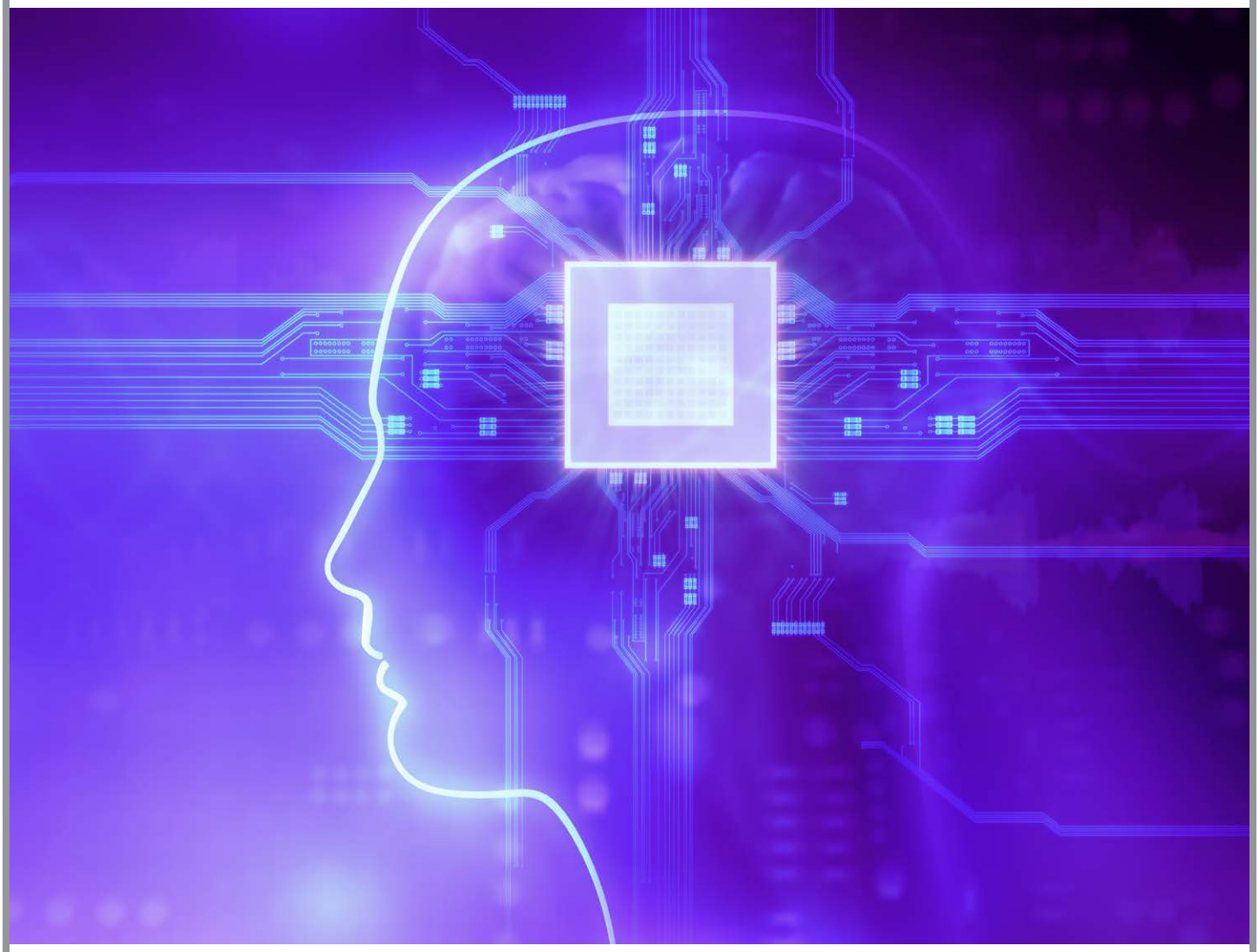
WHITE PAPER

Helping Enterprises Quickly Find Issues in Complex VMware Environments



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BRIDGEWAYS
The monitoring reporting & analytics company.

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Executive Summary

VMware-based computing environments can be extremely complex if we stop to consider the processing, memory, networking and storage utilization along with managing the workloads themselves. Add on to that complex environment, workloads themselves are typical built in layers that include operating systems, databases, networks, storage and virtualization technology for access, applications, processing, networking, and storage.

The suppliers of each layer of hardware and software making up these IT-based solutions offer tools that monitor, analyze and manage their own layer of the complex layer cake. Using these tools often requires deep levels of expertise in the narrow area these tools monitor. This often drives enterprises to adopt management tools that gather data across many layers of technology.

Large and medium size enterprises often organize their IT departments by type of technology, which leads to a challenging situation.

Large and medium size enterprises often organize their IT departments by type of technology, which leads to a challenging situation in which different groups are responsible for the installation, monitoring and management of each of the different layers of technology. Finding and resolving issues typically requires a team. Staff in each discipline may have neither the expertise in other types of technology nor training in monitoring and management tools required for layers outside of their direct control.

This can mean that IT administrative staff either don't have or isn't aware of the right tools to tame a complex virtualized execution environment. They also may not have the needed expertise with tools that are available.

It's important to understand that such tools exist. Providing IT administrators with tools, such as ones based upon Microsoft's own System Center Operations Manager (SCOM) can make it easily possible to monitor many layers of Microsoft's technology and present clear, concise, easy-to-understand information that can reduce the time required to find and resolve issues and prevent costly slowdowns and outages.

Today's Challenge

If we look around the industry today we see that industry standard, X86-based, systems are typically hosting a number of virtual environ-

ments rather than supporting a single function as was often seen in times past. This evolution has been supported by increasingly powerful microprocessors that offer many execution units on a single chip carrier, significantly increased system memory and storage capacities, and worldwide networks that actually perform faster than the internal buss speeds of mainframes of the 1970s.

What improvements are sought?

The industry moved in this direction in the hopes of creating an environment that had all of the attributes of mainframe systems without the restrictions or the costs. Enterprises wanted a computing environment that was agile enough to be able to deal with a rapidly changing workload and ever-changing business requirements.

This computing environment needed to be highly reliable, highly available and scale up and down as each workload goes through its lifecycle.

This computing environment needed to be highly reliable, highly available and scale up and down as each workload goes through its lifecycle. When it needs large amounts of processing, memory and storage, those resources should be made available. When it is not experiencing heavy levels of demands, the resources should be assigned to other tasks.

Workloads should happily co-exist on available systems without experiencing slowdowns, outages or interference from other workloads. This means that workloads that previously were assigned their own host system could now be just another task supported by a single, albeit larger, system.

What Virtualization Tools Make This Possible?

To make industry standard systems able to meet these objectives, virtualization technology is typically used as a foundation. Virtualization is a way to abstract applications and their underlying components away from the hardware supporting them and present a logical or virtual view of these resources.

This logical view may be strikingly different than the physical view. The goal usually is one of the following: higher levels of performance, scalability, reliability/availability, agility, or to create a unified security and management domain. This virtual view is constructed using excess

processing power, memory, storage, or network bandwidth. That is, the benefits of a virtualized environment don't come for free.

Virtualization can create the artificial view that many computers are a single computing resource or that a single system is really many individual computers. It can make a single large storage resource appear to be many smaller ones or make many smaller storage devices appear to be a single device. It can take a single network and divide it up into several application- or organization-specific networks.

The Kusnetzky Group Model of virtualization, as seen below, gives us a reference model of what's needed.

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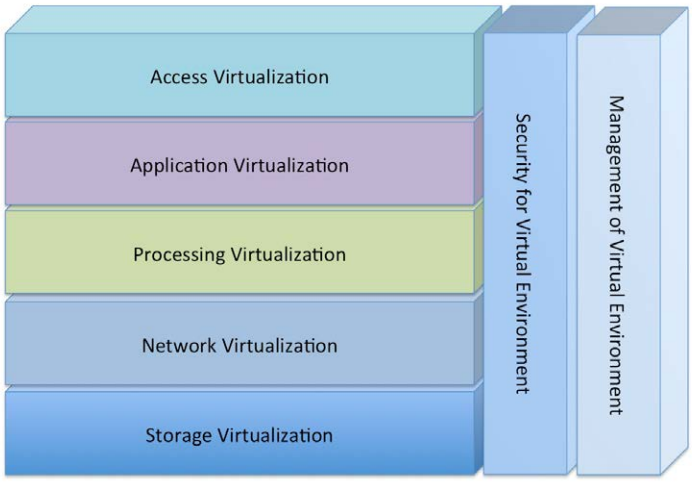
Kusnetzky Group Model of Virtualization



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VMware offers technology that offers the functions needed for each of the layers in this model.

Layers of Virtualization at Work

In order to understand how complex an industry standard computing environment has become, let's look at the many layers of technology that virtualize the necessary computing functions.

Access Virtualization

Application virtualization is hardware and software technology that allows

nearly any device to access any application without having to know too much about the other. The application sees a device it's used to working with. The device sees an application it knows how to display. In some cases, special purpose hardware is used on each side of the network connection to increase performance, allow many users to share a single client system or allow a single individual to see multiple displays.

VMware's Horizon and Horizon View fit into this category.

Application Virtualization

Application virtualization is a software technology allowing applications to run on many different operating systems and hardware platforms. This usually means that the application has been written to use an application framework. It also means that applications running on the same system that do not use this framework do not get the benefits of application virtualization.

Application virtualization is a software technology allowing applications to run on many different operating systems and hardware platforms.

More advanced forms of this technology offer the ability to restart an application in case of a failure, start another instance of an application if the application is not meeting service level objectives, or provide workload balancing among multiple instances of an application to archive high levels of scalability. Some really sophisticated approaches to application virtualization can do this magical feat without requiring that the application be re-architected or rewritten using some special application framework.

VMware suggests that organizations encapsulate applications into virtual clients or virtual servers rather than use this technology.

Processing Virtualization

Processing virtualization is a range of hardware and software technology that hides physical hardware configuration from system services, operating systems or applications. This type of Virtualization technology can make one system appear to be many or many systems appear to be a single computing resource to achieve goals ranging from raw performance, high levels of scalability, reliability/availability, agility or consolidation of multiple environments onto a single system.

VMware cut its teeth in this section of the virtualization market. Its Fusion, Fusion Pro, Workstation and Player Pro fit into this category for client systems. Its vSphere Hypervisor, ESX and Six are the server system tools VMware offers.

Network Virtualization

Network virtualization is hardware and software technology that presents a view of the network that differs from the physical view. So, a personal computer may be allowed to only "see" systems it is allowed to access. Another common use is making multiple network links appear to be a single link. This approach makes it possible for the link to present higher levels of performance and reliability.

VMware presents its NSX as its solution of choice for network virtualization.

Typically, security is provided by software technology that controls access to various elements in a virtual environment and prevents unauthorized or malicious use.

Storage Virtualization

Storage virtualization is hardware and software technology that hides where storage systems are and what type of device is actually storing applications and data. This technology also makes it possible for many systems to share the same storage devices without knowing that others are also accessing them. This technology also makes it possible to take a snapshot of a live system so that it can be backed up without hindering online or transactional applications.

VMware offers its Virtual SAN to address the needs of this category.

Security for Virtual Environments

Virtual environments need security! Typically, security is provided by software technology that controls access to various elements in a virtual environment and prevents unauthorized or malicious use.

VMware presents its NSX as the security solution.

Management for Virtual Environments

Virtual environments are complex and often use resources differently than when the same workloads are executed directly on a physical system. This means that effective management of virtual environments

often requires special software technology that makes it possible for multiple systems to be provisioned and managed as if they were a single computing resource.

VMware offers a number of tools to manage resources including venter, vSphere with Operations Management, the realize suite, and Air watch.

The use of virtualization offers benefits and challenges

As we can see from the previous section, many types of expertise are typically needed just to operate a virtual environment. Add on expertise in Windows, SQL Server, Development tools, networks, and storage and the list can seem overwhelming.

An issue with one resource can result in slowdowns or outages in another area.

Because of the many types of expertise needed, the many layers of software and, in all likelihood, many physical systems involved, it can be hard to figure out what's happening when things go wrong. An issue with one resource can result in slowdowns or outages in another area.

Let's look at an example which, in all likelihood, would require expertise from several IT administrative groups. Suppose a storage issue develops, say a RAID array has developed a bad storage volume and now the RAID technology has to reconstruct data to respond to requests. This could result in poor database performance. The poor database performance could cause application performance problems.

IT administrative staffs may not have a good idea on where to look for the cause and find themselves having to use many different tools to determine the root cause of the problem. Since many organizations have separate departments to monitor and manage operating systems, database products, networks, storage devices and the like, some staff may only know how to use tools that address *their* piece of the puzzle. Others may only know how to use tools to monitor and manage technology in *their own* area. In the end, a tool that makes it possible to get a comprehensive overview may be available but might not be generally known. If an IT administrator is either unaware of tool or doesn't know how to use it, it doesn't exist in his/her mind and won't be used to find and resolve problems.

Most enterprises have learned the painful lesson that a slow response to an outage can be costly. Customers may go elsewhere to purchase what they need. The productivity of staff members can drop dramatically. In the end, the company experiences increased costs and reduced revenues.

What would an ideal solution look like?

An ideal solution would offer comprehensive monitoring of a number of different resources including system resources such as processing, memory, storage, networking, and workload utilization. It would also have the ability to reach into the operating systems, applications, databases and other system services to learn their operational state.

This ideal tool would present information clearly and succinctly in ways that allow a generalist to get an overall view of the operations of the environment.

This ideal tool would present information clearly and succinctly in ways that allow a generalist to get an overall view of the operations of the environment and a specialist to quickly dive deep into a specific resource to learn how it is performance.

This ideal tool shouldn't impose a specific methodology either. It should provide ways for a generalist to start at the top and click down into specific resources. It should also make it possible for a specialist to start at the bottom with one resource and move back up to higher and higher-level aggregations to get an overview.

A very important requirement is that this ideal tool should fit into well known, trusted monitoring and management environments such as Microsoft's System Center Operations Manager (SCOM), and connections with tools offered by VMware.

The use of this ideal tool should sharply reduce time to detect a problem, isolate what's really happening and provide needed clues making a resolution straightforward.

Does an ideal solution really exist?

An important question faced by enterprise decision makers is whether such a tool really exists. In short, it does.

After all, VMware tools are great at monitoring its virtualization products that provide access, application and processing, storage, networking and security virtualization. Those tools don't provide all the needed access

into the Microsoft environment. They simply don't have the needed view into the internal operations of Windows, SQL Server, Exchange Server, SharePoint or other important parts of the Microsoft environment.

Microsoft's tools are great at monitoring Microsoft's own software. They can see deeply into the operations of Windows Desktop, Windows Server, SQL Server, Exchange Server, SharePoint and all of the other pieces of the Microsoft environment.

One approach to tie everything together would be a service pack that allows IT administrative staff to monitor VMware's environment that fits right into Microsoft's SCOM. Windows trained staff would then be able to use familiar tools and also be able to monitor what the VMware technology is doing.

One approach to tie everything together would be a service pack that allows IT administrative staff to monitor VMware's environment that fits right into Microsoft's SCOM.

A solution does exist

One supplier, BridgeWays, offers a family of tools that address the requirements of the ideal solution. The company offers SCOM management packs making it possible for IT administrative staff to monitor a number of other important computing environments including VMware, Oracle, IBM DB2, Red Hat JBoss, Apache, and others using an on-premise or off-premise approach.

Enterprises can install and manage SCOM on-premise and then install BridgeWays tools to reach into other important computing environments.

Enterprises can also let BridgeWays do the heavy lifting and use BridgeWays Tibanna Plus a cloud monitoring tool that uses SCOM in the backend to monitor.

On- or off-premise, BridgeWays offers tools to help IT administrative staff keep on top of complex computing environments.

Summary

If the enterprise is living in a VMware/Microsoft world, better tools are needed to monitor the entire computing environment. These tools should support on-premise systems managed locally or via a cloud service. These tools should also support off-premise systems managed locally or using a cloud service.

The tools must be easy to use for Windows-trained staff, provide a comprehensive view of what's happening and allow top-down or bottom up diagnostic styles.

BridgeWays SCOM plug-in or its Tibanna Plus cloud service offering fit the presented requirements for the ideal solution to the monitoring problem experienced by IT administrative staff. Enterprises experiencing this challenge would be wise to see a demonstration to evaluate the benefits they would receive. The next step should be visiting this URL to learn more. ■

Daniel Kusnetzky, a reformed software engineer and product manager, founded Kusnetzky Group LLC in 2006. He's literally written the book on virtualization and often comments on cloud computing, mobility and systems software. He has been a business unit manager at a hardware company and head of corporate marketing and strategy at a software company. In his spare time, he's also the managing partner of Lux Sonus LLC, an investment firm.

BridgeWays SCOM plug-in or its Tibanna Plus cloud service offering fit the presented requirements for the ideal solution.

About BridgeWays Software

BridgeWays Software is an innovative software company that provides Operations Risk Management solutions for business large or small. Our products include Software-as-a-Service (SaaS)/Cloud-based monitoring solutions as well as Microsoft System Center Operations Manager Management Packs for VMware, Oracle Database & RAC, InterSystems Caché, MySQL, IBM DB2, Apache HTTP, Apache Tomcat, WebLogic, WebSphere and Java Attributes. We are the leader in extending System Center Operations Manager to third-party systems and applications and a founding member of the System Center Alliance. We are a Microsoft Gold Certified Partner. BridgeWays is an American company, headquartered in Connecticut with offices around the globe.

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