Managing Hybrid ERP: New Challenges for the CIO

By Timothy Hofer, Rajninath Patil and Arun Babu
ERP is back on the CIO agenda, though with a different emphasis in today’s increasingly on-demand world. ERP is morphing from a monolithic suite to a modular, multi-sourced and user-driven set of applications at the architecture epicenter of the networked enterprise. In light of these changes, CIOs should create a strategy to effectively plan for and manage this more complex hybrid ERP environment.
Often referred to as the IT backbone of large organizations, ERP applications have been game changing technologies since the 1990s. As the “system of record” for the enterprise, these packaged applications automate and support a range of administrative and operational business processes in finance (record to report), order management (order to cash), distribution and supply chain (purchase to pay) and HR (hire to retire).

Although ERP growth slowed during the recessionary years following the 2008 economic slowdown, these systems are once again now poised for rapid growth. IDC, for example, is forecasting 6.4 percent revenue growth by 2017 to $69 billion, up from $54 billion in 2013.

Why the renewed focus on ERP? Companies, especially global enterprises, require a robust backbone of business functionality that only an ERP system can provide. One reason for this ongoing centrality of ERP is that, as Accenture notes in its 2014 Technology Vision, “big is the next big thing.” That is, after a decade of headlines dominated by digital startups, the coming years are expected “to see the emergence of the traditional companies as digital giants.” These large companies are once again using technology as a driving force. “Backed by their deep resources, enormous scale, and process discipline, these new digerati are about to rewrite much of the digital playbook.”

Another factor is globalization and the need for a common operating model across units and geographies, or after a merger/acquisition—while allowing for sufficient localization—which can support and drive growth faster and more predictably by creating consistency in business processes as well as data management.

A distinctive feature of today’s ERP is that it is built inherently on a hybrid architecture. Commonly, such an architecture is referred to as a “Two-Tier Model”—that is, the combination of core ERP capabilities with cloud/SaaS-based capabilities on the edge in areas such as sales, CRM and collaboration—all integrated with the ERP system.

In reality, however, the architectural environment is more complex than just two tiers. CIOs today need to manage the legacy environment, ERP systems (sourced either through a public or private cloud), SaaS technologies, as well as various platform as a service, business process as a service or Software as-a-Service offerings from vendors and integrators. And all the while companies need to be thinking about the proper way to incorporate today’s leading technologies including in-memory computing, analytics, mobile and social.

This is a complex environment, to be sure, and it is dramatically altering the impact of traditional ERP (see Figure 1). In the future, because of its unique capabilities in the context of cloud, networks, security and other technologies, ERP will be at the architecture epicenter of the digital enterprise.

This paper explores the opportunities but also the distinctive management challenges that CIOs face in managing a hybrid ERP architecture.

**Figure 1: Traditional vs. Hybrid ERP**

**The Role of Traditional ERP**

Traditionally categorized as “systems of records,” everyday ERP applications:

- Process billions of transactions globally, including payments, orders, inventory updates and new hires
- Keep organizations in compliance with regulations such as Sarbanes-Oxley
- Support thousands of users’ needs for a common view of products, services, suppliers and customers
- Manage an ever-increasing amount of data

**Benefits of the new hybrid ERP**

As the modular and multi-sourced application environment for the networked, digital enterprise, ERP has the following characteristics:

- Core building block of the digital technology platform
- Hybrid deployment of components (cloud/on-premise)
- Easily integrated modular (micro) vertical functionality
- Foundation for high-velocity transactions, real-time reporting and analytics
- Support for content-rich interactions (human to human, human to machine, machine to machine) inside and outside the enterprise
- Consistent master data flow to enable meaningful analytics based on a mix of internal and external data
Part 2: Moving to a hybrid architecture: Multiple components

As implied above, managing a hybrid environment involves many more complexities than just core ERP, with SaaS applications at the edge. CIOs looking at their IT environment must manage and integrate a range of elements in addition to core ERP and frontline SaaS applications, including:

- Digital technologies (social, mobile, analytics, cloud, etc.)
- Platform as a Service
- Non-production ERP hosting
- In-memory computing
- Security

In addition, it is not a simple matter of choosing between the big ERP providers and the smaller SaaS providers. The ERP giants are busy making adjustments not only to integrate with SaaS applications but also to compete against them. All these changes are creating uncertainties and hesitations in the minds of CIOs.

To move forward in this complex, hybrid environment, the most effective CIOs will create a flexible ERP strategy. They will make a conscious decision to deploy solutions to complement or expand their existing ERP solutions. Such decisions are complex and require a true business case analysis across many dimensions, including organizational impact, security and speed to value.

As leaders, IT executives will need to make clear why such IT capabilities are critical to the business, what their value is, and most importantly, how the services will be provided to existing businesses or customers. IT must work with the business more closely than ever before to make decisions on investments and the scope of functionality.

As shown in Figure 2, CIO will have to address multiple elements of the hybrid world.

Core ERP (in a private cloud) continues as the system of record for the enterprise, but SaaS applications are becoming equally as prevalent as on-premise niche software applications. These SaaS applications are replacing part of the core ERP or are serving as a bolt-on bringing immediate business value and overcoming traditional customization challenges.

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**Figure 2: Multiple complexities to manage with hybrid ERP**

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Digital technologies such as social, mobility, analytics and cloud are affecting how applications are designed and what functions they deliver; or, in the case of many SaaS applications, are already embedded into the solution—meaning CIOs need to be able to address such new capabilities. In-memory computing is quickly taking center stage, and non-production ERP environments are being migrated to a public cloud. Platform-as-a-service (PaaS) tools in the cloud replace in-house tools. As these trends take shape, security is increasing in importance.

The following sections explore the elements in Figure 2 in more detail.

1. Digitization of the ERP architecture
As discussed in the Accenture Technology Vision reports for 2013 and 2014, digital technologies (social, mobility, analytics and cloud) are revolutionizing commerce to the point where “every business is a digital business.” The convergence of digital technologies signals a transformational shift that is enabling growth through new business models, digital products and redefined business processes. Integration of digital technology into business is essential for driving market differentiation and innovation, as well as creating profitable growth.

Although these technologies are in some cases not fully proven, they present significant opportunities. Leading organizations are already weaving digital technologies throughout their operations to drive technology and business advantage. They view digital as a strategic imperative and a tool for competitive differentiation.

It’s up to CIOs to be stewards and promoters of this new digital mindset. It is no longer possible to separate “the technology” from “the business”; the two are intertwined. CIOs should ensure that IT teams can leverage digital technologies to rapidly create cost-effective solutions to some of their toughest problems and greatest opportunities.

This is a critical time for CIOs. They must decide what digital technologies should come online internally and externally and how they are to be managed. More importantly, technology executives must set expectations with the business about how the digital capabilities will be rolled out and when. If they do not communicate their broader plans, they risk seeing the business take matters into their own hands, potentially causing future disruption in a fast-changing ERP landscape.

2. Two-Tier ERP architecture
“Two Tier ERP” refers to an ERP architecture in which core ERP capability is maintained in an on-premise fashion—traditionally or through a private cloud—and then using different ERP applications “on the edge.” Several business needs such as global expansion, acquisitions and divestments have driven the adoption of a Two-Tier ERP model. Extending the full, complex ERP system (deployed at headquarters) to the local unit or factory would be too expensive and would take too long, delaying the value realized from the expansion or acquisition. A global ERP template many times is simply too complex or customized for smaller regions or subsidiaries that are unique; a two-tier ERP strategy allows for simplified approaches to meet local demand yet still tie back into the corporate core ERP system.

Case: A mobile, cloud-based ERP solution for a European oil and gas company
A Spanish multinational oil and gas company wanted to implement a digital solution for its travel and expense process. Accenture worked with the company to choose and implement SAP Cloud for Travel solution and integrated it with the on-premise SAP ERP Central Component (ECC). The solution allows employees to request travel, perform travel bookings and capture images of bills easily and quickly on their mobile phones. Similarly, managers can receive updates and can approve the workflow on their mobile phones in real time. This solution has helped the client significantly speed up the reimbursement process. SAP Cloud for Travel also provides analytics capabilities to provide deep insights into travel spending to better manage expenses.
A couple of cloud alternatives on the edge are being used to overcome this challenge as shown in Figure 3. One alternative is using SaaS ERP systems such as SAP Business ByDesign and NetSuite for the subsidiaries. A second alternative is using a vanilla installation in the cloud of a core ERP product, removing all the complexity of the master template.4

3. Frontline SaaS applications
The traditional ERP giants now see large elements of the ERP footprint being challenged by SaaS providers in areas such as sales and CRM (salesforce.com, Sugar CRM, Zoho CRM, Sage CRM), talent management (SuccessFactors, Workday, Epicor HR, Taleo HR), e-procurement (Ariba, Coupa), travel-and-expense management (SAP Cloud for Travel, Infor Expense Management), and many more.

These SaaS applications are increasingly becoming part of an organization’s future plans. For example, 45 percent of the CRM systems sold worldwide in 2013 were SaaS based with Salesforce.com leading the market.5 By 2012, more than 25% of all HCM technology spending was in the cloud.6

At the same time, the ERP giants are not standing still but are investing heavily in their own cloud-based applications. SAP has its own cloud strategy and has developed and acquired a suite of cloud offerings across domains such as people (SuccessFactors), customers (Customer OnDemand), money (Financials OnDemand, SAP Cloud for Travel) and suppliers (Ariba) to augment its core ERP/SAP ECC offering.

Case: Faster integration of an acquisition through a SaaS solution
A major energy company needed an agile, streamlined and cost-effective solution to facilitate the rapid integration of an acquisition within its downstream portfolio business. Accenture supported the client in choosing and implementing SAP Business ByDesign instead of extending its SAP ECC from headquarters to its newly acquired subsidiary. SAP Business ByDesign was deemed to be capable of addressing key high-level functional requirements based on an out-of-the-box configuration. The speed and agility in the solution resulted in a short, six-month implementation for the subsidiary, providing a faster integration of the businesses and helping to more quickly unlock the value from the acquisition.

Figure 3: A two-tier ERP strategy

Cloud ERP – ERP implementations different than global Master ERP templates running in private cloud with interfaces back to corporate = smaller subsidiaries with complex yet fundamentally different business process

Cloud ERP – Separate business entity, or acquisition as a standalone ERP in public or private cloud = Divestments

ERP Software as a Service (SaaS) – Providing niche capabilities required by geographic or business segment = standalone sales office

Global Enterprise (Master ERP Template)

Those regions with scale, volume, and/or complexity running on the ERP master
Similarly, Oracle Cloud offers an integrated portfolio of cloud-based applications, including: Oracle Fusion Human Capital Management Cloud, Oracle Customer Experience Cloud, Oracle Supply Chain Management Cloud and Oracle Enterprise Performance Management Cloud.

Microsoft is also in the game, offering cloud-based Microsoft Dynamics CRM.

The key point for IT leadership to realize is that the established ERP vendors plan to provide more than just the software for on-premise solutions. Such solutions provide multi-tenant capability, along with security that exceeds many home-grown, internal applications. IT leadership must determine which applications stay in house and then what SaaS capabilities can be leveraged, with appropriate customizations, to meet the demands of the business.

4. Platform-as-a-Service (PaaS)

Most organizations are faced with growing business demands, and IT departments are working to deliver application services faster and at a lower total cost of ownership. They want to push products to market quickly. In some cases, however, the upfront hardware and software costs for projects are prohibitively expensive, and the expected return on investment does not justify the application in the first place. In situations like these, organizations can leverage Platform-as-a-Service (PaaS) which provides a complete application platform for multi-tenant cloud environments including development tools, runtime, and administration and management tools and services.

Organizations should look to leverage PaaS to accelerate the timelines for application software development and deployment. They can also limit risk by not investing upfront in hardware and software for experimental projects.

5. In-memory computing (IMC)

In-memory computing involves storing business information in the random access memory of servers rather than storing it in relational databases on traditional hard disks. In-memory computing is gaining momentum as a platform for business intelligence and analytics, and may soon be used to support many enterprise applications.

The primary driver here is explosion of data and business information across the enterprise. Traditional disk-based database technology can accommodate larger data volumes; however, it is less efficient when it comes to rapid data analysis. With in-memory computing, companies can analyze terabytes of data in seconds enabling near real-time insights into the business. Some companies using IMC have realized approximately 50 percent reductions in batch run time. Others have seen 5X to 6X improvements in report execution time.

With in-memory computing, information is stored primarily in columnar format that can compress and store massive amounts of information in main memory, utilize parallel processing on multiple cores on the Intel architecture, and move data-intensive calculations from the applications layer into the database layer for fast processing. Because all the detailed data is available in main memory and processed on the fly, there is no need for aggregated information and materialized views, fundamentally simplifying the architecture and reducing latency, complexity and cost.

Increasingly, in-memory computing is being proposed as a platform not only for analytics but for transactional systems such as ERP applications.

According to a recent analyst report, the global in-memory computing market is expected to grow at a CAGR of 43.86 percent over the period 2014-2018. Gartner predicts that by 2018, at least 50% of Global 2000 companies will use in-memory computing to deliver significant additional benefits from investments in ERP. The key vendors dominating this market space are SAP, Oracle, IBM and QlikTech Inc.

Case: Migration to a PaaS solution to reduce infrastructure costs and roll out applications quickly

One of the world’s largest online marketplaces and a mobile commerce leader wanted to deploy and scale applications more quickly and cost effectively. Accenture helped the client in migrating its Apple iPad marketplace site to Microsoft’s cloud-based Windows Azure platform. Microsoft Azure is an open and flexible cloud platform that enables organizations to quickly build, deploy and manage applications across a global network of Microsoft-managed data centers. This has helped the company to launch new types of landing pages and customer experiences faster and more efficiently than ever before without the need to invest in additional infrastructure costs.
6. Security
Addressing security concerns becomes even more critical in the hybrid ERP world as data resides on multiple applications spread across an organization's data center and on multiple clouds, and can be accessed by thousands of employees using separate login credentials on multiple devices. These dynamics significantly increase the security threats and raise compliance-related issues at multiple touch points. Identity and access management becomes an important component of an organization's security infrastructure to control and regulate access to an organization's resources.

Integration of the organization's Identity & Access Management (I&AM) capabilities is key, and should be considered when designing the hybrid solution. Organizations should consider having a centralized identity management, access rights & roles management and single sign-on (SSO) for employees, customers and partners. For this, organizations will have to extend I&AM to cloud-based components to simplify user provisioning management and centralize some key security and identity-related information, eliminating identity silos across the organization. CIOs can leverage existing on-premise I&AM solutions or harness the power of cloud solutions to address identity management challenges.

7. Non-production ERP hosting
Organizations can also benefit in today's ERP environment by moving non-production core ERP environments to the cloud. Or, non-production development can begin on a public cloud and be migrated to a long-term private cloud solution. For example, production and pre-production ERP systems can be hosted on a private cloud or on-premises, while all other non-production instances such as development/sandbox, testing and training can be hosted on a secured public cloud such as a virtual private cloud. The key requirement here is to provide a clear path from non-production to production. As a separate approach, a company may consider continuing to use a public cloud environment, with masked data, for only training environments, turning on the site only when the training will be conducted, controlling costs along the way.

With this strategy, organizations can benefit from SaaS-like pricing, taking on OPEX pay-per-use expenses, adjustable system uptime (directly impacting how much you pay by turning off systems when not in use), and increased flexibility.

Case: Migrating to SAP HANA
A US conglomerate giant (food, agricultural, financial and industrial products and services) sought to enable leading analytical capabilities in an efficient and agile manner. Accenture helped the client to migrate its existing SAP Business Intelligence and Enterprise Data Warehouse to SAP HANA and also helped create new reporting capabilities. The company has seen improvement in ETL performance (Extract, Transform, Load) and report executions. Perhaps most important, the company is now able to exploit available data to provide competitive advantage.

Case: Using a cloud platform to host a non-production ERP environment
A global US chemicals company used public cloud via Accenture Cloud Platform (ACP) to host its non-production environments (sandbox, development, quality assurance and solution manager) during the ERP implementation. This significantly reduced infrastructure and maintenance costs, and moved what ordinarily is a substantial capital cost into a lower-cost and more manageable expense line item. In addition, the solution provided the company with the immediate ability to install and run an ERP system as well as start from a pre-configured SAP system specific for its industry.

A key consideration is the contractual relationship to create a hybrid ERP environment. Companies can plan to negotiate direct contracts with third-party Infrastructure as a Service (IaaS) providers or look to third-party providers who have pre-negotiated terms to offer brokered services. Companies offering brokered services have spent the time to negotiate overarching terms; in many cases they incorporate incremental services not directly provided by cloud IaaS providers that may be attractive to end-users. IT organizations should seek brokered services from proven, trusted third parties.
Part 3: Integration Layer in a Hybrid ERP Environment

Given the complexities just discussed, organizations need to prepare an integration strategy that anticipates the world of hybrid ERP. The number of SaaS applications in the market will grow, as will the number of integration solutions. Organizations will have to integrate SaaS applications with on-premise ERP and other legacy applications to avoid creating information silos internally and to mask complexity to end users.

The integration strategy needs to be consistent and coherent. Using a different integration technology each time to integrate a SaaS application with on-premise ERP will create a spaghetti integration architecture which, over time, will become a nightmare to maintain and will require extensive in-house expertise and higher costs.

It is critical for the CIO to prepare an integration strategy that includes fewer core integration solutions in the IT landscape to avoid a complex integration architecture. CIOs should establish integration standards and review them at least twice a year to ensure they meet the company requirements. ERP and SaaS integration also requires new skill sets and technologies. Organizations must extend their integration teams’ capabilities, governance policies and methodologies.

An effective integration architecture will be increasingly important as the number of devices, locations and time zones needed to be covered grows at a rapid pace. Managing from a single time zone while meeting the business demands of a global organization and keeping application data available and secure presents a significant challenge. Foremost among the decisions needing to be made is the one about leveraging third parties working alongside internal IT staff. What skills need to be retained? Where should they be located? There are inherent advantages to working with a third party who already has built global, 24x7x365 support capabilities across multiple digital platforms and solutions.

The first step will be to develop a vision for a hybrid architecture and then create a roadmap to get there, along with a business case and details on the organizational structure required to be successful. (See page 10.) Based upon that roadmap, a CIO can determine what skills are needed today and those required in the future based on the direction of the business and its growth plans.

Trusted relationships between IT executives and business unit leadership are important. The changing ERP landscape is an opportunity to redefine and reshape IT’s relationship with the business. Hybrid environments, after all, create IT agility but business agility as well. As the business becomes more digitally integrated, CIOs need to manage, organize and resource the IT organization in a very different way. Embracing hybrid ERP architectures and digital technologies has changed the role of IT from a technology provider and caretaker to the role of strategic business service IT orchestrator. CIOs are further challenged because the business can more easily bypass IT and procure IT services themselves if IT is not able to demonstrate its value-add in a timely manner.

Managing day to day—“keeping the lights on”—while also working toward a new vision will also be a challenge. It is important to properly communicate why CIOs are asking for time from business teams and where IT will be. Having the staying power to follow the vision and targeted dates versus the day-to-day activities of supporting IT systems and the business can be a challenge. For this reason, effective organizations often create a separate team focused solely on the vision.
Part 4: Keys to success

Increasing numbers of organizations are adopting SaaS (cloud-based) applications that augment core ERP and are moving elements of ERP to the cloud, creating a hybrid IT architecture. The re-purposing of existing functionality to one-to-many SaaS solutions and moving core ERP to private clouds are creating a new generation of ERP environments.

The move to a hybrid ERP architecture and the increasing presence of digital technologies has evolved the role of IT from a technology provider and caretaker to the role of strategic business service orchestrator. CIOs in the future will be service brokers: focused on securing, managing and governing hybrid cloud computing services, as well as the existing on-premises IT footprint.

Accenture believes the winners in this new, more complex ERP environment will focus on a core set of activities:

- Shore up their ERP system in terms of stability and open architectures
- Look to low cost solutions, such as public clouds, to meet non-critical needs
- Leverage PaaS development in the cloud to meet customization needs
- Implement SaaS where it makes business sense
- Create a long-term integration roadmap and build the architecture as projects are approved
- Explore in-memory computing as an important, viable solution in the near term

Hybrid ERP environments promise to combine the best characteristics of traditional ERP with the benefits of agile cloud and on-demand software environments. Moving to this hybrid approach will have ramifications for almost every part of the business, which makes effective IT management and leadership more important than ever. A CIO today has a key role to play as a change agent, innovator and value creator.
The IT organization itself must evolve to adapt to the changing hybrid ERP environment. Previously, IT teams were responsible for the core ERP, as well as surrounding best-of-breed applications and their customizations and integrations. This is now changing. IT teams will no longer be viewed as the group that does the “custom coding” and is solely responsible for hosting and maintaining ERP and best-of-breed applications. That dynamic is changing at a rapid pace.

IT’s responsibilities will change from customizing packaged solutions or creating custom solutions to managing data and the interfaces with best-of-breed systems and off-premise solutions. New IT roles will emerge that are focused primarily on brokering a relationship with SaaS providers and integrators. These changes mean that IT organizations have reached a true inflection point as they look to the future. (See Figure below.)

Adoption of a hybrid ERP architecture also means that CIOs must manage multiple technologies, solutions and deployment models. CIOs will be focused on securing, managing and governing hybrid cloud computing services, as well as the existing on-premises IT footprint, as a broker. IT will have to collaborate more closely with business customers, understand their needs more deeply, and then meet those needs more responsively by sourcing, managing and integrating a diverse mix of cloud-based, on-premise and legacy services.

Organizations need to determine whether they have the right skill sets within the company to deal with these hybrid ERP realities. The capabilities range from technology to legal and finance. The skills for IT personnel will change in the future. And, new IT roles will need to be defined. Integration of business processes, technology, applications and data will become a key focus area for IT in the new hybrid world. Given the number of technologies involved with hybrid ERP, it will be increasingly difficult to hire, train and manage an in-house IT department with the requisite skills. CIOs should make distinctions between capabilities that are strategic and require in-house capabilities, versus what can be outsourced in a way that leverages cost-effective labor arbitrage yet does not limit the ability to deliver services to the business, customers, vendors and other participants in the overall technology ecosystem.

Organizational characteristics needed to enable hybrid ERP

### Today’s IT Organization
- Role of traditional service provider
- Focus on system integration
- Build and manage bespoke systems
- Responsible for service continuity of all IT Services provided in-house
- Data custodian for on-premise IT
- Responsible for security management and policy setting for non-premise IT
- Deep understanding of Technology
- Focus on skills in IT service department and service delivery

### Future Hybrid ERP IT Organization
- Role of service director and integrator
- Focus on service Integration
- Select and manage pre-configured service component
- Additionally responsible for service continuity of cloud services
- Data custodian across a wide range of cloud-based services and on-premise IT
- Increased role of security management and policy setting. Understanding of data protection regulations, I&AM, Cryptography, Web application scanning, etc.
- Deep understanding of Technology as well as IT trends and rapidly-changing supplier landscape to access the most appropriate and cost-effective services
- Focus on skills in IT management, services strategy and business/supplier and vendor management processes
Footnotes


4See the Accenture paper: Cloud-based ERP Implementations: Comparing the options.


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