CLABBY ANALYTICS

Research Report

Virtual Instruments: Analytics-Based Infrastructure Performance Management

Executive Summary

New workloads (mobile, analytics and cloud) are placing heavy demands on information infrastructure (systems, storage, networks and related software). As a result, Quality-of-Service (QoS – latency/response times, performance, security, reliability and more) is being heavily tested. Further, the management and troubleshooting of complex, virtualized, heavy input/output (I/O) environments using human labor only has become almost impossible. There are just too many data points to analyze; too many speeds and feeds to examine; too many information systems layers (systems, storage, networks, operating environments, middleware, applications, databases, etc.) to handle.

> *To more efficiently manage complex information technology (IT) infrastructure, a new generation of automated IT tools and utilities is needed – a generation that can offload human managers from having to manually analyze thousands of information infrastructure data points.*

Virtual Instruments makes an *analytics-based* infrastructure performance management platform called VirtualWisdom. It has been designed to monitor and automatically analyze vast amounts of information system data. Using this platform, IT managers can more easily identify problems and visualize bottlenecks – performing root-cause analysis and other troubleshooting tasks more quickly. *In short, this platform improves IT infrastructure management efficiency*.

For years, *Clabby Analytics* has covered the application performance management (APM) marketplace. Like infrastructure management tools, APM tools also aim to help streamline management tasks, leading to improved performance. But we see Virtual Instruments' infrastructure performance management offerings as distinctly different because they:

1. Focus on managing the entire *systems/storage/network software infrastructure*;
2. Offer a software-enabled, as well as *hardware-enabled,* approach to infrastructure management, providing granular insights quickly; and,
3. Offer service engagements that include audits, as well as managed infrastructure services, placing infrastructure experts on the front line in enterprise infrastructure management engagements.

In this *Research Report*, *Clabby Analytics* takes a closer look at Virtual Instruments and its infrastructure performance management offerings. We find these offerings to be advanced, comprehensive and innovative. And we especially like the way that *hardware is used to enable monitoring and analytics processes*. We believe that these offerings will serve two main purposes within an enterprise: 1) they will lead to improved infrastructure efficiency (performance, improved service levels); and 2) they will help drive down human-related infrastructure management costs.

Virtual Instruments: Analytics-based Infrastructure Management

Introduction

According to two recent surveys conducted by IBM's Institute for Business Value (IBV) and Oxford Economics, there is a crisis of confidence taking place within IT organizations. This crisis has to do with the preparedness of information systems infrastructure (systems, storage, networks and related software) to handle the QoS demands of new mobile applications, data-intensive analytics environments and heavily virtualized cloud workloads.

Survey respondents included 750 IT executives from 18 countries across 19 industries. 32% of those surveyed were chief technology officers (CTOs); 30% were chief information officers (CIOs); and the remainder was senior IT managers. Surveys showed that respondents believe information infrastructure is strategically important because it helps to drive business strategy and growth. *But, only 10% of the executives surveyed indicated that their infrastructure is "fully prepared to meet the demands of mobile technology, social media, Big Data and cloud computing."*

> *These surveys also indicated that over 60% of organizations plan to increase IT infrastructure investment over the next 60 months. But these organizations also intend to reduce IT infrastructure costs BY IMPROVING INFRASTRUCTURE EFFICIENCY.*

The Focus Should Be on Infrastructure Efficiency

In days gone by, humans could effectively manage physical systems/storage/network resources. But with the market move to virtualization (the pooling of unused systems/storage/network resources that can then be exploited by users and applications), the task of managing information system resources has become exponentially more complex. For instance, a single server can run thousands of virtual machines – each of which can be executing different workloads. Managing systems, memory, storage, networks, security, availability and other variables can be extremely challenging for the human mind.

> *Clabby Analytics believes that one way to improve infrastructure efficiency is to manage systems, storage, networks, applications and databases using a new generation of sophisticated, analytics-driven, automated infrastructure management tools and utilities. These new tools and utilities have the ability to gather metrics from thousands of sources – and the ability to correlate and interpret that data using machine-driven analytics. Further, this information can be graphically displayed, making it easier for humans to interpret information. Virtual Instruments is a maker of automated, analytics-driven infrastructure performance management solutions.*

In order to handle the security demands of mobile devices, the demands to analyze large amounts of data (Big Data) and demands for access to more computing power, storage and network services (by accessing virtualized systems/storage/network pools), enterprises need to:

1. Invest in more information infrastructure (adding capacity), and
2. Manage infrastructure more efficiently (in order to maximize the return on investment in that infrastructure).

> *Virtual Instruments offers products that address point #2: making infrastructure more efficient.*

Virtual Instruments: Analytics-based Infrastructure Management

About Virtual Instruments
Virtual Instruments, a maker of infrastructure management tools and utilities, is led by John W. Thompson (Chairman of Microsoft, CEO of Virtual Instruments – and formerly at IBM and Symantec). Over the years, Thompson, along with fellow engineers and software designers, developed deep experience in infrastructure design and deployment. They now believe that they have architected a new, analytics-driven architecture that is more efficient than previous-generation infrastructure management and application performance management tools and utilities. They have dubbed their new-generation infrastructure performance management environment the "VirtualWisdom" platform, and their associated software and hardware offerings as "Probes" (ProbeVM, ProbeSW, ProbeFC* Family and ProbeNTAP).

> *Apparently, both customers and business partners agree with Virtual Instruments' market view, as the company now boasts 300-350 customers (with 38 of those customers part of the Fortune 100 ranks, including MetLife, AT&T, NASDAQ and more), as well as strong partnerships with industry leaders such as Oracle, IBM, Citrix, Microsoft, EMC, Hitachi, HP and others.*

Virtual Instruments describes its vision as "creating a world where applications and infrastructure perform better together." And it describes its mission as: "to provide innovative products and expertise that deliver the unique insight required to ensure the highest levels of performance and availability for every mission-critical workload." *The most operative word in the preceding section is "**infrastructure**" – several vendors focus on managing application performance*, *but Virtual Instruments focuses on both application and infrastructure management* with a goal of delivering high performance and availability for the workloads it serves. Virtual Instruments describes its market as the "*infrastructure performance management*" (IPM) marketplace and estimates market opportunities at more than $8 billion (the SAN attached IPM market = $4B; the FCoE and NAS markets represent $2B; and additional server platforms can generate an additional $2B).

Infrastructure Performance Management vs. Application Performance Management
Taking a broad view of the IPM marketplace, there are three logical elements that are served by IPM tools:

1. *Infrastructure* – End-to-end compute nodes (servers) through storage infrastructure from virtual machines through storage logical units. IPM examines activities at the system level, within Flash and mechanical storage, and across adapters and switches, monitoring both applications and infrastructure behaviors;
2. *Performance* – Continuous measurement of system-wide infrastructure response time; and,
3. *Management* – Using advanced correlation techniques, analytics and visualization to provide definitive and actionable insights on infrastructure/application behavior.

In short, IPM tools monitor information across various types of systems, storage and networks, and present that information to IT managers and administrators who use that information for performance tuning and/or for troubleshooting. Advanced analytics and visualization – made possible by improved correlation techniques –- make it possible to analyze vast amounts of Big Data rapidly. As we have written in numerous APM reports, many vendors have long offered tools and utilities that can monitor and collect data, as well as visually represent that data in graphical form. Using APM products, IT administrators can launch their own probes and fixes, and automate certain management actions. The biggest differences between APM and IPM are that: 1) IPM tools monitor the entire infrastructure down to very granular levels, and 2) some IPM tools use specialized hardware to enable advanced monitoring and analysis.

Product Offerings: A Closer Look at VirtualWisdom4 and Related Probe Hardware
Virtual Instruments' infrastructure performance management offering, VirtualWisdom, is made up of multiple components. The VirtualWisdom platform is composed of a powerful, fully integrated combination of the VirtualWisdom Management Software, and the dedicated Platform Appliance. This platform leverages metrics provided by a robust suite of software and hardware probes that collect data from throughout the end-to-end infrastructure (see Figure 1.)

Figure 1 – The Virtual Instruments Product Family
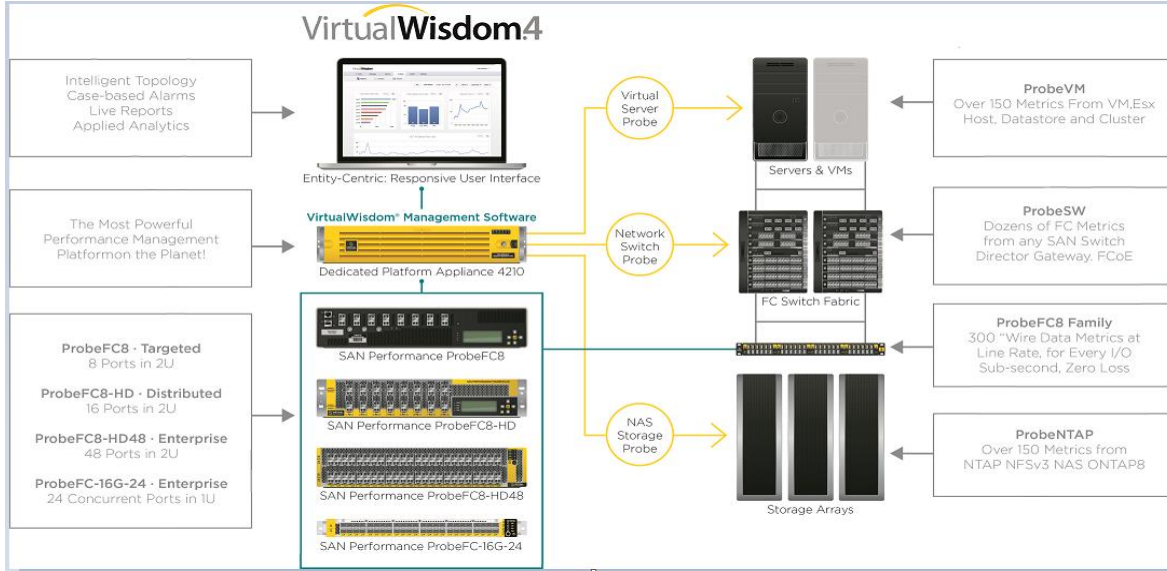
Source: Virtual Instruments – February 2015

VirtualWisdom4 – Entity-Centric Interface, Intelligent Topology, Analytics and Reporting
The VirtualWisdom4 infrastructure performance management solution consists of a unique interface, intelligent discovery/topology services, analytics tools and report generation facilities.

1. ***The Interface*** – Virtual Instruments describes the interface to its VirtualWisdom4 infrastructure performance management environment as "entity centric" – meaning that the interface provides representations of various resources as entities or groups. Entities can be groupings of physical systems, storage, or network resources combined with application workloads. These groups are hierarchically oriented, allowing IT managers and administrators to view resource behavior at a high level and to drill down in greater depth (at a very granular level) when more information about infrastructure behavior is needed. Using this interface, IT managers and administrators can better understand how resources are interrelated and how resources are performing based on function, correlation and interdependency.

2. ***Intelligent Topology*** – VirtualWisdom4 offers an intelligent topology monitor that can discover system/storage and network assets, and then monitor those assets. Data collected can be correlated, analyzed and graphically presented, enabling IT managers and administrators to better understand infrastructure behavior. Using this information, IT personnel can reduce the number of issues reported; help prevent outages; reduce trouble tickets and improve overall service levels.

   a. The intelligent topology environment also provides "Sparc lines" that show key trends related to performance, health and utilization of information systems resources (a visual monitoring environment).

3. ***Case-Based Alarms*** - VirtualWisdom4 provides "alarm badges" that identify problems or events that may be occurring (or about to occur). Virtual Instruments has identified that a lot of alarms that are generated by various monitoring environments generate "a lot of noise," and it has implemented "case-based" alarm generation. Using this approach, a case is opened when an alarm has been generated and all subsequent related events populate that case, providing IT managers and administrators with a comprehensive, organized view of a given issue all in one place. With this view, IT managers and administrators can more easily understand trends, correlations/relationships and severity on a case-by-case basis.

4. ***Applied Analytics*** – Machine-driven analytics is the wave of the future in systems/storage/-network (infrastructure) management. Quite simply, the volume of data that is monitored and collected is far too great to be efficiently analyzed by human beings. Analytics software helps filter infrastructure data, automatically presenting humans with key insights into infrastructure behavior. VirtualWisdom4 offers a variety of analytics services, such as an Event Advisor that searches for deviations; a Balance Finder to help verify load balancing configurations; a Trend Matcher to help IT managers and administrators understand causality between events and trends; and a Queue Solver that enables you to quickly identify the queue depth setting that optimizes performance.

5. ***Live Reports*** – VirtualWisdom4 live reporting facilities help "human interpreters" visualize performance, context and real-time data by converting the data analyzed in step 3 (described above) into visual "Live Reports." These reports convert analytics results into graphical representations (such as bar charts, trend charts, time-based comparisons and histograms) that allow IT managers and administrators to more quickly understand infrastructure behavior patterns.

> *The bottom line on VirtualWisdom4 is this: the VirtualWisdom4 infrastructure performance management environment provides continuous, real-time measurement of performance, health and overall utilization rates across servers (including virtual machines), network and storage devices. Using this information, IT managers and administrators can reduce latency, improve availability, proactively prevent outages, improve service levels and improve resource utilization. In other words, VirtualWisdom helps make IT infrastructure run more efficiently.*

"Probe" Software and Hardware
As shown in Figure 1, Virtual Instruments also uses intelligent appliances to help monitor activities taking place on servers and within storage and networks. The company's Dedicated Platform Appliance 4210 is used to link to its virtual server probe environment, to network switches (using a software-based network switch probe), and to network-attached storage (NAS) using the company's hardware NAS storage probe facilities.

To monitor virtual server activities, Virtual Instruments' Dedicated Platform Appliance 4210 works in conjunction with the company's software-based "ProbeVM" offering to monitor virtual machine activities. ProbeVM collects more than 150 metrics on VM activities, including monitoring ESX host, datastore and cluster activities.

To monitor network activities, Virtual Instruments uses its software-based "ProbeSW" to monitor dozens of fibre channel metrics from any SAN (storage area network) switch (including director, gateway and fibre channel over Ethernet environments). Virtual Instruments also uses hardware to collect additional information on network behavior. A SANInsight TAP (traffic access point) patch panel is used to transparently provide a passive, out-of-band, full line rate copy of all traffic to VirtualWisdom's SAN Performance Probes. Industry best practices suggest that installing TAPs

when the physical layer is initially deployed provides immediate monitoring access for both reactive troubleshooting and proactive performance management, as well as capacity planning and cost optimization. The TAP Patch Panel System provides a broad range of streamlined options for implementing TAPs into both new and existing cable plants.

The VirtualWisdom SAN Performance Probe (models ProbeFC8-HD, ProbeFC8-HD48 and ProbeFC16G-24) supports Fibre Channel SANs at speeds of up to 16 Gbps. The solution helps to redefine performance management by providing detailed measurement and statistics about storage I/O traffic as it relates to an application server, storage subsystem, remote replication, virtual or other key SAN devices, or applications. The SAN Performance Probe detects application performance slowdowns by measuring every SCSI I/O transaction from start to finish, for both reads and writes. Exchange completion time (ECT) metrics are maintained for every server/volume combination (initiator/target/LUN). A single SAN Performance Probe can be dedicated to simultaneously monitor up to16, 24 or 48 Fibre Channel links based on the model type.

As for storage, Virtual Instruments' Dedicated Platform Appliance 4210 is the industry's first purpose-built, enterprise-class, infrastructure performance management (IPM) appliance that collects real-time data and correlates VM server, SAN network, and I/O metrics from the Virtual Server Probe, Network Switch Probe and "off-the-wire" from the hardware Performance Probe into a complete view of end-to-end systems between virtual machines and storage environments.

> *From our perspective, this <u>hardware appliance approach</u> is what truly distinguishes Virtual Instruments from its competition. The way we see it, specialized hardware is being used to offload systems from having to use precious systems cycles to collect infrastructure data. Instead, lower cost appliances assist in data monitoring while associated Probe software is being used to monitor various system, storage and network activities. We believe that this approach enables Virtual Instruments users to gather data more quickly (leading to better real-time analytics and better service-level performance). And, in the end, faster performance and faster insights lead to better overall infrastructure efficiency, which is the ultimate goal for business leaders struggling to launch complex new workloads.*

Training
Virtual Instruments offers four options for those interested in learning to use VirtualWisdom4:

1. eLearning;
2. Live online classroom instruction;
3. In-person classroom instruction; and
4. Dedicated onsite custom instruction.

Virtual Instruments' eLearning environment is offered as a 24/7 on-demand, self-paced learning environment through the company's Virtual Instruments University. Live online classroom instruction is available through remote access to a Virtual Instruments lab environment. In-person classroom training can also be arranged at a Virtual Instruments classroom location. And, finally, dedicated onsite instruction at customer facilities is also available.

Services
Virtual Instruments offers three distinct services designed to: 1) help its customers troubleshoot their infrastructure environments; 2) help customers better understand and proactively manage their infrastructure environments; and/or 3) offload infrastructure management to the company itself. To better understand a given infrastructure environment and remediate problems therein, Virtual Instruments offers its customers "SOS4IPM." SOS4IPM (save-our-ship for infrastructure

performance management) is an immediate response team that offers expertise in problem discovery, assessment and remediation.

Virtual Instruments' "Critical Infrastructure Audit" (known as "CIA") is a comprehensive service engagement that provides end-to-end virtualized host and SAN environment analysis. This service is offered as a one- to-two-week non-disruptive, agentless data collection engagement that analyzes data and makes recommendations on how to improve infrastructure performance and availability. (CIA services include baseline reporting, advanced analysis and alert investigation.)

The Virtual Instruments Managed Services (VIMS) program offers customers access to a dedicated team of subject matter experts (SMEs). This service delivers monthly health, utilization and performance reports, tracking progress against key KPIs (key performance indicators) and is meant to augment existing staff.

Go-to-Market
Virtual Instruments has both a direct sales organization and a channel sales model. The direct sales teams are made up of a regional sales manager and a solution consultant. There are currently more than 30 of these direct teams spanning four continents, and the company is in a state of constant growth. The channel sales model is made up of a team of partner business managers who support Virtual Instruments' growing number of resale partners.

Virtual Instruments also partners with original equipment manufacturers, independent software providers, value added resellers and consultancies, using these channels primarily for fulfillment. These partnerships enable the company to offer a stronger "local geo" coverage model. The company's Global Alliance Partners include CISCO, EMC, HP, IBM, Microsoft, NetApp, VCE, VMware and PANDUIT. Reseller partners include ByteLife, World Wide Technology, Datalink, IRONBOW, ViON, Sirius, Mainline Information Systems, OnX, Presidio and Trace3 to name just a few. OEM partners include EMC, HP, IBM and Hitachi Data Systems.

What Customers Are Saying
Virtual Instruments' website is rich with customer case studies and testimonials. (Scroll to the bottom of the page for a customer listing by industry.)

As for case studies, some of the prime examples of how customers are using Virtual Instruments solutions to improve infrastructure efficiency include T-Mobile, Unilever and Sprint:

- *T-Mobile* – T-Mobile faced performance issues with a particular financial application, and these issues had a high impact on the business. A multi-vendor support team had been deployed to troubleshoot this problem and was unsuccessful. Virtual Instruments SOS services were deployed to identify the root cause of the problem (within hours), and overall systems performance was improved. Based on these results and the associated efficiency gains, VirtualWisdom was deployed permanently and $2 million in ROI was recognized in the first year of operation.

- *Unilever* – Unilever needed to consolidate four regional SAP instances into a single global instance. The company also desired to build a massively heterogeneous, fully virtualized infrastructure environment. Virtual Instruments infrastructure performance management products were used to validate and optimize this infrastructure, and to support the company's new service level expectations. TCO was lowered; the migration to the new single instance environment had zero business impact; the company has reported no severity 1 incidents in more than three years; and the business now has sub-3ms infrastructure performance levels.

- *Sprint* – Sprint needed to realize the full benefits of its roll-out of a fabric-based storage virtualization environment using IBM's SAN Volume Controller in a multi-vendor environment. The company desired to leverage real-time sub-second granularity and input/output protocol visibility to measure end-to-end performance of new technologies, and it desired to validate technology selection using this approach to measure performance improvements. The Virtual Instruments solution enables Sprint to double overall system performance at 40 percent lower cost.

Summary Observations

Surveys show that enterprise executive managers are very concerned that their information systems infrastructures are not well prepared to accommodate the growth of new workloads – particularly new Big Data analytics, mobile and cloud workloads. Further, these executives also worry about service levels, including performance, availability and security. Enterprises are willing to spend money to add capacity and to bring their infrastructures up to snuff, but they expect their infrastructures to become more reliable and more efficient than ever before.

To date, enterprises have invested in a wide variety of tools and utilities to attack the problem of complex infrastructure management. There are tools to manage networks and switches; tools to manage storage and system virtualization; tools to manage application performance and more. But perhaps it's time to take a more holistic view of infrastructure and manage it as a whole rather than in silos.

Virtual Instruments offers a comprehensive infrastructure performance management environment designed to simplify systems, storage and network management. Its approach is inclusive – not siloed. The interface to the company's management environment is "entity centric," combining elements such as systems, storage and networks with workloads to paint a comprehensive picture of what's taking place at the infrastructure level. An intelligent topology view helps sort out device interrelationships; analytics tools automatically seek for trouble spots; reporting tools interpret analytics results in graphical form, making it easier for humans to understand complexities and nuances. This environment makes information systems perform self-analysis using system resources rather than human resources to perform much of the complex analytics work.

What we especially like about Virtual Instruments' infrastructure performance management solution is the use of hardware appliances to offload systems from having to burn precious cycles gathering monitoring information. Using a specialized management appliance linked with specialized hardware and/or software solutions at the systems, storage and network levels, Virtual Instruments has created a separate monitoring environment that has a very low impact on system operation and latency. *We've not seen anything else like this to date, and we expect that this innovative approach will become a design standard in the future.*

> *The bottom line when considering Virtual Instruments infrastructure performance management solutions is this: if your company is looking to get its infrastructure under control – and is looking to improve overall infrastructure efficiency – then a comprehensive, granular infrastructure performance management environment is called for. Virtual Instruments offers one such environment.*

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