Who moved my app? How to achieve effective application performance in a virtualized world

EXECUTIVE SUMMARY

Under pressure to "do more with less," IT departments are steadily moving to virtualization. Server virtualization provides many benefits, such as cost savings and flexible response to peak demands.

But all those gains can be lost if virtualized applications slow down, perform poorly for end users, or get harder for IT to troubleshoot and fix. The damage includes lost productivity, lost revenue and lost credibility for IT.

Troubleshooting a virtualized application is extremely difficult, with serious technical and cultural challenges to overcome. And the most common approach of setting up a war room with 6 to 15 people may not yield any results.

IT teams have tried using component-based monitoring tools, software instrumentation, log files and tools from virtualization vendors—but no bottom-up approach is completely effective in a virtualized environment.

The only effective way to troubleshoot application performance issues in a virtualized environment is with an end-to-end analysis that starts from the end-user's perspective. This analysis must combine high-level transactional views that span virtual machines along with deep insight into Java and .NET applications, and network, server and mainframe infrastructure components. And the results must be integrated with a top-down view of the business impact of any issues to give IT a real-world set of priorities.

An effective solution for application performance management (APM) in a virtualized environment will quickly pinpoint the root cause of any issue, no matter how elusive or intermittent, and determine its true business impact.

And a successful solution will leverage IT investment in existing monitoring tools and consolidate all relevant data on the same dashboard. This will reduce the need for war rooms, eliminate finger-pointing and improve collaboration between IT teams.

This white paper examines these challenges in more detail, and describes what to look for in an effective APM solution for a virtualized world.

VIRTUALIZATION IS GROWING FAST

Under constant pressure to "do more with less," IT departments are steadily moving to virtualization. A recent Gartner report shows that 16 percent of all x86 architecture server workloads are now virtualized; by 2012, this number is expected to reach 50 percent.[1]

Enterprises that move to server virtualization gain many benefits, especially cost savings on hardware, power and cooling, as well as a flexible response to peak demands.

But this does add another layer to an already complex IT infrastructure. And all the gains of virtualization can be quickly lost if applications slow down and perform poorly for end users, or if apps become harder for IT to troubleshoot and fix.

USERS JUST WANT TO GET ON WITH IT

Users don't care about virtualization, and neither do web site visitors; they just want to get on with what they're doing. And their opinion matters.

> "The performance of IT is based on the performance of business applications as viewed by end users," says a recent study by Forrester Research. "The application performance that matters is therefore the response experienced by end users."[2]

Compuware®
We make IT rock around the world

But performance issues rarely come to light until unhappy users report them. In a recent survey, two out of three IT executives said they do not realize end users are having any performance issues until they complain to the help desk.[3] And nearly half admit that end users report slowdowns even when IT monitoring tools say everything is running well.[4]

POOR PERFORMANCE HAS A HIGH COST

If virtualization slows down important enterprise apps, or makes it more difficult for IT to find and fix problems, the damage can be dramatic, including:

- lost productivity of employees
- abandoned shopping carts
- lost revenue
- slower customer service
- lower customer satisfaction
- bad publicity.

In fact, Aberdeen Group found that application performance issues can lower enterprise revenues by up to 9 percent; among the 200 enterprises surveyed, the average loss would be $117 million a year.[5]

Internally, this can undermine IT's credibility, slow down approvals for other projects and even add to the chorus of voices calling for IT to be outsourced.

VIRTUALIZED APPLICATIONS ARE TOUGH TO TROUBLESHOOT

As you well know, every IT system relies on equipment from different vendors, software from different sources and services from different providers. Different teams are responsible for developing, delivering and supporting enterprise apps.

When any issue arises, there is a natural tendency to point fingers.

These technical and political challenges add even more uncertainty to a virtualized environment. Troubleshooting an intermittent slowdown is a big challenge for even the most seasoned IT professional. Where do you look? And what exactly do you look for?

Virtualization makes it more difficult to identify any problem, understand the business impact it may cause, prioritize IT's efforts, isolate the root cause and then take corrective action.

WAR ROOMS ARE NO SOLUTION

Many slowdowns are not resolved until they escalate to a high level. Then the most common response is to set up a war room to look for clues. But this approach is unwieldy and often unsuccessful.

War rooms tie up a huge chunk of resources. More than half the IT executives recently surveyed commit 6 to 15 (or more!) people to each war room. With participants drawn from all different silos, just organizing a meeting may take days.[6]

And no matter how many people you throw at an application slowdown, this brute-force approach may not find anything useful. This is not IT's fault; it's because component-based troubleshooting tools have not kept up with the explosive growth of virtualization.

WHAT HAS I.T. TRIED IN THE PAST?

To track down and isolate application performance issues, war rooms have tried using component-level monitoring tools, software instrumentation, log files and tools from virtualization vendors. Unfortunately, none of these are completely effective in a virtualized environment.

- **Component-based monitoring tools:** These tools take a bottom-up approach, starting with the low-level infrastructure. They may give some visibility into the performance of the virtual container, but none into the apps running in that container. Many metrics collected by these lower-level tools—such as CPU usage, network load and disk I/O—are meaningless in a virtualized environment. They simply don't see the end-to-end application flow with virtual servers being dynamically provisioned and de-provisioned.

> "Virtualization poses a new series of problems for application performance management (APM), as the use of a hypervisor makes the application within the container relatively opaque in terms of performance data collection."
>
> — Forrester Research[7]

Figure 1: Virtualized applications are tough to troubleshoot

- **Software instrumentation:** In this context, instrumentation means inserting lines of code into an application to generate time codes or variable status when those lines are executed. But the parameters returned will not likely pinpoint any root cause, since these are not linked to the virtualization. If time and money were no object, this approach might perhaps yield a few relevant clues; but in the real world, it is simply too labor-intensive and costly to be feasible.
- **Log files and log mining:** This is the first line of defense for many IT teams. But mining through log files is a very time-consuming and manual process, which seldom reveals any meaningful clues in a virtualized environment.
- **Tools from virtualization vendors:** These tools can monitor the virtual environment, but they cannot relate it to the physical environment. For example, metrics like response time and transaction time collected by a guest OS are not accurate, since they do not account for an end-to-end view of the application and its transactions.

To sum up, each of these traditional approaches shows only part of the picture. None of these are completely effective in a virtualized environment.

I.T. NEEDS AN END-TO-END VIEW

The most effective way to help IT solve application performance issues in a virtualized environment is with an end-to-end view that starts from the user's perspective. This has been called a "holistic approach to APM."[8]

In a recent study, best-in-class companies were nearly four times more likely to measure application performance from the end user's viewpoint than the laggards in this regard.[9]

As a second step, this analysis must be integrated with a top-down view of the business impact of any issues. This ensures that limited IT resources are spent solving the most important issues first.

Yet IT priorities must not be carved in stone. IT needs a way to dynamically re-prioritize issues based on location, time of day, day of the week, number of slow transactions, number of users affected, overall priority of the application in question and any other relevant business rules.

IT'S TIME FOR A NEW SOLUTION

With a virtualized environment on top of an infrastructure made up of many different pieces from many different vendors, traditional systems management no longer applies.

> "Increased use of virtualization technology creates greater demand for performance management solutions that can track end-user experience and isolate performance problems across highly complex, interconnected physical and virtual servers."
>
> — IDC[10]

This new solution must be able to collate, analyze and predict application performance at the transaction level across all production environments, and also probe deeply into the various technology domains: Java and .NET applications; network, server and mainframe levels; and transactions between virtual machines.

WHAT TO LOOK FOR IN AN EFFECTIVE SOLUTION

A successful solution for APM in a virtualized environment will quickly pinpoint the root cause of any issues and determine their true business impact.

A truly effective system will provide all the following capabilities:

- record baseline application performance metrics prior to virtualization, so that IT can validate success
- monitor application performance from the end user's perspective
- provide a deep level of analysis that follows an offending transaction end-to-end along the complete transaction path
- trace and diagnose issues from a specific user through all network and server infrastructure, Java/.NET applications, mainframe and server tiers
- isolate the root cause of application performance problems, no matter how elusive or intermittent, and effectively reduce MTTR
- significantly cut the time and resources to fix problems by reducing the need for war rooms
- process application metrics through relevant business rules to generate a real-world set of priorities for IT
- leverage IT investment in existing monitoring tools by interoperating with them smoothly
- present all relevant data gathered by all monitoring tools on the same dashboards in the context of the end-user experience
- deliver objective facts that eliminate finger-pointing and improve collaboration between teams.

Fortunately, this kind of APM system now exists in Vantage 11 from Compuware. This software suite has been called "a flexible platform that builds and leverages a performance-driven service model to link application performance and business impact" and "a high-horsepower solution."[11]

SOURCES

1 Thomas J. Bittman, *"Virtual Machines and Market Share Through 2012,"* Gartner, October 7, 2009, page 3

2 *"Becoming Proactive in Application Performance Management,"* Forrester Research, January 2009, page 12

3 Ibid, page 3

4 Ibid, page 13

5 Bojan Simic, *"Application Performance Management: The Lifecycle Approach Brings IT and Business Together,"* Aberdeen Group, June 2008, page 15

6 *"Becoming Proactive in Application Performance Management,"* pages 8-9

7 Jean-Pierre Garbani, *"Market Overview: The Application Performance Management Market,"* Forrester Research, October 17, 2008, page 2

8 *"Becoming Proactive in Application Performance Management,"* page 4

9 Bojan Simic, *"Application Performance Management: Getting IT on the C-Level's Agenda,"* Aberdeen Group, March 2009, page 2

10 Mary Johnston Turner and Tim Grieser, *"Worldwide Performance and Availability Management Software 2008 Vendor Shares,"* IDC, August 2009, page 20

11 *"Compuware Vantage 11: Performance-Driven Service Model, Unified Performance Analysis Tie Application Problems to Business Impact,"* EMA, June 2009, pages 3 and 7

To find out more about how you can achieve effective application performance in a virtualized environment, visit **www.compuware.com/vantage11**.

Compuware Corporation Corporate Headquarters
One Campus Martius
Detroit, MI 48226-5099

12.09

Compuware®
We make **IT** rock around the world