

Avocent White Paper

How to Get the Full Value of Virtualization

Virtualization technology offers cost savings through server consolidation and increased efficiency—but only if your IT staff can meet the management challenges it presents.

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Introduction

With its ability to enable IT groups to reduce the number of servers they need through consolidation, virtualization technology helps cut costs in not only hardware and software, but also power and physical space—all welcome attributes in a time when budget cuts are the order of the day. But as is so often the case in IT, virtualization technology burst on the scene well ahead of tools for effectively managing it, and now many companies are encountering vexing management challenges that threaten to derail the benefits.

Those challenges include the ability to get a consolidated view of all physical and virtual machines, as well as groups of servers that support a single application. That makes it difficult to determine how servers and applications are performing and to troubleshoot any errors—a particularly acute problem given that a single server may now support many applications. Additionally, in a virtual environment it can be difficult to control which administrators have access to which physical and virtual machines. That's especially true given the constant changes in a virtual environment, where new virtual machines can be created with a few mouse clicks.

While these challenges threaten to erode the many benefits that virtualization brings, solutions are coming to the fore. Avocent DSView® 3 management software, for example, provides a consolidated view of all events and alerts from both physical and virtual machines, whether they are located in the same data center or across the globe, and enables access for remote troubleshooting. DSView 3 software also provides control over access rights to physical and virtual machines, ensuring proper security and compliance even amid the constant changes in the environment.

The Virtualization Movement

There's little question that companies see the value in virtualization. In January 2009, the research firm Computer Economics, citing figures by its business partner Metrics Based Assessments LLC, reported that 95 percent of data centers are deploying some level of server virtualization, with the rate of virtualization increasing year by year. From 2006 to 2008, the growth rate varied from 14 percent for Windows® to 18 percent for UNIX® and 27 percent for Linux®, Computer Economics says.¹

The benefits of virtualization include not only saving money on hardware and power but increasing efficiency and resiliency in IT. The savings come from the simple fact that virtualization technology means companies can consolidate their server farms, resulting in fewer physical servers shouldering the same application load. That reduces the server footprint in the data center, meaning organizations require less expensive data center real estate. And fewer servers means less power is required for both the servers themselves and the air conditioning required to keep them cool.

System Management Issues

- Need the same view for physical and virtual servers
- Accurate access rights to servers
- Physical server availability more critical

On top of cost savings, virtualization also enables IT to increase its effectiveness and efficiency. With the ability to “create” a new server with just a few mouse clicks, IT can more quickly respond to business demands for new computing resources. That is a boon not only for production applications but for development and test environments.

Virtualization Challenges

On the other hand, virtualization brings with it significant systems management challenges, most owing to the fact that the technology removes the traditional one-to-one relationship between an application and a server. Instead, each server may host multiple virtual machines, each capable of running its own operating system. That means a single server may be running multiple applications, making it all the more critical that the physical server doesn't go down. Similarly, a single application may span multiple virtual machines across numerous physical servers, depending on how much processing power the application needs and which server has processing power available. What's more, the server configuration can—and typically does—change frequently, as new applications come online or existing ones need more or less computing power.

A Limited View

Existing network and systems management tools simply weren't made with that kind of environment in mind. While lots of tools can provide a good picture of the health of your networked servers, they typically don't know about the individual virtual machines running on each server and whether each is functioning properly.

For that, you need to use tools specific to the virtual environment, such as VMware® vCenter Server (formerly VMware VirtualCenter). Even those tools have limitations, however. For example, no company will install one copy of vCenter Server and manage all their virtual machines with it. Instead, they will install multiple copies and manage based on location or role. The problem then becomes that vCenter Server can't provide a consolidated view of environments that span multiple vCenter Server instances; rather, each instance provides a picture only of those servers under its own purview. This can put the data center into a constant state of change with virtual machines being dynamically created and/or moved between physical servers.

Accurate Access Rights

Additionally, while virtual machine management tools may help in provisioning and monitoring virtual machines, they may not address another important capability: administering who has access rights to each server. The purpose of tools like vCenter Server is to help the infrastructure team manage the virtual infrastructure itself, not help the system administrators manage permissions, rights or apply authentication for the application specialists. The application specialists may only need access to one of the 10 virtual machines on a physical server but will be granted access to the complete physical server since it is the management gateway to the virtual machines. Giving an application specialist full access to a physical server means they will have access to all applications running on it.

To avoid such a situation, companies want to give application specialists access only to those applications they need to administer. This sometimes requires giving administrators the specific IP address or management URL of the machines on which their applications run. The problem is, in a dynamic virtual machine environment, applications

routinely move from one physical server to another, forcing constant updates to the lists of IP addresses and management URLs. In practice, it won't be long before an application specialist finds an IP address or URL they have been using no longer works.

They then have to seek another administrator to find the new address or URL, all of which adds complexity and wastes valuable time—while the business waits for its new or revised application.

One solution is to give administrators rights to the virtual machine management tool, such as vCenter Server, or the underlying virtual machine hypervisor, such as Citrix® XenServer™ or VMware ESX. But that means those administrators get admin rights to all virtual machines in the environment, even those they have no need to monitor or control. Such a strategy is at odds with the security principle of least access, giving employees access only to resources they need to do their jobs. Depending on the industry, it can also put the company at risk of running afoul of regulations and company policies that govern the protection of sensitive data. Even if compliance is not an issue, giving administrators access to resources they don't need is simply not good security policy and puts the company at increased risk from insider threats.

Ensuring Server Availability

In theory, virtualization should improve application availability, because the technology makes it simple to create a mirror image of a server on multiple, different physical machines. If one physical server breaks, another can quickly pick up the load based on business rules.

This can put the data center into a constant state of change with virtual machines being dynamically created and/or moved between physical servers. And with each physical server now hosting multiple applications (versus the traditional model of one application per server) it becomes even more critical that each physical server remain up and running. For example, companies must have tools to enable IT to access and repair a physical server—even when it is otherwise nonresponsive—such as BIOS-level access or the ability to force a reboot by power cycling the machine.

Avocent Offers an Answer

All of these challenges must be addressed for organizations to get the full value from virtualization. Avocent DSView 3 software can help do just that.

DSView 3 software works in heterogeneous environments, supporting operating systems such as Windows, UNIX and Linux, and virtualization software from Citrix and VMware. It complements existing management tools such as VMware vCenter Server by adding to the capabilities they provide to increase functionality while reducing complexity.

A Consolidated View

From a single console, DSView 3 software provides a consolidated view of both the physical and virtual machine environments. Users can set up the view in a way that reflects how the virtual infrastructure is used in their business, such as giving all administrators a view of the resources they manage. From the same screen, administrators can see events and alarms from both physical and virtual machines, with no need to toggle between multiple management applications to troubleshoot. Or, companies may want to map applications according to their business function. DSView 3 software

enables that kind of business-level view, no matter how many virtual or physical machines on which an application resides.

DSView 3 software also provides a consolidated view of a physical and virtual machine environment that spans multiple vCenters, supporting the concept of federation. That allows each vCenter Server instance to monitor and control some subset of the server infrastructure, such as by geographic region, while a central DSView 3 software console can provide a complete view across all regions. Of course, vCenter Server is not required for use with DSView 3 software, which can also provide access to stand-alone virtual hosts.

With this kind of consolidated view, companies no longer need separate personnel to manage their physical versus virtual infrastructure. That creates an even more compelling total cost of ownership equation for the virtual environment.

Accurate Access Rights

DSView 3 software also solves the issue of access rights by enabling a granular level of access control according to the company's existing policy or the user's area of responsibility. Users no longer need to keep track of IP addresses or management URLs—DSView 3 software will do it for them.

A Nod to the Market Leader

Avocent DSView 3 software supports multiple operating systems and virtualization platforms, including these capabilities for the market-leading VMware platform:

- Auto-discover vCenter Servers (formerly Virtual Centers), VMware ESX Servers and the virtual machines they support, including managing these virtual machines as “Target Devices.”
- Consistent synchronization and updating of the Target Device list as virtual machines are created, torn down or moved.
- Multiple ways to access virtual machines, including VMware Viewer and RDP and UNC protocols. You can also use the Virtual Infrastructure Client (VI Client) or Virtual Infrastructure Web Access component of the vCenter server associated with the ESX server that hosts the virtual machine you want to access.
- Granularly administer management rights for virtual machines in the same fashion as you do for other devices and to automatically replicate those permissions to the corresponding ESX server.
- The inclusion of events and alarms from vCenter servers and VMware ESX servers in the DSView 3 software event log for display and associated actions.
- The capture of all management operations performed on virtual machines in the DSView 3 software audit log.

Once an administrator is granted permission to access a certain virtual resource, DSView 3 software keeps track of where that resource resides, even as its location changes. When administrators look at the DSView 3 software console, they see only the resources to which they have admin rights. To access a particular resource, administrators simply click on it; DSView 3 software maps out the appropriate path. DSView 3 software also keeps a single log of all server management activity, another feature that will aid in compliance.

The software also supports various authentication services, including Active Directory®, LDAP, RADIUS, TACAS+ and RSA SecurID®, enabling IT to provide the proper level of security for each resource.

Accent on Availability

At the core of DSView 3 software is the ability to address the dynamic nature of the data center environment by remotely managing virtual or physical machine resources. Additionally, any creation, deletion or movement of a virtual machine is tracked by DSView 3 software and maintained in a log. In other words, DSView 3 software allows the infrastructure to be dynamic while keeping the access and security constant.

DSView 3 software gives administrators the ability to not only identify problem areas but also to repair them. If a server becomes unresponsive, DSView 3 software can provide a BIOS-level view or power cycle the unit. Such a capability is critical in a virtual machine environment where a single server may host a dozen or more applications.

DSView 3 software can also act as a remote console for various networked devices, provide access to embedded service processor management technology, manage Power Distribution Units (PDUs) or access rack-mounted and blade servers. It does this by working in concert with the Avocent ACS advanced console servers, Avocent KVM over IP switches, Avocent PDUs or other third-party devices.

FEATURE	BENEFIT
Consolidates view of physical and virtual machines	View servers the way administrators manage
Manages the virtual resource's location and access	Server view is transparently maintained regardless of virtual/physical location
Faster identification of server problems	Better equipment availability

Conclusion

There's no question that virtualization brings real value to most any organization. By enabling companies to consolidate the number of servers they own and operate, virtualization brings savings in both hardware and software costs as well as power, cooling and real estate. At the same time, virtualization can actually improve IT service delivery and availability, creating a more nimble IT group that can respond more quickly to business requirements.

But, those benefits will not come to pass unless IT can effectively manage its new virtual environments. That means presenting a single, consistent view of the environment, with the ability to remotely manage both physical and virtual machines, while ensuring administrators each have appropriate access rights—and nothing more.

Avocent DSView 3 software addresses those challenges head-on, adding to the list of data center management chores it has long been helping administrators to perform. In short, DSView 3 software gives IT the tools it needs to manage a virtual environment, so the business can get the full value that virtualization technology has to offer.

“Avocent is always one step ahead of the competition. As a result, SAP has stayed on the leading edge of infrastructure management, which has made us a better, stronger, more competitive company.”

James Armstrong

Senior Infrastructure and
Data Center Management
SAP

About Avocent Corporation

We believe IT complexity should never stand in the way of achieving a business goal.

Avocent is a leader in open, modular software and hardware solutions that rapidly enable our customers to better tackle the chaos of their information technology environments. Our innovations drive lower costs, lower risks and greater agility, enabling IT to meet more and more demanding service levels. It's no wonder that some of the world's leading brands depend on Avocent technology to simply manage their mission critical IT resources.

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