to service level agreements and internal policies, but also record them and keep them in an easily searchable format.

# Products

## Q: What is the VirtualWisdom hardware probe?

A: Our family of hardware-based SAN and NAS Performance Probes are the most advanced, high capacity line-rate data inspection and analysis devices available. They inspect, process, and analyze every FC frame header and SCSI Command on the Fibre Channel SAN links in real-time. They capture the true, unaltered, I/O profile of the actual application traffic, detecting application performance slowdowns and transmission errors by measuring every SCSI I/O transaction from start to finish. The SAN Performance Probe family consists of an ultra-high-density (8G) 48-port enterprise edition, and (16G) 12 and 24 port models suited for high-performance environments. The NAS Performance Probe is an 10G, 16-port, full line-rate model.

## Q: What are TAPs?

A: Traffic Access Points (TAPs) provide a passive, fail-safe access point to storage network traffic on the Tapped link. This makes the light available for real-time performance monitoring, deep problem diagnosis and protocol layer analysis. TAPs are non-powered, non-mechanical devices that reflect a small portion of the signal through the TAP to another port, which provides a copy of the light to upstream, out of band Probes and Sensors. The passive TAP does not introduce any latency or overhead, has no impact on application or SAN performance, and is integrated with several industry leading Patch Panel Systems for simple deployment.

TAPs can sit anywhere between the HBA/NIC and the storage system, but are normally inserted between the storage array ports and SAN/NAS switch ports, preferably as part of the patch panel. Tapping between the Storage (Target) and the network switch is the recommended installation location for Virtual Instruments' SANInsight TAPs for a few reasons. Tapping the storage takes the best advantage of fan-in ratio, fewer links need to be tapped and conversations from all servers to the tapped storage port are tracked.

## Q Do the taps affect the performance of the SAN or NAS?

A Taps are passive and do not affect the performance of the SAN/NAS in any manner.

## Q: Does Virtual Instruments do software only monitoring?

A: Yes, we use software probes for VMs, switches and some NAS systems. Some of our customers opt for software-only solutions, which is easier and faster to deploy than hardware-based monitoring.

The switch probe, our Network ProbeSW, is a standards-based software probe leveraging SMI-S and SNMP to collect extensive metrics from the Fibre Channel switching infrastructure (regardless of manufacturer or type of switch), from director class to top of rack FCoE, embedded gateway or other FC standard switching devices.

The ProbeVM Family of software-based probes collect and present hundreds of performance and utilization metrics from the associated physical server and hypervisor estate—including CPU utilization and status, memory utilization, disk I/O requests and capacity, as well as network requests and utilization. The VirtualWisdom ProbeVM family supports VMware vSphere®, IBM PowerVM®, and Microsoft Hyper-V® environments, presenting all of critical performance and utilization metrics from across the virtual estate.

VirtualWisdom's ProbeNTAP software probes help provide additional visibility into how the storage array impacts the end-to-end system performance. ProbeNTAP is an API-based NAS storage software probe that collects and correlates health and utilization data from the underlying NAS arrays (NetApp OnTAP8 Clustered Systems).

**Q: Which infrastructure components is VirtualWisdom compatible with?**

A: Virtual Instruments supports all of our functionality as outlined in marketing papers, product documentation, website content and all other VI collateral for all Fibre Channel or NFSv3 connected arrays. We do not maintain any official compatibility list of storage array support because thanks to our physical layer monitoring, we uniquely support all Fibre Channel and NFSv3 arrays of all generations past and present, that adhere to the ANSI specifications. The practical benefit for our customers is that since our inception in 2008, we have not found a Fibre Channel or NFSv3 array that we do not support, because the array vendors themselves must support these standards in order to be in the storage business. Unlike most monitoring products on the marketplace, Virtual Instruments' products monitor the very lowest level of the network stack, well below array firmware level issues.

VirtualWisdom supports all known, shipping FC switches that adhere to the SMI-S and SNMP standards. A complete list is available in our product release notes. In 2016, we will add an extensive list of Ethernet switches to our compatibility list.

VirtualWisdom supports all host HBAs which conform to the ANSI and FCSI Fibre Channel specifications.

VirtualWisdom supports VMware ESX, Microsoft Hyper-V and IBM PowerVM hypervisors.

If you have any questions about your particular environment, we can answer your specific questions, and often provide customer references who already have components similar to or exactly like what you are using in your datacenter.

**Q: What benefit does your applied analytics provide?**

A: Applied Analytics deliver the authoritative insights and consistency you need to maintain agility and sustain your competitive edge.

**Q: What Types of Analytics do you support?**

A: **Balance Finder** Ensures that the hosts in the environment have functioning path failover to ensure application availability to data in the event of a link failure. Compares traffic patterns of all the ports associated with a single host to determine whether the multi-pathing software is functioning as intended.

**Event Advisor** Enables you to specify an entity and a timeframe, and provides a prioritized list of potentially interesting (spikes, relevant performance issues, anomalous behavior, etc.) events and time periods that require attention, ranked by magnitude and duration.

**Trend Matcher** Enables you to quickly identify cause of problems and potential problems. Leveraging baseline trends (specified by you or by Event Advisor), and target metrics, it compares against every device over specified timeframes and provides lists of correlated matching devices.

**Seasonal Trend** provides data-informed predictions of resource needs within seasonal business patterns, by entity, by hour, day, week, month, quarter or year. Dramatically reduces false alerts, ensuring that actual problems are not ignored, as is often the case with simpler rules based alarms.

**Queue Solver** Recommends the resetting of an execution (or queue depth) throttle on the HBA card(s) of specified host(s), which enables you to optimize the read or write response time of those hosts

**VM Coordinator** Recommends optimal placement for VMs across an ESX, Hyper-V, or PowerVM clusters, and recommends reconfigurations to reduce contention for CPU or memory resources.

**VM Deployment Advisor** Finds which ESX, Hyper-V or PowerVM hosts are overloaded. If they are overloaded, run VM Coordinator to rebalance the workload, often delaying the need for additional CAPEX for new hosts.



**Workload Analysis** Transfers production workload modeling data to LDX-Enterprise, enabling the most hyper-realistic storage testing and validation possible today.

**Q:** Is there a cost associated with Applied Analytics?

**A:** The pricing for the analytics subscription is based specifically on your existing VirtualWisdom deployment. This ensures that you get exactly what you need for exactly what you have. Please contact your sales rep for more information.

## Product Functionality and Usability

**Q:** What does your interface look like, CLI or GUI?

**A:** The intuitive VirtualWisdom graphical user interface increases the value of the VirtualWisdom solution to the entire organization, from IT operations to line of business leaders. The dynamic, entity-centric GUI enables multiple teams to quickly and confidently answer questions—and deliver the right information at the right time. This means regardless of function (application, server, storage, virtualization, etc.), you can collaboratively fine-tune infrastructure performance based on business, application, workload and SLA requirements.



Example screen shots of the entity-centric GUIs that enables you to manage in a way that makes the most sense, based on your role, responsibility, or concerns.

**Q:** How easy or complex is VirtualWisdom to use?

**A:** The ongoing requirements of our enterprise customer base continually drive the direction, scalability, and usability of our industry-leading analytics platform. With the release of VirtualWisdom 4.4 and 5, you and your teams get more power, speed and analytics-driven control to manage your ever-evolving digital business with precision and confidence. Specially, the analytics modules of VirtualWisdom act as virtual system admins, leading you to answers, not just data. As an example, setting thresholds and alarming is too cumbersome to manually do. The Seasonal Trend Advisor learns from “seasonal” business patterns—whether a season is hourly, daily, weekly, monthly, quarterly, yearly, etc. With it, customers can set multi-variate thresholds, and make tuning adjustments on-the-fly via data-informed prediction of resource needs. Its primary benefit is that it detects variances above or below established thresholds, based on the seasonality of business workloads. End users will typically take our 3-day QuickStart class which makes them extremely knowledgeable on VirtualWisdom setup and reporting.

As a proof point for ease-of-use, VirtualWisdom is the ONLY leading performance analysis solution which is deployed not only as a product, but as a service. The vendor-supplied tools are too heavyweight for their own PS personnel to effectively use in a short term (1 or 2-week engagement) project.

**Q: How can VirtualWisdom be integrated into my existing environment?**

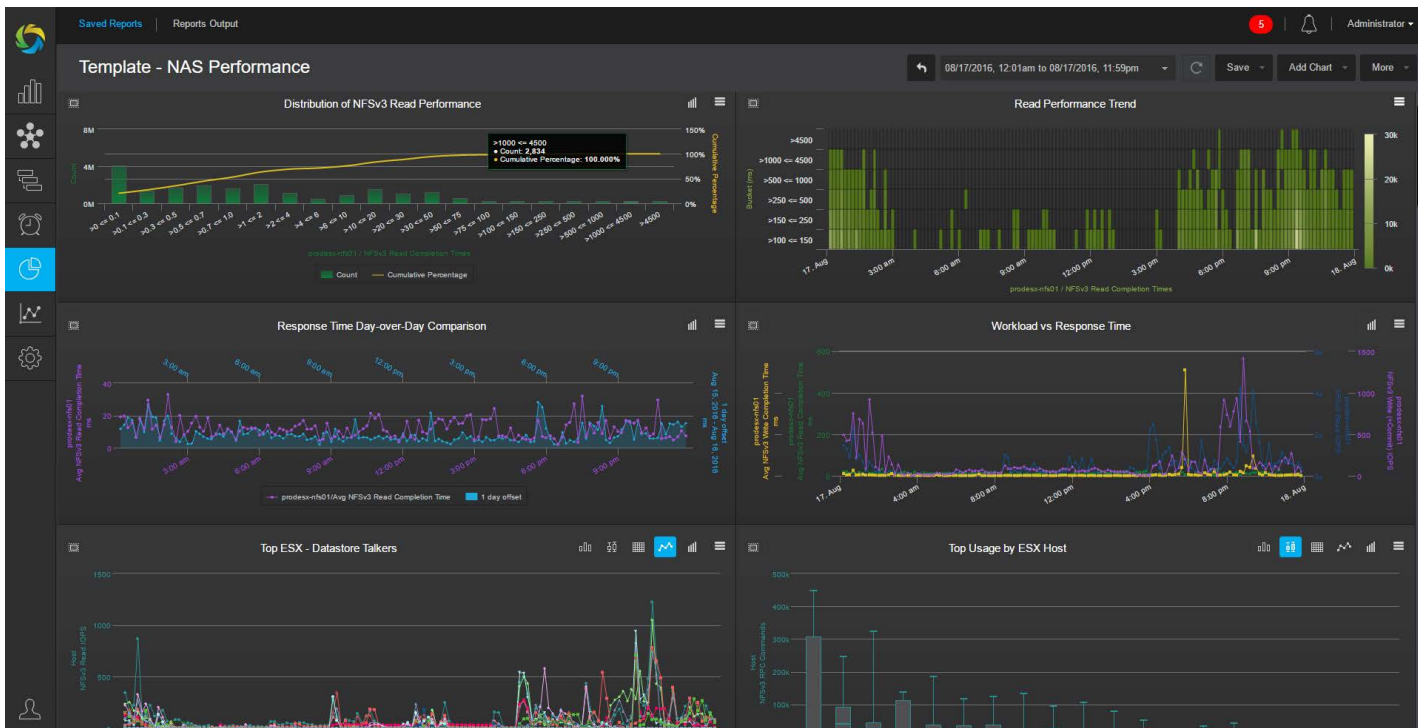
A: VirtualWisdom easily and non-intrusively integrates into any physical or virtualized infrastructure. VirtualWisdom is an “out-of-band” solution that requires no agent running on the server or guest. VirtualWisdom has no impact on application performance or response time. VirtualWisdom collects its monitoring data from 3 unique sources. First, The Virtual Server Probe collects data from the hypervisor software. VirtualWisdom sees all of the data that hypervisor mgmt systems, like vCenter, collect. Second, the Network Switch Probe collects SAN switch utilization data from the existing SNMP or SMI-S utilities of the SAN switches. Finally, and most importantly, VirtualWisdom directly measures I/O transaction data via Fibre Channel probes and NAS probes that “copy” the fibre channel frame header or IP packet data on the network. This is accomplished via a non-intrusive, light splitter or TAP (Traffic Access Point) that re-directs some of the light on the network. All of this data is measured, analyzed and correlated via the VirtualWisdom Server application, which resides on a separate server. This data can then be used to easily feed or trigger alerts into any management platform such as vCenter, IBM Spectrum/Tivoli, BMC ProactiveNet, EMC Unisphere, or Symantec Command Center.

**Q: Do you work in a virtualized environment?**

A: Yes, both server and storage virtualized environments. The vast majority of our customers use us in highly virtualized environments to give them comprehensive visibility from the VM to the LUN./ Filesystem.

**Q: Can you show me some sample output?**

A: As a sample, a screen showing ESX and NFSv3 data below:



**Q:** When my vendor introduces a new array, how long until Virtual Instruments supports it?

**A:** Unlike typical monitoring tools, VirtualWisdom does not need to be qualified with new FC storage arrays, as VirtualWisdom monitoring is based on industry standard Fibre Channel protocol and immediately supports all arrays.

**Q:** Do you install agents?

**A:** VirtualWisdom achieves full functionality with absolutely no agents.



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