Ensuring Application Performance Across Hybrid Environments

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper
Prepared for Riverbed
August 2016
Table of Contents

Overview ........................................................................................................... 1
Hybrid Cloud: A Different Animal ................................................................. 2
Extending the Cloud via Hybrid Services ....................................................... 2
APM for Cloud and Hybrid Cloud ................................................................. 4
Riverbed Differentiators .............................................................................. 5
EMA Perspective ............................................................................................ 6
Overview

The term “hybrid cloud” is defined differently by virtually every industry analyst, vendor, and company, highlighting the fact that applications leveraging a hybrid cloud architecture can take a wide variety of form factors. In the context of Application Performance Management (APM), a simple definition suffices to encapsulate the key issues encountered by companies deploying production hybrid services accessing externally hosted systems: “Hybrid applications are those applications executing, in part, on the public cloud or on any external platform that is beyond the IT organization’s sphere of control.”

The final phrase in the definition provides the key to understanding how and why, from the management perspective, hybrid cloud is a “different animal” compared to internally-hosted services. On premise services can be instrumented, monitored, and measured by traditional APM toolsets. Because the elements of the application can be “discovered” and tracked by the APM solution, topology maps can be auto-generated, modeling relationships between application components and underlying infrastructure. These topologies support virtually every aspect of application delivery, including correlation of performance issues to their underlying root causes and general troubleshooting across the application ecosystem.

This is not the case with external services hosted by public cloud providers, partners, or suppliers. Since they are outside IT’s sphere of control, they can’t be instrumented or monitored with most incumbent APM toolsets. Auto-discovery technologies simply can’t reach beyond the firewall to fully discover and model end-to-end topologies.

In hybrid scenarios—and in virtually any scenario where public cloud platforms such as Software as a Service (SaaS) and/or Infrastructure as a Service (IaaS) are in use—cloud services too often become “black boxes” from the monitoring perspective. Without “hybrid-ready” toolsets, platform performance can’t be quantified separately from that of the Local Area Network (LAN), the Wide Area Network (WAN), or the public Internet.

The same problem exists with the API-connected transactions that drive business-to-business integrations in the digital economy. Such transactions integrate with systems of record owned by suppliers, partners, and customers, again reducing the visibility to end-to-end execution that is so vital to the monitoring and troubleshooting processes.

In hybrid scenarios in particular, IT organizations are facing a “brave new world” of performance monitoring in which visibility is dramatically reduced and performance characteristics that have traditionally been accessible are no longer available. Tasked with the responsibility of ensuring service quality in a world over which they have little control, IT organizations are increasingly being challenged to manage systems that their tools don’t fully support. Incumbent toolsets simply lack the capacity to monitor beyond organizational borders and into the cloud.

This Enterprise Management Associates (EMA) white paper discusses APM in the context of hybrid cloud monitoring. It touches on ways to develop better visibility into the actual execution of cloud applications for the purposes of performance/availability management and to support root-cause analysis. Finally, it introduces Riverbed’s SteelCentral APM solution suite as a potential answer to the inherent challenges of efficiently managing hybrid cloud delivery.

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1. EMA research
2. Some IaaS platforms do permit, and some APM solutions do support, instrumentation of IaaS instances. However, auto-generated topology models and end-to-end execution tracing are still beyond the scope of virtually all such APM solutions.
Ensuring Application Performance Across Hybrid Environments

Hybrid Cloud: A Different Animal

It is now clear that cloud in some form is here to stay; cloud users almost universally cite cost savings averaging in the neighborhood of 20% compared to on-premise hosted services. So while the potential for cost savings has always been one of the promises of cloud usage, this potential is now being realized for the majority of users.

However, almost every company consuming public cloud services very quickly discovers the need to integrate cloud-hosted applications with one another and/or with on-premise applications. So an unexpected quirk in the cloud story is the fact that hybrid applications—spanning in-house and externally hosted services such as public cloud—are almost as ubiquitous as public cloud usage itself.

As Figure 1 shows, almost 70% of IT organizations are running hybrid transactions that share data between on-premise and public cloud–based applications. This percentage is rapidly growing, up from 40% in 2015.

Extending the Cloud via Hybrid Services

Much of this growth is being driven by increasing use of public SaaS and/or IaaS. However, most companies utilizing hosted Customer Relationship Management (CRM) systems, such as Salesforce or SugarCRM, soon encounter the need to share CRM data—containing information such as customer contacts and sales closings—with Enterprise Resource Planning (ERP) systems of record, as an example. In other examples of hybrid services, application components hosted in IaaS environments must often communicate with databases in the data center. And in a growing number of cases, API calls to partners or suppliers are an integral part of day-to-day business as usual.

Because of the business criticality of these types of services, their use is driving a new focus on application performance and availability in general, and APM tools in particular. This is because today, too many IT organizations lack the tools they need to effectively track such services end to end. As a result, management of hybrid services is being done primarily with toolsets that are rudimentary, fragmented, and disconnected.
In fact, in an industry where some APM solutions have become extraordinarily sophisticated and analytics-driven, many hybrid cloud users have actually taken a step backward. As Figure 2 shows, log analysis solutions and homegrown tools are the most common ways that hybrid environments are being managed. These types of tools, while effective in some cases for silo monitoring, are a far cry from the end-to-end APM story we have been hearing for the past decade.

The bigger problem, however, is that even with traditional APM solutions, a significant portion of the execution path cannot be traced and performance can’t be accurately monitored. Monitoring gaps inherent in disconnected toolsets make it impossible to track transactions with 100% accuracy. Incumbent APM solutions—much less log analysis and homegrown scripts—simply lack the capabilities necessary to perform this function.

While User Experience Management (UEM) solutions such as synthetic transactions and Real User Monitoring (RUM) technologies can help fill this gap, it is almost always the case that APM and UEM solutions are separate, disconnected products versus integrated products whose data can be cross-correlated.

Combining UEM solutions with APM—particularly in cases where the analytics supporting APM also support cross-correlation spanning the two data sets—may well be the ideal management scenario for these sophisticated execution environments.
Ensuring Application Performance Across Hybrid Environments

APM for Cloud and Hybrid Cloud

In addition to being externally hosted, cloud systems—particularly those supporting IaaS—can also be dynamic. Cloud-based servers can be spun up, individually or by the cluster, in a matter of seconds and can disappear just as quickly. A wide variety of software-based “appliances” and platforms—Application Delivery Controllers (ADCs), application servers, database servers, and web servers as examples—can also be deployed almost instantaneously by automated Deployment and Release Management solutions to support duplication of entire software ecosystems.

These real-time deployments and the dynamic systems they generate can be very difficult for traditional APM solutions to model and track. Their levels of abstraction and transient nature mean that traditional management functions designed to address the applications of past eras don’t work as expected in such environments. In many cases, discovery technologies are too slow. In others, topology modeling and root-cause analysis functions were simply not designed to support real-time provisioning and de-provisioning.

At the same time, the potential for failure in such services is as real as it is for on-premises services. As Figure 3 shows, cloud consumers report that cloud services don’t always work as expected. Almost 25% report “excessive” downtime, and about the same percentage report intermittent problems and excessive time spent troubleshooting.

In other words, hybrid connections can obscure the sources of performance and availability issues, whether they lie in the cloud portion or the on-premises portion of a given transaction.

![Figure 3. Adverse impact of public cloud usage](image-url)
Riverbed Differentiators

Riverbed’s multidimensional SteelCentral suite (see Figure 4) monitors on-premise, cloud, and hybrid services via a wide range of integrated capabilities. Where SaaS and IaaS create monitoring blind spots, SteelCentral mitigates their impact with unified and correlated visibility into network performance, application performance, and supporting infrastructure.

Multiple analytical engines eliminate monitoring silos by analyzing network and application data sets in context with one another. The resulting graphs and reports deliver actionable information of value to multiple roles including IT Operations, Network, DevOps, Application Management, and Line of Business IT teams.

SteelCentral also supports monitoring for elastic applications, as applications scale up and scale down on Azure and Amazon. By decoupling physical from logical application flows, Riverbed ensures that applications can be accurately modeled whether they execute on physical infrastructure or transient resources such as containers and/or virtual machines.

Recent enhancements include:

- Additional support for Azure and Amazon Web Services (AWS) monitoring and for virtual data centers and execution environments
- Riverbed AppInternals is Azure certified and is now available through both the Azure and AWS marketplaces.
- SteelCentral UCExpert supports unified communications via an API approach that gathers data from the call manager and the endpoint without probes or agents.
- NetProfiler enhancements focus on the user experience.
- Riverbed has also standardized the look and feel of its Graphical User Interface (GUI) across the product line, focusing on simplifying user workflows and providing specific, role-based information supporting a wide variety of user types and skill levels.

![Figure 4. Riverbed SteelCentral provides unified visibility of all elements supporting hybrid cloud.](image-url)
Ensuring Application Performance Across Hybrid Environments

EMA Perspective
As companies focus on extending their borders to consume external resources and provide value-add services to customers and end users, hybrid services have become essential elements supporting the digital economy. However, performance of stand-alone cloud services isn’t always flawless, and hybrid services add a level of complexity that is preventing many companies from achieving their digital objectives. And while few companies have tools fully capable of monitoring hybrid applications in place, more than half have already deployed such applications to production.

As a result, many IT organizations are finding that the promise of cloud computing is being tarnished by the inability of incumbent toolsets to accurately model topologies, monitor performance, or track hybrid transactions. IT teams lack the actionable information they need to diagnose and solve cloud-related problems, which means that the cloud value proposition is offset in part by higher support costs.

Collectively, these factors are contributing to the #1 overarching IT-related challenge cited by line staff, middle managers, and executives alike: the escalating costs of application support caused by the increasing complexity of IT-delivered services.

As the use of new types of technologies and architectures creates new requirements to monitor and analyze applications from new vantage points, APM solutions must incorporate data from a broad, comprehensive range of devices, networks, and technologies into their management databases and analytical engines. This “perfect storm” of requirements matches well with the capabilities of the SteelCentral platform, as Riverbed’s unified performance monitoring delivers better visibility—with fewer blind spots—than the vast majority of APM solutions on the market.

As cloud and hybrid services move into production, the importance of production-grade, purpose-built tools capable of supporting them cannot be overstated. Because of its unique visibility into the network, the data center, the user endpoint, and the application, Riverbed is well positioned to manage these types of deployments. For additional information and/or a free demo, please visit www.riverbed.com/products/steelcentral/.
About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA’s clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals and IT vendors at www.enterprisemanagement.com or blogs.enterprisemanagement.com. You can also follow EMA on Twitter, Facebook or LinkedIn.

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