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# SOA and BPM Are Better Together

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Although many user organizations have separate service-oriented architecture and business process management initiatives under way, both are more successful and the benefits are compounded when they are united.

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## STRATEGIC PLANNING ASSUMPTION(S)

Organizations that align their BPM and SOA initiatives in 2007 will double their likelihood of becoming industry leaders by 2011 (0.7 probability).

## ANALYSIS

# 1.0 What You Need to Know

Although service-oriented architecture (SOA) and business process management (BPM) are usually initiated independently, they share some common goals — particularly increased enterprise agility. Combining SOA and BPM projects results in increased benefits, which are achieved more quickly than when either is initiated alone, especially for larger initiatives.

Although SOA can be successful without BPM software tools, one should never do SOA without involving business management and business analysts. BPM creates a deep understanding of processes that, in turn, provide an important dimension for understanding what parts of the application portfolio should be re-engineered into SOA services. BPM technologies can be used to orchestrate the process execution, including the late binding of SOA services for the IT-enabled parts of the process. Without an SOA, BPM initiatives tend to create one-off integration points to existing application interfaces. However, when SOA-designed services exist, less custom integration is needed, and, therefore, time is saved for faster deployment.

In addition, aligning these efforts in a common initiative delivers optimal use of limited funding, especially when alignment is made over the totality of processes that share the same functionality. To get the best business value out of SOA and BPM, especially for large strategic initiatives, the two initiatives should be combined, collaborating at multiple levels, and coordinating and sharing key resources. This is the most effective way to drive business priorities through the IT infrastructure, and it is a powerful method to align business with IT.

# 2.0 Context

Businesses need more agility than ever before. Historically, process change has been delivered via application maintenance. However, traditionally, maintenance has not been that fast or responsive, and it has been totally controlled in terms of delivery timeframes by IT, inhibiting overall agility. The dynamics of business markets have fundamentally changed with the rise of the Internet and the forces of globalization. Businesses now compete on a global and electronically connected scale. These pressures will persist and are a major contributor to accelerating cycle times in all aspects of business (such as inventory turnover, accounts receivable collection, new product introductions and fraud detection).

BPM is a management discipline that requires organizations to shift to process-centric thinking, and to reduce their reliance on traditional territorial and functional structures. BPM requires and enables organizations to manage the complete revision cycles of their processes, from process design to monitoring and optimization, and to change them more frequently to adjust to changing circumstances. Such rapid change is impractical while processes are embedded in conventional applications.

The development of BPM technologies is enabling process flows and rules to be abstracted from the underlying applications and infrastructure, and is increasingly enabling business managers and users to change them directly. In this way, BPM enables process agility. It's a structured

approach employing methods, policies, metrics, management practices and software tools to manage and continuously optimize an organization's activities and processes.

BPM disciplines help business leaders identify which processes can benefit most from becoming more agile. This is one of the many outcomes of enterprise architecture and BPM; together, these disciplines guide practitioners to examine and model several processes in a business context to determine which ones will benefit most from having the changes done rapidly vs. more slowly. This review and analysis helps further SOA. SOA is a major enabler of faster process adjustment for automated tasks, logic and calculations (together with other means, such as abstraction of rules, rule-driven flows and human workflow controls).

Increasingly, the boundary between the description of a process (its metadata) and its implementation is becoming increasingly fuzzy, as development and runtime environments converge into a single platform supporting multiple IT and business roles collaborating more closely on the end solution delivery. As a result, the next generation of "applications" will be delivered out of a tool box of services that are configurable for many process variations. Rather than current generation transactional applications, which have largely automated repetitive tasks within a broader workflow, next-generation applications will increasingly look like the complete process(es) they implement, incorporating human-centric activities (such as approvals, decisions, negotiations, analysis, research and collaboration), as well as system-automated tasks.

## 3.0 What SOA and BPM Really Are

SOA is an architectural style that is modular, distributable, sharable and loosely coupled. It assumes multiple software tiers and usually has thin clients and fat servers (that is, little or no business logic on the client), but it is more than that. It organizes software functions into modules in a way that maximizes sharing application code and data (see "Service-Oriented Architecture Overview and Guide to SOA Research" and "Clarifying the Terms 'Event-Driven' and 'Service-Oriented Architecture'"). It has become one of the most important concepts in modern application design. SOA may be implemented using a variety of technologies, including Web services.

BPM refers to the newest process management discipline in which business processes are viewed as assets to be managed, designed and continuously improved to enhance business agility and operational performance. BPM is a structured approach employing methods, policies, metrics, management practices and software tools to manage and continuously optimize an organization's activities and processes. BPM-enabling technologies make a process explicit — that is, visible and readily changed. BPM-enabling technologies separate a process model from its implementation. The process model is independent of technologies (including applications, data and infrastructure) that may be used in its deployment. The newest, most complete and integrated set of BPM-enabling technologies is defined by Gartner as a business process management suite (BPMS) — see "Business Process Management Suites Enhance the Control and Management of Business Processes" and "Selection Criteria Details for Business Process Management Suites, 2006."

## 4.0 SOA and BPM Have Common Objectives and Many Intersections

SOA and BPM try to address historical issues, relating to the relationship between business and IT, such as:

1. Most organizations function in a reactive state, relying heavily on daily reports and data analysis that reflect completed transactions, rather than the proactive monitoring of events as business transactions progress to completion. This is like driving a car by relying on the rear-view mirror. This reactive mode means that management has little

time for planning. So whenever challenging business circumstances arise that warrant a change in operations (such as compliance or simply the need to match a competitor's product quickly), the entire organization (especially IT) is not prepared to react quickly to the change. As a result, costs rise and business opportunities are missed. SOA and BPM strive to address these agility requirements.

2. IT's response to business needs tends to be reactive. Funding for projects is frequently done on a one-off basis, usually driven by one functional executive. Rarely is IT asked to coordinate a major project across business functional areas. Rarely is there an effective governance process for driving cross-functional cooperation regarding IT investment projects, except when there is a major business need, such as a compliance or Y2K/ERP project. This issue compounds the effects of the previous one — it becomes increasingly difficult to harmonize incremental changes with truly business transformational ones with this approach. Again, SOA combined with BPM provides a more pragmatic approach to balancing incremental with transformational change.

3. Current "stovepiped" applications, with limited scope for adaptability, automate specific operational work tasks within a broader business process. Prior to SOA, application architectures addressed similar activities — such as business commerce transactions, for example, online transaction processing (OLTP), or data analysis, including data warehousing and business intelligence (BI) applications — for greater efficiencies. Usually, implementing new business requirements forces the replacement and redevelopment of an old system. BPM, enabled by an SOA, automates more of the end-to-end process, including transactional, reference and human-knowledge-centric activities, providing more of a closed-loop feedback mechanism to business leaders.

4. IT and business managers find it difficult to predict costs, new features' implementation times or service delivery levels. Imprecise estimates elongate delivery time frames, again causing missed opportunities. An "assemble and compose" delivery style, enabled by SOA, addresses this issue too.

5. IT prioritizations are at best loosely linked, but generally not mapped to business goals. The link between business objectives and IT priorities is difficult to make. Structured methods, such as balanced scorecards, are not in widespread use. Business priorities are not understood by IT, and IT is always on the back foot. Usually, there is no effective, repeatable method/process/governance approach to harmonizing incremental maintenance needs with transformational change to processes, functions and tasks. Big changes are treated as "unusual," "one-time/episodic events" rather than implemented as part of a strategy to achieve specific shared goals. BPM and SOA, both supporting more iterative and continuous refinements to automated operations, enable mid-course, strategic adjustments.

SOA and BPM intersect along a variety of disciplines and can begin to address (if not resolve) these historical issues. In particular, BPM enabled via an SOA delivers strategic alignment of corporate goals with processes, changing enterprise culture and its concept of leadership. It supports better management and measurement of people in the context of the processes in which they work, drives better governing decisions and more. It's no surprise that combining SOA and BPM forces can result in more-effective benefits for the enterprise that can eliminate several reinventions of the wheel.

## 5.0 How Can SOA Take Advantage of BPM?

An SOA service is a software component that is suitable for cross-functional use. A software business service represents a business activity/task that may be implemented as a single

technical component, or multiple technical services can be combined into a business service (often referred to as a composite business service). This is akin to manufacturing component assembly lines; the more and smaller the subcomponent design, the greater the number of combinations of those subcomponents to meet different functional needs. In this way, the final "service" assembly (the final design) links the business capability to the technical design of the user-facing business application.

Business process semantics can be more easily implemented by combining granular technical services into composite services. The sequencing of business tasks or activities also creates context for the work. As the business semantics change, or the process sequence changes, services can be recombined, re-sequenced or even substituted to produce realignment with the new context. A service is never a complete application or a complete transaction. A service is always a building block.

Because business units help fund application development and purchasing, BPM methods highlight common, shared requirements for business services and, in this way, can help fund SOA and raise awareness at executive levels of its importance. The focus of SOA has largely been reuse, so business units generally avoid shared pieces of functionality ("if it's shared, it doesn't really do what I need — I am unique"). Thus, it has been difficult to get business executives to accept shared developments.

Furthermore, linking SOA to BPM also helps address most of the governance issues related to SOA/services. The more easily software services can be shared and recombined, the better an SOA. It is increasingly desirable to implement explicit business process by combining reusable services. The first structured methodologies for identifying reusable services — such as IBM's service-oriented modeling architecture (SOMA) — all work this way. Hence, whenever the process changes, due, for example, to different regulations or market strategies, the services can be re-sequenced using different process execution logic, changed or even substituted. In other words, when the process is mapped out in a different way than the initial design, new services might need to be implemented to support the changed process or other, existing software services may need to be changed.

Nonetheless, an implementation change takes days, instead of months, because of the underlying SOA. In addition, the more aspects of the process (such as participant roles, business policies, required information and escalation procedures) that are abstracted from the initial implementation, the easier and faster it is to change these aspects of the workflow.

As detailed in "Benefits and Challenges of SOA in Business Terms," the main benefits of well-designed SOAs are:

- Improved responsiveness to business change (agility)
- Improved resource use
- Consistent, progressive and flexible policy implementation
- IT cost savings

For the reasons stated above, attaching reusable services to explicit business processes makes SOA more effective in delivering the first and the last benefits, which are typically the two results business leaders care most about. In addition, the logic that implements the flow of execution is separated from traditional programming by using the metadata models of a BPMS.

# 6.0 How Can BPM Take Advantage of SOA?

SOA frequently starts as an IT-driven initiative, with application-architecture-centric guidelines. Typically, these SOAs clearly identify reusable pieces of functionality and improve application integration by using common interfacing techniques and, thus, ease the maintainability of systems. All of these benefits contribute to building process agility. However, these benefits have been seen as primarily benefiting IT. Instead, the value of an SOA must be communicated in business terms. SOA must be viewed as contributing to improved business performance and innovation by addressing constantly changing business needs. SOA should be promoted as the technological enablement of BPM.

BPM is a business-driven view of how operations execute to deliver on strategies and goals. Operations are largely executed through automated processes known as IT applications. BPM guides managers to identify which processes need to change more often and identify the forces of change. BPM helps create a shared perspective on how multiple functions contribute to the entire end-to-end process. It helps leaders see the value of their contributions as part of something larger. This facilitates creating shared performance objectives for the process, rather than just functional performance objectives. This vision/understanding should be driving IT priorities, especially SOA priorities, since SOA is the leading best practice for creating more-flexible IT systems. To the degree that processes are executed using systems, the flexibility of those systems should match the flexibility requirements of the process.

SOAs with BPM delivers more value than either would alone, because business priorities are better aligned with IT capabilities and priorities. BPM forces business leaders to think about how and where they want to be more agile, rather than just building agility for the sake of agility. BPM initiatives identify and prioritize which services should be built up as SOA first. By alignment also, business and IT can have a meaningful discussion about what kinds of things business managers should be able to change via a metadata layer (that is, parameters, some rules, some user interface and form layouts, and human workflow aspects) and what kinds of things IT professionals must continue to maintain. SOAs with BPM guidance provides a strong base for the business process platform model (see "Flexibility Drives the Emergence of the Business Process Platform")

# 7.0 SOA/BPM Collaboration Should Occur at Multiple Levels

Although SOA and BPM are complementary, the relationship is indirect. BPM is a high-level set of management disciplines and principles, and SOA is a lower-level set of technical principles. For them to be aligned, a number of other issues or concerns need to be addressed, including business architecture (especially regarding strategic goals and objectives), modeling, governance, role and responsibility definition and organization, and technologies.

## 7.1 Enterprise and Business Architecture

A big part of enterprise architecture is creating a business architecture. Within the realm of business architecture, the functions and processes needed to fulfill the enterprise's mission are defined. In most companies, there should be between four and 12 high-level conceptual models (architectural blueprints or models) of these processes showing how the processes connect the functions and resources. All enterprises should also have a strategy — a plan for how to achieve specific goals. Strategy is executed through these processes, not through the functions. Each function contributes to the achievement, but the processes move the work outputs of the functions toward the specific goals. In an SOA, those processes are a starting point for designing reusability into the services.

## 7.2 Modeling

Process owners, business process architects, business process consultants and business process analysts work together on the conceptual model of a process, as well as on the high-level logical design. Ideally, they progress from a model of "as is" to "to be" in an interactive improvement cycle (since a model is just a snapshot in time of how work should be accomplished). As business dynamics change, increasingly at a faster rate than in years past, (accelerated cycle times are witnessed in all industries), these models are adjusted to a next iteration to meet the business dynamics.

In the world of hard coding applications, "as is" and "to be" represented putting a stake in the ground, a known future state, so that IT could code. In BPM thinking, a process is always changing because the future state is not predictable: "As is" and "to be" are simply temporal states of reality. Therefore, process architects, consultants and analysts must do these designs with process owners, ideally making the process owner increasingly comfortable with modeling tools and simulation to more consistently participate in the improvement effort on an ongoing basis.

When initial conceptual models of the processes are in place and agreed to, at least a subset of the resources above should work in an integration competency center (ICC), alongside the other technical resources to collaborate on the physical implementation. (For more information, see "Integration Competency Centers Demand a Wide Set of Skills.")

## 7.3 The Competency Center

It is common to have a group within the organization that develops and manages the growth of an SOA. Such groups, generally called SOA centers of excellence (COEs), are often expanded from ICCs, augmented with ad hoc SOA governing functions (see "The ICC and SOA Governance").

On the BPM side, a process COE normally includes process architects and consultants (supporting the process analysts who increasingly report directly to the process owners, rather than IT). A process COE normally concentrates knowledge about process modeling and design, leveraging business domain knowledge, modeling skills, policy and rule management skills, as well as optimizing human-to-human processes with system-to-system processes. Much of what a process COE provides is best practices, facilitation for "work out" sessions and methodologies (such as Six Sigma, Lean, VoC and VSM).

This group should be familiar with the registry/repository of process-relevant components to draw on them for reuse (typically maintained by the administrator of the SOA COE). From a BPM perspective, process is central, and an SOA COE (or an ICC) should be just part of the process solution.

The SOA COE requires the input of business process architects and/or business process analysts. How do you define high abstraction, coarse granularity, intuitively reusable services otherwise? Gartner believes that most of the reusability in services of SOAs is there today because there was an architect or a smart developer who behaved and thought like a process analyst. After all, one of the top priorities for CIOs is "building business skills in the IT organization.."

So, in what COE should top-level service architecture definition be done? That depends on each company's organization, process orientation, architectural ability and, ultimately, IT culture. Generally speaking, the important thing is that top-level process service needs to be defined jointly by a set of roles, and that set includes enterprise architects, senior developers, process architects and/or process analysts (please see "Sample Governance Mechanisms for a Service-Oriented Architecture"). Some of those roles typically sit in an SOA COE (for example, senior

developers), some of them sit in a process COE (for example, process designers), and some of them sit in both (for example, process architects).

The COE in which the work is done doesn't really matter, as long as the right roles are involved. Depending on the factors described above, some companies will do the work in a process COE (especially when the process COE originally starts as a more technical development group deploying the first BPM technology solutions). Others will use an SOA COE.

### 7.4 Governance

The governance framework must accommodate prioritization and decision rights for improving processes that cut across organizational reporting structures and application environments. This is especially true for SOA governance (see "Service-Oriented Architecture Craves Governance")

### 7.5 Technologies

Increasingly, development tools appropriate for IT professionals will be converging with newer tools (such as BPM suites, business rule engines and business process analysis tools) designed to support more involvement of business users throughout the process improvement life cycle. To the extent that BPM initiatives focus on increasing process agility (with higher rates of change than application systems can accommodate easily), then BPM designs will want to leverage SOA designed system components (as SOA is the leading best design practice for loosely coupled, standards-based software components — please see "Achieving Agility: SOA Will Build Organizational Agility, but Watch the Hype"). This is already emerging, as initial process composition environments start shipping with SOA-designed business service components included.

## 8.0 The Bottom Line

To get the best business value out of SOA and BPM, the two initiatives should collaborate at multiple levels, coordinate and share key resources. This is the most effective way to drive business priorities through the IT infrastructure, and it is a powerful method for aligning business with IT.

**RECOMMENDED READING**

"Service-Oriented Architecture Overview and Guide to SOA Research"

"Clarifying the Terms 'Event-Driven' and 'Service-Oriented Architecture'"

"Business Process Management Suites Enhance the Control and Management of Business Processes"

"Selection Criteria Details for Business Process Management Suites, 2006"

"Benefits and Challenges of SOA in Business Terms"

"Flexibility Drives the Emergence of the Business Process Platform"

"Integration Competency Centers Demand a Wide Set of Skills"

"Gartner Research Index on SOA Governance"

"The ICC and SOA Governance"

"Sample Governance Mechanisms for a Service-Oriented Architecture"

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"Achieving Agility: SOA Will Build Organizational Agility, but Watch the Hype"

## Acronym Key and Glossary Terms

**BI** business intelligence

**BPM** business process management

**BPMS** business process management suite

**COE** center of excellence

**ICC** integration competency center

**OLTP** online transaction processing

**SOA** service-oriented architecture

**SOMA** service-oriented modeling architecture

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