VirtualWisdom® Tech Brief

VIRTUAL INSTRUMENTS

Proactive SAN Monitoring vs. Reactive SAN Troubleshooting

VirtualWisdom®

VirtualWisdom is the only real-time proactive monitoring and alerting solution that detects and alerts on storage network events across tens of thousands of fibre channel links, long before users are impacted.

I have a Fibre Channel Protocol Analyzer, or am thinking of buying one, why do I need VirtualWisdom?

Used to reactively troubleshoot Fibre Channel SAN problems, Protocol Analyzers capture traffic and report performance metrics and data errors in real time, whenever there is live traffic over any individually monitored Fibre Channel link. Users can view MB/s, Kframes/sec, utilization, frame errors, and physical layer errors from each direction of the link. Protocol Analyzers are typically dedicated to only one link at a time and no view of the entire SAN. They are designed to capture bytes on a single Fibre Channel link. Protocol Analyzers also provide a tool that analyzes the trace and provides the user with useful Protocol information, Protocol error and performance metrics. Data captured in the traces is generally measured in seconds or minutes due to amount of data that needs to be stored. This is a useful tool for point-in-time analysis for Fibre Channel links, for people who can read and understand fibre channel primitives. Very few IT managers know or would want to know how to read the output of a Protocol Analyzer. It was designed for electrical engineers, not SAN administrators.

The VirtualWisdom SAN Performance Probe is designed to analyze Fibre Channel traffic in real time. Results of the analysis are then stored in the VirtualWisdom database where users can later retrieve it, instead of byte-by-byte frame information as is supplied by the Protocol Analyzer. The SAN Performance Probe looks for physical errors, FC Link layer events, SCSI event and latency information. This is the same type of information the user would be looking for in Analyzer traces, but presented in much more understandable way. The SAN Performance Probe provides continual statistics and events where the Analyzer provides detailed point-in-time data. By deploying all 3 VirtualWisdom Probes, including the SAN Availability Probe and the Virtual Server Probe, the user has the ability to correlate and analyze information from across the infrastructure and see overall health of the end to end storage network, from the virtual machine (VM) on the server to the LUN on the storage array. These probes provide an early warning of potential issues as they continuously look for SAN events and performance metrics across the SAN. The VirtualWisdom database allows users to review historical and real-time information and see the changes in their SAN over time. This is crucial for performance-based metrics since workloads change over time and the ability to review historical information and detect peak usage are crucial.

Advantages of deploying VirtualWisdom over Protocol Analyzers:

- Continuous real-time monitoring and filtering that calculates statistics based on seeing all the fibre channel frames that are traveling through the entire fibre channel SAN - up to many 1000s of links, not just one.
- Immediate proof whether or not the SAN is the cause of application slowdowns.
- “What if” modeling to predict the effect on application performance of adding or re-deploying virtual machines or changing SAN I/O infrastructure configurations.
- Comprehensive event recording and real-time capture capabilities for finding intermittent problems and supporting SLAs.
- Performance trending of SAN device components to identify hardware degradation to enable IT managers to preemptively replace components before they actually fail.
- In-depth 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.
- Dramatically lower cost. On a per port basis, Protocol Analyzers are very expensive relative to VirtualWisdom.

Typical enterprise IT problems addressed by VirtualWisdom include:

How can I resolve SAN and virtual infrastructure problems faster?

Decreasing time to problem resolution is accomplished 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 time to problem identification and resolution. In some cases, a troubleshooting probe can be configured to “capture” the moment of failure, reducing the overall time to discover the root cause. VirtualWisdom is the only product that can monitor an entire SAN, and send alerts 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 helps to dramatically expedite

troubleshooting and allows the IT Manager to 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.

How can I increase my use of virtualization?
VirtualWisdom provides VMware and storage administrators a common view from the VM to the LUN, dramatically reducing the risk of virtualizing mission-critical applications. VirtualWisdom adds SAN I/O performance and utilization data to virtualization management solutions such as VMware's vCenter to enable the deployment of more VMs per server and to better balance the load for higher overall performance.

How can I accelerate storage 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 improvements by using storage arrays that cost less than half of tier I arrays. VirtualWisdom offers the real-time analysis that proves the effect of the storage arrays on application response time.

How can I lower expenses 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 to save on acquiring additional expensive core switch ports, storage ports, related cables, and SFPs. Running reports that show latency and throughput per port enable the comparison and recommendation of optimizations that balance utilization and increase consolidation.

How can I reduce 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 endemic 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 firefighting drills.

How do I avoid future performance degradation?
Avoiding performance problems is accomplished by monitoring the virtualized and SAN infrastructures with the complete set of VirtualWisdom roving or dedicated probes. Proactively monitoring by setting alarms and running periodic reports results in the prevention of 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.

Summary and for more information on VirtualWisdom's proactive approach:

Protocol Analyzers are designed to be used to troubleshoot existing problems on a known bad link. Because they collect a huge amount of data they can only monitor one link for 1 to 2 minutes until the buffer is full. This means that if you want to troubleshoot an issue, the error has to occur within these 1 to 2 minutes to be caught. You have to exactly know when and where the issue will occur. And you really have to be a Fibre Channel expert to do the analysis.

Each VirtualWisdom SAN Performance Probe monitors up to 8 links permanently and collects nearly 200 metrics for each single Initiator-Target-LUN relationship on these links. These metrics include response times, IOPS, MB/s, block sizes, frames/sec (each for read and/or write) and also outstanding IOs, pending exchanges, SCSI errors and FC events. VirtualWisdom is often considered to be a "virtual SAN administrator" that actively monitors all of the links on a SAN and alerts to potential problems before they cause application slowdowns or outages. VirtualWisdom saves you time and money.

For more information, go to: http://www.virtualinstruments.com/san/solutions/prevent-performance-problems

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