

# Minimizing the Pain of Hybrid IT Management

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## An Analytics-driven Approach to Hybrid IT Management Integration & Automation

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper  
Prepared for IBM

April 2017



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# Minimizing the Pain of Hybrid IT Management: An Analytics-driven Approach to Hybrid IT Management Integration & Automation

## Table of Contents

- Overview ..... 1
- The Challenge of the Hybrid IT Ecosystem..... 2
- Characteristics of the Hybrid Service ..... 3
- Factors Impacting IT Operations in Managing Hybrid Environments..... 5
- An Automated Approach to Managing Hybrid IT Deployments ..... 5
  - Monitoring and Managing Hybrid IT Environments ..... 6
  - A Hybrid IT Tooling Model and “Single Pane of Glass” ..... 7
- Summary ..... 8



# Minimizing the Pain of Hybrid IT Management: An Analytics-driven Approach to Hybrid IT Management Integration & Automation

## Overview

Hybrid cloud architectures add new layers of technology and abstraction to the already complex task of managing IT infrastructures, applications, and services. Hybrid IT environments—which are rapidly proliferating as applications span on-premises data centers, public cloud, and private cloud—are taxing the resources of virtually every IT organization. As servers, databases, software, and networks increasingly span in-house and “in the cloud” delivery, connecting disparate systems into cohesive hybrid IT ecosystems requires experience, skill, and know-how. Once in place, monitoring and managing these ecosystems to ensure that delivered service levels meet the expectations of end users is a challenge virtually all IT Operations managers and their organizations eventually have to face.

As these organizations confront new requirements to holistically manage hybrid services, numerous questions arise. How are hybrid IT environments best managed—and how can IT management be automated—in ways that ensure an optimal user experience? How can all elements supporting an application be tracked and monitored to ensure that slowdowns and outages are addressed proactively, before they impact end users? How can hybrid IT management systems be connected and integrated in standardized, reliable ways? Finally, how can disparate execution elements be managed holistically-- from BOTH end to end- AND device- focused perspectives-- to ensure that all constituent elements are optimized for a high quality user experience?

Regardless of where an application runs—whether in cloud, on-premises, cross-platform, and/or in hybrid environments—a primary role of IT management toolsets is to track and model the application end to end, across software, hardware, and connection points. And despite the diversity underlying modern applications and transactions, accurate topologies depicting the service the user actually accesses are essential to supporting an optimal user experience.

A hybrid IT management strategy capable of supporting such environments requires the ability to span disparate, multi-vendor platforms and tools via a consolidated, analytics-based overlay solution and associated IT management approach. It also requires levels of intelligent automation sufficient to model complex topologies and proactively manage service levels in near real time.

In short, today’s hybrid IT environments combine complex, fragile applications and workloads with diverse IT infrastructure and cloud networks. Reducing the “pain” of managing them requires an integrated automation layer combining IT monitoring and management technologies with advanced analytics.

This Enterprise Management Associates (EMA) white paper describes the characteristics of modern hybrid IT environments. It discusses the implications of cloud delivery, multi-location hardware/software environments, network connectivity, and integration technologies to the viability of the applications they support. It focuses on a consolidated, top down approach, essentially consisting of an intelligent operational analytics overlay capable of integrating and automating multiple processes related to managing and consolidating disparate platforms in context with one another. And, it stresses the importance of automation supporting IT Operations managers in realizing the true “vision” of hybrid IT management. The result is an effective methodology to monitor, manage, and optimize hybrid IT infrastructures and clouds and associated application delivery systems.

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## The Challenge of the Hybrid IT Ecosystem

The terms “hybrid applications” and “hybrid IT” encompass on- and off- premises, public, private, and hybrid cloud, systems of engagement/record, and a wide range of platforms, applications and services. Today’s applications and workloads can traverse hundreds of nodes, network connections, providers, integrations, APIs, and platforms, making monitoring and management a challenge.

Modern applications and workloads are the latest incarnation of the distributed, component-based applications and services of the past. Often loosely connected via Application Programming Interface (API) code and integration technologies, hybrid services may span infrastructure and services owned by multiple entities and located in diverse geographies.

In the case of hybrid cloud, support teams may not even know where a hardware or software component is hosted. At the same time, they are still tasked with end to end management and with ensuring optimal performance as end users increasingly become the focus of the business universe.

Figure 1 shows EMA’s latest figures<sup>1</sup> on the deployment incidence of hybrid transactions in enterprise IT. Up from approximately 35% in 2014, the percentage doubled in two years. Increasingly, these types of transactions are an absolute necessity for interacting with partners, suppliers, and customers.

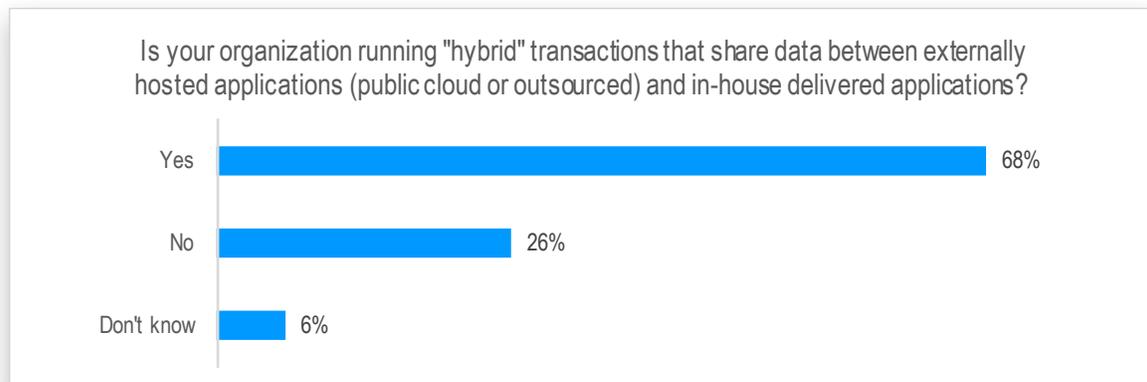


Figure 1: Percentage of companies running hybrid transactions spanning on-prem and cloud has doubled in past 2 years

EMA research also finds that, as businesses increasingly embrace the use of cloud IT technologies such as Infrastructure as a Service (IaaS) and Platform as a Service (PaaS), these platforms also become essential elements of hybrid transactions. Almost 50% of companies are now using IaaS to deliver a production service; another 50% are running hybrid applications executing across mainframes and public cloud.

Clearly, hybrid deployment models have taken hold within enterprise IT in a wide variety of form factors. At the same time, this is occurring in the context of new trends in application development—focusing on speed of delivery—which are changing application architectures and management strategies while generating high rates of production change. As a cumulative result of all of these factors, many IT Operations organizations are overwhelmed with the responsibility of ensuring optimal service levels in the face of growing complexity and ongoing change.

**Put simply, a digital workspace is an abstracted environment that hosts a user’s applications, data, and services.**

<sup>1</sup> APM in the Digital Economy: What’s Hot, What’s Not, and What’s on the Horizon: July 2016. Available for download at [www.enterprisemanagement.com](http://www.enterprisemanagement.com)

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## Characteristics of the Hybrid Service

Hybrid cloud deployments can span multiple combinations of on-premises and cloud services. As Figure 2 shows, diverse platforms are connected by “the network”, typically via APIs or enterprise-grade middleware designed for speed and guaranteed delivery. Particularly in production hybrid deployments spanning tens, hundreds, or thousands of technology elements, the management of hybrid services requires specialized tooling with visibility to the entirety of the underlying delivery structures.

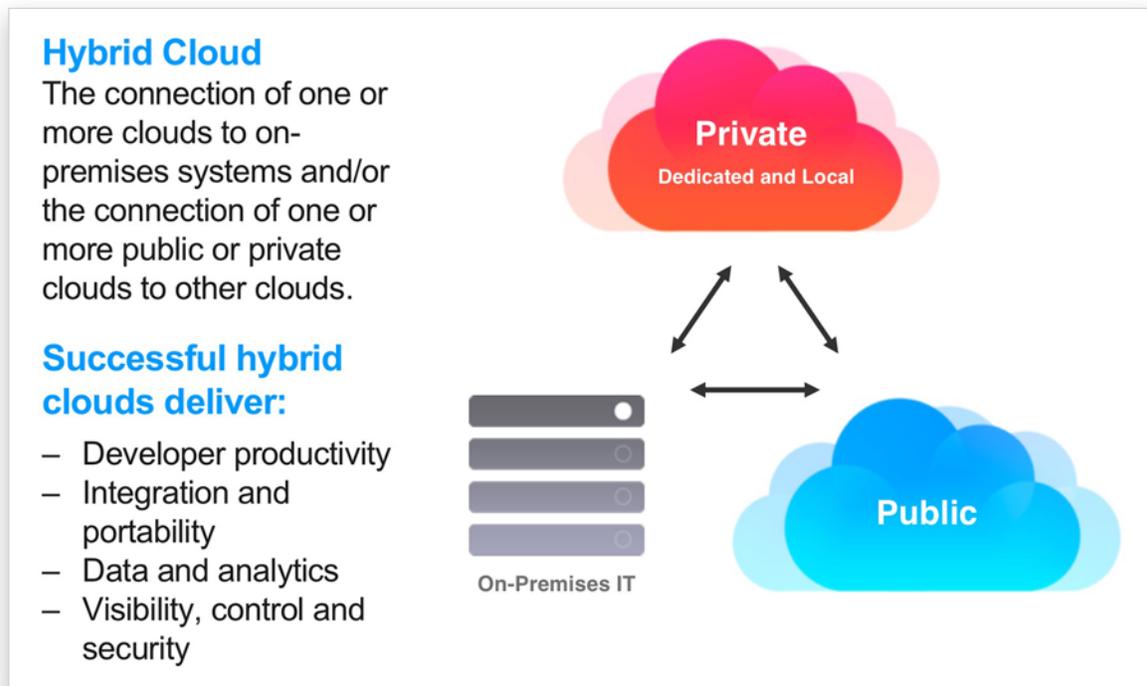


Figure 2: Hybrid clouds span multiple clouds OR span on-premises/cloud

There are multiple aspects involved in developing a tools portfolio addressing hybrid services, with use cases traversing virtually every stage of the application lifecycle. Common use cases for such tooling include:

- *Self service access:* Providing timely run time environments to developers and Quality Assurance (QA) personnel so they are not waiting in line for development and testing environments
- *Onboarding new hardware/software to diverse platforms:* Provisioning the hardware, software, and configurations supporting applications and infrastructure in environments characterized by frequent change
- *Inter-cloud governance and management:* Determining the “right” cloud option for a given workload, governing policies related to each platform type
- *Network connectivity and application integrations:* Ability to connect existing applications to one another and the cloud via network connections and middleware
- *Support for cross-functional management of end to end applications and/or services:* Combining public/hybrid/private cloud performance and availability metrics with metrics from on-prem IT infrastructure systems for end to end performance monitoring, service level management, and proactive remediation.

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The “right” automation can bridge and unify diverse platforms and technologies into a single execution and management fabric. Via a combination of management tools and analytics, leading edge hybrid IT management systems optimize the tasks of deploying, operating, and connecting multi-cloud environments to one another and to their underlying infrastructures. This approach can eliminate wasted time and human error on the part of IT specialists by eliminating time-consuming and error-prone manual processes.

Hybrid IT management-focused toolsets can detect and help remediate infrastructure issues before they become full-blown problems, assist IT staff in determining the right IT infrastructure and cloud network for a given workload, and provide a foundation for governing and supporting diverse IT platforms. Each of these is a requirement supporting the delivery of high value applications.

While automation is an important factor in effectively managing any enterprise service, it is particularly critical for supporting hybrid IT environments. Application reliability, availability, and performance are inherently more fragile in hybrid deployments, due primarily to the fact that a broad range of diverse technologies interconnect and interoperate with one another. A failure on any given platform, infrastructure element, or connection point will adversely impact the user experience; such failures are extremely difficult to diagnose without tools providing visibility into complex, interconnected systems.

However due to the diversity underlying hybrid deployments, automating hybrid IT management functions requires a combination of instrumentation and advanced IT operational analytics (ITOA). Operational big data consisting of operational and performance metrics—log files, messages, and metrics providing visibility to hardware, software, and infrastructure—provide the raw material for end to end management of hybrid services. Advanced analytics provide real time analysis of the relationships between those metrics and operational health.

Able to correlate massive amounts of operational data much faster than humans can, analytics systems utilize information from across the ecosystem to develop and maintain a management fabric capable of supporting correlation across a broad range of platforms and metrics. The objective is to proactively monitor and manage complex IT and cloud environments, and ultimately the applications that they support – identifying and resolving problems quickly before end user service is impacted. The end goal? To provide a high quality user experience and high quality services capable of delivering on business objectives.

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## Factors Impacting IT Operations in Managing Hybrid Environments

In addition to the challenges presented by heterogeneity and integrations, there are additional challenges with hybrid services that must eventually be addressed. They include:

- *The impact of Agile practices, DevOps, and Continuous Delivery:* EMA analysts are finding, via surveys and interviews, that a majority of enterprise-sized companies are now delivering software at a much faster pace than was the case in the past. This, in turn, creates high rates of change that can impact production execution and disrupt user access to critical services. Adequate automation can mitigate the impact of change by discovering and modeling changes automatically and in real time, and tracking the impact of a given change on production execution.
- *The impact of multi-cloud usage:* Today's IT support personnel are often confronted with diverse provisioning, monitoring, and billing requirements, depending on the type of IT infrastructure and/or cloud environment(s) in use. Each "flavor" of IaaS and PaaS has its own provisioning processes, monitoring methodologies, and licensing/costing structures. Each separate product—AWS, Azure, or SoftLayer—requires specific provisioning steps. Each platform also has a variety of sizing and licensing options that require expertise to select and understand; and even private cloud is often billed internally. Yet many IT organizations lack the tools required to optimally size, configure, and manage cloud efficiently and cost effectively, and to quantify cloud usage.
- *New types of monitoring requirements:* Monitoring availability and scalability for diverse IT infrastructures, including public, hybrid and private clouds, requires a heterogeneous set of metrics and logs, each in different formats and addressing diverse execution platforms. Analyzing logs and metrics in context to the platform producing them can yield important information that is critical to troubleshooting and root cause analysis.
- *Proactive monitoring and management:* Predictive failure analysis supports proactive problem resolution before issues impact users. Intelligent, "self learning" operational IT management systems can "learn" the normal behavior of environmental elements and detect when performance and/or availability drift beyond normal limits. Such analysis requires a combination of real time and historical metrics, as well as advanced analytics specifically geared towards hybrid environments. Today, many IT Operations organizations lack tools with these features.

## An Automated Approach to Managing Hybrid IT Deployments

There are multiple considerations involved in developing an IT management tools strategy for hybrid IT infrastructure, cloud, and application management. Heterogeneity, the integrated nature of hybrid services, and meeting the requirements of the multiple operational groups supporting these services must all be taken into account. Perhaps the biggest consideration of all is that of safeguarding the user experience, a key capability necessary to ensure that business needs are being met.

Developing such a strategy requires two types of hybridization:

- Support for monitoring and managing the hybrid IT environment itself
- Support for unifying insights and metrics from diverse IT monitoring and management tools, creating a "single pane of glass" into the hybrid service.

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## Monitoring and Managing Hybrid IT Environments

Monitoring and managing hybrid IT environments requires the ability to monitor/manage disparate, multi-vendor platforms in the context of the end to end service. While distributed and component-based applications have similar requirements, hybrid services have several key differences:

- They are massively integrated, requiring monitoring of APIs and middleware which are key factors in service performance and availability.
- They may incorporate technologies such as IaaS and PaaS, and other services owned by external entities; these platforms cannot be instrumented directly by customers themselves.

Successfully monitoring and managing the hybrid world relies on a single view of operational IT environments that combines top down and bottom up perspectives. Ideally, this can be done in an integrated manner that allows for the correlation of management information and its transformation into true management insights via analytics

This approach requires visibility to underlying silos and technologies—for operational support—AND to the execution layer, which IT Operations Management teams need for infrastructure-, network- and application-focused insights.

Integrated top down and bottom up views provide role-relevant visibility for IT Operations managers as well as deep dive monitoring/troubleshooting for siloed operational specialists. Additional benefits include:

- Support for the diverse provisioning and monitoring, requirements of multiple cloud providers (i.e. Internal IT, AWS, Azure, SoftLayer)
- Change management functions addressing accelerated changes introduced by Agile development and Continuous Delivery. Functions may include automated change detection, rollback capabilities for failed deployments, topology models showing interrelationships between software elements that could cause “downstream” issues, etc.
- Capacity management via monitoring of performance in the context of potential expansion or scalability requirements
- Predictive analytics to identify likely performance impacts of clustering, scaling, virtualization, etc.
- Log monitoring across diverse cloud platforms, including centralized, searchable views of cross-ecosystem log messages
- Onboarding of new hardware/software in a platform agnostic fashion.
- Capabilities supporting self-service provisioning to allow IT Operations managers to empower developers and Quality Assurance (QA) testers to provision their own environments..

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## A Hybrid IT Tooling Model and “Single Pane of Glass”

As companies increasingly rely on hybrid services to achieve business objectives, most recognize the need to adapt IT operational models to the realities of modern application and workload delivery. They face new requirements to unify diverse IT operations support teams with a single pane of glass addressing both role-based and service-based management. Since virtually every company already has a host of IT monitoring and management tools in place, few have the luxury of “ripping and replacing” with more hybrid-friendly options.

Figure 3 suggests a more visionary option. Integrating and automating IT monitoring and management data from a variety of tools, while adding analytics to the mix, can drive companies closer to a true vision of hybrid IT management. With the added benefit of an Intelligent Operational Analytics Overlay, IT Operations teams have access to capabilities supporting high-speed correlation/analysis of metrics from existing toolsets—and from future tools added to support integrations or new technologies over time—to treat logs, metrics, and similar data as a unified operational data lake. This overlay enhances the “single pane of glass” vision to deliver greater visibility into the hybrid service at a far lower cost of acquisition and ownership than “rip and replace” solutions.

Requirements for implementing this hybrid IT management vision include:

- Assessment and gap analysis of IT infrastructure, network, and application management tools installed today and needed for the future.
- Development of an integration strategy for existing IT management tools, including investments in analytics that “understand” the metrics those tools generate
- Deployment of tools features supporting integration and automated visibility to the on-premises and cloud delivery systems and topologies underlying applications/services
- Creation of actionable insights into the cross-platform integrations and network connections that can seriously impact application performance/availability
- Support for detecting, reporting, and modeling changes in an agile, real-time manner
- Planning for the “next steps” required for reaching the ultimate hybrid IT management vision.

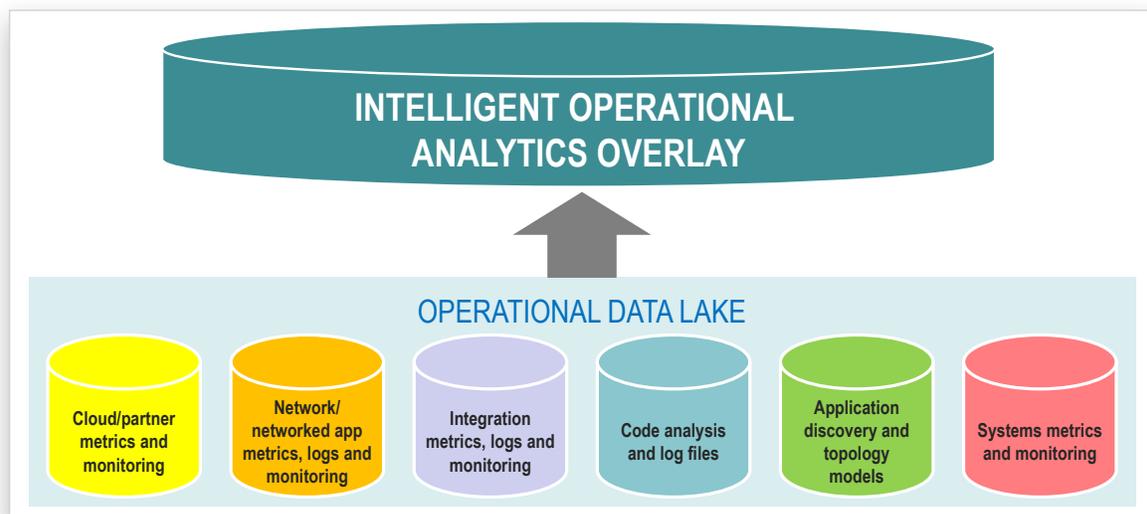


Figure 3: A cohesive hybrid IT management platform: automation umbrella or overlay correlates from underlying tools, delivering single pane of glass into hybrid IT environments

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## Summary

EMA has long recognized the growing need for increasingly sophisticated hybrid IT management solutions addressing modern technologies and applications. Figure 3 is the latest iteration of a semantic model that has evolved over the past 10 years. Over time, it has become increasingly apparent that siloed tools alone are no longer capable of delivering correlated information quickly enough—and with enough depth or predictive insight—to support the increasing complexity of modern IT execution environments.

Businesses increasingly rely on Business Intelligence (BI) products designed to analyze multiple business-related variables in context with one another. Figure 3 suggests a similar answer addressing IT Operations Management professionals, who typically face much higher volumes of monitoring and management data which must be correlated and analyzed in real time.

From this perspective, the idea of striving toward an overarching hybrid IT management vision infused with a strong analytics overlay may be the only viable option for ensuring the performance and availability of massively complex IT operational and application environments.

Hybrid IT management is an area of focus and investment for IBM as well. IBM is working with clients around the globe to help them evaluate and execute on a hybrid IT management strategy. IBM's hybrid IT management solutions include areas such as application performance management (APM), IT operations management/Netcool Operations Insight, WebSphere Application Server (WAS), PureApplication, Bluemix Local Server, and hybrid cloud management—all with a strong focus on infusing analytics capabilities throughout.

Very recently, IBM announced IBM Cloud Automation Manager, a new offering in this space that helps clients simplify management and provides greater visibility across all cloud environments. IBM understands that this is not an “all or nothing” approach. The company works with clients across the world to help them design purpose-fit solutions and transform their disparate IT management capabilities into integrated, automated, and intelligent hybrid IT management environments.

The idea of striving toward an overarching hybrid IT management vision infused with a strong analytics overlay may be the only viable option for ensuring the performance and availability of massively complex IT operational and application environments.

### 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](http://www.enterprisemanagement.com) or [blogs.enterprisemanagement.com](http://blogs.enterprisemanagement.com). You can also follow EMA on [Twitter](#), [Facebook](#), or [LinkedIn](#).

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