

# SOLVING VIRTUALIZATION CHALLENGES WITH SCIENCELOGIC EM7

**Extending Virtualization Management  
Beyond VMware vCenter**

# EXECUTIVE SUMMARY

**Virtualization is revolutionary.** It is changing the way you provide IT resources to your users, and consequently it is changing the way you manage your IT infrastructure. In contrast with its impressive and well-known benefits, however, virtualization also introduces an entirely new set of management challenges. To ensure that virtualization is delivering on its potential, you must be able to master these challenges effectively, and you need the right tools to do it. While native tools offered by the virtualization technology vendors, like VMware vCenter, are critical to the management of your virtualization environment, they are not enough to manage your entire virtual infrastructure. A variety of point tools may be available to supplement the vendor virtualization tools, but navigating through an ad hoc collection of monitoring and management dashboards is not a practical approach. To totally conquer the challenges of virtualization management, you need a comprehensive management solution that provides a single pane of glass and single source of truth across all the components that impact the quality of service of the applications and services running in your virtual environment.



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## Leveraging the Benefits of Virtualization

Not long ago, in the purely physical environment, resources were substantially underutilized across most organizations. Virtualization changed all that by allowing several virtual machines to run on a single physical machine. With virtualization, multiple operating systems and applications can run concurrently on the same physical hardware without conflict—sharing resources as they need them, and significantly improving utilization.

The advantages of virtualization are clear—maximizing assets, improving application performance and availability, strengthening reliability and redundancy, and mitigating risk, all while reducing costs. According to VMware, virtualization increases utilization of existing hardware from 5-15% up to 80%, and reduces hardware requirements by a 10:1 ratio or better. Virtualization is also more efficient and flexible, and it enables a self-service delivery mode that streamlines and optimizes processes, and drives innovation in application development. There is no question that virtualization can be highly advantageous to your organization. But how do you manage your virtual environment effectively to realize these results?

VMware is the innovator that has made virtualization the powerful force it is today, and the company is positioned as the undisputed market leader in virtualization, with more than 170,000 customers, including 100% of the Fortune 100. Microsoft Hyper-V and Citrix Xen Server are the emerging challengers to VMware in the virtualization market. Each one of these vendors offers their own

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version of a virtualization management tool, but they only solve part of the problem. In this paper, we will focus on VMware management and specifically how ScienceLogic extends VMware vCenter management capabilities far beyond the virtual machine (VM) itself, but the challenges and solutions can also be applied to Microsoft and Citrix virtualization management.

## Virtualization Requires Smarter Management

The many advantages of virtualization also bring various management challenges that can negate the benefits of virtualization, if not handled correctly. The dynamic virtualization environment is more complex than traditional physical infrastructure, and this requires a whole new way of managing performance and availability of applications and services. To achieve success with virtualization requires smarter management of the infrastructure and more automated processes to support it—and smarter management starts with an intelligent management solution.

ScienceLogic EM7 is a comprehensive IT management solution designed for dynamic virtual infrastructure. Providing visibility across all the layers of your infrastructure, EM7 arms you with the knowledge you need to make decisions in real time, and also automates many management tasks to streamline the process.

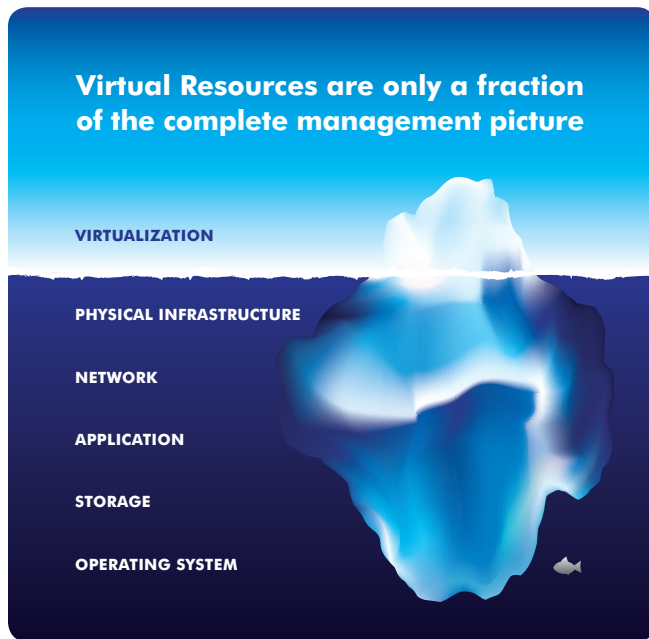
Smarter management requires agility, a key to managing the dynamic world of virtualization. Your virtualization initiative can only be successful if you have the agility to manage change at high speeds. Users expect to be able to spin VMs up or down as needed. But virtualization management can be a road block. If it takes too long to provision VMs, because the management process is not streamlined to handle the accelerated process, this will counteract the benefits of virtualization. Your virtualization environment must meet user expectations for speed and ease of use, or adoption rates will be low, and the virtualization initiative will fail within your organization.

Agility is enabled by automation. Virtualization is too complicated to manage without automation of many tasks that were previously handled manually. For example,

EM7 improves your agility and speed by automating the discovery of new VMs, eliminating the need for manual discovery. EM7 monitors every VM from the moment it is provisioned, allowing you to quickly determine which VMs are up and down, keep track of all the different guests and the applications running on the VMs, monitor their performance and even take corrective action automatically.

## Gaining a Holistic View of Operations

Virtualization management is about the big picture. To manage the virtual environment, you must focus on more than just the virtualization technology. You need a comprehensive view of your entire infrastructure—not just hypervisors and VMs, but everything that impacts availability and performance of the applications and services running on those hypervisors and VMs. Ultimately, it is the performance and availability of applications and services that matter, not the hypervisors and VMs themselves.



**Figure 1.** ScienceLogic EM7 provides a holistic view of all the components that impact application and service delivery in your virtual and physical environment.

While the native tools from the virtualization vendors keep excellent track of hypervisors and VMs, that is not enough coverage to manage the virtual environment. For example, VMware vCenter is critical for the provisioning process, but it was never designed to ensure performance and availability across the entire infrastructure. Trusting your performance management to this single native tool means bypassing many opportunities to enhance performance and ensure availability.

Supplementing vCenter with multiple point tools is not the answer either. It is not efficient to use one tool to monitor the application, another tool to monitor network performance, and yet another tool to see how the VM is performing. In this scenario, the information you need to make the right decisions—and the information the system needs to automate the right corrective actions—is spread across a variety of disparate tools. With multiple unconnected monitoring applications, there is no way to correlate this information and pinpoint the source of a performance problem. Looking at each individual infrastructure component takes too long, and is too complex a task, especially in the face of critical performance issues coming at you in real time. You need a tool that can channel all this information into a single pane of glass.

ScienceLogic EM7 provides a holistic view of the environment, from hypervisors and VMs, all the way down to the physical hardware that the virtual environment is running on, and all the way up the stack to the actual applications. If there is a failure on the physical hardware that is running the hypervisor, if there is a performance issue with the application or even the operating system, EM7 can identify the issue and its source, enabling fast proactive problem solving. This is a level of visibility that native virtualization management tools cannot offer.

Replacing or augmenting a variety of monitoring and management tools, EM7 provides multiple “lenses”, each delivering insight into a layer of your heterogeneous IT environment—hypervisor and VM, as well as application, physical hardware, network, operating systems, and storage—enabling you to drill down to troubleshoot and solve problems on each of these layers.

By including all the data needed to resolve issues, all in one tool, EM7 streamlines the correlation between the

## EM7 provides visibility into Hosts and Guests, and all the layers that support them:

### Applications

EM7 provides full visibility into the application stack, delivering real-time and trended availability and performance data on application delivery components to keep business-critical applications up and running. The solution provides metrics on all of your applications including Microsoft Exchange, SharePoint, SQL Server, Oracle, Apache, Blackberry Enterprise Server and more.

### Physical Infrastructure

EM7 offers a complete view of physical hardware, monitoring hardware performance and availability, as well as power consumption, cooling, network connectivity and memory issues.

### Operating System

EM7 tracks operating system performance and availability for Windows and the many flavors of Linux, as well as SunOS, HP-UX, IBM, AIX, z/OS, OS X, Netware, SCO and more. EM7 furnishes information on versions, patch levels, disk utilization, web services, installed software, and all the services and processes that are running on the O/S.

### Storage

EM7 provides insight into storage performance, availability, capacity, utilization, file system, I/O, and all the data being written to and retrieved from storage.

### Network

EM7 presents metrics on network availability, utilization, latency, inbound and outbound traffic, looking at the virtual interface as well as the physical interface.

layers, and automatically understands how the layers impact each other and the overall performance of the environment, exponentially reducing time to resolution. Only a tool like EM7 that correlates performance and availability data from all the layers, and all the different environments, can provide the unobstructed path to problem resolution.

## Going Beyond the Limitations of Traditional Tools & Extending Virtualization Management Beyond vCenter

Many of the management challenges associated with virtualization are due to limitations of the native tools from the virtualization technology vendors, such as VMware vCenter. This is not the fault of the vendors—these tools have not been designed to manage your entire infrastructure, but only the components of virtualization technology, such as hypervisors and VMs. The information provided by the vendor tools is invaluable, but you still need a more comprehensive management system that can incorporate data from the native virtualization tools while tracking metrics from the many other layers of your environment.

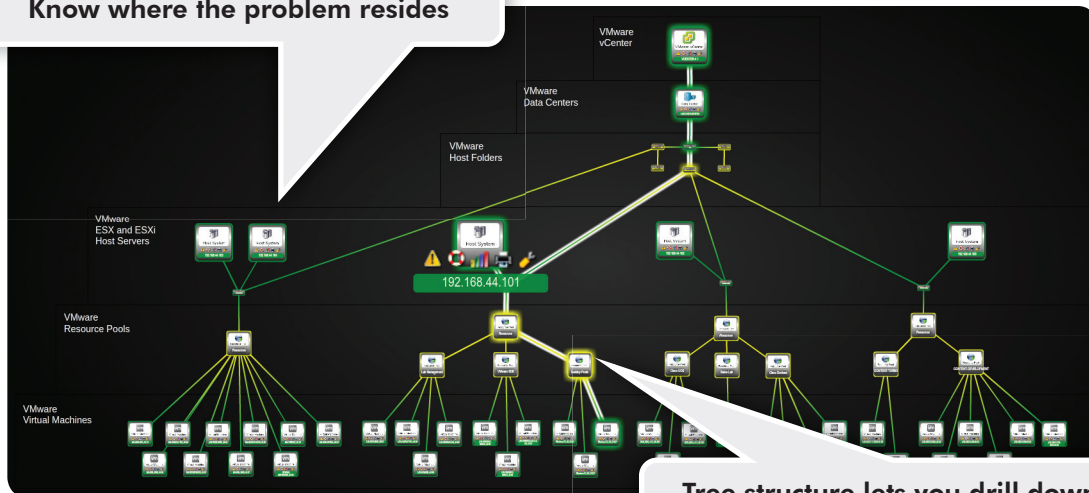
The following outlines the virtualization management challenges that can only be solved by a comprehensive management tool:

### Getting the Big Picture

Virtualization management requires the ability to assess the situation quickly and zero in on the problem. To fully manage the virtual environment, you need to be able to see the big picture. vCenter and the other vendor tools do not offer this panoramic view of the entire environment.

For the high level view, EM7 provides a single dashboard covering your entire environment, enabling you to quickly gauge all your KPIs at a glance. For more granular details, EM7 also allows you to drill down to multiple levels, via separate lenses for each layer of your environment.

Color coded by Alarm severity—  
Know where the problem resides



**Figure 2.** Dynamic Component Mapping automatically discovers, maps and updates the relationship between the components of your dynamic virtual infrastructure.

Tree structure lets you drill down to see all the moving parts of a heavily virtualized environment

## Avoiding VM Sprawl

Although virtualization can dramatically improve resource utilization, it can also enable resource hoarding, a familiar practice in the physical infrastructure. In the virtual world, this hoarding is called VM Sprawl, and it is enabled by the fact that resources are designed to be easy to provision in a virtual environment, and difficult to track once provisioned. Stakeholders within the organization will hold on to VMs, even when they are no longer being used. In the self-service model, it is the user's responsibility to de-provision the VMs when they are done, but when this step is skipped, the number of unused VMs can easily grow.

Without granular visibility into the environment, identifying which VMs are allocated to which stakeholders and how much of the VMs are being utilized, VM sprawl can get out of control fast. Even though better utilization of resources was your initial reason for adopting virtualization, VM sprawl can nullify this advantage and actually lead to reduced utilization of resources.

Again, the native virtualization tools are limited because they do not supply any information on VM utilization, but EM7 exposes the previously hidden world of VM usage. To eliminate VM Sprawl, EM7 provides extensive visibility into which VMs are being spun up or down, the users that

the VMs are allocated to, the budgetary or chargeback models the VMs are aligned to, and most importantly, how those virtual machines are being utilized. With this vital information at your fingertips, you can more easily and accurately determine if resources are being maximized, and take corrective action. And to make it even easier, EM7 provides tools to automate remediation and alerts—from identifying abandoned and inactive VMs to notifying end users and finally to shutting down those VMs and helping to right-size your VM environment.

## Discovering VMs

You cannot manage the virtual environment without knowing what is running on every VM, at all times. This goes beyond the issue of VM sprawl. Any type of diagnostics in the virtual environment depends on this high level of visibility. The key to such wide visibility is auto-discovery functionality that native virtualization tools like vCenter cannot provide.

EM7 features Dynamic Component Mapping, an auto-discovery mechanism that automatically discovers and maps the relationships between components in the changing virtualized infrastructure, without requiring manual rediscovery. In near real time, EM7 automatically discovers all new VMs as they are created, and tracks all

the details about the VMs, such as the guests and software running on them. Any changes in relationships are also automatically detected, and the map is continuously updated, so the information on the EM7 dashboard is always current. This is the only way to truly maintain visibility into the health of applications and services that depend on these constantly changing components.

### Tracking vMotion Events

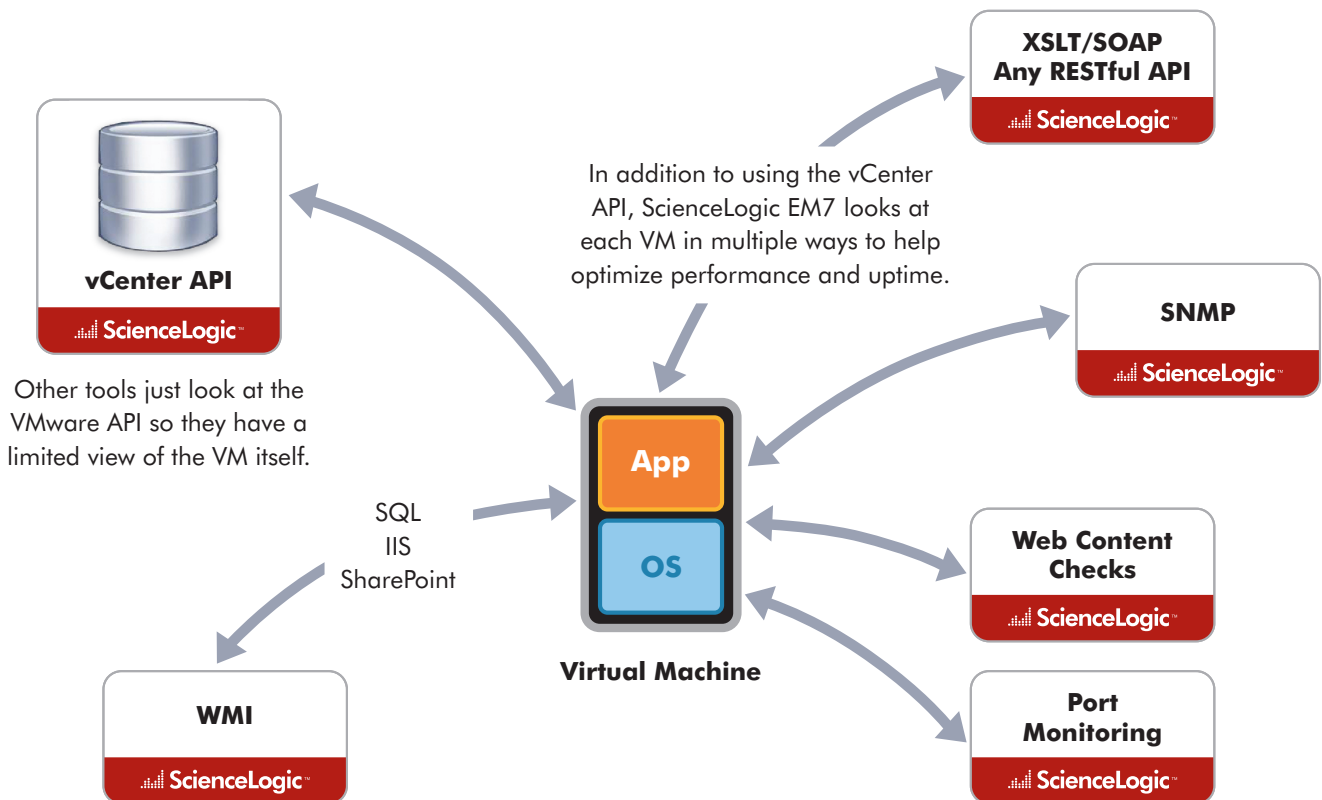
While a tool like vCenter allows you to view events, there is no alerting mechanism to notify you about vMotion—the actual migration of a VM from one physical server to another. The objective of virtualization is to seamlessly move VMs across your physical infrastructure without impacting end users, but as the IT stakeholder responsible for the infrastructure, you still need some way to track when this movement happens and where the VM is going. This is pivotal information that will help you pinpoint the sources of

performance issues throughout the virtual environment.

EM7 is designed to pull information straight from vCenter and alert you directly, in near real-time, whenever a vMotion event is triggered. This visibility empowers you to be more proactive about performance—catching the changes as they happen, rather than reacting to a phone call from an end user with a complaint about performance.

### Managing Multiple Events and Alerts

Almost 500 events and alarms are generated by vCenter. Coordinating and consolidating all of those events and alarms via vCenter is a painful process, and this impacts your ability to act on those notifications when necessary. EM7 simplifies the process by aligning notifications with the actual devices and hosts, automatically identifying which services would be impacted, and notifying you in near real time.



**Figure 3.** In one console, ScienceLogic EM7 provides views of all the components that are critical to optimize applications and services running on VMs.



See important management information including: CPU, Memory, Disk, Network at a glance or in detail



Figure 4. ScienceLogic EM7 provides critical KPIs in a single console.

EM7 alerting can be customized to your unique needs, and you can also use EM7’s default out-of-the-box alerts, as well as vCenter alerts—leveraging three different perspectives to ensure full proactive coverage. Escalation of alarms can also be configured to your exact specifications, so you have proactive visibility into growing issues that can cause potential problems. EM7 affords you complete flexibility to define alarm thresholds based on individual users needs or globally across your entire team.

Automation is also an important way to resolve alerts. EM7 can be custom configured to trigger diagnostics and take automated proactive action to remediate any issues to ensure continued operation.

**Dealing with VMware Failures**

If VMware vCenter dies or chokes, the system is designed so that all your VMs will continue to run properly. As soon as vCenter comes back online, the VMs will reestablish a connection and everything goes back to normal. Although

this continuity is desirable, if you are using vCenter as your sole monitoring solution, this still presents a major problem. If vCenter goes down, you are running blind until the system comes back up. You have no visibility into performance and availability in your virtual environment.

By providing multiple views into the environment from each different layer’s perspective, EM7 gives you critical visibility into the applications, operating systems, networks, storage and even the physical servers—real-time availability and performance metrics—even when vCenter is down. You may not have access to the metrics from VMware while vCenter is down, but you can still use metrics from these other sources to manage the environment and troubleshoot performance and availability issues.

In addition, EM7 provides visibility into VMware-related failures that the native VMware tools cannot offer. For example, if a hard drive dies on the box that vSphere is running on, vCenter would not recognize that issue.

vCenter may report that performance of a related VM is reduced, but it will not be able to identify the source of the problem. Because EM7 monitors the entire infrastructure, virtual and physical, and alerts you in real time, it would enable you to easily pinpoint this hardware issue, and proactively solve these types of VMware failures.

### **Accessing Management Tools Remotely**

Remote access to performance data via vCenter is a major challenge. To view events and alarms in vCenter, a Java-based client must be installed on each user's individual workstation. If you are accessing vCenter remotely, and you do not have the client and the credentials, you have lost all visibility into your environment. On the other hand, EM7 can be used from any Web browser with an Internet connection, allowing immediate access from a smartphone, iPad, laptop or any publicly accessible desktop.

### **Handling Memory Issues**

If a VM is overprovisioned or consuming more RAM than you have allocated, VMware will automatically compensate, rather than allow the machine to crash, by ballooning memory. This situation is usually a symptom of a larger problem, but vCenter does not notify you when this happens.

EM7 enables you to proactively monitor memory ballooning, by setting customizable thresholds for alerts. These timely notifications give you the power to limit ballooning and troubleshoot the underlying problem. You can even track memory growth over time, to spot trends toward potential problems before they impact end users.

vCenter is also unable to identify memory leaks that impact performance. It will alert you that a machine is almost out of memory, but you have no visibility to see what is causing the memory leak because vCenter does not have visibility into the applications themselves. EM7 monitors the application stack, and can ascertain which process running within the application server is causing the memory leak.

## **Conclusion**

Time is no longer a luxury available to IT operations. Due to the nature of virtualization— multiple virtualized systems, applications and services running on a single piece of hardware—a simple issue can quickly transform into a massive set of disastrous failures if the problem is not fixed fast enough. These are failures that impact business operations, customers, transactions, and ultimately the bottom line.

You must choose the right tool to give you the agility to respond rapidly to performance and availability issues in the virtual environment. Native virtualization management tools such as VMware vCenter are essential in managing your virtual environment. But they are not enough and can create “tools sprawl” that make management inefficient and slow you down. They do not provide enough visibility across all the layers of your environment to enable you to ensure performance and availability. ScienceLogic EM7 delivers this holistic view, all contained in a single pane of glass, alerts you so you can be proactive instead of reactive, and automates corrective actions, to keep your virtual environment up and running at peak performance.

**ScienceLogic** facilitates centralized IT operations and dynamic cloud management by uniting and correlating critical IT functions such as performance, fault, availability, asset, service desk, automation, and event management. The cohesive ScienceLogic platform provides an accurate, actionable view of business service delivery across any mix of physical, virtual and cloud environments. Beyond just monitoring, ScienceLogic technology gives service providers and enterprises the management and customization capabilities needed to deliver optimal application performance, improve IT efficiency, and confidently move to new architectures and differentiated service offerings. For more information visit [www.sciencelogic.com](http://www.sciencelogic.com) or the ScienceLogic Blog at [blog.sciencelogic.com](http://blog.sciencelogic.com).

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