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# Creating business value by dynamically connecting business and technology with enterprise architecture.

*Issues and challenges for coordinating and managing business change and transformation*

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## Executive summary

Your company and its industry are continuously evolving.

The drivers of business change are many and varied. Market and financial conditions shift dramatically in short periods. New competitors force alterations of marketing and sales strategies and tactics. Innovative products launched by your company or its competitors change the market landscape. You adopt game-changing technologies to gain competitive advantage—or to catch up to the competition. To stay relevant amid shifting consumer preferences, your company develops new products. And economic changes—positive or negative—force your company to change its pricing strategy and/or product mix. Whatever the causes, change is inevitable and unremitting.

Information technology and your IT staff must help to facilitate change, not impede it. Enterprise architecture (EA) dynamically connects the business and technology needs of an organization and serves to fulfill the goal of accommodating change and transformation. Yet you can achieve the greatest value not by merely adopting an EA approach, but rather by integrating EA into all of your business technology initiatives and maximizing the synergies that can be created by doing so.

EA is critical to your effort to maximize your return on your business and technology investments. Key to this return is a clear understanding of what the organization has, how well it operates, and how business strategies and goals are translated into operating processes with supporting technology. In addition, the organization needs to relate its current strategy and structure to longer term plans that provide the vision of the organization at some point in the future, whether that be in two, three or five years.

By understanding where you are now and where you are going, you can create clear roadmaps for change that can help optimize your operations, thereby creating the agility you need to win in an ever-changing market. To this end, EA provides a solution for planning, analyzing and architecting business change and transformation, and assembling the technology that best serves those changes and transformations. The results advance the strategies, goals and objectives of the company and maximize overall business agility.

**Highlights**

***Executives today are highly focused on creating value for their companies by increasing efficiency, agility and innovation while achieving regulatory compliance.***

This white paper defines EA and explains how it can help your organization manage change and transformation, to become more efficient, agile, adaptive and innovative.

### Creating value

Businesses create value in a number of ways: Some are specific to a particular company or industry, but others are open to businesses across all industries. Value-creation opportunities and threats that are top-of-mind in the executive suites of many enterprises include the following:

- *Business efficiency*
- *Business resilience and agility*
- *Regulatory compliance*
- *Innovation*

### Business efficiency

When organizations increase the efficiency of their business processes, they can create more value with fewer resources. The IT department has an obvious role to play here, but first it must understand the:

- *Organization's goals.*
- *Business processes that the organization uses today.*
- *Processes that will be required to achieve the enterprise's objectives.*
- *Human, financial, equipment and other material resources that are required to perform those processes.*

But IT must take care that it does not become part of the problem. Where possible, the IT department should consolidate technology resources as it delivers on business needs. And, again where possible, it must fully leverage the value of those resources by reusing technology components to serve multiple purposes.

**Highlights**

### Business resilience and agility

Year-in and year-out, businesses frequently encounter opportunities and threats, some of which are anticipated, and some of which are surprises. Your success will, in part, be determined by how quickly and how well you take advantage of the opportunities and counter the threats.

Information systems often play significant roles in generating value from opportunities and in avoiding value destruction from threats. For example, after a merger or acquisition, a protracted, faulty integration of the systems of the previously separate entities will be a burden on the combined company, thereby adding costs rather than generating value. On the other hand, an agile company that has a good handle on the goals of the merged company and the business processes and technology artifacts of the predecessor organizations will be able to move quickly to create value from a business integration.

***A series of high-profile corporate scandals have resulted in more numerous and stringent business regulations, placing a heavy burden on IT and other business units.***

### Regulatory compliance

The number and severity of business regulations waxes and wanes, but they are always with us. In recent years, business regulations have become more numerous and stringent as a result of accounting scandals, well-publicized breaches of data security and serious concerns about the negative economic effects of insufficient business oversight.

Some regulations, such as those requiring that organizations protect the privacy, integrity and availability of consumer and financial data, directly affect the IT department. In other cases, the onus of regulatory compliance falls on other departments. Nonetheless, even in these areas, IT can create value by reducing the overhead burden associated with regulatory compliance and, thereby, lowering the cost of compliance.

**Highlights**

### Innovation

Competing on price is one road to profitability, but there can be only one price leader. Other business models may prove more profitable by choosing from among many other options:

- *Targeting customers who are less price sensitive and more focused on value received than price paid*
- *Achieving higher profit margins on each sale by augmenting products with innovative, valuable services*
- *Developing novel products and services that customers will value more highly than existing offerings*

No matter which business model your company chooses, innovation is a critical success factor. Innovative business applications and services are required to enhance customer satisfaction and deliver on the chosen business model in ways that clearly differentiate your company from the competition. A holistic view of all components of the organization is an important determinant of success when transforming business models.

***EA allows organizations to visualize and represent their strategies and various architectures to improve efficiency and create roadmaps for the future.***

### Enterprise architecture

EA is an enabling discipline that translates business vision and strategy into effective enterprise change by creating, communicating and improving the key principles and models that describe the enterprise's future-state and enable the enterprise's evolution toward that state. Simply stated, EA allows an organization to visualize and represent all of its operative components as variables. This representation provides the ability to analyze the organization for inefficiencies, redundancies and disconnections of strategies and technology investments. It also allows an organization to help itself today and to contrast its current state with a model of itself in the future. This clearly highlights the changes needed so process and technology roadmaps can guide daily decisions and resource allocation.

**Highlights**

***Though businesses require change to improve and grow, they must also manage that change to ensure they yield measurable improvements and to avoid creating problems elsewhere.***

An EA includes the following elements:

- *Strategy encompasses the business vision, goals, objectives and value propositions, along with the strategies and tactics that will be used to achieve them*
- *Business architecture consists of the enterprise's capabilities, services, events, information, roles, locations, organization, terminology, etc.*
- *Information systems architecture refers to the business scenarios, processes, applications, services, components, data, personnel, etc. that support or implement business functions*
- *Technology architecture includes the specific hardware and software components (e.g., middleware) that the information systems run on*


*Figure 1: EA translates strategies into effective change*

### Business change and transformation

The desire for efficiency and agility, along with the requirements for regulatory and contractual compliance, drive the need for business change and transformation. However, organizations require consistent, repeatable and actionable results to help ensure that change yields measurable improvements. Furthermore, care must be taken to make certain that business change will not resolve one issue only to worsen others. Specifically, business change and transformation should alleviate rather than augment overhead.

**Highlights**

***Business change and transformation are salient issues for many companies today due to the rise of Internet commerce, increased corporate consolidation and regulation, and a move toward SOA principles.***

Business change and transformation have become salient in the current business environment for a number of reasons:

- *Since the late 1990s, the Internet has promoted worldwide markets and trading communities. Consequently, markets have become much more accessible to innovators. Taking advantage of significantly lower barriers to entry into their chosen industries, these innovators became powerful new competitors that entrenched companies had to counter. As a result, customer choice and, hence, customers' purchasing flexibility grew exponentially. This placed enormous competitive and, consequently, responsiveness demands on businesses.*
- *Regulators scrutinize business operations more carefully than ever before. From the debris of Enron, Global Crossing, Tyco and others emerged the legislative quagmire of U.S. and international operating guidelines, restrictions and requirements. Concerns over data privacy and security drove forceful demands, often obligatory, for caution when handling and processing financial and consumer data. In addition, recent troubles in the worldwide financial industry may engender yet more regulations.*
- *Despite ebbs and flows over the course of economic cycles, the overarching trend is one of continuing business consolidation, which forces the integration of an increasing number of disparate processes and organizations. Without attention to process optimization, these business combinations threaten to increase the complexity and, therefore, the costs of the resulting organization's merged activities.*
- *Many organizations are moving or considering moving business functionality to an SOA foundation. Because of the process reusability enabled by SOA, organizations are more focused on optimization, as inefficiencies will be replicated whenever the service is called.*

**Highlights**

The scope of organizational change and the ensuing challenges dwarf the hurdles that businesses faced as little as 10 or 20 years ago. To be successful, companies cannot rely on just outfoxing the competition or creating a novel distribution channel. Vision and execution must go hand in hand, and the organization must be able to react and adjust at a moment's notice. Thus, the scope of excellence within an organization must be broad and deep.

Business change and transformation requires transparent operations that allow organizations to fully comprehend all business and technology inputs, outputs, workflows and constraints. To understand how operations function, organizations have to model the who, what and how of their business processes.

### EA for business change and transformation

For some organizations, an EA effort must start with a view of the state of the organization today, not the desired future-state. In our experience, many companies do not take that approach. Instead, they start with the target end-state. This is done so that the future view of the organization is unencumbered with the known weaknesses of the current organization. Then, this view of the future organization creates the template that identifies which current business processes and technologies will be necessary for future transformation.


Figure 2: An EA roadmap plots a course from the current to the future EA

**Highlights**

***Some companies begin their EA effort by analyzing their current state, while others prefer to document the target end-state in order to create a template for future business transformations.***

By thoroughly analyzing the current-state enterprise architecture, you will almost certainly find many components that can be discarded almost immediately because they do not fit within the desired end-state or they do not supply adequate value—or possibly any value—today.

#### Enterprise portfolio planning and analysis

Several considerations and challenges arise when pursuing business change and transformation. The organization most likely has a mix of legacy systems, such as enterprise resource planning (ERP), customer resource management (CRM) and custom applications that encompass the bulk of the business processes. It may also have technology for SOA or business process management (BPM). This complex environment implies a broad set of users, requirements and necessary integrations.

Related questions to consider include:

- *Who needs to participate in business process modeling and analysis?*
- *How can an organization best analyze the impact of new business initiatives, as well as changes to current initiatives?*
- *How does the change connect to mission-critical new and legacy applications?*
- *Will the resulting process, data and application models be transportable and interoperable?*

#### Multiple users in enterprise modeling

***Encouraging collaboration from all participants in a process is key to creating an accurate model.***

A key challenge for business change and transformation initiatives relates to participation and collaboration. Business processes have many touch points within an organization and typically involve nuances or vague complexities. Process experts can be managers, subject matter experts, business analysts, IT personnel or long-tenured staff. Thus,


Figure 3: EA must support all users and their skill levels.

**Highlights**

accurately modeling a process requires the participation of a broad set of people within an organization. Those participants inevitably possess varying levels of process modeling experience and technical ability.

As Sandy Kemsley wrote in her blog, *Intelligent Enterprise*, "By providing business users and analysts with new collaboration technologies and the ability to perform some level of process modeling, they'll have more control over the effectiveness of their business processes, and new applications of the tools will emerge. In fact, Gartner predicts that by 2010, more than 50 percent of collaboration and user productivity interactions will be integrated with process technologies such as BPM."[1]

Additionally, the modeling exercise itself has many stages, which typically include creation, review and approval. This suggests that modeling requires team and/or work group reviews.

Finally, many organizations use Microsoft® Visio® for modeling, as the general-purpose nature of Visio has led to its adoption by more than seven million users worldwide. This widely accessible and broadly familiar tool allows the organization to tap into enterprise knowledge and repurpose it to facilitate structured process modeling for change and transformation initiatives, but that means that it must be integrated into the broader EA toolset.

**Highlights**

***A robust modeling solution supports widely-used tools and platforms such as Visio and Microsoft Windows. A good solution also supports Web-based modeling and includes a portal to facilitate group reviews.***

Overcoming the above challenges of planning and analyzing such a diverse group of users and technologies requires a modeling solution with multiple user interfaces that can accommodate varying user abilities and all of the tasks they will have to perform. Some of the other requirements of such a solution include:

- *A modeling portal that can be used for group review and publishing business models.*
- *Visio modeling support, based on a standard such as business process modeling notation (BPMN) that can be communicated and understood by all stakeholders to allow subject matter experts, functional managers and others to model using a familiar tool.*
- *Web-based modeling capabilities to support business analysts and architects wherever they reside and to provide a platform that is easy to use and requires little training. Browser-based access over the Web becomes particularly important as a means to support workforces in the increasing number of corporations that have spread their operations around the globe.*
- *Microsoft Windows® client modeling capabilities with comprehensive linkages to architecture, analysis and implementation products.*

### Business change and transformation analysis

For analysis to be comprehensive, organizations must pay special attention to not only the process logic, but also to its implications for existing infrastructure identified in the enterprise architecture. Process architecture analysis should highlight potential problems in process change and implementation by answering the following questions:

- *Which systems and applications does a particular process or application require and what resource dependencies will they have? Are there risks associated with the architecture or limitations regarding scaling? Are there data models related to this process or application that should be considered?*
- *If resource allocations must be altered to implement a new or changed process, what are the impacts on other processes? Will the change exhaust particular resources?*
- *Will the new or changed processes or applications threaten the organization's business continuity or increase information security risks?*

**Highlights**

***While EA analysis can reveal numerous opportunities for streamlining processes and increasing value, it's important to carefully analyze the result of these changes can have on the organization prior to implementation.***

EA analysis reveals impacts on systems, data and associated applications that must be taken into account before implementing or changing a process or application. This analysis can also be used to test various options as a means to find the optimal way to achieve a desired outcome.

By allowing organizations to streamline their technologies, the analysis of process flow provides great value. However, the impact of new processes or process changes on systems, data and associated applications should be determined prior to the implementation of a new or changed process.

The considerations described above allow organizations to fully analyze the architecture of their businesses and to gain a deep understanding of the linkages between those businesses and the underlying systems, applications and data. The addition of architecture analysis helps ensure that changes or additions to business processes and technology do not create tertiary or downstream problems.

Therefore, to achieve its objectives, an enterprise architecture modeling and analysis solution should facilitate the following:

- *Modeling of the enterprise process (by definition)*
- *Analysis of basic processes (Are they still relevant to the organization's strategy, tactics, goals?)*
- *Analysis of the process architecture (e.g., via IBM® Rational® System Architect®), including the analysis of:*
  - *Applications,*
  - *Systems,*
  - *Data.*

**Highlights**

***It's unlikely that a single workflow engine based on BPEL will meet your enterprise-wide implementation needs. Make sure your organization can support multiple implementation paths.***

### Exporting process models for implementation

As noted previously, enterprise architecture provides optimal value when it is interwoven with technology implementation. It then serves as the planning and analysis hub for the organization and increases the value delivered by facilitating the reuse of prior work.

Because of the great variety of processes that they perform, medium- to large-scale organizations will almost certainly require multiple implementation paths to the automation of workflows and processes. The probability that a single workflow engine, typically based on business process execution language (BPEL) or a proprietary approach, will fully serve the enterprise's needs is very low. Most organizations will require the ability to render workflow or process automation via multiple paths.

Therefore, several implementation paths, including the following, can serve to achieve enterprise-wide change and business transformation via reuse of enterprise architecture:

- *BPEL: Many BPMS vendors use some form of BPEL; transportability does not exist as each BPEL is tuned to the specific workflow engine. Interoperability must be independently verified until more comprehensive BPMN and BPEL standards emerge.*
- *Unified Modeling Language (UML): UML supports model-driven development, a growing methodology for structured software development. UML can yield C++, C# and Java.*
- *Custom integration: Many applications use proprietary extensible markup language (XML) formats and require specific connectors to facilitate the translation of BPMN process models to their XML or other specific workflow specification.*

**Highlights**

It is imperative to facilitate the implementation path that best suits the particular requirements of simple or complex processes. This requires business modeling and analysis technology that supports the following:

- *Standards-based modeling, whether BPMN or others*
- *Transformation of process models to standard BPEL or to BPEL customized to a specific BPMS platform*
- *Alternatively, transformation of process models to UML to generate custom code (C++, Java, etc.) to support model-driven development of complex processes or to do both*

In addition, the process models should be able to link Web services for the support of SOA initiatives.

***The use of standard modeling notations such as BMPM, iDEF and UML are essential for model transferability and interoperability among organizations and industries.***

### Standards and reference models

The need for multiple paths makes the use of standard modeling notations, such as BPMN, integrated definition (iDEF) and UML, essential to help ensure model transportability and interoperability. Standard model notations also provide for the exchange of industry reference models that provide generic business process templates. Reference models range from government to various industry verticals. In the government sector, frameworks include the U.S. Department of Defense Architecture Framework (DoDAF) and the U.K. Ministry of Defence Architecture Framework (MODAF). In the commercial sector, The Open Group architecture framework (TOGAF) and Zachman are well-known frameworks and industry reference models and include new generation operations support systems (NGOSS) for telecommunications, supply chain operations reference (SCOR) for supply chain processes and the AKMA data frame for financial services.

Organizations can quickly adopt industry best practices by tailoring one of the available templates to their particular need. Compared to zero-based modeling, these templates can greatly accelerate the modeling of processes.

**Highlights**

***Many organizations have taken their first steps toward business transformation. Expanding on those initiatives and taking them to the next level require a flexible and integrated enterprise architecture solution.***

**Case in Point: Dubai Customs**

Dubai Customs is a world leader in customs administration through innovation and customer service. Its vision is to sustain economic and social development in Dubai, and to be one of the world's leaders in customs administration supporting legitimate trade.

Situation: Dubai Customs needed an enterprise architecture (EA) platform that would support the business and technical frameworks planned to propel the organization forward in the upcoming 10 years.

Solution: With its proven track record of success, IBM Rational System Architect met most of Dubai Customs requirements for flexibility and ease of use. Customs used the extensibility of System Architect to extend it in areas specific to Dubai Customs and its world-class methodology.

"We use System Architect as the basis for our Enterprise Connected View (ECV), which enables us to manage enterprise information, run impact analysis, and make decisions more effectively."

– Juma Alghaith

Executive Director for Customs Development Dubai Customs

Bottom line: System Architect supports Dubai Customs' EA methodology, which enables Customs to do business faster and better with impressive agility. As a result, users of Dubai Customs' new platform witnessed an 80 percent increase in the speed of client registrations and a 4800 percent increase in the speed of processing customs declarations.

## Conclusion

Most organizations have initiated business transformation to some degree. The first step is usually a focused initiative that tackles specific processes. Alternatively, the initial effort might address a subset of the enterprise architecture for which critical processes have been mapped to the architecture. After having taken those first steps, many organizations go further to institutionalize business change and transformation as an enterprise-wide initiative.

As revealed in this paper, business change and transformation demands enterprise-wide planning and analysis, which requires many user interfaces to support widespread collaboration. A further requirement for success is a thorough analysis of the interrelation and dependencies of processes and resources within the organization.

Within many of the IT departments that are moving to SOA, a question arises as to how well SOA fits with business change and transformation. The answer is, very well. SOA can optimize business-driven processes using IT-driven functionality provided by reusable services. These reusable services can significantly improve overall business agility, while reducing costs related to new process development or existing process enhancement.

Finally, as organizations initiate business change and transformation, a highly flexible solution is needed to aid enterprise-wide collaboration and implementation of these initiatives. This is accomplished using a flexible and integrated enterprise architecture solution. For simplicity, we propose the use of the term "EA hub" to identify a solution that offers support for SOA, BPM and legacy applications, while providing centralized modeling, analysis and planning capabilities. In addition, the prescribed solution allows for multiple user interfaces and supports a standardized process for modeling. This allows organizations to integrate their change and transformation activities across business and technology users and to connect their plans to actual implementation.

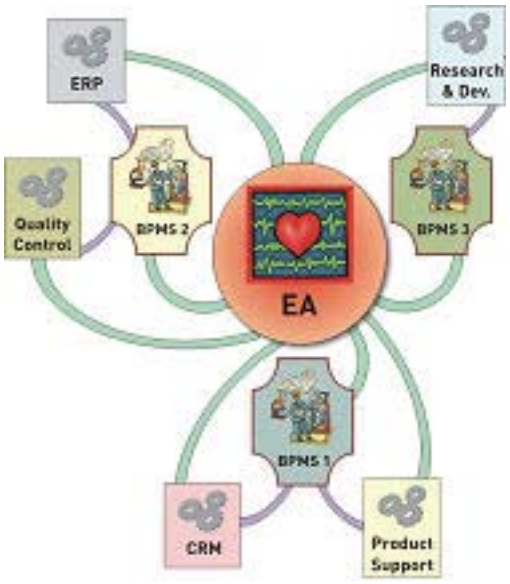


Figure 4: EA Hub



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1 Sandy Kemsley, "BPM Focus Turns to People in the Process," Intelligent Enterprise, CMP Media (September 7, 2007).

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