SearchServerVirtualization.com E-Guide

Expert Tips for Virtual Infrastructure Management and Performance

As administrators expand their virtualization deployments, they typically encounter obstacles in terms of performance and management. In this expert E-Guide, brought to you by SearchServerVirtualization.com and VKernel, you will learn how to overcome the distinct challenges associated with virtual environments. Gain insight into the top 10 best practices for improving virtual machine performance, and explore a unique online virtualization community. Discover the ten essential virtual management tools, as well as what to consider when making a purchase decision.

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Expert Tips for Virtual Infrastructure Management and Performance

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Which virtualization management tools should you buy?

By Jeff Byrne, Contributor

A new class of management technologies has emerged to help administrators overcome challenges as they scale a growing virtualized infrastructure. Called virtual infrastructure management, lifecycle management, policy-based management and orchestration applications, these virtualization management tools go beyond the capabilities of hypervisor-based element managers to solve many of the problems associated with fast-growing virtualization environments. In this article, I look at the functionality of these tools to manage a virtualized infrastructure and offer a list of capabilities that you should consider when purchasing a virtual management product.

Virtualization management tools and their functionality

Core virtualization platform providers -- Citrix Systems, Microsoft and VMware -- provide hypervisor element management tools, and traditional system management vendors -- BMC Software, CA, Hewlett-Packard and IBM -- have begun to adapt their tool sets to manage virtualized infrastructure. In addition, the following vendors provide products that address virtual infrastructure management issues:

• **DynamicOps**. DynamicOps Virtual Resource Manager (VRM) automates the deployment and management of virtual infrastructure based on a set of pre-defined policies. VRM provides users with a self-service provisioning portal, powerful and customizable workflow, and an open architecture that enables VRM to integrate with other major enterprise systems and manage heterogeneous virtualized environments. The product can also manage virtual servers and desktops. Originally part of banking giant Credit Suisse VRM became a separate company, so it has strong operational roots, and for several years it has been used in production.

• **Embotics**. Embotics V-Commander is a policy-based VM lifecycle management system that provides IT managers with enterprise-wide insight into and control over a virtual infrastructure. V-Commander allows organizations to prevent virtual machine (VM) sprawl by tracking and controlling a VM throughout its lifecycle as well as automating critical management and monitoring tasks. The agent-free architecture enables the integration of V-Commander with major data center management systems and virtualization management environments. Founded in 2006, the company has taken advantage of its five years of prior R&D investment in its current product.

• **Fortisphere**. Fortisphere Virtual Essentials is yet another policy-based virtualization management technology that provides visibility into and control of the inventory, configuration and lifecycle management of virtual machines. Organizations use Virtual Essentials to automate the process of identifying, tagging, tracking and reporting on all VMs as they move from development into production and to enforce operational and IT security policies through built-in best practices.

• **Hyper9**. Hyper9 is a search-based software platform for managing virtual environments. Hyper9 leverages a Googlelike search engine to access real-time and historical data on components from the guest operating system to the physical infrastructure. It then presents the data with a next-generation user interface. As a result, Hyper9 supports rapid troubleshooting, comprehensive monitoring, and detailed reporting on performance, configuration and utilization of virtual environments.

• **ManageIQ**. The ManageIQ Enterprise Virtualization Management (EVM) suite of products provides comprehensive management of virtual assets. EVM provides insight into VMs, including detailed configuration information; captures interdependencies of virtual components; enforces controls over VM execution and operations; and easily integrates with major management systems and processes. The suite also provides real-time, policy-based management security and compliance controls over VMs.

• **Vizioncore.** vControl is a VM management solution that provides self-service provisioning, multi-VM control and task-based automation. vControl lets VM consumers build and deploy VMs for themselves, while providing administrators a single interface for task-based VM administration. Furthermore, vControl allows organizations to automate manual and repetitive tasks through self-service provisioning, multi-VM control and task-based automation. vControl is a component of Vizioncore's broad VM management suite, which includes vConverter (P2V/V2V), vRanger and vReplicator (backup and replication), and vFoglight and vOptimizer (monitoring and storage optimization).

• **VKernel**. VKernel Capacity Analyzer enables VMware users to achieve optimal virtual server performance on an ongoing basis by ensuring that each VM is allocated the right amount of underlying resources. The product proactively monitors shared cpu, memory, network and storage utilization trends across hosts, clusters and resource pools, enabling administrators to anticipate where potential resource imbalances might lead to future performance problems and prevent these issues from happening. With VKernel Capacity Analyzer, users can get more out of their existing VMware infrastructures and safely increase the number of VMs they are running per physical server, thereby reducing the cost per VM in an ESX environment.

Virtualization management product selection considerations

When evaluating virtual infrastructure management technologies, users should consider products with the following capabilities:

• A high level of scalability. In enterprise shops, the number of virtualized servers has grown rapidly, and as organizations begin to virtualize large numbers of desktops,the need for robust and scalable virtual management capabilities becomes even greater. So the technology you purchase should be able to manage multiple hypervisors and scale hundreds of physical servers, thousands of desktops and dozens of virtualization management instances.

• Open and extendable architecture. Given the growing diversity of virtualization products on the market, a virtualization management tool must provide support for multiple vendors and technologies. This includes major hypervisors, connection brokers, OSes and application deployment offerings. The product must have interfaces that allow easy integration into customers' existing management ecosystems, and should provide a common interface and set of processes for managing physical and virtual infrastructure. The product should also include open interfaces for integrating with major enterprise software systems, such as configuration management databases (CMDBs) and other IT management packages.

• Powerful, flexible workflow. The virtualization management offering must be policy driven and provide workflows that can be extended and customized to fit an end user's needs. The workflow engine should be able to automate the execution of manual, repetitive tasks that are required to provision and manage a virtual infrastructure.

• Ease of use and administration. The management technology should provide users with a self-service portal to provision and manage their own virtual servers and provide administrators with a visual dashboard and array of reporting capabilities. The tool should also offer a set of pre-defined, out-of-the-box templates and workflows.

What will the future bring?

Looking ahead, the Taneja Group believes that the next generation of virtualized infrastructure management technologies will enable users to increase IT productivity further by spanning physical and virtual infrastructures while enabling the management of all IT resources (see Figure 1). Resources include servers, memory, networks and storage -- from a single, unified interface.

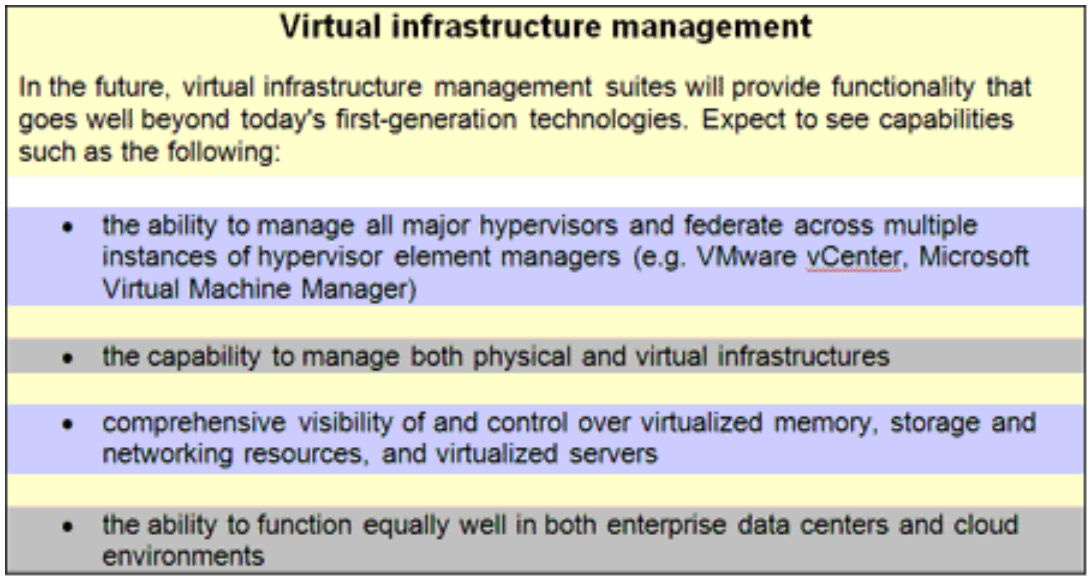

Figure 1: The future of virtual infrastructure management

Fortunately, virtual server administrators don't have to wait for relief from issues that can severely hamper a virtual infrastructure such as sprawl, manual provisioning and administrative complexity. This new generation of automated technologies we have outlined can bring immediate relief to embattled administrators working with VMware infrastructure and other server virtualization environments.

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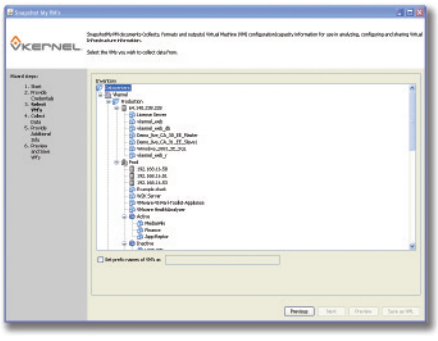

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The 10 best virtual infrastructure management tools

By Rick Vanover, Contributor

In any field, doing a job well requires the right tools. Luckily for VMware Infrastructure 3 (VI3) administrators, there are plenty of solid virtualization infrastructure management tools available to monitor and troubleshoot virtual machine (VM) performance problems, identify network components, migrate files, manage virtual machine lifecycles and more.

In this article, I list the top 10 tools on the market help virtualization administrators ease the burdens of management and monitoring tasks in their daily lives.

The 10 best virtualization management tools

• **VKernel SearchMyVM.**VKernel offers SearchMyVM, a free virtual appliance that allows administrators to obtain information on almost any components ofaVI3 environment. Its most impressive function allows you to see which virtual machines (VMs) have snapshots enabled and which VMs have VMware Tools installed or have CD-ROMs attached to an .ISO file. In addition, SearchMyVM's Web-based interface is user friendly and has a query builder that you can use to create criteria based on your needs for such things as wildcards and greater-than or less-than operations.

• **Veeam FastSCP with Veeam Backup**.Veeam FastSCP enables administrators to move files to and from a Windows client to an ESX host, a vCenter Server or a Linux host through a native interface. When browsing vCenter Server with FastSCP, all hosts are enumerated in their cluster and data center configuration to create a transparent interface for exchanging files. Note that ESXi hosts cannot exchange files with FastSCP version 2.x but can do so with version 3.

• **Akorri BalancePoint.** In managing virtualized environments, one challenge is the frequent disconnections that occur between virtual hosts, storage systems, networks and applications. Akorri's BalancePoint monitors all these critical components with the agentless ScanPoint software. The data is collected and displayed in a report that indicates the source of performance problems. BalancePoint also offers the GuidePoint application, which makes recommendations based on the monitored data and modeling of the workload across the various components of a virtual infrastructure.

• **Embotics V-Commander.** Managing the lifecycle of a VM is challenging, but Embotics V-Commander has a smooth, Web-based interface that allows administrators to manage a VM's expiration date, cost center, approval status, Active Directory integration, reporting and other management elements of a VMware-based virtual environment. V-Commander follows the activity of vCenter Server for each VM component in real time. Resource pools, clusters, hosts and data centers are also displayed in V-Commander to provide a solid lifecycle management option in several critical areas. Beyond V-Commander, Embotics offers V-Scout, a free lifecycle management application.

• **Reflex Systems Virtual Management Center.** In VI3 environments, it's difficult to get detailed accountability of the network presence of virtual machines. Reflex Systems Virtual Management Center

monitors the current virtual switch of an ESX host and features granular controls, advanced reporting, visual representations and virtual switch port awareness. Reflex Systems Virtual Management Center is also available for Citrix XenServer 4.x and XenCenter environments.

• **FastScale Composer with Virtual Manager.** FastScale's approach to system provisioning is unique because it deduplicates common operating system components. By removing these components from a virtual environment's footprint and consolidating them into a back-end resource, the virtual environment can consolidate itself at a greater ratio and use storage more efficiently by requiring only the specific binaries and configuration elements of a virtual machine. Virtual Manager allows administrators to use systems with a high degree of efficiency that, in some cases, exceeds traditional virtualization standards.

• **LeftHand Networks Virtual SAN Appliance.** LeftHand Networks' Virtual SAN takes the storage assigned to ESX hosts and pools it to create an iSCSI storage area network (SAN) that can be accessed by ESX hosts. But this product goes a step further because it offers LeftHand's network RAID protection for storage. With network RAID, a collection of drives on one host are treated as a "drive" of a RAID set in a traditional array, meaning that losing one host effectively uses the parity on the other local arrays. The Virtual SAN product can serve as a buffer space for migrations or a means to put that local hard drive space to use.

• **Ultimate Deployment Appliance.** The Ultimate Deployment Appliance can aid the VM and physical machine construction process. Coupled with the ESX Deployment Appliance, this tool allows systems, including ESX host systems, to perform a boot from a Preboot Execution Environment (PXE) and pull down an OS installation. This is usually done via the product installation in an ISO file being configured for use in the appliance. ESX host systems can be configured to specify IP address, server name and other configuration items.

• **Vizioncore vEssentials.**This listing isn't entirely fair, because vEssentials is not a single tool but three popular tools bundled together. VRangerPro, vReplicator and vFoglight work together to provide a feature-rich management option for the VI3 administrator. VRangerPro provides a vCenter Server-integrated backup agent to protect virtual machines on the fly, vReplicator provides VM replication to other ESX servers for essential VMs across different networks and storage systems, and vFoglight provides comprehensive performance monitoring and VI3 environment reports and alerts. All the vEssentials components are agentless to the guest VM.

• **Storage VMotion plug-in**.The Storage VMotion plug-in created by virtualization expert Andrew Kutz enables administrators to move VM storage from one Virtual Machine File System (or VMFS) volume to another. The plug-in begins to function when the application programming interface calls to the vCenter Server to execute a Storage VMotion task. While you still have the option of running the svmotion-interactive command or making a script to move several of VMs, this plug-in makes Storage VMotion easy and intuitive.

Improving VMware ESX Server performance: 10 best practices

By David Davis, Contributor

When you decided to virtualize, you never agreed to sacrifice performance. But VMware virtual machine performance in particular can be sluggish if you don't observe some basic best practices. Without further ado, here are 10 ways to ensure that your virtualized infrastructure performs at its best.

1. Make sure your hardware satisfies the hardware compatibility requirements

Prior to purchasing hardware to be used for VMware virtualization, you need to make sure that that hardware will meet the VMware ESX Server hardware compatibility requirements. Keep in mind that this applies to the server, the NIC cards and Fibre Channel cards, as well as the internal or external storage that will be used.

If you already have hardware, you will want to check it against the Hardware Compatibility List (HCL) prior to installing ESX Server. I know this may seem obvious to most administrators, but you'd be surprised how many times people have contacted me with non-working ESX Servers, only to find out that the underlying hardware wasn't supported.

Also, just because your non-HCL listed hardware seems to work with VMware ESX doesn't mean that it is going to work and perform well over the long term.

Here are a few quick links to the various VMware Hardware Compatibility lists:

- HCL: I/O Compatibility Guide For ESX Server 3.5 and ESX Server 3i
- HCL: Storage / SAN Compatibility Guide For ESX Server 3.5 and ESX Server 3i
- HCL: Backup Software Compatibility For ESX Server 3.5 and ESX Server 3i

2. Know your hardware; ensure correct sizing

There are a lot of unknowns when trying to work with a virtual network that you personally did not configure. How many CPUs are there? Are they 32-bit or 64-bit? How much RAM is available?

In a small virtual data center, the VMware Infrastructure Client (VI Client) can give you the basics on each VMware ESX Server. On the other hand, in a large virtual data center, getting to know the hardware could mean examining data from hundreds of servers.

Either way, you might want to consider looking at a tool like Veeam Reporter which can give you a professional report of all of your hardware, its detailed specifications, and information on all of the virtual machines running on that hardware, including their specifications.

Finally, make sure that your hardware is sized properly for the virtual machines and the applications on those virtual machines. The VI client is very good at pinpointing performance issues, such as why one VM is using 2.5 GB of RAM when all the others use 350 MB. A nice new tool that is used to find performance bottlenecks (even predict them) is the VKernel Capacity Bottleneck Analyzer.

3. Know your virtual guest operating systems and applications

If you understand how much hardware your applications in each virtual guest need, you'll be able to size you hardware properly. When you configure the amount of RAM, the number of CPUs, and the disk space for each virtual guest, you're also configuring those variables for the applications running on the virtual guest. The more you can do to understand the specific applications, the more successful you will be at sizing the virtual guest servers and the VMware physical hardware.

4. Benchmark your server hardware and use a performance monitor utility

Using a benchmarking tool will help you understand which host system, storage system, and/or virtual guest configuration is the best for your application. Unfortunately, traditional benchmarking utilities don't understand virtualization.

VMware's VMmark virtualization benchmarking tool is free. It can help you get the best performance when testing out new hardware and configuration changes. Additionally, you should use a performance monitoring utility that understands your virtualized environment. To start, I recommend looking at Vizioncore's vCharter Pro and the VKernel Capacity Bottleneck Analyzer.

5. Enable VMware DRS

VMware's Distributed Resource Scheduler (DRS) is a nice piece of software because it reads information about your virtual guest operating systems, the resources in use, and the resources available. It then makes the best decision as to which virtual guest needs to be on which VMware ESX Server. It doesn't work, however, unless you configure it. Enable DRS.

6. Follow VMware best practices

VMware offers a number of documents detailing best practices for performance. I encourage you to read them and follow them, so long as they fit your hardware and applications requirements. VMware offers specific documents on VI3 performance enhancements, networking performance, best practices for the VMware VMFS, aligning VMFS partitions, how to use VMmark, and resource management with DRS.

7. Keep VMware Tools up to date

Each virtual guest needs to be performing as well as possible to ensure that you're getting the most performance out of your entire virtual infrastructure. To make sure each virtual guest has the most efficient drivers, you need to make sure that the guest VMs' VMware Tools are always up to date. Fortunately, this isn't too difficult using the VI Client. Simply select Upgrade Tools on a guest (however, this does require a reboot).

Additionally, remove unneeded virtual hardware from the guests. Why have a floppy drive on every guest if it isn't needed? There's no reason to allocate 1 GB of RAM to a guest VM that only uses 256 MB..

8. Beware of virtual machine sprawl

When the number of virtual guests seems to grow quickly without proper analysis or planning, you are experiencing VM sprawl. This happens because it's very easy to create VMs. For optimal performance, you should only have as many guests as is necessary. By controlling VM sprawl, you can prevent unneeded guests that drain your performance.

9. Keep patches up to date

Make sure that you keep your VMware ESXi and ESX 3.5 patches up to date. There are always new updates coming out for these virtualization platforms and there are cases where performance draining bugs are resolved. Fortunately, this has become easier with the new VMware Update Manager.

10. Scan blogs for the latest performance tips

There is new information coming out every day concerning how to best tweak the performance of your virtual infrastructure. I encourage you to subscribe to blog RSS feeds and to newsletters from both SearchServerVirtualization.com and SearchVMware.com, and subscribe to VMware VROOM!, a blog about performance run by VMware.

How do your virtual machines compare with your peers'? Find out

By Bridget Botelho

A small virtual appliance company in Portsmouth, N.H. called vKernel first grabbed my attention last year with its virtualization management software, and they have it again with a new online virtualization community called Compare My VM.

The site gives users a way to annonymously compare their virtual machine (VM) configurations, by application category, with peers to see how others are allocating resources, and hopefully, take something useful back to your own environment.

vKernel's Founder and CEO, Alex Bakman, came up with the CompareMyVM idea to help the IT community learn from each other about allocating resources for specific application VMs.

"How to properly allocate resources in a virtual environment is still a trial and error process. Simply using the same allocations of a physical server when virtualizing it can quickly lead to resource capacity issues caused by either over or under allocations," said vKernel's communications director, Christian Simko. "Ultimately, users can come to the site to learn how to 'right size' VMs so that they can drive higher VM densities without impacting performance."

By setting Compare My VM up as a community site, visitors are more apt to share with and learn from their peers, than to have a product vendor tell users how and what to do, Simko explained.

So far, Compare My VM has around 300 submissions. Users typically enter their VM info either because they think their VM set up is da bomb, or because they need some help, which is why vKernel added a peer to peer ranking system on the site, Simko said.

"One person may think their set up for an MS SQL VM supporting X number of users is allocated just perfectly," but it might not be so hot when viewed outside the four wall of that users data center. "We give others a chance to rank what they think is the right way, much like how Blog sites give others the ability to rank stories," Simko said. As is vKernel's style, the site is designed so that it is simple to navigate and submit information to, allowing users to find similar profiles and compare them.

"It is a tool to help admins learn, share, and improve," Simko said. "VKernel has only set up the framework of this site; we are not populating it or dictacting how people should be doing things. It's purely a community tool."

I encourage you to check out the free CompareMyVM.com site and anonymously compare your VM resource allocation profiles with that of your peers. You will either feel pretty good about what you are doing, or really bad - and in that case, you'll probably learn something.

Resources from VKernel

How to Resolve Capacity Bottlenecks and Ensure Great Performance in Your VMware ESX Environment

Virtual Machines Are Not Free

VKernel Capacity Analyzer

About VKernel

VKernel is dedicated to developing best-of-breed virtual appliances that enhance performance, lower costs, and simplify management of virtual environments of all sizes. The VKernel Virtual Appliance Suite for Systems Management is a set of 'plug-and-play' virtual appliances that quickly solve real world systems management challenges as organizations migrate to VMware virtual environments. Certified by VMware, VKernel Virtual Appliances enable IT groups to immediately solve today's critical pain points by providing visibility into the capacity and resource consumption of each virtual machine.