



Performance. Availability. Guaranteed.

VirtualWisdom[®] Overview

VirtualWisdom[®] is a comprehensive infrastructure optimization platform that ensures the performance and availability of mission-critical applications deployed in physical, virtual, and private cloud environments.

VirtualWisdom® Overview

VirtualWisdom® infrastructure optimization products and services provide comprehensive, real-time instrumentation and measurement that allows IT managers to optimize the three IT imperatives of Cost, Risk, and Cycle Time.

VirtualWisdom enables IT managers to simultaneously optimize the performance, utilization, and availability of their physical, virtual and private cloud infrastructures by analyzing key SAN I/O metrics.

The move to virtualized and private cloud environments can help reduce CAPEX growth in servers, but this new paradigm can't contribute to controlling storage CAPEX or OPEX growth in maintenance costs and staff, which are exacerbated by this new computing paradigm. In addition, there's often a revenue impact of downtime or unacceptable performance, which can also impact brand equity. If one is not vigilant, the net effect of cloud-driven consolidation, migration, and new technology roll-outs is increased risk and cycle time, often the very reason for the move to cloud infrastructures in the first place.



For senior IT managers, VirtualWisdom accelerates enterprise transformation by helping you guarantee the benefits of reduced capital expenditures, lower operational costs, and improved business agility promised by server virtualization and the migration to a private cloud infrastructure. By providing an end-to-end view of transactions, VirtualWisdom cuts through the haze of virtualization. At the same time, it reduces risk by guaranteeing superior I/O performance, which is the most critical component to application performance. The key to maximizing I/O performance is deploying instrumentation technology that directly measures what is going on at a deep level in the transaction workflow, from the virtual machine all the way to the storage array's LUNs.

IT organizations that manage high levels of complexity in their IT infrastructures require a sophisticated set of capabilities to diagnose and prevent application slowdowns caused by the infrastructure, especially during consolidation or migration. Complexity is driven by the heterogeneity of storage subsystems, host bus adapters (HBAs), operating systems, fabric switches, virtualization platforms, multi-site replication, storage virtualization, and the continued 50% annual growth of data and bandwidth utilization. The larger the server and SAN (Storage Area Network) infrastructure, the greater the risk of problems. Data center consolidation, accelerated use of server and storage virtualization, flat budgets, and the migration to a private cloud computing environment further complicate the infrastructure manager's ability to track and optimize performance and availability.

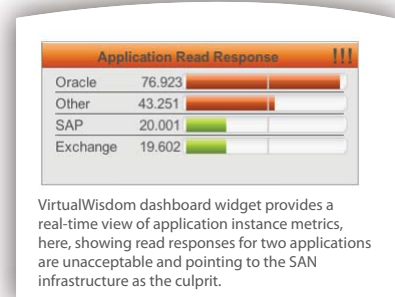


For infrastructure, SAN storage operations, and server managers, VirtualWisdom provides real-time SAN I/O measurement capabilities from the VM to the LUN. It enables you to reduce application response time, proactively avoid outages, and dramatically improve resource utilization. VirtualWisdom helps identify application performance bottlenecks in the SAN, resulting in significantly higher virtual and physical infrastructure performance and utilization.

Solutions: Problems that Virtual Instruments Solves

How can I de-risk my major data center projects?

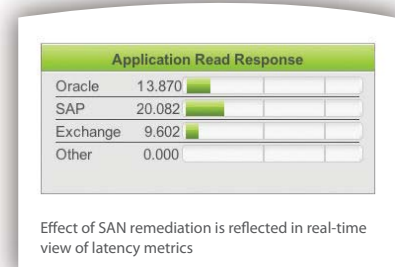
Major data center projects, such as server and storage migrations, refreshes, and consolidations all carry a risk of unexpected problems. And new or major application refreshes add to the risk. You can experience delays and cost overruns when performance, mis-configurations, or availability issues arise. Even with all the help you get from your vendors, properly designing your new environments still includes guesswork. With the real-time monitoring provided by VirtualWisdom, you can baseline the entire infrastructure's effect on application latency, track it during the changes, and report on final results. You will know, to the millisecond, exactly how the changes are impacting application users. And you can potentially save millions of dollars of CAPEX by eliminating the over-provisioning you're often forced into, in an effort to mitigate risks.



VirtualWisdom dashboard widget provides a real-time view of application instance metrics, here, showing read responses for two applications are unacceptable and pointing to the SAN infrastructure as the culprit.

How can I use VirtualWisdom to improve business agility and reduce cycle time?

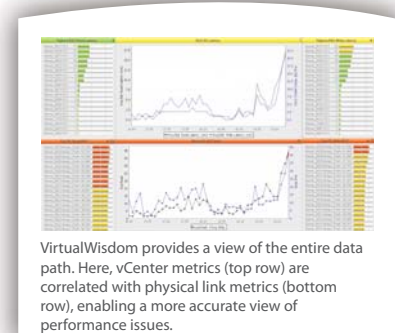
VirtualWisdom delivers the required visibility to ensure a successful infrastructure and application deployment. IT managers can monitor production deployment rollouts in real time to ensure all is performing as expected, with no mis-configurations or version incompatibilities. VirtualWisdom finds performance inhibitors before they bubble up to the application layer, accelerating new deployments, consolidations and technology migrations. VirtualWisdom helps validate new technologies by providing real-time measurements to determine the positive or negative performance impact of IT infrastructure changes.



Effect of SAN remediation is reflected in real-time view of latency metrics

How do I avoid future application performance degradations?

Performance problems are avoided by proactively monitoring the SAN and virtualized infrastructures with the complete set of VirtualWisdom dedicated or roving probes. Proactively monitoring by setting alarms and running periodic reports prevents performance issues and eliminates more serious downtime issues. As one example, VirtualWisdom is the only product that can measure real-time aggregated queue depth (regardless of storage vendor or device) to ensure storage ports are optimized for maximum application performance.



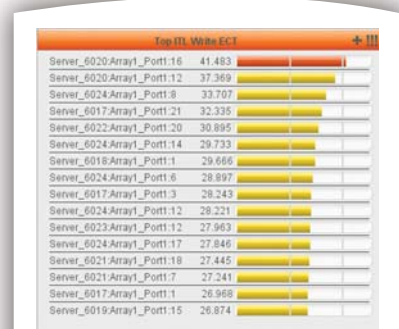
How can I reduce risk and unplanned application downtime?

Proactively monitoring the IT infrastructure with VirtualWisdom reduces downtime by finding hidden problems. Every network has hidden issues, from physical layer errors to configuration and load-balancing issues. Almost all application outages are the result of a combination of these issues. By setting alerts key to these issues, administrators can proactively eliminate them while they are still benign, making VMware and SAN administration a proactive activity rather than a series of fire-fighting drills. Being able to effectively address potential issues before application users report problems creates a more methodical process of ensuring application availability and reducing risk.



How can I resolve infrastructure problems 5X faster?

Time to problem resolution is decreased by monitoring transactions from the VM to the LUN with the complete set of VirtualWisdom probes. The ability to prove within minutes whether the SAN is to blame for slow application performance focuses the right team on the task and allows other teams to remain focused on other business imperatives. Running historical reports to look back in time enables faster problem identification and resolution. VirtualWisdom is the only product that can monitor and send an alert about storage access times, congestion, link errors, and SCSI errors, and generate trend reports that show the behavior of a heterogeneous SAN, by virtual machine and by application. This information can reduce troubleshooting time by up to 80% and allows the IT manager to immediately prove whether the problem is in the SAN, the application, or the server. This simple first step speeds troubleshooting by days, weeks, or even months.



This dashboard widget clearly shows a latency problem in the SAN by identifying an Exchange Completion Time of over 41 milliseconds, at the server port.

How can I reduce my storage costs by >40% through better tiering?

With VirtualWisdom, IT organizations can use lower-cost Tier II storage to provide Tier I performance using latency data and other information to properly plan and optimize the environment. This is combined with real-time alerting capabilities to prevent user impact as demands change, enabling IT to realize huge CAPEX savings. The organization can use Tier II or Tier III storage for all applications except those that actually demand other Tier I attributes. When the decision is based on performance, VirtualWisdom offers the real-time analysis that proves the effect of the storage arrays on application response time. The ability to use less expensive storage can result in 40-50% cost per terabyte savings and reduce floor space, power, and cooling requirements by up to 80%.



This widget shows that the busiest ports on the SAN vary between 13% and 2% utilization.

How can I proactively determine how storage virtualization impacts performance?

Storage virtualization adds a new layer of abstraction into the SAN infrastructure. Most storage and SAN managers have no idea how the storage virtualization products impact application performance. By using VirtualWisdom to establish a baseline, the performance impact will be immediately known and quantified.

How can I lower storage networking costs by >25% via SAN consolidation?

We have consistently found that SANs at larger companies are significantly over-provisioned, with average network utilization rates of less than 10%. VirtualWisdom can help you reclaim underutilized SAN ports and avoid acquiring additional expensive core switch ports, storage ports, related cables, and SFPs. Buy only what you need. Running reports that show latency and throughput per port enable the comparison and recommendation of optimizations that balance utilization and increase consolidation.



Here, you can see time-correlated metrics, including average CPU utilization, disk I/O latency, and the worst I/O Exchange Completion Times. Together, these widgets offer real-time evidence of the effect of configuration changes.

How can I mitigate the risk of moving mission-critical applications to a private cloud or virtual server infrastructure?

Cloud computing and virtualization offer many benefits, but IT staff lose the ability to “see” through the virtualized cloud, jeopardizing their ability to troubleshoot problems and assure performance meets application SLAs. It’s no secret that many companies are reluctant to virtualize their most mission-critical applications, leaving 70%+ of today’s enterprise applications still running on purely physical infrastructures. What happens when an application slows? VirtualWisdom allows the private cloud infrastructure to be instrumented, monitored, and constantly, yet unobtrusively, measured to see how it is affecting applications. It provides virtual server and storage administrators a common view from the virtual machine to the LUN, dramatically reducing the risk of moving mission-critical applications to a private cloud infrastructure.

VirtualWisdom Hardware & Software Products



VirtualWisdom® Server, Dashboard & Views
VirtualWisdom Server software resides on a Windows server platform, controlling and collecting metrics from the three types of VirtualWisdom probes. It manages the database of metrics,

handles integration with third party products via SNMP traps, and handles alerting. The Server co-resides with the Virtual Server Probe and the SAN Availability Probe software. The VirtualWisdom Dashboard UI is a real-time summary display that provides an overview of virtual and physical infrastructure performance and faults, based on the metrics available from the three types of probes. It displays the activity between VMs, servers, and storage, including measurements for percent utilization, reads, writes, events, and alarms, as well as signal and error status on the probe channels. VirtualWisdom Views software is an extremely flexible, powerful, and easy to use report writer that allows users to access the VirtualWisdom metrics and alerts from their workstations in the form of reports, graphs, and tables, in real-time or by historical trends.



VirtualWisdom® Virtual Server Probe
The Virtual Server Probe is a software probe that collects status from VMware servers via vCenter. It collects data on

and calculates 100+ different metrics (including CPU utilization and status, memory utilization, disk I/O requests and capacity, network requests and utilization), allowing for end-to-end correlation from virtual machines to LUNs.

VirtualWisdom® SAN Availability Probe

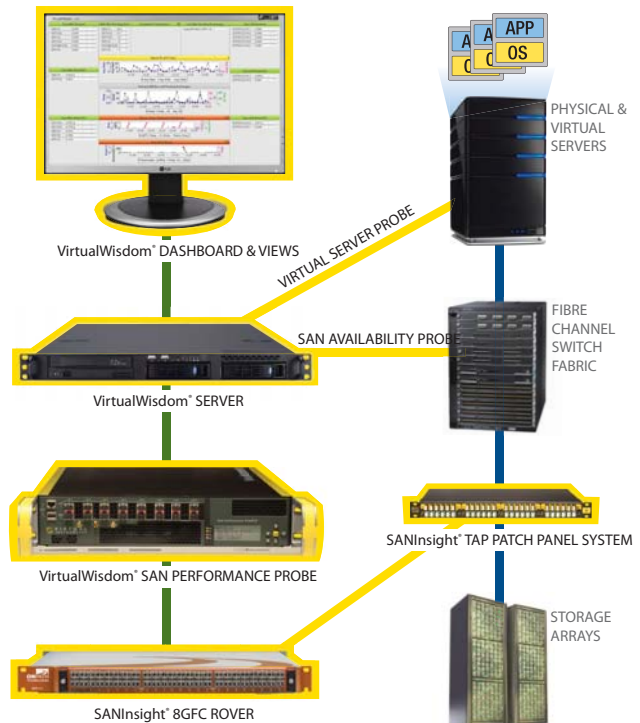
The SAN Availability Probe is a software probe that collects status from SAN switches via SNMP. The software probes collect metrics for each port, and these metrics are aggregated and reported to the VirtualWisdom Server by each SAN Availability Probe. Each SAN Availability Probe monitors all the ports of a specific fibre-channel switch and collects the metrics for each port, (such as the number of frames and bytes), as well as the key faults for each port, (such as loss of synchronization, link resets, link failures, packet discards, and CRC errors).

VirtualWisdom® SAN Performance Probe

The hardware-based SAN Performance Probe analyzes every frame header on a fibre channel SAN at line rates of up to 8 Gbits per second. The SAN Performance Probe detects application performance slowdowns and transmission errors by measuring every SCSI I/O transaction from start to finish, for every server/volume combination (initiator/ target/ LUN).



VirtualWisdom®



SANInsight® TAP Patch Panel System

Traffic Access Points (TAPs) provide a passive, fail-safe access point to fibre channel network traffic on a SAN for failure analysis, problem diagnosis, and performance monitoring. TAPs operate "out-of-band" by transparently diverting a small portion of the signal through the TAP to another port, which provides a copy of the fibre channel frame headers. The agent-less TAP has no impact on application or SAN performance and is integrated with a Fibre Channel Patch Panel for simple deployment.



SANInsight® 8GFC Rover

The Rover physical layer switch extends the monitoring reach of each SAN Performance Probe to groups of SAN links. SAN Performance Probes and protocol analyzers can be attached to Rover physical layer switches and access any of the connected SAN links. Rovers provide a way to deploy a tiered monitoring architecture to lower the cost of monitoring and extend the investment in VirtualWisdom.

Virtual Instruments Services

In addition to our annual product support services, Virtual Instruments offers professional services that help our customers augment their existing IT staff with highly trained SAN and virtual infrastructure optimization specialists. Your organization can experience the complete functionality and benefits of VirtualWisdom by utilizing Virtual Instruments Professional Services.

The Infrastructure HealthCheck and Scan Services

The Infrastructure HealthCheck and Scan Services use VirtualWisdom to provide real-time performance information on the infrastructure from the host to the LUN. The service scans all levels of connectivity to identify potential communication issues from the virtual server, the host HBA and switches, through the Fibre Channel network to the storage arrays. It points out potential issues that are on the verge of or have exceeded the baseline infrastructure behavior. Services are available for both virtualized and purely physical infrastructures.

The SOS-4-SANs Emergency Troubleshooting Service

The SOS-4-SANs Service is designed to offer immediate expert assistance to end-users, integrators, and SAN component vendors who require deep expertise in troubleshooting SAN problems. By utilizing the VirtualWisdom and SANInsight monitoring and analysis products, Virtual Instruments is unique in its ability to identify and resolve Fibre Channel SAN emergencies to bring mission-critical applications rapidly back to optimal performance.

How VirtualWisdom Complements Your Current Management Solutions

Today's most common management solutions - such as Enterprise Management Frameworks, Storage Resource Managers, Virtual Server Monitors, Application Performance Monitors, and SAN Fabric Managers - all lack physical, real-time monitoring of the I/O path from the VM to the LUN. These legacy storage management products typically poll SAN devices and average the metrics over 5 - 20 minute periods, which is usually insufficient to identify and resolve problems, especially intermittent problems and complex problems that have more than a single cause. VirtualWisdom is the only product that can non-intrusively optimize the performance and availability of applications by measuring actual SAN I/O traffic data. To the management tools you use today, VirtualWisdom adds:

- A comprehensive view of the SAN physical layer to find problems undetectable by software-only monitoring
- Continuous real-time monitoring that calculates statistics based on seeing all the fibre channel frames
- Immediately prove whether or not the SAN is the cause of application slowdowns
- "What if" modeling to predict the effect on application performance of changing I/O infrastructure configurations
- Comprehensive event recording and real-time capture capabilities for finding intermittent problems and supporting SLAs
- Performance trending to identify hardware degradation to enable preemptive component replacement before failure
- Fibre channel network statistics such as pending exchanges to tune queue depths for maximum application performance
- Ability to determine if configuration changes are affecting application performance by examining SAN latency
- Support of all, (not just "most") SAN devices, including legacy or the latest fibre channel components



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