# Moving to the Cloud

## The Emerging Paradigm for Analytical Environments

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

July 2015

EMA™
IT & DATA MANAGEMENT RESEARCH,
INDUSTRY ANALYSIS & CONSULTING

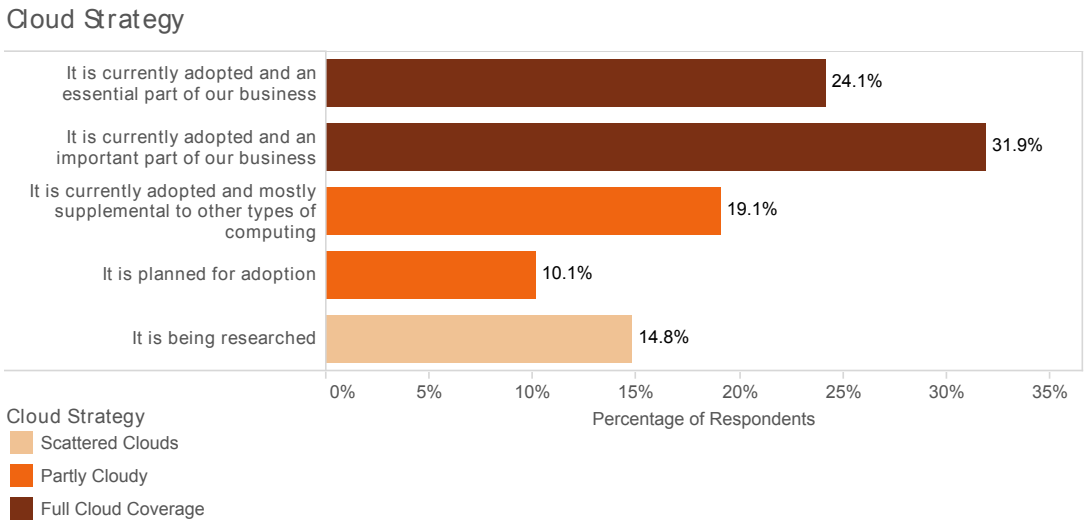
# Moving to the Cloud:
# The Emerging Paradigm for Analytical Environments

Although viewed as a fairly recent phenomenon, the emergence of the cloud computing paradigm has been decades in the making. With this cloud infrastructure in place, software vendors began introducing the multitenant software as a service (SaaS) solutions, enabling the enterprise to outsource the management of critical enterprise applications. These applications not only provided significant business value in their own right, they served as a vital proof-of-concept for secure and high-performance delivery to the enterprise via the cloud. The evolution of the cloud continued with the introduction of infrastructure as a service (IaaS) offerings, providing computing and storage resources for companies who wanted to deploy noncloud-native applications and processes via the cloud. This was followed by the introduction of platform as a service (PaaS) offerings, which provide a cloud-based framework by which the enterprise can develop and manage its own applications.

The movement of data, resources, and processes to the cloud represents one of the most significant shifts in the history of enterprise computing, bringing about the same kinds of widespread transformation as such previous game changing developments as the introduction of personal computers and the advent of the World Wide Web. And the trend is far from over. If anything, movement to the cloud is accelerating as the reliability of the platform becomes apparent to organizations that have implemented it, as services offered via the cloud continue to grow and mature, and as rapidly changing business requirements propel businesses to adopt new practices, processes, and methodologies favoring decentralized, non-localized, and/or virtualized deployment.

The movement of data, resources, and processes to the cloud represents one of the most significant shifts in the history of enterprise computing.

In recent EMA research, 56% of respondents indicated that cloud-based analytical strategies were "essential" or "important" to their corporate strategies. There are numerous advantages to cloud deployment. The cloud enables the enterprise to outsource both infrastructure and complexity. Deploying via the cloud enables a business to reduce staff requirements and strategically refocus resources. It also provides a seamless way for the enterprise to keep technologies current while managing costs.





©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com

Each of these points bears further exploration. Outsourcing infrastructure and complexity is one of the chief appeals of the cloud deployment model. Managing infrastructure on-premises involves significant investment and commitment of resources to manage the infrastructure. For software this includes both the cost of the license and the resources required to install, manage, and maintain the environment. For hardware, this involves the cost of the hardware itself along with what the enterprise must pay for the floor space the server occupies, the power that it consumes, and the climate control system that keeps it functional.

Reducing staffing requirements is one of the promises of cloud deployment, although in reality it rarely results in major headcount reductions. Freeing existing staff from the burdensome and complex tasks listed above more often enables the enterprise to engage in a strategic refocusing of resources. Having moved some share of infrastructure to the cloud, the organization can dedicate newly freed resources to expanding existing initiatives or introducing new initiatives, including new product and service offerings, that previously could not be supported.

### Types of Cloud Implementations

**Public Cloud –** Deployments via third-party infrastructure that enable the elastic provisioning and operation of data management platforms.

**Private Cloud –** Deployments that include the elastic provisioning and operation attributes of public cloud resources, but that are implemented within the firewall of a data center.

**Hybrid Cloud –** Installations that enable organizations to securely store their data within the firewall of a private cloud environment and flexibly use additional resources in public cloud environments.

Managing costs is another key driver for organizations making the move to a cloud-based model. Whether a particular deployment is more economical on-premises or via the cloud can be difficult to determine, primarily because an apples-to-apples comparison is difficult to achieve. An on-premises installation of a given solution can be shown to be very economical at a base level, particularly when run on commodity hardware. But as previously noted, cloud deployments eliminate costs associated with floor space, power, cooling, and personnel to manage the environment; any comparison that does not factor these elements in will be misleading. Moreover, the business avoids expenses that might be incurred from purchasing too much or too little capacity. The ability to "pay as you go" is a major benefit of cloud deployment.

## Projects

Because of the benefits described above and owing to the flexibility with which cloud solutions can be deployed, organizations are using the cloud for a wide variety of use cases. Customer relationship management (CRM), human resources (HR), accounting, enterprise resource planning (ERP), and other enterprise applications are moving to the cloud. As IaaS and PaaS expand their offerings, the enterprise is likewise expanding its cloud footprint to include more and more of its IT infrastructure. This paper explores how a critical piece of corporate infrastructure, the enterprise data warehouse (EDW), is making the transition to a cloud-based environment.

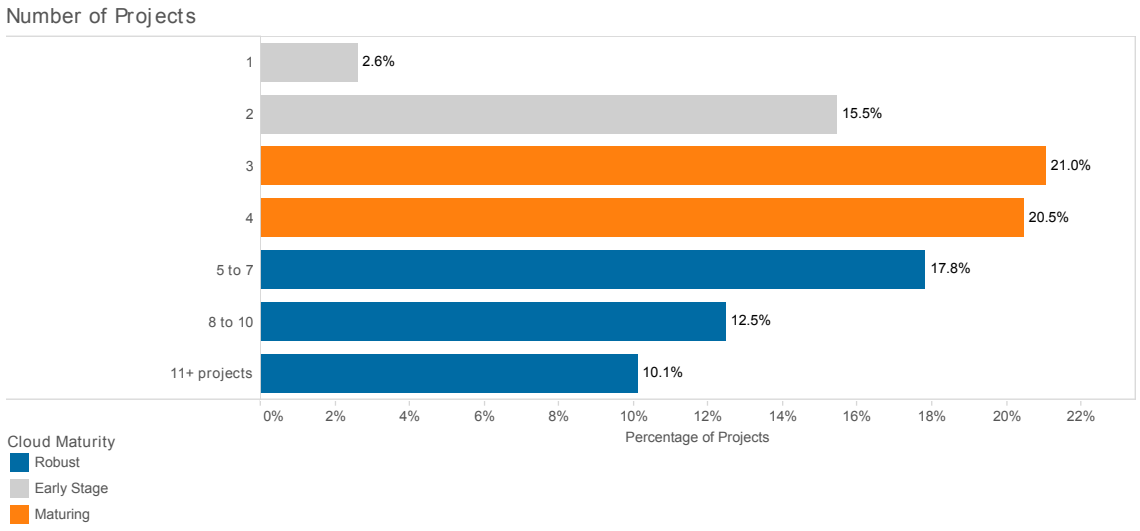
As IaaS and PaaS expand their offerings, the enterprise is likewise expanding its cloud footprint to include more and more of its IT infrastructure.

Some may ask whether in the age of big data solutions an "older" set of capabilities, such as data warehousing, are as critical to the enterprise as they were in the past. Yet, in reality, the data warehouse is as relevant as it ever was, most often coexisting with new technologies and capabilities rather than being replaced by them. The need to aggregate and synthesize structured data is more urgent today than at any prior time. It is true that the enterprise must also work with massive volumes of sensor and other


©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com

machine data, manage live streams of data in real time, integrate text, images, and other unstructured data, and address dozens of other challenges raised by emerging technologies and business practices. However, none of that diminishes in any way the need for a secure, reliable, managed data environment to provide the most accurate view possible of the business as a whole, support critical decision-making, and ensure legal and regulatory compliance.

Just as an enterprise does not move the entire IT infrastructure to the cloud all at once, organizations typically do not move all of their data warehousing activity to the cloud immediately or in one go. Moving the EDW to the cloud is typically done on a project basis. The value proposition of the cloud is different from the traditional on-premises environment. Organizations are adding analytical environments, such as the EDW, to their cloud implementations in a progression. In the same EMA research, respondents detailed the number of cloud-based analytical projects implemented in their organizations. Overall, 40% of respondents indicated five (5) or more cloud-based analytical projects.




The most common use cases for initial cloud deployment of an EDW project include:

- Greenfield, or net new, projects requiring a temporary sandbox
- Underperforming projects where it is believed that an infusion of new infrastructure will be useful
- High strategic value projects involving large quantities of data generated in the cloud

When deploying a new project that will require significant experimentation and trial and error in its configuration and deployment, an IT organization often implements a "sandbox" environment. For BI and analytics, a sandbox environment makes it possible for the organization to avoid the proliferation of "spreadmarts" and other shadow IT solutions. Cloud deployment of a sandbox environment enables the enterprise to avoid both of these pitfalls.

In some instances it is not new projects that require an infusion of infrastructure, but rather the existing environment that cannot perform adequately to meet current demand. This can be caused

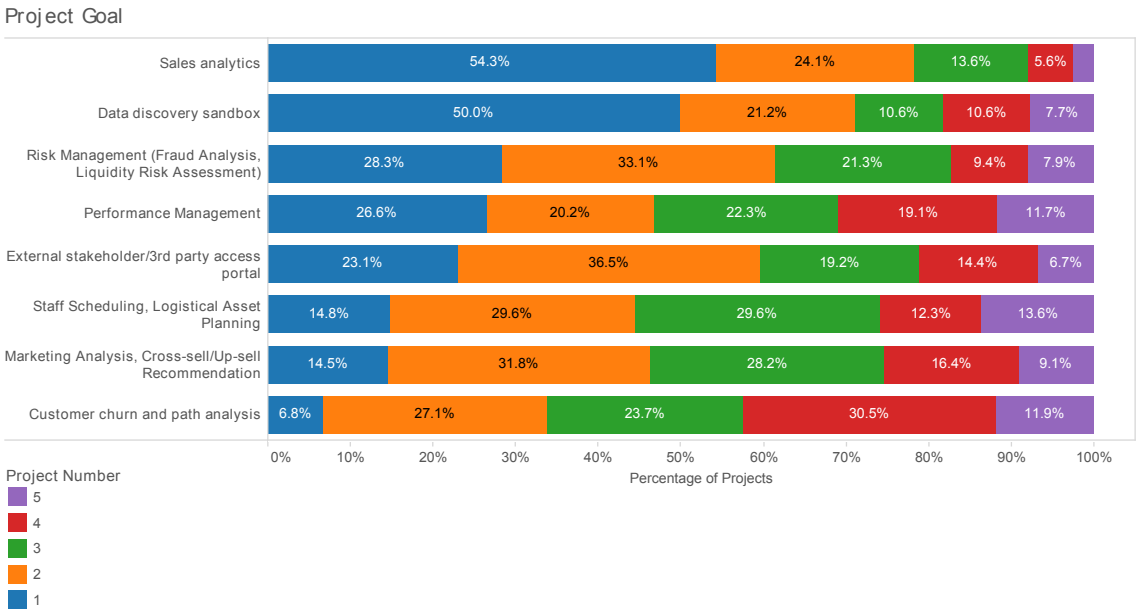
In some instances, the organization supports the implementation of high strategic value projects involving quantities of data, processing capability, or analytics capability well beyond what is available on-premises.


©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com

by any number of factors such as the volume of data managed, the number of users relying on the environment, or the diminishing time windows for reporting to stay within requirements. Organizations moving an existing EDW environment to the cloud to boost performance can take any number of approaches, whether private, public, or hybrid.

In some instances, the organization supports the implementation of high strategic value projects involving quantities of data, processing capability, or analytics capability well beyond what is available on-premises. Such projects can accompany the rollout of new projects or the entry of the enterprise into a new line of business, or they can be projects aimed at optimizing overall organizational business performance.

Examples of organizations implementing these types of projects can be seen across the spectrum of project maturity. Organizations in the early stage of their cloud-based analytics implementations favor the type of project that can be implemented as a sandbox such as operational sales analytics or a discovery environment. These types of environments have little risk associated with them and can be the initial foray into cloud-based implementations.




Organizations in the mid-tier of cloud-based implementation maturity most often implement projects requiring a refresh of processing power or an increase in processing access (concurrency). With the drive toward moving decision making further into data-driven organizations, cross-sell/up-sell for marketing organizations and logistical planning efforts such as staff scheduling and asset optimization are such projects. The amount of information available to make the "next best offer" to a customer making an online purchase or using a mobile application can overwhelm existing platforms. These platforms can also be inundated with increases in shopper activity, such as holidays and specialty item availability.

Finally, organizations with robust cloud implementation best practices can make the leap to strategic projects. In these cases, information from all over the organization is pulled together to provide a real-time view of the organization or its customers. These types of projects are typified by performance management engagements and determining the retention and churn of customers.


©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com

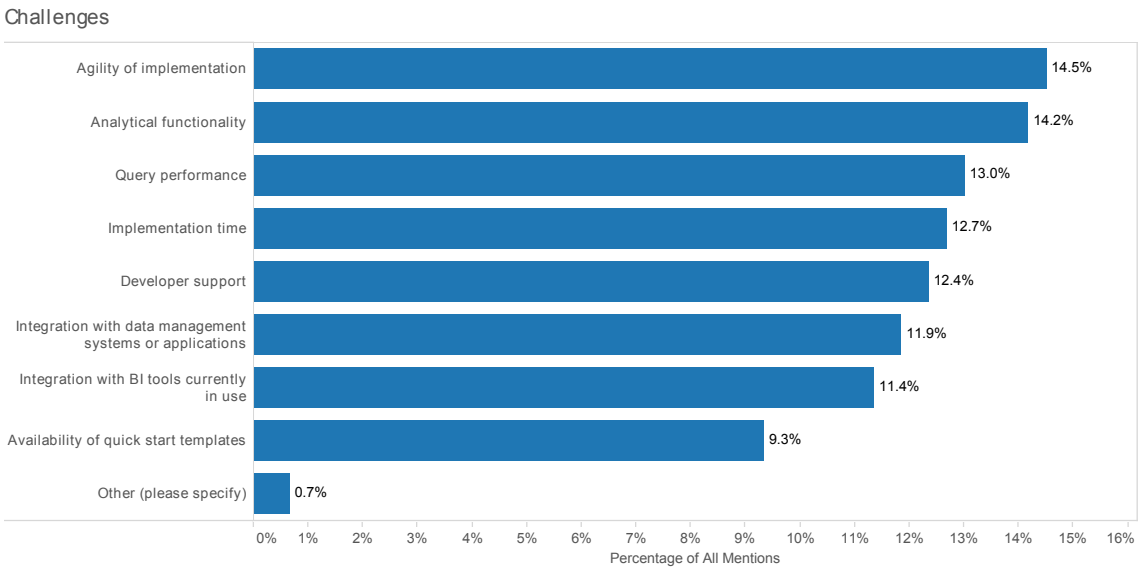
In each of these cases—sales analytics, cross-sell/up-sell performance management, and customer churn—the ability to perform the analytical workloads in a low-latency time frame is important. These use cases demonstrate that the timely exercise of data is still important to maintain competitive advantage and should be seriously considered.

## Challenges

At its heart, implementing an analytical environment, such as an EDW, is an environment that enables the enterprise to consolidate data from different sources and separate data analysis workloads from transactional/production workloads. As discussed above, cloud implementation of an enterprise data warehouse can offer significant advantages over conventional on-premises environments; however, the enterprise also faces substantial challenges when moving to the cloud.

Cloud implementation of an enterprise data warehouse can offer significant advantages over conventional on-premises environments.

EMA research respondents indicated their top three challenges in implementing a cloud-based analytical environment were agility of implementation, analytical functionality, and processing query performance.



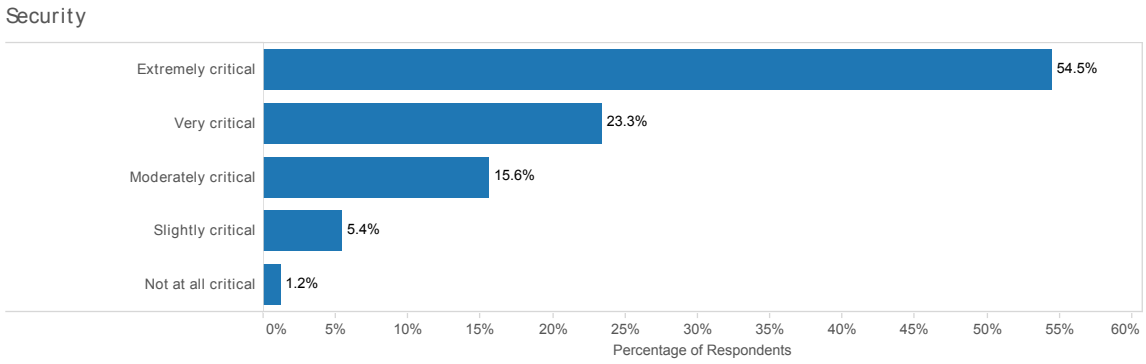

The first concern comes from the concept that cloud-based environments may not have the type of configuration agility that on-premises implementations do. A mindset of a stripped down version of a software package being implemented in cloud may be pervasive. Also, analytical functionality is a concern of organizations making the leap to cloud implementations. They are concerned with the ability of cloud-based platforms to meet the advanced analytical requirements of workloads, such as optimization. The last top concern of cloud-based implementers is how their queries performance would meet performance expectations associated with customer-facing analytic results such as cross-sell/up-sell.


©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com

There was a time when utilizing a cloud-based platform meant that compromises relating to agility and functionality were required. However, that time is behind us. Cloud-based implementations of analytical and business intelligence platforms have matured to the point where, both in terms of feature/function lists and end-user sentiment, they are on a par with their on-premises licensed counterparts.

### *Importance of Security*

As with general performance issues, specific challenges relating to security and compliance must be addressed via execution on clearly articulated system requirements and SLAs. Although security is still one of the most frequently cited objections to cloud deployment, the security risks associated with operating in the cloud are not greater than those associated with operating on-premises, they are merely different. The real danger for the organization derives from not understanding the difference between the two and not preparing adequately. The enterprise also encounters heightened risk when, as described above, the full cutover from one environment to the other is delayed. In that instance, the organization is subject to both varieties of security risk until the final transition occurs. Nearly 55% of EMA panelists indicated that security was Extremely Critical to their cloud-based analytical implementations.




While there have been no significant breaches associated with analytical platforms based on cloud architectures, there are plenty of examples of how security breaches negatively impact the perception of overall corporate and platform confidence. Recent security breaches at major US-based retailers and a significant breach of security at an international movie studio and gaming provider highlight these issues.

## Architectures

As noted above, a primary reason that cloud deployment has become a popular approach when it comes to investing resources in new projects is the affordable "pay as you go" model, which minimizes upfront infrastructure costs. Another important benefit of the cloud is the flexibility that it provides in terms of selecting the appropriate solution architecture for the EDW.

The following graph shows the overall importance of various cloud-based implementation strategies of analytical elements as indicated by EMA panel respondents. The bars trending to the right side of the graph indicate a higher rate of implementation using cloud-based strategies such as infrastructure as a service, platform as a service, software as a service, or managed services. The bars that trend to the left utilize on-premises data center options for implementation.

### Types of Cloud Services

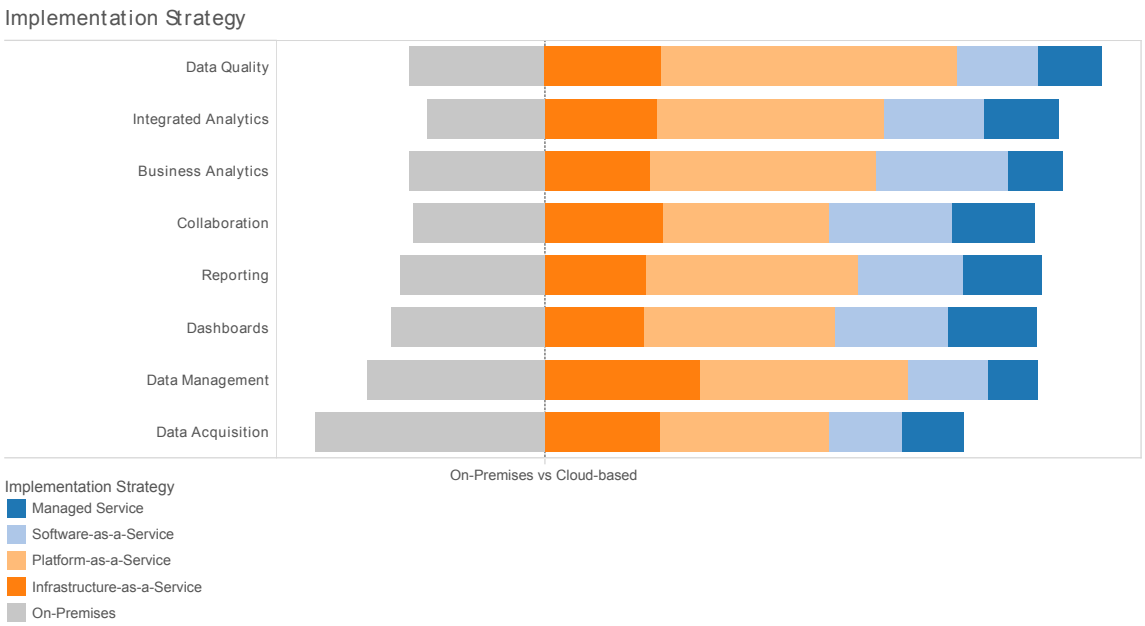
**Infrastructure as a Service (IaaS) –** Includes storage, hardware, servers, and networking components

**Platform as a Service (PaaS) –** Data management systems and development environments

**Software as a Service (SaaS) –** Hosted application environments

**Managed Services –** Fully managed end-to-end technical environment and services to support the delivered solution


©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com




Data management is a strong component of analytical projects in the cloud. Yet there is a strong historical installation base for relational databases and NoSQL data stores that have focused much of their implementation history on licensed installations. When you look at the chart above and how organizations implement data management for analytical projects in the cloud, PaaS and IaaS are the two strongest options for implementation of their data management environments.

> PaaS and IaaS are the two strongest options for implementation of their data management environments.

The evolution of these deployment architectures shows how different models take different approaches to defining analytical architectures. These analytical architectures must align with business drivers, operating models, and key processes. They must support the principle requirements for data access, and should be the best fit for overcoming obstacles within the data. Perhaps most importantly, the architecture must be future-ready, consistent both with current needs and the likely evolution of technological capability and business requirements. Increasingly, to meet those requirements, organizations are looking for an architecture that supports real-time operation. This is driving the move from standard disk retrieval to virtualized disk to in-memory architectures and finally to a true real-time platform.


©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com

## EMA Perspective

Business as a whole continues to evolve in an increasingly digital direction, as evidenced by the growing prevalence of such concepts as virtualization and by the relationship that businesses have with their own data. Businesses seek to virtualize aspects of their development and delivery processes via methodologies such as Agile and Lean, even as they virtualize core operations by moving infrastructure to the cloud. Meanwhile, the emphasis on revising data management practices and infrastructure reflects the fact that data has become the core component of products and services, as well as the primary medium by which business is conducted. Increasingly, the business world is—from top to bottom—a world made out of data. This shift is unprecedented. It is not just the quantity of data that is growing exponentially, it is the pervasiveness and relative value of data assets. Organizations increasingly must parallel within their business and IT practices the same evolution that has occurred within their core infrastructure, demonstrating the kind of fluidity, speed of response and adaptability to change that are inherent within their digital assets.

These are the factors driving businesses to the cloud; they are also the reason that business is accelerating towards real-time operations. In such a context, it is easy to see why a critical function such as data warehousing would be a strong candidate both for cloud deployment and real-time functionality. Businesses no longer have the luxury of picking and choosing which digital strategies to emphasize. Today's formula is increasingly "all of the above." Achieving both the perspective and the core practices that will enable progress on all dimensions simultaneously is a significant undertaking—one that can result in tremendous risk and complexity for organizations that take the wrong approach.

The cloud is emerging as a valuable environment for data warehousing. Cloud implementations offer to boost performance while reducing both costs and complexity. Moving to the cloud dovetails with the need to adapt to an increasingly real-time model. Ideally, businesses want a solution that will address both challenges.

In the face of these changes, SAP has been a leader in introducing new thinking about how to design and implement enterprise data environments. With the SAP Cloud, they are moving core ERP applications as well as the underlying data infrastructure offsite and into an easily managed cloud environment. With SAP HANA, they have simplified the core data architecture by moving the entire database into memory, eliminating delays associated with reading from and writing to the disk.

As a platform, HANA enables real-time analytical and transactional processing at the scale required to support the full enterprise. The HANA model eliminates work cycles and resources dedicated to maintaining multiple database copies and keeping them in sync with each other. HANA also combines transactional and analytical data, doing away with the need to populate the organization with multiple copies of the same data.

Available via the SAP Cloud, the SAP HANA in-memory computing platform represents a new approach not just to data warehousing, but to enterprise computing overall. HANA supports the kinds of transformation of business processes, business models, and delivery methodologies that organizations must undertake in order to remain competitive in a rapidly changing environment. SAP builds its cloud and real-time knowledge on a foundation of decades of business process expertise, demonstrated by addressing business problems for some of the world's largest, most complex, and fastest-paced organizations. With HANA, SAP enables organizations to leverage the benefits of cloud deployment for their EDW while simplifying operations via cloud deployment.


©2015 Enterprise Management Associates, Inc. All Rights Reserved. | www.enterprisemanagement.com

## 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.

---

This report in whole or in part may not be duplicated, reproduced, stored in a retrieval system or retransmitted without prior written permission of Enterprise Management Associates, Inc. All opinions and estimates herein constitute our judgement as of this date and are subject to change without notice. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. "EMA" and "Enterprise Management Associates" are trademarks of Enterprise Management Associates, Inc. in the United States and other countries.

©2015 Enterprise Management Associates, Inc. All Rights Reserved. EMA™, ENTERPRISE MANAGEMENT ASSOCIATES®, and the mobius symbol are registered trademarks or common-law trademarks of Enterprise Management Associates, Inc.

**Corporate Headquarters:**
1995 North 57th Court, Suite 120
Boulder, CO 80301
Phone: +1 303.543.9500
Fax: +1 303.543.7687
www.enterprisemanagement.com

3203.072215