WHITE PAPER

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Net Optics Phantom Virtual Tap Delivers Best-Practice Network Monitoring For Virtualized Server Environs

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Event

On February 14, 2011, Net Optics introduced a new product that provides network-layer visibility into virtualized server environments for security, compliance and performance monitoring. The Phantom Virtual Tap™ integrates with the hypervisor kernel to provide monitoring and management products with a full/copy of all traffic occurring within the virtualized host, between guest virtual machines. This represents a new approach for providing the type of visibility required for optimizing resource utilization, troubleshooting performance issues and ensuring auditability.

Context

Server virtualization has been one of the fastest growing and most disruptive IT innovations in the last decade, and only a small percentage of IT shops have yet to embrace this exciting new technology. The value is clear — more efficient use of x86 compute/server systems and more dflexinility to grow and meet the changing needs of the supported organization. However, as with any new technology, with great promise often comes new challenges, and server virtualization is no exception to that rule. In this case, one of the biggest problems that server virtualization creates is a loss of visibility into the interactions and traffic flow between guest Virtual Machines (VMs) on a common virtualized host. And a loss of visibility means a loss of control, because managers and operators are potentially blinded to performance, security and compliance issues.

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At the root of this challenge is the fact that within virtual server hosts exist virtual network elements that allow the VMs to communicate both with the hypervisor and the outside world as well as amongst themselves. There are two key elements here – a virtual switch (a.k.a. vSwitch) and virtual Network Interface Cards (vNICs). And since these are all implemented in software and exist only in active memory, new approaches are required for monitoring and troubleshooting the traffic that flows across them.

Many potential answers for restoring management visibility have been announced over the past few years – mostly in form of new packaging of traditional monitoring solutions. One option is collecting NetFlow from the vSwitches; however, this is a problem because current technology supports this only in experimental mode. Virtual switch providers outside of the hypervisor, such as the Cisco Nexus 1000V, will fill this gap more effectively, but adoption is still early and deployments are limited, and smaller server virtualization deployments may never require the horsepower this offers. Another group of options available today is re-packaged packet inspection technologies. These either act as a virtual tap by connecting to the vSwitch in promiscuous mode and exporting a copy of packet streams of interest out the server's physical NIC, or as a software probe sitting in a VM and (again) connecting to the vSwitch in promiscuous mode. These solutions are more effective, but create their own issues by forcing the vSwitch to operate in promiscuous mode, incurring a performance hit, losing essential troubleshooting data, and not efficiently multi-purposing packet streams for multiple management analyses.

One of the vendor groups largely left out of the mix thus far is the network-layer access solution providers, who deliver everything from basic network taps to sophisticated access matrix switches. These are typically layer 1 devices that provide the hardware connectivity so that other (often multiple) management tools can draw data from the managed environment. In the world of hypervisors and server virtualization, there is no hardware layer into which a traditional tap can be applied, and so access devices must become "virtual" software entities just as the network infrastructure itself has become virtualized.

Net Optics Phantom Virtual Tap – Applying Best Practices to Instrumenting Virtual Networks

Net Optics has long been one of the dominant providers of access-layer solutions to organizations of all sizes and geographies. Net Optics solutions are resold by many of the management product vendors who need such access options to deliver their own management value. Net Optics has been watching the growing need for a better visibility answer in virtualized server environments and has now introduced an innovative answer that applies the very best-practices approaches which are commonplace in the traditional, non-virtualized world. The new Net Optics Phantom Virtual Tap, comprised of Phantom Monitors (installed on each virtualized system) and a central Phantom Manager console (for administration and viewing activity) acts as a fully functional, software equivalent to a physical tap, specially adapted for the virtual network realm.

The Phantom Virtual Tap is unique at the present time, because unlike other approaches, it is integrated directly into the hypervisor kernel. This allows full access to the entire network stack, without the performance penalty of running the vSwitch in promiscuous mode. As such, it avoids the loss of important network-layer errors which are often cleaned before sharing in promiscuous mode and thus not visible to other monitoring approaches – errors that may hold the key when troubleshooting a difficult performance or interoperability issue. Finally, the Phantom Virtual Tap can share packet streams either with one or more co-resident guest VMs or with any number of external monitoring and management tools by means of direct connection and interaction with a NetOptics Director switch. This latter approach offers the opportunity to apply smart filters to packet streams so that only data of interest is sent to downstream management systems.

The Phantom Virtual Tap represents an innovative new option for restoring lost visibility.

The Phantom Virtual Tap was developed interactively with VMware. The initial release has been optimized to support ESX and ESXi v4.x environments, and is "VMsafe Certified." It works not only with internal VMware vSwitches, but also with the Cisco Systems Nexus 1000V soft switch. The solution supports high-availability configurations via deployment of multiple Phantom Monitors in each hypervisor, and can also tie into Net Optics' Indigo Pro platform for enterprise-wide management of access devices.

EMA Perspective

ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) analysts have been closely monitoring the rapid evolution and adoption of virtual server technologies, and have long believed that, over time, the rest of the operations team would catch up with it and apply (necessarily) best practices for management control. Only in this way will this new technology enjoy the same levels of quality assurance, security and compliance that have been carefully and laboriously constructed for the rest of the IT infrastructure.

The NetOptics Phantom Virtual Tap represents an innovative new option for restoring lost visibility into virtualized server infrastructure in a way that closely mirrors best practices for traditional monitoring. In EMA's opinion, this solution holds the best promise yet available for flexible and complete approaches to establishing rigorous and appropriate network management visibility and control over sprawling virtual server infrastructures. In short, the Phantom Virtual Tap provides big steps forward towards mainstreaming server virtualization.

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