

Real-time Performance Monitoring and Analytics Come to NAS-based Storage

Situation

Businesses run on applications. Applications are delivered by ever-changing infrastructures, and the speed in which data is created and leveraged contributes directly to the bottom line. Transactions, analytics, and problem solving all enable competitive advantage, operational efficiencies and IT agility. In this age of digital transformation, application deployment and data creation continues to expand exponentially, requiring significant growth in IT infrastructure, administrative effort and cross-domain collaboration. Application performance, so critical to a business's success, relies on a multitude of variables including virtualization platforms, application code structure and integrity, workload behavior, and supporting IT infrastructure components such as servers, network switches, and storage. Of all these components, the networked storage architecture and changing workload behavior represent the largest influences on overall application performance. Storage has become both more complex and more diverse making performance assurance much more difficult.

Cost optimization also plays a significant role in today's data centers. Budgets for infrastructure are not growing anywhere near as fast as the expansion in applications and data. This paradox created a significant increase in the amount of network and storage infrastructure that engineers and administrators are responsible for. With IT staff overtaxed, having the ability to accurately identify factors that affect performance and availability and then correct them before end users are affected, requires advanced cross-domain analytics.

Though storage management tools provide views into macro-level performance results, what they cannot provide is a vendor-agnostic solution that delivers acute/granular real-time understanding of performance issues and how to resolve them. A solution that quantifies the performance impacts of an ever-changing IT environment across both SAN and NAS-based infrastructures is required. Both the performance cause and effect of the ecosystem is needed, complete with an unbiased feedback system to quantify infrastructure and workload changes.

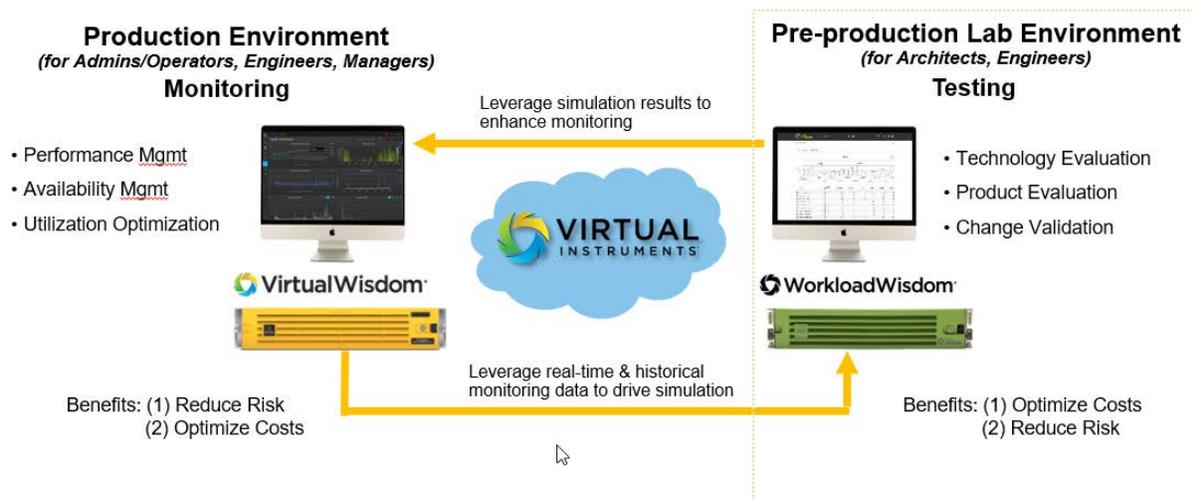
Virtual Instruments and Load DynamiX Join Forces

Virtual Instruments, a provider of performance management solutions, and Load DynamiX, a provider of storage performance analytics products, announced a merger on March 21, 2016, electing to use the Virtual Instruments name for the combined company. Some mergers and acquisitions look to add a customer base or move into a new technology segment. In this case, the two companies have products that work extremely well together, and the highly complementary merger is as big a benefit for end users as it is the two companies.

Virtual Instruments' VirtualWisdom is an infrastructure performance monitoring and analytics platform. Known as a "Big Data for data centers" analytics solution, this out-of-band solution persists, correlates, and analyzes real-time performance data across the open-systems stack (servers, network, storage) via agentless software probes and additional purpose-built appliances. Through applied analytics developed in partnership with their enterprise customer base, the solution provides server and storage engineers with the information required to confidently monitor, troubleshoot, and make intelligent deployment decisions and adjustments regarding virtual server configuration and networked storage infrastructure.

This continually analyzed production workload data can then be leveraged by WorkloadWisdom (formally known as Load DynamiX Enterprise) and Workload Generation Appliances to drive simulations. The WorkloadWisdom Load Generation Appliance is deployed within test environments to emulate the workloads found in production environments. This enables the performance effect of new hardware or configurations, technologies such as flash, engineering changes, and software updates, to all be quantified before new infrastructure is deployed into production. The testing results for WorkloadWisdom can also be used as baseline data to enhance performance monitoring with VirtualWisdom in the production environment.

The combination of the two companies and their respective products creates an ideal scenario that measures, analyzes, recreates, and validates how the entire infrastructure will respond to changing workloads, changing infrastructure, and ever-emergent performance problems.



The data collectors that feed the VirtualWisdom Platform Appliance and applied analytics to make a complete, vendor-agnostic production monitoring solution include:

SAN and NAS Storage Performance Probes – collect full line-rate wire data from the links between the switching network and storage arrays, and they enable physical layer issue detection via I/O trend analysis for workload flow, distribution, and latency. These probes are the industry’s only real-time storage infrastructure monitoring devices, and are offered in a 2U chassis with up to sixteen 10 GbE for NAS, or up to 48 fibre channel (FC) ports. The probes work out-of-band via a passive optical TAP, and do not impact performance or operations.

ProbeVM (virtual & physical server) and ProbeSW (network & switch) software probes – collect and feed data to the VirtualWisdom Platform Appliance to provide a completely correlated understanding of end-to-end workload performance. The ProbeVM provides real-time measurement capabilities on the performance, utilization, and availability of the virtualized server infrastructure, enabling IT staff to model server performance and balance the creation and deployment of virtual machines (ESX/I, Hyper-V and PowerVM) based on real-time measurements and feedback of I/O performance. The ProbeSW pulls available data via SMI-S and SNMP MIB (management information base) to gather switch performance and link error statistics. Also, the ProbeNTAP software probe collects additional NetApp storage information used in managing the health and utilization of storage attached in VMware environments.

The WorkloadWisdom platform – generates and simulates storage traffic in a test environment based on workload models and access patterns identified in the production environment. If the site has VirtualWisdom installed, the data can be automatically exported from the VirtualWisdom monitoring solution. There are four Workload Generation appliances units with support for 10Gb and 40Gb Ethernet: 4, 8, 16, and 32Gb FC, and unified FC and Ethernet connectivity. Supported protocols include NFS, SMB, CIFS, FC, FCoE, iSCSI, HTTP, HTTPS, OpenStack, Swift and Cinder CDMI, and S3 protocols. Any file, block, or object storage system to can be tested and evaluated, eliminating the guesswork within storage procurement and change management.

Introducing the VirtualWisdom NAS Performance Probe

Until now, Virtual Instruments performance probes were limited to SAN storage environments. NAS storage currently contributes 50% of all new network-based storage additions, often co-existing with SAN storage within the same data center. In addition, NAS solutions no longer house just file shares. Mission critical applications now run on NAS storage, in part because of the increased granularity and simplicity NAS affords virtualization. IT organizations can benefit greatly from NAS storage monitoring and real-world testing, especially since NAS storage presents unique challenges that can affect performance. Metadata consumes 50% and more of NFS (the primary NAS protocol) traffic. This problem grows with scale, as more files translate into additional metadata, and the older a file is, the more metadata it is likely to collect. Changing workload and usage patterns, noisy neighbors and rogue client activity are all potential issues in addition to the NAS hardware itself. Because of the difficulty in solving NAS performance problems, a common solution is to buy more NAS storage, which may solve the problem but does so at a cost much higher than necessary.

On September 20, 2016, Virtual Instruments announced the VI NAS Performance Probe, extending their analytics-driven technology beyond SAN storage. It is the industry's first real-time performance monitoring device for NAS environments. The NAS Performance Probe is an out-of-band, non-invasive, and vendor agnostic solution that feeds real-time I/O wire data to provide an accurate and fully correlated understanding of storage performance, capacity, and health. The 2U Probe supports full 10G line rate monitoring of NAS protocols with support for 16 concurrent ports. Like the SAN Performance Probe, the NAS Performance Probe is installed between the switch port and the NAS head, using passive optical traffic access points (TAPs) to divert a small amount of light to the NAS Performance Probe. The process is completely out of band and in no way impacts performance. Hundreds of metrics are captured in real-time and analyzed, including link and hot file metrics, flow metrics for commands, and RPC statistics.

VirtualWisdom delivers a customizable and intuitive GUI that provides a view of overall NFS performance, or that of a single client view. The Event Advisor analytic provides a quick glance of whether there are trends or events that warrant investigation. The Trend Match analytic can then be used to correlate events to identify root causes. For instance, a single rogue client can be identified that affected overall system performance.



EMA Perspective

The NAS storage market is currently half that of SAN-based storage, but projections are that by 2019 it will be double that of SAN. With this announcement, Virtual Instruments reaches a larger target market including pharmaceutical, oil and gas, media and entertainment, and electronic design automation (EDA) verticals that are dependent on NAS storage. Performance-heavy NAS users, such as those in financial services and service providers, are sparingly but increasingly using NAS in business-critical applications. Having a complete solution that enables them to monitor performance and availability in true real-time will enable NAS to spread much further into business-critical environments. In addition, having a single pane of glass helps reduce the proliferation of single-purpose monitoring devices.

Load DynamiX got its start providing performance modeling and load generation solutions for the major storage vendors in engineering labs and regional competency centers for proof of concepts and benchmarking. Their access to equipment, workloads, and infrastructure substantially benefits enterprise customers. With the introduction of enterprise-targeted solutions, end-user customers are now key beneficiaries of the technology and a significant contributor to overall sales. Customers used both companies' products for years and looked for tighter integration, which is now available. The merger of Load DynamiX and Virtual Instruments was a natural progression for both companies, and as a result is a synergistic, profitable company that is exceeding expectations. Now, the benefits of performance monitoring and intelligent analytics extend holistically throughout the entire data center, regardless of the protocol.

About EMA

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