DEMYSTIFYING FIVE MYTHS OF VIRTUALIZATION MANAGEMENT

An eG Innovations Technical White Paper

www.eginnovations.com

Total Performance Visibility

Introduction

Over the past several years, virtualization has gained dominance in IT across most industries, allowing organizations to consolidate server resources, increase deployment responsiveness and reduce overall IT costs. Recently, Gartner reported that 75% of all x86 workloads are now virtualized. Further, the Wall Street Journal recently reported on a Protiviti survey which indicated that virtualization is one of the top priorities for IT decision makers, outstripping hardware upgrades and even security. Virtualization of servers and applications is clearly the driving paradigm for IT growth and management for the foreseeable future.

The Protiviti survey found that the drivers for increasing virtualization budgets are primarily scale and efficiency: "About 64% of respondents said their IT transformation projects are aimed at simplifying existing systems and reducing costs, while 55% noted enabling new functionality as a driving force."

While these budget-friendly attributes of server virtualization are widely accepted as fact, there is considerable confusion when it comes to the best way to approach management of virtualized IT resources for maximum availability and performance. After all, what good is saving money on hardware if you're not able to manage your critical business services after they are virtualized?

Here's the core of the problem. IT professionals feel challenged to manage their physical IT infrastructures as those environments increase in scale and complexity. But they are unsure about what they need to do for virtualized IT infrastructures.

As IT professionals assess the management challenges of virtualized IT infrastructures, some misconceptions, call them myths, have emerged about the task at hand. In this white paper, we discuss the five common myths of virtualization management. We highlight, why these are myths and replace them with five truths of virtualization management.

MYTH #1 Virtualization makes monitoring easier.

Virtualization reduces the number of physical servers in the infrastructure. So many believe that virtualization makes the infrastructure easier to monitor and manage.

While virtualization does reduce the number of physical servers, it does not necessarily simplify monitoring. This is because of three main reasons:

- Firstly, even though virtualization reduces the number of physical servers, there are still a number of VMs running on the physical servers that still need to be monitored. The guest operating systems and the applications running on the VMs also need to be monitored. The number of guest operating systems and applications remains the same before and after virtualization. So the total number of components that need to be monitored is not reduced as a result of virtualization.
- Secondly, the number of components to be monitored in a virtual infrastructure is more than those in a physical infrastructure. This is because virtualization adds an entirely new set

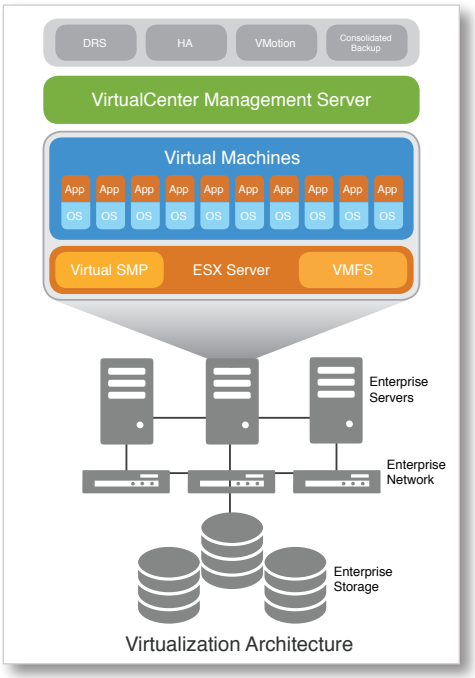


Figure 1: The number of elements to be monitored is more than that in a physical infrastructure

of components and functions that need to be managed. Firstly, there is the hypervisor which is the heart of the virtualization solution. Then here are datastores, which provide storage for data used by the VMs. Virtual switches offer connectivity between the VMs. VMs can be grouped into resource pools so resources can be allocated differently for different pools. To support high availability, physical machines are set up as clusters and VMs can be migrated depending on the load on the physical machines from one machine to another. Amonitoring solution for virtual infrastructures must monitor the hypervisors, the VMs, the datastores, the virtual switches, the resource pools and clusters.

- Thirdly, a failure in a virtual infrastructure has a much more catastrophic effect than in a physical infrastructure. In a virtual infrastructure, each virtualized server may have a number of virtual machines and applications. So if one server goes down, it will bring down a number of applications.

From a management standpoint, virtualizing an infrastructure is like putting a number of eggs into one basket!

PHYSICAL

VIRTUAL

TRUTH #1 Virtualization makes monitoring more complex, not less.

MYTH #2 Resource reservation can be used to ensure that one VM never interferes with the performance of another.

Although virtualization allows the resources of the physical machine to be shared across multiple virtual machines, it also introduces a substantial complication; namely, if one virtual machine has a runaway job, it can greatly impact the performance for other virtual machines on the same physical server. To avoid this problem, early implementations of virtualization used resource reservation, so the minimum amount of resources needed for a virtual machine are reserved in advance.

Most real-world implementations of virtualization do not use resource reservation. This is because statically reserving resources for a VM prevents all other VMs from using the reserved resources even when that VM is idle. This significantly reduces the resource-sharing benefits that virtualization offers. Consequently, in real-world implementations, static resource reservation is not common.

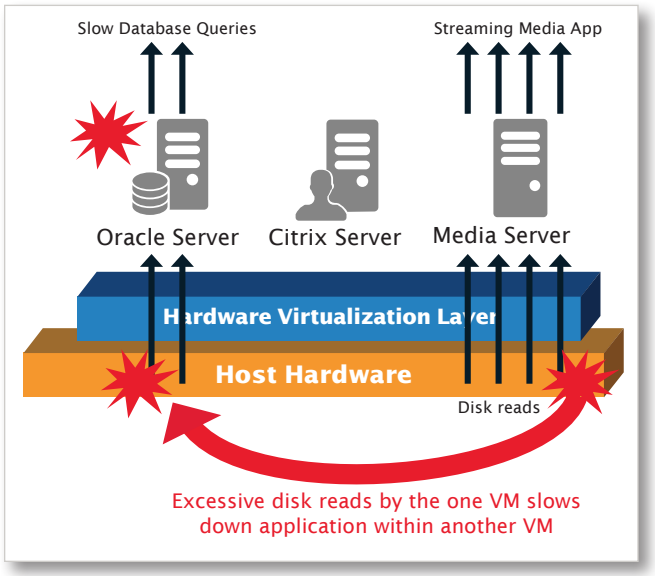


Figure 2: A sudden spurt of requests for videos hosted on a media server is causing the physical machine to choke, thereby impacting the performance of all the applications/VMs hosted on the physical machine.

When multiple VMs share the resources of the same physical server, it is possible that one of the VMs may experience a surge in requests that could impact the performance of other VMs hosted on the same physical server. In the example below, a media server and an Oracle database are hosted on the same physical machine. When a number of users access videos from the media server, the high load could choke the physical server, thereby slowing down all accesses to the Oracle database server as well. Thus, we can see that unlike in a physical infrastructure, virtualization introduces new forms of inter-dependencies that need to be taken into account when managing such infrastructures.

TRUTH #2

Resource reservation in a virtual infrastructure is not always possible nor is it an effective performance solution.

MYTH #3

Virtualization is just another infrastructure tier. It can be monitored and managed independent of other software and hardware tiers that support business services.

Enterprises tend to view virtualization as simply another infrastructure silo. The virtualization team manages the physical servers and their resources, and is responsible for provisioning the VMs on these servers. When a business team requires a server, the virtualization team provisions a VM and provides access to the business team. The business team is responsible for all the applications that are deployed within the VM. From the virtualization team's perspective, they only manage the resources provisioned for a VM but are not really responsible for what is happening within the VM.

This typical silo-based approach to monitoring leads to significant operational inefficiencies. Because VMs running on the same physical machine share the physical resources of the machine, a malfunctioning VM assigned to one business unit could impact the business service of another unit. To illustrate this better, consider the example below. Figure 3 shows the topology of a business service. In this example, the SQL database server is having a problem and as a result is impacting the web front-end (as seen by the orange color code; green indicates normalcy).

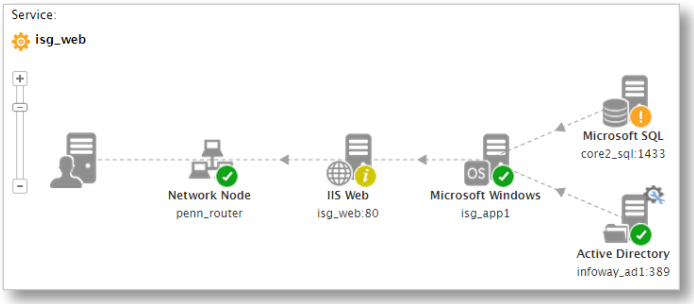


Figure 3: Topology of a business service showing the applications and devices involved in service delivery and the interdependencies between them.

Figure 4 shows that the SQL database is actually running in a VM that is hosted on a physical machine. This virtual topology highlights that the performance of the VMs is possibly being impacted by a critical issue with the physical machine.

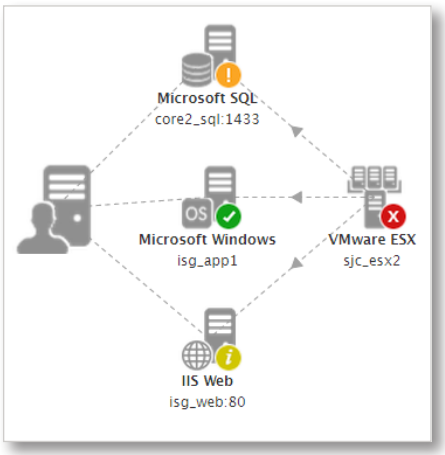


Figure 4: The virtual topology view showing the applications that are running on VMs hosted on the same physical machine

Figures 5 and 6 provide additional details, revealing that a CPU bottleneck on the physical machine caused by a backup job running on the service console VM is causing the SQL database to be slow.

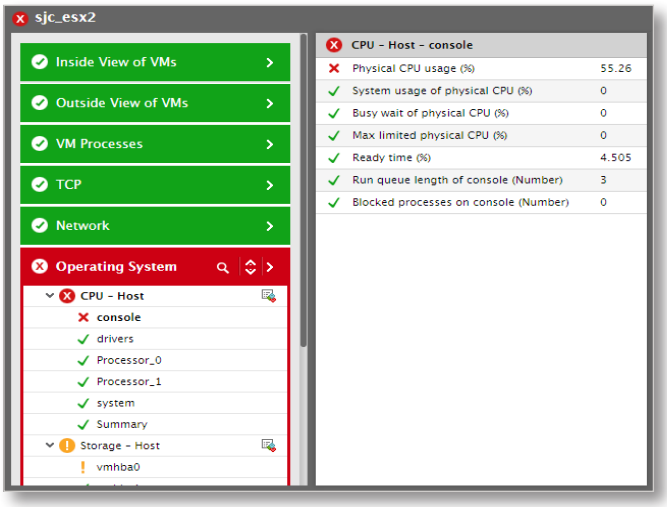
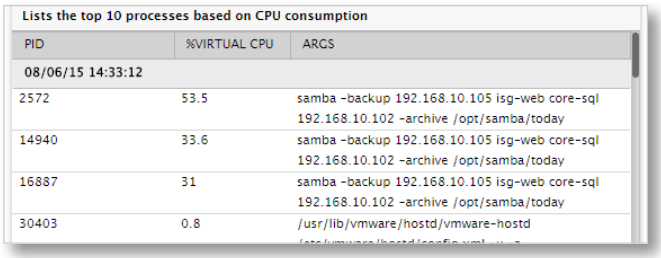


Figure 5: Details of the physical machine's performance. This figure shows that the service console is taking an unusually high 55% of the physical CPU

This example highlights the importance of always managing virtualization in the context of business services it supports. With only siloed views, the business team would have focused on how to resolve the SQL server performance problem, without being aware that the issue is actually the result of a backup job running in another VM. Seen in isolation, a backup job running on the service console is not an alarming occurrence, but the fact that the backup job is running during the day and is impacting the performance seen by all VMs on the physical machine is what makes the problem significant. If the VM administrator had information about the effect of the virtual infrastructure on the business service's performance, he/she could have taken preemptive action to resolve this issue before any impact occurred.



Lists the top 10 processes based on CPU consumption

PID	%VIRTUAL CPU	ARGS
08/06/15 14:33:12		
2572	53.5	samba -backup 192.168.10.105 isg-web core-sql 192.168.10.102 -archive /opt/samba/today
14940	33.6	samba -backup 192.168.10.105 isg-web core-sql 192.168.10.102 -archive /opt/samba/today
16887	31	samba -backup 192.168.10.105 isg-web core-sql 192.168.10.102 -archive /opt/samba/today
30403	0.8	/usr/lib/vmware/hostd/vmware-hostd

Figure 6: Detailed diagnosis reveals that a samba backup process is responsible for the CPU spike on the console OS

TRUTH #3 Virtualization monitoring must be integrated into business service monitoring in order to be effective.

MYTH #4 Virtualization platforms include all the tools needed to ensure that the platform is well tuned and operating as expected.

Virtualization platforms have only an "outside" view of a VM. This view reveals the portion of physical resources that each VM is consuming. What this outside view does not reveal is what is happening within a VM. For example, the outside view does not indicate whether a resource spike of a VM is being caused by a runaway process or whether it is being caused by user load on the VM. To be able to diagnose performance problems in a virtual infrastructure, it is essential to have an "inside" view of a VM that reveals exactly the portion of a VM's virtual resources that each application is using.

To understand the importance of the inside view of a VM, consider figures 7 and 8. Figure 7 shows that a specific user's VM is taking up a lot of CPU. This is the outside view.

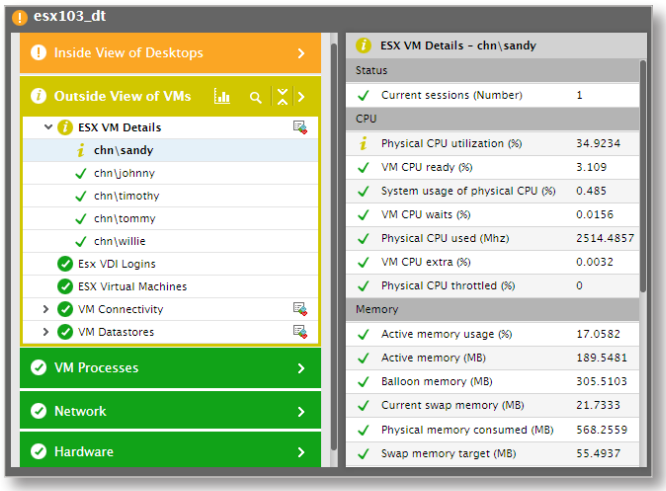
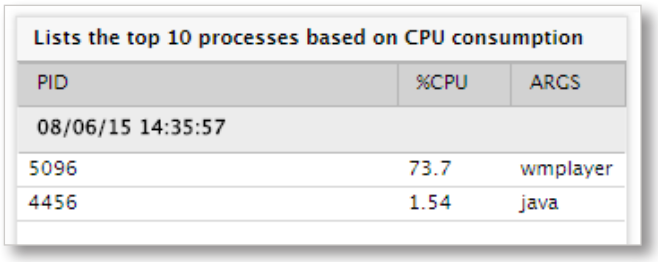


Figure 7: A specific user's VM (sandy's) is taking 35% of the physical CPU of a server



Lists the top 10 processes based on CPU consumption

PID	%CPU	ARGS
08/06/15 14:35:57		
5096	73.7	wmplayer
4456	1.54	java

Figure 8: The Windows Media Player application is responsible for the high CPU usage on sandy's VM

Figure 8 shows that the CPU has spiked on a virtual desktop specifically because the user is running Windows Media Player. Without an inside view into each VM, we cannot explain why CPU usage is high on one desktop but not another.

TRUTH #4 Virtualization platform metrics show only the "outside" view of each VM.

MYTH #5 Tools for monitoring virtual servers are sufficient for monitoring virtual desktops. After all virtual desktops are just VMs.

It is important to understand that the workload of a virtual desktop is dynamic and depends on the user who is logged in to that desktop. Therefore VDI monitoring needs to be based on user activity, not just VM activity. Also, the virtualization platform is only one of the many possible tiers in a VDI. End-to-end VDI monitoring requires monitoring all of the components supporting the VDI, including connection brokers, terminal servers, profile servers, license servers, and more.

And finally, while agent-based monitoring is reasonable for virtualized servers, an "agentless" method is more practical for seeing inside thousands of dynamically provisioned desktops. If you are deploying VDI, don't try to use an existing virtual server monitoring solution as is. Rather, look for a monitoring solution that is specialized to handle the unique characteristics of VDI.

TRUTH #5 A virtual desktop infrastructure is very different from a virtual server infrastructure. To monitor a virtual desktop infrastructure you need monitoring tools that understand the complexities of such infrastructures. Virtual server monitoring tools cannot just be reapplied for monitoring VDI.

Five Truths of Virtualization Management

1. Virtualization makes monitoring more challenging.
2. VMs can and will interfere with each other if the infrastructure is not carefully planned and monitored.
3. Virtualization must be monitored in the context of the business services it supports in order to be effective.
4. Management tools included with virtualization platforms must be complemented with tools that look inside the VMs to understand why resources are being used.
5. VDI monitoring is more complex than virtual server monitoring and has different requirements.

Now that you know the truth about virtualization, you need a performance management solution that matches reality.

eG Enterprise: The Complete Solution for Virtualization Performance Management

eG Enterprise is the only solution to provide a 360° view of a virtualized server and its VMs. Instead of monitoring virtualization as another infrastructure silo, it analyzes virtualization performance in the context of the business services that it supports. Administrators can proactively discover issues, diagnose and fix them quickly, and keep users happy.

Its key features include:

- In-N-Out monitoring providing 360° visibility into hypervisor and virtual machine performance (from the outside and inside)
- Broad virtualization platform support in the industry (10+ virtual platforms)
- Single click diagnosis using a truly virtualization-aware root-cause diagnosis technology
- Comprehensive reporting for diagnosis, optimization, right-sizing and capacity planning

Virtualization Management as an Integral Part of IT Service Management

Instead of monitoring virtualization as an independent infrastructure silo, eG Enterprise analyzes and automatically correlates virtualization performance with that of the other tiers supporting an IT service.

eG Enterprise auto-discovers inter-application, application to VM, and VM to physical machine dependencies and uses this mapping for prioritizing alerts. This unique approach delivers deep, actionable insights into the true causes of IT service performance issues, and enables administrators to pre-emptively detect, diagnose and fix issues before end users notice.

Unparalleled Virtualization Platform Support

eG Enterprise offers the broadest coverage for monitoring virtualization platforms in the industry. Whether you are running a VMware, Microsoft, Citrix, Red Hat, Oracle, or IBM virtualization platform, you can use eG Enterprise as a single pane of glass to monitor your entire virtual infrastructure. A common hierarchical, layer model representation of each virtualization platform makes it easy for administrators to manage a heterogeneous infrastructure from a common console.

Setting up the monitoring is a breeze. Licensed per server (not by cores or sockets) and with the ability to monitor the hypervisor, VMs and their operating systems with a single license, eG Enterprise offers great value for money.

The Industry's Only Virtualization-Aware Automatic Root-Cause Diagnosis Solution

eG Enterprise is the only automatic root-cause diagnosis solution for virtualized application infrastructures. Its patented correlation engine analyzes and correlates performance across every tier of the infrastructure and helps administrators identify the exact cause of performance issues - whether network, database, application, VMware, Storage, or other.

With eG Enterprise's virtualization-aware monitoring capabilities administrators and helpdesk staff can immediately arrive at a reality-based solution: Namely, the exact root-cause of an application performance problem across all layers and tiers, with just a single click.

About eG Innovations

eG Innovations is dedicated to helping businesses across the globe transform IT service delivery into a competitive advantage and a center for productivity, growth and profit. Many of the world's largest businesses use eG Enterprise Universal Insight and Correlative Intelligence technologies to enhance IT service performance, increase operational efficiency, ensure IT effectiveness and deliver on the ROI promise of transformational IT investments across physical, virtual and cloud environments.