

SOA Governance
An IBM White Paper

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Executive Summary

As SOA becomes a new way of implementing applications, organizations need a way to manage the assets (especially reusable services) developed as part of their SOA activities, to permit the use of these assets to be maximized and insure the results the enterprise envisions. This might include decision rights, measurement, policy and control mechanisms, all placed around the services lifecycle.

In this White Paper, we look at how SOA Governance is being used by firms who are moving to SOA to enable solutions to their business problems. It will quickly emerge that regardless of the industry, the issues are similar:

- How do you get to SOA? And do you actually arrive at a destination – or is it an ongoing journey?
- When do you insert Governance into the SOA equation: at the beginning or later on?
- Who's in charge of issues like Governance which affect multiple business groups – and who pays for them?

What advice can we give enterprises about SOA and SOA Governance to help them have the best possible experience and, more important, the best possible results?

In this White Paper, you will find the experiences of five firms. Three of them are based on actual firms, in the process of implementing SOA. Two are synthetic case studies, based on multiple experiences, designed to better describe SOA experiences in combinations that have not yet occurred.

Introduction

Service Orientated Architecture (SOA) is a new way of thinking about, planning for, and implementing applications. It allows business strategists and IT professionals to together assess how their IT infrastructure supports their business today and to plan and implement a business infrastructure, over time, which will more flexibly, more quickly, and more dynamically support their business as it adapts and grows.

SOA supports integrating your business as linked, repeatable business tasks or services. Reacting to change or creating new business applications in this environment will mean connecting existing services (and perhaps creating new ones). An underlying SOA-style IT infrastructure will permit easily connecting these services to organizational information from a variety of sources. This new style of application development is much quicker and less expensive than previous forms of development and permits the business to be much responsive.

SOA Governance can be a first step into SOA or, more commonly, it can occur as an organization's SOA projects multiple and require more management and control in order to insure reuse and consistency and avoid duplication of effort. The examples in this White Paper will offer a number of ways to approach SOA Governance in the context of a variety of SOA projects and organizations.

What is SOA Governance and Why Business Requires It

SOA Governance helps organizations meet their SOA goals and visions by establishing decisions rights, measurement, policy and control mechanisms around the services lifecycle of the SOA applications and their component services.

A typical SOA governance need might be an organization's need to store services in a way to makes it easy to share them to promote reuse. The organization also needs to know how and where the services are being used so that they can understand the implications of any change to an existing service. A Registry and Repository permits information (metadata) about each service to be stored for shared access. It can both promote the use of the services assets by making them easy to find and easy to share and also control access to any particular service or to changes in that service.

Governance is also required so that services will be written not for a single user designing code for a single project, but with a view toward broad reuse across the organizational infrastructure. This requires a place where an enterprise-wide point of view can be encouraged and implemented. It prevents (as we will note in several of our examples) needless duplication of effort and wasted resources, as well as designing multiple systems that do "almost the same thing" and then create inconsistent output on an ongoing basis, only to cause expensive manual manipulation in the real world..

SOA Governance and ESBs (Enterprise Service Buses) require investment – less for software and more for time and skills to study the business and provide the right rules, rights, and policies to these useful tools. These investments are appropriately shared among multiple business groups (or paid by the organization as an investment in future business systems). It is this investment which can be difficult to get business groups to individually consider and jointly fund, so that such investments are often delayed until after one or more successful SOA projects are implemented without SOA Governance.

Without SOA Governance, there's a real chance that an organization could achieve SOA within projects in individual business units but fail to achieve any of the synergies of SOA available across the organization when multiple SOA projects are successfully implemented. That's because there is no central point of view looking to coordinate projects, avoid duplicate effort, and encourage reuse of services and consistency in implementing processes. And it's there that the real values in cost reduction and business opportunities often lie.

How to Implement and Manage SOA Governance: Governance Measurements, Metrics, and Controls

An **ESB** (Enterprise Service Bus) is a flexible connectivity infrastructure for integrating applications and services. It is not part of SOA Governance itself, but like SOA Governance it is often the sign of a maturing, well thought out SOA system. Again, it's designed to make sure that services don't live in isolation, requiring that similar services be duplicated in other silos. Like SOA Governance, it facilitates sharing and routes messages between services, converts transport protocols, transforms message formats, and handles business events from disparate sources.

Registries allow the organization to track all of its service assets (through the search of their metadata), knowing who is using them and for what. It also encourages the reuse of services by making them easy to discover. Some think that a registry is the equivalent of SOA Governance; it's not – it's just a part of the picture.

SOA encourages the **Reuse** of services to avoid duplicative effort and to save time and money. Services should be created with a broad view of how they may be used across the organization, not just in a single project. Reuse also addresses taking existing IT assets and service enabling them to preserve legacy investments and the reuse of services from external providers. Policy Creation, Implementation, and Management

SOA Governance establishes through **Policy** and **Rules** who's in charge. This allows the owners of services to offer them while maintaining their authority, for example, over making changes to the service. It differentiates between the roles of owners and participants as well as giving operational responsibility for certain functions to IT, even if authority over the process the service creates remains in a business unit.

All of this occurs with an **SOA Lifecycle** which defines the methodology for SOA projects from modeling the business processes and services that will support them, to assembling the services into a composite application, to deploying these services into a robust environment with appropriate monitoring and managing of key IT resources (such as system performance) and business metrics (such as customer satisfaction), all in the context of SOA Governance and best business and IT practices.

SOA Governance Approaches:

There are many ways to approach SOA Governance. Some companies start with SOA Governance and plan and implement their projects under its guidance and control. Others start with the need to restructure or create a business process and consider the subject of SOA Governance only when they realize that managing multiple SOA projects requires a new kind of oversight and coordination. Still others start with IT Governance in place and extend it into SOA Governance as a natural growth of their development environment.

In the five case studies in this white paper, we present three real companies who are implementing SOA today (but who agreed to be described rather than named) and two synthetic customers, created to better describe SOA experiences in combinations that have not yet occurred.

Coordinating SOA Projects in a Major Car Manufacturer

As a program manager for Customer Order Entry, our interviewee at this major car manufacturer had added duties in SOA as his organization had started using this new methodology. The enterprise is currently focusing on two SOA projects to get started. The whole thing came together from two separate efforts.

- A project to get information from the vehicle business to partners and customers more easily and quickly. The vehicle side wanted to get inventory information to partners to keep things in sync and get sales information moved around. A customer business unit had a similar problem getting data. They recognized they were trying to accomplish the same thing and decided to get together and select a single solution.

At this stage, the group thinks of themselves as “working toward SOA,” a common attitude, as organizations expect SOA to be a destination, a place you arrive at after you’ve achieved some set of milestones, rather than an ongoing journey. Of course, with a project in production, into its second release, and deemed a success, we’d be happy to confer SOA status on them.

This project was a combination of enhancements and refinements to existing systems (one of the reasons it could be completed more quickly).

- A much bigger project is a major Supply Chain Management overhaul, based on an analysis and modeling of Business Process Management, (BPM). This project was started by IT and included the business groups. It used a popular Japanese business practice – *nimowashi* – which socializes people into a concept before they meet to discuss it. (Think of it as a consensus building exercise.) This project is scheduled to start in the second quarter of 2007 and is currently in the planning stage.
- Another project is being considered which might actually occur sooner than the big Supply Chain Management one. It involves working with a purchased application with a predefined API. The SOA team is starting to talk with the business group now to evaluate whether it has a high yield of reusable services – an important measure of priority at this stage of SOA growth for this organization. A proof of concept might be built in late 2006. The firm looks at this as a seven to eight year project.

SOA Governance was a necessary component of SOA projects at this firm right from the beginning. Their business exists in silos, e.g., vehicles, customers, and parts, and each business group has its own interests, priorities, and budgets. Governance was required for prioritization, to decide who and how the firm would use SOA.

On the other hand, they don't believe they have SOA Governance fully in place yet. They view themselves as developing it with IBM, employing IBM best practices and fitting them into their own business process. They have not fully deployed SOA Governance and they don't have all of the staff and governance pieces in place yet.

SOA Governance is separate from IT Governance, but it's definitely linked. While IT initiated SOA Governance, the business units are expected to be more involved as the use of SOA grows. The organization believes strongly that SOA Governance will allow the firm to be more agile and responsive. They already use IT Governance. In the new projects even at this early stage of SOA, they already identified dependencies in vehicles which required SOA Governance.

They anticipate implementing all of their SOA projects under SOA Governance, although they admit this will be an organizational challenge; individual business units are not accustomed to this brake on autonomy. On the other hand, their tradition of *Keizen* – constant improvement – will provide feedback into the governance stream and ensure its ongoing refinement.

Full Steam Ahead in a Tier One Technology Provider

The Vice President of Enterprise Integration Architecture we interviewed got right to the point. Reiterating something we heard from several customers, he said, "We had to look across the whole company to fix the whole problem." That's the difference between just implementing SOA as a new kind of technology perspective in answer to a particular business problem (generally within a particular business department, location, or division) and implementing SOA with Governance, enforcing an enterprise-wide view.

For this firm, although SOA Governance started as a separate project, as part of Web Services and then grew with it into SOA, it was off on the side, different than IT Governance. But as it grew, it became more mature and widespread; the overlaps with IT Governance became more obvious. This architect believes many customers will integrate SOA Governance and IT Governance, perhaps from the start, perhaps over time.

The enterprise is doing many SOA projects, trying to set the example for its customers as well as serve its own business interests with the best available technology concepts.

For example, they have developed a tax engine for commerce tools and billing applications. The systems have been upgraded to avoid the common problem (causing much lost time and money for both the enterprise and its customers) that invoices didn't match bills because the systems were built separately and viewed the outcome of the same process differently. The IT department used SOMA (Service Oriented Modeling Analysis) to help the parties decide. This method recommends a set of existing and/or new services to build and reuse.

"The trick," he notes, "is to get the value to be gained out in front of a wide array of stakeholders so that they will recognize that their group needs and will use that function/subsystem/system, too." That builds support and can avoid the difficulty of getting multiple groups to assign budget funds toward a cross-enterprise project.

Another SOA implementation in this enterprise is an order validation service. Two different departments were looking to build such services to different sets of requirements. If no one had reviewed the project at an enterprise level, no one would have seen that they were nearly the same. — What was needed was one common service that checked for everything. IT was the facilitator that enabled the review and agreement on a single, common service, saving resources and avoiding duplication.

Reinforcing the idea that SOA is a process, not a project, our architect offered this advice, "We started with one project. We inventoried the other projects in that area, and we built it up over time. It doesn't all get done at once; it's a lengthy process based on projects we're investing in anyway."

He offers a few thoughts about how to proceed:

- It's important to build new skills to help overcome the investment hurdle. Building to the new model becomes faster and less costly with in-house skills.
- Deciding how you'll measure the business value of SOA applications will make it easier to gain approval. It might be ROI, cost reduction, new revenue opportunities, increased customer satisfaction, but deciding what it is and how you'll measure it will prove important.

Lastly, the architect looked back on his SOA experiences and noted a conundrum: He likes the idea of transforming legacy applications by pulling out some pieces from a big application and rewriting them to transform its life, improve performance, or improve code quality without waiting a long time or doing a large migration. But he admits that if you do a good job you will still have the legacy application in place – and since it's been improved, it will take even longer to justify its replacement.

Extending IT Governance to SOA Governance in a Government Agency

In a Canadian government agency, SOA has been selected as the architectural style and development strategy going forward. Under a newly hired enterprise architect, the decision was made to start with governance. This was made easier because substantial IT Governance useful to SOA (Application Acceptance Standards, Review Standards) were already in place and some pieces of SOA Governance have been put added (BPM Standards, Metadata Repository). They have also added a business oriented governance structure, made up of area directors.

IT reviews new projects and tries to get them to use SOA techniques, starting with BPM (Business Process M). This helps drive reuse and other parts of SOA. These might be within the individual business areas (with some consideration for being able to reuse services written for such solutions) or across the organization. One broadly implemented application is the corporate

address book, a replacement for an existing application. The agency describes it as “half in” but not yet well integrated or documented. They will need an ESB and a Registry for that.

In addition to developing services and emphasizing reuse and governance, the agency has been creating integration points for legacy applications. They’d like to finish that part of their effort and have consistent entry points for future applications in the SOA style.

The agency emphasizes that so far SOA has been a migration not a Big Bang project. They believe that they will need such a large scale, across-the organization project, to justify investments in more governance and an ESB. They note that paying for the ESB itself (software) is not the issue, but rather the expense of negotiating and writing the policies which will make the ESB a valuable piece of the SOA environment, providing connectivity across assets and services.

A candidate for a large-scale project that could justify the ESB is a system that will provide an interface to their agency services to all of the businesses which are their customers. Here they are in preliminary design mode in an SOA style. If the ESB is approved this year and implemented in 2007, it will be part of the implementation. The project, intended to replace a legacy system, is scheduled to go into its coding phase in late 2007.

The architect emphasized the need to draw a visible line of sight between IT investments and business needs. SOA does that but there are costs to get started, including the investment in an ESB. They are considering these issues:

- What funding model should they use? Are shared SOA assets an organizational investment or must they be sponsored by a business unit? If the first users pay the price for those who get the future use of the asset, where’s his incentive?
- Today, business applications live in business unit stovepipes and because each business unit has gotten good service from IT they are happy continuing with that strategy. How do you get to an enterprise-wide view?
- How to get LOB (Line of Business) managers to change from wanting to invest in their own silos to investing in across-the company SOA investments. The agency has sought the endorsement of its vice president – and received it – but getting the LOB heads to hear that message isn’t easy, especially when they’re satisfied with the current state of things. Our architect is looking for a project with cross-department appeal.

Promoting Reuse in a multi-location insurance business

A large international insurance company provides sales and customer service activities through more than 150 local offices, geographically dispersed worldwide. They have decided to use SOA to manage their customer application, rate quotation, and contract processing workflow. The project will start with a pilot project in three North American offices located near their U.S. headquarters.

The headquarters business analysts, IT, and local office management are in agreement that the customer application process requires substantial attention. It was identified as a key opportunity in an SOA evaluation using the Component Business Model (CBM). A new process has been designed, using SOA concepts, as a series of web services, and implementation in the pilot sites is under way.

In just a few weeks managers in other locations were inquiring as to when they might have the updated process, too. IT is concerned that some ambitious managers may try to start their own projects, using local resources. That would be unfortunate, because the whole idea is to use the experience of the first pilots to fine tune the new applications before an orderly rollout through the

entire organization. Maverick attempts will interfere with the process and may be incompatible. In any case, they would represent duplicated work that was a waste of overall resources.

The insurance company's IT department decided to implement SOA governance in order to avoid costly replication of effort. It has created an ad hoc virtual team (they only meet in an on-line space), with members from every location. Most members are not expected to be active (unless they choose to be), but one from every region has been selected as the regional spokesperson.

- They will all be informed of the plan for the project, including how they can input to requests for changes and additions, and how they can indicate their interest in being positioned on the implementation schedule.
- Policies in the governance scheme will then determine who does what when.
- Common processes will only be designed and implemented once and will be reused throughout the organization.
- Services will be placed in a registry as they are released for use, so all of the locations can access them.

Over a period of one year, all of the 42 North American offices have now brought the new SOA-based customer application, quotation, and contract processing workflow on line. All of them do this under a common SOA Governance procedure, using common services.

With such an efficient use of resources, the insurance company has been able to start making necessary modifications to the processes for its European and Asian offices and to start these international implementations ahead of schedule. Improvements made by one office can be offered to all of the offices for use, should they support general requirements rather than local conditions. New SOA projects, focusing on other parts of the organization's needs, are now under consideration.

Managing Consistent Processes with Dynamic Growth

A successful restaurant chain is expanding rapidly by both opening more of its existing branded restaurants in new locations and by acquiring additional brands to expand into new markets. This had led to dynamic, almost uncontrolled, growth. A particular concern is how to integrate all the different IT processes and systems as a result of the acquisitions (three to date, two more in progress).

Today, each restaurant manually takes its sales checks after each shift to confirm that they represent the total revenue for the restaurant, consistent with its cash and credit card receipts. At the bar and in the kitchen, a designated chef and bar manager check inventory and order additional supplies, based on what was used. Some things are automatically replaced at regular intervals (unless the local inventory manager notes that they do not need resupply); others need to be specifically ordered as replacements or for featured items in future menus.

Each restaurant has its own variation of the system – and the new acquisitions have their own distribution centers and automatic resupply arrangements. To allow things to continue as they are today would be inefficient, replicating work, ordering from multiple suppliers at lower volumes (and lesser discounts).

The chain had been considering moving to an SOA for its main business process. It would like to roll up its daily sales and use that as the basis for ordering additional inventory and directing it to regional distribution centers and individual restaurants. Because sales are stated as individual menu items, it would be easy to understand inventory replacement needs (as well as sales and

revenue) from this single process. All of it could start with entries by wait staff into the menu order entry system. As checks are paid, (confirming those orders), sales would be entered, and totaled at the end of each shift. Store managers would receive a report on both shift revenue totals and also on inventory updates (so that they can make any adjustments to the automatic reordering process, both those items regularly ordered and those ordered as replacements based on usage).

Individual store revenue data and inventory replacement or increment needs will be rolled up daily on both a regional and a company-wide basis. A revenue dashboard will allow HQ'S executives to see daily results on a real time basis, drilling down into regional, brand, and individual store results.

But for this ambitious plan to happen there must be a process for facilitation, coordination, policy management, and control. SOA Governance will offer the restaurants those management and control functions. It will insure all of the restaurant locations use a consistent process for entering orders and collecting and processing checks. It will offer local, regional, and HQ management insight into both daily revenues and the management of food and supply inventories. As individual restaurants, groups, or the entire organization plan for new SOA projects they will be able to easily discover and reuse the intellectual property (IP) they created for this application. For a project of this size, additional controls and infrastructure can be justified, so the initial plans might include not only some rudimentary SOA Governance for coordination and oversight, but also more advanced building blocks like an ESB, permitting the easy connection of applications and services.

The future of SOA Governance: An Assessment

It's easy to predict the near future of SOA Governance: we're going to have a lot more of it as SOA becomes the way most large enterprises (and many medium-sized ones) do their application development and life cycle management.. It's easy to predict what will happen in the very long run (say, 20 years or more). We'll probably have found a new and still better way of doing things – perhaps based on the power of nanocomputers or neural networks. It's the in-between part that's tricky. But good planning requires that we try for that five-to-ten year view, so here are some educated guesses bases on lots of experience and the facts at hand.

From Nascent to Mature SOA Systems

Today, most of the SOA systems we're looking at are very young. Most of them – with a few exceptions – are a few projects, general below mission critical level. Many of them consist largely of service-enabled legacy investments with a few newly created services added. We talked to companies who had written ten services – or 20 or 30 – for two or three projects. That was actually a lot. Many companies were still more in the talking about or planning for stages.

That's fine, as long as you don't miss the paradigm parade. While we'd agree that only a few pioneering spirits want to be the very first to try a new technology, those who invest earlier get more for their money, because they can use the technology longer, while still being in the period of that technology's full bloom. Those who wait too late are just getting started when something more interesting comes along (which, inevitably, it does) and whatever you just did becomes a lot less interesting.

Of course, some technologies barely have a blossoming summer and a fall harvest at all – they just fade away with the little buds still tightly closed. It might be lack of interest or insufficient differentiation, but it's more likely that something more interesting just pushed it aside. Other technologies just stay around forever, in spite of analysts predictions that they will be fading any

minute now. Think for example, of the ever-young IBM i-series, the Intel-PC, and the forever with us IBM mainframe computer. Imagine looking that good at nearly fifty! Predicting which is which possible, but the odds are high.

SOA is young enough that there's plenty of time to take advantage of its' expected life. Given the interest of both developers and customers, it's likely to be around for quite a while.

The Whole Vision: A View of the Enabled Enterprise

SOA Governance has a particular and valuable quality. It enables both business and IT to view the entire organization, at every level of SOA implementation. An important view is the Enterprise, from the Department Silo view to the Enterprise View, but perhaps more important will be the future ability to extend that view to include the enterprise's Value Chain. In that view, it will be possible to see the effect of a process – or a process change – from a single desk or department to every supplier, partner, and customer.

That broad future vision would enable management to quickly remodel processes and adapt services when unexpected changes in the marketplace – a strike, a natural disaster, an interruption to the supply chain – create challenges or opportunities. And that will make SOA and its Governance and infrastructure powerful indeed.

A Call to Action about SOA Governance

While it's possible to start an SOA project successfully without SOA Governance in place, especially if it's a small project, inside a single department, SOA Governance helps insure that SOA projects will provide their intended results. It does this through promoting consistency, the reuse of IP, and the development and application of organization-wide policies. This avoids having very good SOA projects inside individual groups but never realizing the much larger benefits that are available when SOA is implemented in a coordinated way across the organization.

For larger projects and for companies that are moving from small SOA pilots to larger and more ambitious projects that affect larger parts of their organization, SOA Governance should be viewed as a requirement for smooth planning, implementations, and management with exceptional results.

SOA Governance is often a cooperative effort between the business users of SOA and the technology facilitators in IT, especially if you already have an IT Governance program in place. In any case, this will be a good subject for sharing views on as well as responsibilities.

For information on IBM's SOA and SOA Governance portfolios, visit www.ibm.com/SOA

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