



Ecommerce Business Deploys Virtual Instruments' VirtualWisdom to Gain Transaction Visibility and Ensure SAN Uptime

Background

This Virtual Instruments customer is a leader in the grocery retailing industry – one of the top 3 in the U.S. This grocer combines expertise in retail and supply chain operations - two highly complementary core competencies. This company's over 100 years of food logistics innovation, coupled with their established retail expertise, offers a unique blend of capabilities and a highly complementary business model that's unlocking new opportunities. Through innovation and focus, they have grown into a retail network serving more than 5,000 retail end points via their supply chain and support services. The enduring mission for their employees has been to serve customers better than their competition.

To support this supply chain infrastructure, the Information Technology team must provide extremely high levels of application availability for payroll, pharmacy, financials and merchandising, amongst others. With data growth exceeding 20% per year and pressure to maintain profitability in a hyper-competitive market, the data storage team is expected to help contribute to the financial success of the company.

IT Environment

IT supports hundreds of servers, almost half are UNIX and included are approximately 60 virtual servers supporting 1,000 virtual machines. There are 2,000 Brocade switch ports and dozens of IBM SVC ports, with a goal of 100% utilization of SVC. 150 array ports front end over 2 PB of online storage. All processing is handled by two datacenters over 1,000 miles

Challenges:

- Escalating costs of IT in a hyper-competitive market puts pressure on staff to do more with existing resources
- Inordinate amount of IT staff time spent on trying to diagnose SAN problems

Solution:

- First installed Virtual Instruments VirtualWisdom, then called "NetWisdom" for basic troubleshooting in 2005
- Increased VirtualWisdom usage over time to include storage tiering and vendor evaluation solutions

Customer Benefits:

- Potential application slow-down causes identified and corrective action provided, often before the application consumer is even aware of a problem
- Substantial reduction in the need to replace suspected bad SAN components because of superior fault diagnosis, saving on both CAPEX and OPEX
- Reduces risk of placing mission critical applications on much less expensive tier 2 storage

apart, connected with a dedicated link.

Like most IT shops, this grocer is challenged with tight budgets and with getting more and more performance out of existing resources. The storage team knows that they're doing their jobs when "the phone doesn't ring". To do this, IT knew it must be proactive; they had to avoid problems and to anticipate issues before the application owners felt the pain. The only way to do this without dramatically increasing the staff size was to find some way to automate the monitoring and analysis of the effect of the SAN on application availability. The goal for the future is "to do more with less". After talking with their existing vendors, the IT staff developed a set of evaluation criteria.

- Enables more effective analysis and evaluation of new SAN components with real-time testing

Storage Evaluation

Criteria were agreed upon:

- Comprehensive solution specifically for monitoring heterogeneous SANs
- Vendor agnostic, has to support any host, any switch, any storage, with a common toolset for all
- Ability to work seamlessly with vendors for quick problem resolution
- Solution must have mature hardware and software
- Ability to provide detailed, accurate graphs that other teams can understand and act upon
- Enable real-world testing and results for equipment evaluation
- Demonstrate ability to decrease time to problem identification to minutes
- Offer real-time useful statistics for all I/O conversations
 - How much traffic?
 - IOPS, MB/s, reads vs. writes ,etc
 - How fast?
 - Response times for I/O
 - Command to first data
 - Latency of network, bottlenecks
- Ability to look at specific metrics for small or large subsets of hosts, devices, etc.
- Non-disruptive; shouldn't consume switch or host resources and should be invisible to host and storage
- Help justify purchasing decisions by identifying storage tiering opportunities

Several alternatives were evaluated; their pluses and minuses considered:

Storage performance tools

- Most offer many useful metrics, but all have trade-offs
- Most are not geared specifically for performance monitoring of storage
- Can consume resources
- Typically not turned on for "rear view mirror" analysis
- No "one tool" to do it all
- Different toolset for each platform
- Raw data often must be analyzed

Host based tools

- Don't tell the whole story, but often are "application aware"
- Difficult to centralize management
- No visibility after the HBA
 - Cannot see bottlenecks in the SAN

- No visibility of HBA behavior
- Difficult to isolate problems
- Data not granular enough
- Difficult to store long-term data in easily accessible format

Array based tools

- Very deep metrics for storage arrays
- Often require costly licenses or additional software
- Can affect storage system performance
- Data not granular enough
- No visibility inside SAN to latency, bottlenecks or errors
- Not always turned on
- Different for every vendor, or even different models from same vendor

Switch tools

- Additional license or software required
- Mainly useful for throughput trending
- Data gathering was de-prioritized during peak load times
- Limited visibility to Fibre Channel Protocol layer
 - Read / Write sizes
 - FC Exchanges
 - Latency to storage device

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-Grocer

Against the evaluation criteria, Virtual Instruments was selected, though the first installation was small. The grocer needed to see the real benefits in its shop before committing to a wider deployment. Happily, the decision was judged to be successful, and today, the grocer continues to deploy VirtualWisdom as its SAN grows.

Troubleshooting the SAN

According to the grocer, VirtualWisdom has enabled them to cut the time spent troubleshooting SAN issues in half. In their own words, “We have used VirtualWisdom to prove our innocence countless times since installing the solution, and the graphing function helps us prove to our managers that the SAN is balanced and behaving well.” The IT staff uses other products such as IBM TPC, EMC Control Center, Brocade DCFM, and NetApp SANScreen which all “provide 90,000 foot views of problems, but can’t provide the details to determine root-cause like VirtualWisdom”.

Cost per terabyte of tier 1 storage exceeds the cost of tier 2 storage by 2 – 3 times.

- SNIA, 2009 “Exploiting multi-tier file storage effectively”

Further, they estimate that by monitoring with VirtualWisdom, they’ve reduced by two-thirds the number of suspected bad SAN components that they’ve had to switch out. Without VirtualWisdom, they may have simply replaced all of the components (HBA, cables, and ports) in a given path. With VirtualWisdom, they can be sure of identifying the faulty item, saving many CAPEX and OPEX dollars.

Application Performance

Ultimately, the storage staff was judged by how effectively they support the application consumers. A senior administrator states that “We have made our payroll system more efficient by decreasing latency and increasing utilization. That would have been difficult without VirtualWisdom.” They go on to say that “using VirtualWisdom, it’s pretty easy to demonstrate that everything in the SAN is balanced”.


Optimizing Use of Storage

VirtualWisdom helps to determine when and how much future SAN capacity to acquire. It helps ensure IT is using the right class (tier) of storage by enabling them to utilize lower cost tier 2 storage as opposed to expensive tier 1 storage. According to a staff member, “We always use VirtualWisdom for performance testing. We used it to determine performance characteristics on EMC DMX and CLARiiON when deciding between T1 and T2 Storage, in fact we wouldn’t have near as much T2 storage without VirtualWisdom because it enables us to guarantee response times for our critical apps.” Their process is to look at each application, measure latency, IOPs, cache hits and review the historical data to determine which applications to move to lower tiers. The key to re-teiring is the use of storage virtualization. What used to take many months, now takes less than a week”.

And it’s not just tier 1 vs. tier 2 questions. They go on to state that “We always use VirtualWisdom for any head to head testing that goes on here- it provides insight that others tools can’t give us. VirtualWisdom is always a big piece of our evaluations of new products.” Other benefits of easily monitored performance called out include the ease of migrating hosts to different backend storage systems, including different drive speeds and RAID configurations. They measure results in real-time, looking at key metrics to give the proper storage to the most “deserving” host.

Lessons Learned

One of Virtual Instruments’ long-time customers, this leading grocer has a few best practices suggestions for new customers. First and foremost, they suggest placing TAPs (Traffic Access Points) on all storage ports from day 1. This allows complete non-disruptive monitoring immediately or at a later date. They suggest placing the TAPs to monitor the storage ports, as this provides the best value and offers visibility to the entire fan-in. They also recommend establishing host and application baselines immediately after deployment to identify odd behavior, key to anticipating issues before they become real problems.

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