

SOA Governance: Framework and Best Practices

An Oracle White Paper

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INTRODUCTION

In the context of Service-Oriented Architecture (SOA), governance is an often-misunderstood term. Some people use the term *SOA Governance* to mean service lifecycle governance—that is, governing the lifecycle of services from creation through deployment. Others take it to mean applying runtime policies to services. But is there more to SOA governance than this? And without a common understanding of what governance means, are organizations that adopt SOA simply setting themselves up for failure?

Our view is that governance with SOA should ultimately be about delivering on your business and SOA objectives. It must link SOA investments to business goals and initiatives, mitigate the risks associated with SOA, and fit into the context of an organization's overall IT Governance framework.

One thing is certain: lack of governance can be a serious impediment to success. According to a strategic planning assumption by Gartner Group's Paolo Malinverno, through 2010, the lack of working governance arrangements will be the most common reason for the failure of SOA projects (0.8 probability). Conversely, companies that have established governance to help individuals make good decisions within the context of the problem space, have matured their SOAs successfully. These companies have also achieved an effective layering of SOA capabilities in areas such as architecture, technology infrastructure, operations, information, governance, people and organizational structure, portfolios, project execution, and finance.

A SOA Roadmap built using a maturity model, such as Oracle's Five-Level SOA Maturity Model: *Level 5 SOA*,¹ allows companies to begin the SOA journey, and manage the transformation to SOA by building on each successive step, and ultimately delivering the SOA benefits expected: service reuse, improved integration, interoperability and business agility. Governance is a significant part of that journey and the focus of this paper.

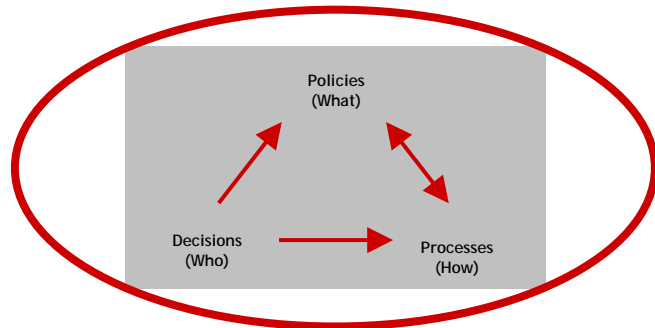
This paper outlines a framework and best practices for governance as it specifically relates to SOA, and introduces our Six Steps to Successful SOA Governance model. Armed with this model, architects and IT managers with SOA responsibility will have the knowledge and framework they need to ensure SOA success.

¹ Go to <http://www.oracle.com/soa> and look for the Online SOA Assessment

Governance—whether it is financial, business, legal, or IT—is about getting people to do the right thing at the right time. In other words, it is about encouraging the behavior that will achieve your business goals.

CONTEXT

Peter Weill of MIT defines IT governance as "specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT." In other words, IT managers must use decisions, processes, and policies to encourage the behavior that contributes to success. The IT Governance Institute expands this definition to include "... leadership and organisational structures and processes that ensure that the organisation's IT sustains and extends the organisation's strategies and objectives." In the case of SOA adoption, SOA Governance can be defined as the interaction between policies (what), decision-makers (who), and processes (how) in order to ensure SOA success (See Figure 1).



GOVERNANCE with SOA ADDRESSES

- **What** decisions must be made for effective management
- **Who** should make those decisions and who has input rights
- **How** the decisions will be agreed on and implemented

Figure 1: Essence of Governance with SOA

This definition of governance implies that you need to have a SOA strategy, ensure that it's aligned with where your business is going, and develop a concrete idea of what you expect from your SOA investments. In order to deliver on these expectations, and as part of your SOA strategy, you need a plan that we refer to as the SOA Roadmap, which outlines the projects to be implemented with SOA and, the capabilities that need to be put into place over a period of time (such as two to five years), to ensure that you deliver on your business and SOA strategy. By incrementally building the required capabilities over a period of time, you can increase your SOA maturity, thereby enabling you to deliver more projects in a more efficient and change-resilient way.

Enacting policies and procedures to ensure the timely and appropriate execution of your SOA Roadmap is the essence of Governance with SOA.

To ensure SOA success, you should enact policies and supporting processes that support the delivery of the SOA Roadmap. You should communicate them widely, and then monitor their implementation and make adjustments as you go. This is the essence of governance with SOA—enacting policies and procedures to ensure the timely and appropriate execution of your SOA Roadmap.

So if governance with SOA is about decisions, processes, and policies, "What kinds of policies do you need to put into place? And to what do those policies need to be applied?"

ENTERPRISE ARCHITECTURE AND SOA

Enterprise Architecture (EA) is a planning, governance, and innovation function. EA's objectives are threefold: to provide dynamic processes for managing enterprise IT change through transformation; to develop business capabilities over a period of time which gives the enterprise a competitive edge; and, to identify an investment plan in people, processes, and technologies for the transformation plan. These goals should drive everything within EA. The deliverables of EA are a target enterprise IT architecture based on an articulation of the business requirements vision, and a governance model that enables achievement of that vision through a well defined, planned and executed transformation.

SOA is one philosophy or framework within enterprise architecture (EA), the goals and objectives of which are alignment with the business and business goals, which include

- Reducing overall total cost of ownership (TCO)
- Improving time to market
- Achieving business agility
- Fostering innovation
- Enabling compliance
- Improving the top and / or bottom line
- Increasing customer satisfaction and retention
- Global expansion

Further, SOA is increasingly a typically (significant) part of EA and has implications for key aspects of EA

- The Business Architecture – the basis for the definition of business processes are business services and business events.
- The Application Architecture – the basis for which are services, service consumers, and composites that bind into user interfaces.
- The Information Architecture – the focus of which is on data schema standardization, data services and data quality.
- The Technical Architecture – which evolves through new SOA infrastructure, tools and shared platforms.

In fact, SOA supports the EA strategy through a service portfolio that provides a view into EA artifacts, and, service repository that becomes the basis for the processes and systems supporting the business architecture. This helps to create a common view of the way in which an enterprise achieves and maintains agility.

KEY LEVERAGE POINTS FOR SOA GOVERNANCE

To meet business, EA and SOA goals, policies must be enacted across the different business areas: architecture, technology infrastructure, information, finance, portfolios, people, projects (or rather, the way in which projects are executed) and operations. This is the role of governance: i.e. policies, which need to be designed and enacted to ensure this alignment. The format and medium for policies may be different - some policies can be captured and enforced

in technology, for example, a registry/ repository aids in enforcing service lifecycle governance, and a Web services management solution realizes the application of operational policies to services at runtime. Other policies, such as architectural policies, or funding policies need to be captured through policy documents that are distributed through the organization.

The key aspects that need to be governed in the context of SOA are shown in Figure 2.

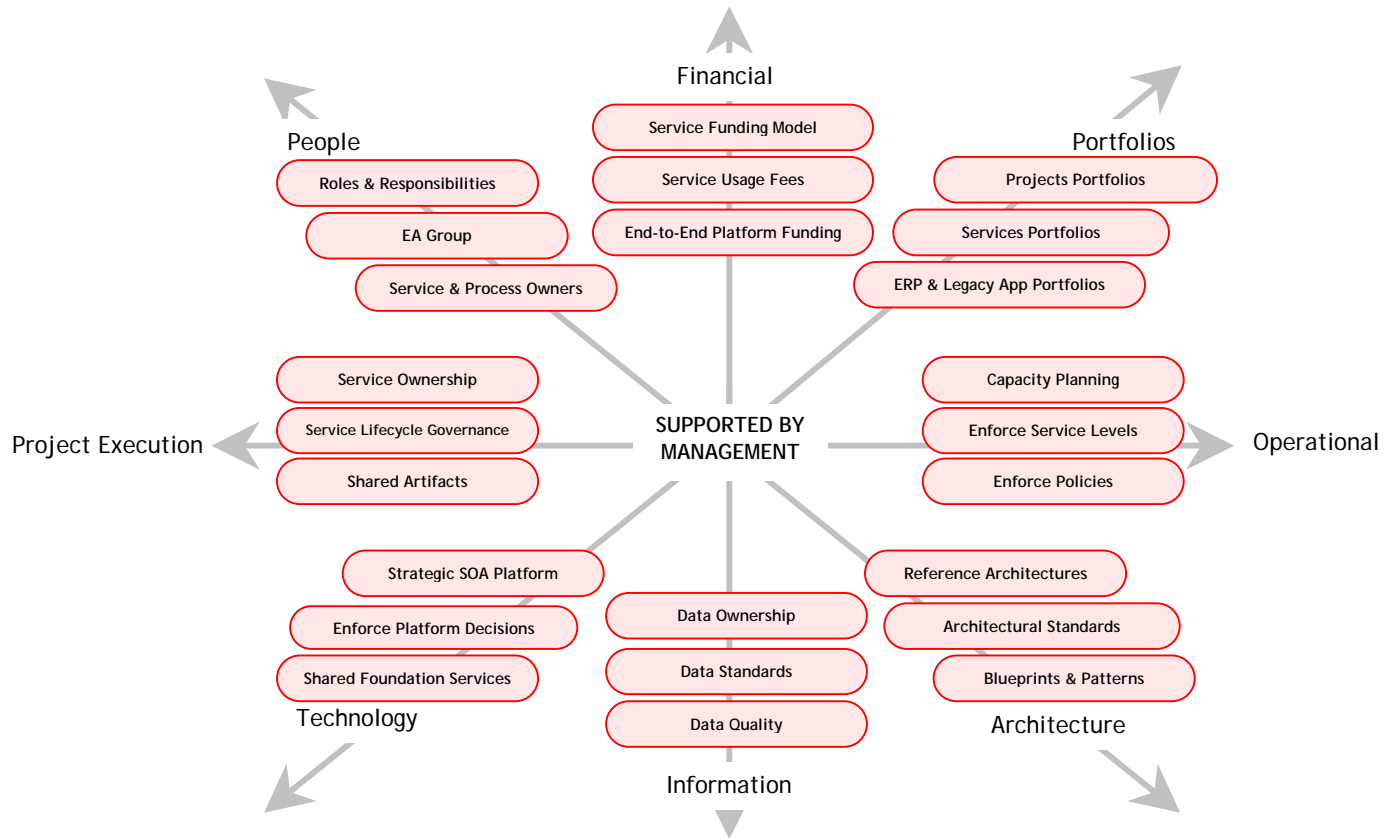


Figure 2: Key Leverage Points for Policies (SOA Governance)

Figure Legend

- Project Execution refers to the way that projects are executed. We believe that key changes need to be made to the way that IT projects are executed in a SOA world. The focus of this change is about managing the lifecycle of services – which are typically implemented as part of existing projects. Other issues which need to be resolved are service ownership and the management of shared artifacts.
- Operations captures the operational aspects of services. Services have implications on the way that IT is operated and managed. As such, operational policies need to be managed differently in a SOA world.

You can apply SOA tactically to individual projects and reap benefits, for example by replacing point-to-point integration with a less-costly and more interoperable integration platform based on SOA. However, it's important to understand that you can achieve the

change necessary for enterprise-wide SOA adoption (and the resultant inter-department reuse) only by putting policies and processes in place around all of the key leverage points noted above. If you put the appropriate policies in place—that is, if you govern your SOA journey wisely—then you will be able to deliver on your enterprise-wide SOA strategy and business objectives.

We now elaborate on the kinds of policies that need to be enacted with respect to each of the leverage points mentioned.

Architecture

Architectural policies provide the foundation and framework for your SOA and enable you to build it better, faster, and cheaper. Every system must be built so that it both fits into your existing environment and reflects your organization’s future vision and SOA strategy. Building out your SOA to enable change is best done using an architectural approach that sets up a minimal set of constraints, thereby realizing consistency in service implementation, improved interoperability, stakeholder innovation, and enablement of applications that are minimally developed, yet offer general-purpose capabilities that are useful to other applications and take advantage of and enhance a shared infrastructure.

As part of your SOA journey, you should consider policies built around:

- Standards compliance—for example, WS-I Basic Profile compliance for service interfaces
- Use of architectural assessments, including reviews and change processes
- Utilization of architecture documents and guidelines covering use cases, views, service interface design, and design patterns
- Use of service-based application blueprints
- Adherence to reference architectures

Organizations must attain a certain level of process maturity—and architects must establish credibility—before they can incorporate effective SOA architectural governance. Don’t expect to establish governance authority before the organization as a whole sees the value of the SOA program and is ready to change its behavior to attain that value. Also bear in mind that for large organizations, the nirvana of a single enterprise wide SOA is hard to mandate. We recommend segmenting such organizations into separate domains each of which will have their own SOA strategy, architectural standards, (possibly overlapping) service portfolios and governance regimes. A plan to ensure interoperability across these domains and alignment should also be implemented.

Failure to enact policies relating to enterprise architecture will result in duplicated effort, services that are not reusable (because they won’t “plug” together), and services that suffer from poor reliability.

Best Practice

To gain the most reusability across lines of business, departments, and projects, it is important to create standards to which architects can design solutions. This is typically accomplished

through reference architectures that are used as both blueprints for new designs and a yardstick by which architectures should be evaluated.

Many companies face “siloed” business models in which there are no shared designs, policies, or processes across the LOBs. These companies often work harder to create seamless integration with business partners than they do within their own internal divisions. But the architecture discipline must be aligned within companies or they will not be able gain the maximum benefits of SOA, such as service reuse and reduced maintenance costs.

Oracle recommends that companies create a single, consolidated reference architecture implemented across the entire enterprise. By keeping your enterprise architecture artifacts simple, you increase the chances that your audience will understand them, project teams will actually read them, and you will be able to effectively enforce and update them over time. An enterprise may create separate architectures for: applications, integration, security, and data, or a single reference architecture that encompasses all of these domains. This solution architecture is sometimes referred to as a *composition architecture*. What is important is that the EA group defines a common blueprint for new application development and integration, with standard interfaces for easier assembly and maintenance.

Once the reference architecture—or architectures—are created, training should be provided to enable architects to understand how to use and interpret the reference architectures. Many companies are good at creating documents that quickly become shelfware because no one wants to read through a hundred-plus-page document. This is only slightly better than having no reference architecture at all. These documents should be considered “living documents,” and updated and versioned. A best practice for any large organization is a “just in time” document strategy that allows architects and tech leads to easily find the information that they need when they need it.

Remember that timely guidance from an enterprise architect who understands the current environment and the future vision for the enterprise—even when this guidance is imperfect and based on incomplete information—is often far better than the uneducated guesses that a project team will make on its own while it waits for the official architecture to be published.

➔ Best Practice: Align architecture principles across lines of business by creating reference architectures

In addition to a reference architecture, companies need to create standards around design patterns, tools, policies, and processes. Many companies do this through a working group that is part of their architecture review board, or ARB. (Gartner refers to this group as the ICC, or Integration Competency Center; others may call it the SOA Center of Excellence).

In an ideal world, the SOA Center of Excellence would be funded during the early stages of the execution of the SOA strategy. Whilst this may only be possible in organizations in which there is executive commitment to SOA, its presence means that issues such as service ownership, service design and governance are in place as services transition to service owners

and reused starts to kick-in. This helps to maintain the integrity of services from day one and avoid service redesign, normalization and re-implementation.

One of the primary responsibilities of this working group is to establish design and tool standards across the enterprise. Its second responsibility is to establish enterprise wide policies, processes, and service criteria. This working group might establish policies such as the following:

- All service interfaces must be WS-I compliant
- All external service calls must use WS-Security
- All asynchronous interfaces must use WS-Addressing

Many companies have representatives from the lines of business involved in the task of creating SOA policies, since these policies span both technical and business issues. For example, such policies might govern the process for the identification, definition, and creation of services, and the support model for these services. Similar to enterprise standards, policies and processes are worthless unless they are both understood and followed.

➔ Best Practice: Centralize the creation of standards, policies, and processes

Technology Infrastructure

Technology must be identified, sourced, and managed just like any other component of SOA; it is not a one-time “fire-and-forget” decision. Hence, policies need to be enacted to ensure that

- A technology foundation (often termed Strategic SOA Platform or End-to-End SOA Platform) that provides messaging, security, and other services (sometimes termed *utility services*) is centrally funded and leveraged by all projects
- A governance platform that is part of the SOA platform to enable the automation of policies where possible
- Consensus is built regarding the migration of legacy systems and platforms to SOA technologies
- SOA platform enhancements coincide with the project portfolio plan and business service portfolio plan
- The design and implementation of shared foundation / utility services are a part of SOA infrastructure

Many architecturally mature organizations today have organizations and processes devoted to software and hardware governance, and these need to be leveraged for building out a SOA infrastructure.

Failure to enact policies on technology and software infrastructure will result in incompatible services with poor interoperability, which aren't fit for enterprisewide use. If each of your project teams uses its own separate SOA infrastructure—without integrating or sharing components with the other teams, or using standards-based architecture to ensure interoperability— is there any chance of building composite applications that are reliable and secure?

Best Practice

Most large companies that have been developing technical solutions for years, either internally or through acquisitions, end up with redundant teams that rely on different vendor products or home-grown solutions, yet provide the same basic functionality. Companies should strive for simplicity in their technology infrastructures, and avoid vendor lock-in by selecting vendor solutions that are based on industry standards and—equally important—choosing vendors that are active members of standards organizations, such as W3C, OASIS, and WS-I. Many companies—especially ones just starting out—may find they already have technical solutions in-house that provide the desired functionality for SOA implementations. Once a company has selected a solution as a standard, whether it is a software or hardware solution, the company must establish governance processes that define when the solution is to be used and make sure the selected solution is leveraged.

➔ Best Practice: Select technical solutions and vendor partners that adhere to industry standards

Information

Developers often create service interfaces that perpetuate poor data access methods, which negates the benefits of creating services that share data. To give service-oriented applications a strong foundation, data quality and interoperability issues must be addressed. The goals of any SOA initiative, then, should be to create data standards to overcome disparities in data representations across legacy, ERP and other systems, and to create a set of services that becomes the authoritative way to access high-quality enterprise data. An enterprise data environment should

- Create single logical sources for key enterprise entities (such as customers or products)
- Eliminate custom interfaces and proprietary data formats
- Improve data quality across the enterprise
- Enforce data standards in the data services layer
- Make data readily discoverable, accessible, and interoperable
- Realize policy-driven security for data services

The specific data governance issues that need to be addressed by an enterprise data management function include

- Defining data ownership and stewardship, including roles and responsibilities for data consumers and producers
- Setting up a data services architecture
- Establishing policies and guidelines for adhering to the data standards chosen by the enterprise
- Mandating the use of specific schemas as the format for exchange master data (such as customers or orders)

- Establishing processes for exceptions, changes to standards, version management, and so on
- Mandating the use of specific data services as the single source of truth for the data families they serve
- Mandating policies to ensure that data services conform to data quality metrics
- Defining and enforcing the security policies that are applied to data services
- Defining service-level agreements (SLAs) to which enterprise data services must conform

Failure to address information-related issues and apply appropriate policies around them will lead to SOAs in which data services provide poor quality and inconsistent data—which, in turn, will lead to poor analytics and business processes that fail to fulfill their requirements.

Best Practice

From an architectural perspective, policies must be enacted to create and use an enterprise layer that logically centralizes access to the data spread across the enterprise. This set of logically centralized data services provides several architectural advantages. First, the enterprise can assert greater control over the governance and implementation of data access mechanisms. Second, clients use a consistent mechanism to access data. Third, the enterprise can design and implement a solution in a holistic fashion instead of the typical one-off models that are the norm in data integration, thereby reducing cost and improving information quality. Finally, besides the basic Create, Read, Update, and Delete (CRUD) operations, the underlying architecture can support data aggregation, inter-service transactions, and multiple access and usage patterns, all while ensuring acceptable levels of quality of service.

- ➔ Best Practice: Establish an enterprise data management function to define and monitor enforcement of data governance. This group should establish policies and procedures that cut across multiple departments
- ➔ Best Practice: Enforce security policies at the data service layer using tools that enable declarative policy definition centrally and localized enforcement throughout the enterprise

Financial

In the pre-SOA world, budgets were allocated in silos at the project, group, or department level. SOA, on the other hand, is about sharing capabilities as services and leveraging assets across the enterprise. Thus, SOA requires new policies and procedures (including chargeback models) for funding services and architecture. Ideally, these policies should facilitate

- The sharing of hardware and software infrastructure that is the backbone of an enterprisewide SOA
- The funding of business and technical services that will be shared across multiple departments

Without active involvement from executives, or at least their strong endorsement, Governance with SOA stands little chance of delivering on SOA and business objectives.

- The funding of SOA-related capabilities that aren't delivered as part of existing projects
- The funding of an active enterprise architecture group and SOA center of excellence (which often happens when the SOA journey is well under way).

The greatest benefit and return on investment with SOA occurs when companies stop trying to maximize investments locally (silos) and start maximizing all assets across the entire enterprise.

The sooner you balance the interests of service providers, who pay an overwhelmingly large portion of the cost for producing a service, and service consumers, who pay an underwhelmingly small cost for using the service, the more reuse you will get! SOA usually costs more at the outset—as the first projects build out the services and infrastructure that will be leveraged later by other areas—but benefits increase as time goes on. The greatest benefit and return on investment with SOA occurs when companies stop trying to maximize investments locally (silos) and start maximizing all assets across the entire enterprise.

Failure to address financial issues—especially providing central funding of reusable services—will lead to duplicated technology infrastructure and service functionality, and poor-quality services that only fulfill the needs of individual projects, and are thus unusable across departments.

Best Practice

SOA projects are difficult to justify from a short-term financial perspective because they may have a steep ramp-up cost. Creating a sharable enterprise service requires much more work and testing than simply creating a component within for one application. SOA starts to become cost-effective when the second or third application leverages the service or SOA platform, or when you start to measure the total cost of maintenance. SOA can also greatly reduce maintenance costs when done correctly, because Web service management platforms and ESBs can provide real-time insight and dynamic alerting capabilities that allow support teams to know exactly where a problem occurs. This is a huge benefit compared to the large crisis teams that are typically brought in to find problems in monolithic applications. It is important, therefore, that any financial evaluation of service-oriented applications take into account the long-term business perspective.

- ➔ Best Practice: Use a multiyear financial strategy to justify SOA investments
- ➔ Best Practice: Consider central funding for services that are to be used across departments

Portfolios

You need to enact policies around three types of portfolios: business and technical (utility) services portfolios, project portfolios, and enterprise applications (legacy, ERP, packaged, home-grown) portfolios. Your policies should

- Ensure that application lifecycles (upgrade, enhancement, maintenance, and retirement) are consistent with your SOA strategy and enterprise architecture—especially with the SOA standards on which interoperability is built
- Ensure that hardware and software agendas and plans are consistent with your SOA and enterprise strategy

- Create projects to align applications and infrastructure with the milestones and goals of your SOA Roadmap
- Plan your business services and foundation/ technical services portfolios so that you can phase in services that are in sync with projects that will be leveraging them
- Ensure that your packaged enterprise applications—which are a potential source of services—are leveraged in your business services portfolio, and that decisions on new packaged applications conform to the SOA strategy and EA direction

At the same time, your policies should ensure that the project you are building using SOA principles contributes services to the business services portfolio, from which other projects can then benefit.

Failure to take a portfolio view of SOA will lead to duplicated efforts as overlapping services are implemented across departments, packaged applications aren't harvested appropriately, and SOA principles aren't applied to suitable projects. In addition, the SOA benefits of improved reuse and interoperability won't be realized.

Best Practice

When most companies begin their SOA journey, they find that their efforts are very project-focused—that is, SOA tools, services, and so on are developed and created under the budget of an individual project. Some companies with a greater risk appetite may start creating sharable services first; others may look at their business architecture and focus on key business processes. As a company matures its SOA practice, eventually it moves to both a service- and process-based model. A service-based approach focuses on the most reusable services and designs and deploys these services. A process-based approach looks at the business architecture to clearly define the high-level business processes, and then works down to the lower-level services. A process-based approach typically provides the highest return on investment (ROI), because it allows businesses to focus on the business processes that are truly core to their business, and lets the IT people build the right set of services to support those processes.

➔ Best Practice: The SOA approach should focus on high-value business processes

A best practice in the portfolio area is to ensure tight alignment between the strategic plans for business and IT. Companies that are most successful in this area put together IT and business teams to collaboratively create unified five-year (or longer) business and IT strategic plans. Creating these plans allows the IT departments to get out in front of the most important business projects, especially if the business projects will not be starting for a year or two. Most IT departments are in a reactive mode when they create one-year business plans, so they cannot get out in front of their business counterparts to help provide business agility and a true competitive advantage.

➔ Best Practice: EA and SOA should be driven by multiyear strategic plans that integrate business and IT goals

People

Adopting SOA requires more than just a technology shift. Policies to encourage desirable behavior among employees must be part of your SOA governance. Specific areas that need to be considered include

- Assigning and empowering employees who are responsible for driving process improvement, often called *process officers* (SOA is about improving business processes, thus someone needs to be responsible for making it happen.)
- Developing the skills necessary for architecting, building, testing, and deploying services and service-oriented applications
- Creating incentives to encourage the building of sharable services and the reuse of existing services
- Forming an enterprise architecture group to drive adoption of EA disciplines and SOA in particular
- Creating a group that is specifically tasked with governing the SOA road map

Typically, the SOA governance group consists of representatives from EA, the different lines of business, and finance. Failure to address organizational and change management issues will lead to slow SOA adoption that lacks coherence, because employees aren't empowered (through organizational structure, training, and incentives) and aren't held accountable for delivering on SOA benefits.

Best Practice

As companies start their SOA journey, typically a small group of architects and developers drives solutions. Since SOA is essentially a philosophy within enterprise architecture, it is important that the EA and/or integration competency center (ICC) groups establish training. This training should cover the following areas

- Standards and their implementation within the company
- Governance policies and procedures and reference architectures
- Software architecture document (SAD) creation
- Roles and responsibilities of the various teams during service development, testing, deployment, and maintenance

Enterprises should not assume that by simply making documentation available in a common repository, they will provide the necessary training. Q&A sessions should be held to help IT staff understand the principles and behaviors that the enterprise is trying to establish. Training also must be provided for the individuals supporting the SOA tools, as well as the project managers (PMs), business analysts (BAs), quality assurance (QA) team, and others who interact with the design, implementation, deployment, and maintenance of the SOA solutions.

➔ Best Practice: Provide enterprise SOA training for managers and stakeholders as well as architects, developers, PMs, BAs, and QAs

Project Execution

SOA has a pronounced impact on how projects are executed. Not all projects are compatible with SOA technologies, and even projects that are designed for SOA must have a range of additional considerations and policies applied to them. Policies need to be put into place to

- Ensure that appropriate projects are selected for the application of SOA techniques and technologies
- Prioritize projects and align them with the SOA strategy and SOA Roadmap (for example, to ensure that projects take into account services that gradually come online as denoted in the business services portfolio plan)
- Address the funding, ownership, and management of services, including ensuring that services meet existing and future business needs. It's very helpful if service ownership, service design and governance are in place as services transition to service owners, and ahead of service modeling and design.
- Drive consistency in service implementation to ensure that shared services are architected and deployed to facilitate and realize sharing (some of these policies will focus on architecture as well)
- Address the creation, storage, and retrieval of shared SOA artifacts
- Formalize the governance of the lifecycle of services, business processes, and business rules, including service identification

Good governance practices are often similar to those followed by successful open source projects: The community itself decides how it will govern itself. Governance models handed down to the team are often self-defeating if the team does not buy into the model. The team needs to see a clear tie between the governance model and improved results. In other words, the governance model should measure things that matter and hold team members accountable for things that will affect the overall team results.

Policies that address the lifecycle of services—or service lifecycle governance—are usually the focus when people talk about SOA governance. Service lifecycle governance covers every aspect of services, including service identification, approval for enterprise services, service design (including interface design, creation guidelines, and best practices), service publishing, change request management, versioning, retirement/sunseting, deployment, and operations. Proper service lifecycle governance is a critical component of SOA success. Without it, services may end up only fulfilling local project needs: you may have services and SOA technology, but you almost certainly will not realize the benefits of an enterprise service-oriented architecture.

Technologies such as UDDI registries and repositories help to enforce service lifecycle policies, and integrated business process management suites include capabilities to manage the lifecycle of business processes. However, each organization must define and enforce its own best practices to ensure that service lifecycle policies are followed.

Failure to apply appropriate policies to the way projects are executed will lead to poor reuse—one of the key SOA benefits that many enterprises seek.

Best Practice

To realize service reusability, existing services must be discoverable by architects on new projects. A best practice for companies is to provide a UDDI registry with a service repository to enable people to quickly find existing services and related information, such as SLAs, service owners, availability, and so on. As architects come to realize that components within their design could be sharable services, a well-established and well-governed process for the submission of services must be defined and available. Architects should be given incentives to both use existing services and create sharable services. As these new sharable services are created, they can be placed in the business service catalog (or registry/repository) for another project to use.

➔ Best Practice: Utilize a service registry to catalogue existing services and define processes to identify and submit potentially sharable services

Operations

Services that are shared across enterprise departments have operational implications that need to be captured as policies. The runtime enforcement of operational policies is the other aspect of SOA governance that many focus on. These policies must address

- The operational model for services, including who pays for additional resources when services levels are increased
- Capacity monitoring and planning, to ensure that critical business processes that rely on shared services are monitored and that the services that support those business processes have the capacity to handle the load
- The handling of policy exceptions and violations
- Service execution, including the definition and enforcement of runtime policies such as security, access, logging and billing policies, and service reliability. A SOA/ Web services management solution can help you apply runtime policies to services

Failure to apply operational policies to services will lead to unaccountable SOAs in which reuse is difficult and security may be implemented poorly and inflexibly.

Best Practices

One of the biggest and least-discussed benefits of SOA is in the maintenance and operations space. By utilizing the service management capabilities of SOA, organizations can isolate, diagnose, and fix production problems for service-oriented applications more quickly than for monolithic applications, saving money and reducing customer dissatisfaction. As SLAs are encroached, maintenance teams can proactively resolve problems before they actually occur.

Many reports indicate that 60 to 80 percent of the TCO of an application is in maintenance. Thus, even a 10 percent cost reduction in the maintenance space will greatly outweigh a 10 percent cost reduction in the development space. Business processes and applications that leverage services should be designed to achieve lower maintenance costs and transparency for the business. Most successful SOA efforts have used a centralized team to help provide consistency and best practices. Over time, as the processes mature, these operation support teams can become more decentralized.

The runtime monitoring of services and service levels, including logging and auditing, and the runtime enforcement of policies, such as security policies, is best implemented early on in the SOA journey. The sooner you put monitoring and policy enforcement infrastructure into place, the earlier you will be able to understand service usage patterns, and change security policies as your requirements evolve.

- ➔ Best Practice: Centralize SOA operations and support until greater maturity is realized
- ➔ Best Practice: Deploy a Web services management solution for runtime policy enforcement through distributed policy enforcement points

SIX STEPS TO SUCCESSFUL SOA GOVERNANCE

In the previous sections, we discussed the importance of aligning the various areas within a company to get maximum benefits from an SOA journey, and we provided best practices for achieving this alignment. We also referenced the five-level SOA Maturity Model, in which a company leverages past successes by building its SOA competency one layer at a time. The SOA journey—and thus the SOA governance journey—is an incremental process. Here we describe a six-step process to help move a company forward in its SOA governance capabilities (shown in Figure 3), and we provide best practices for each step of the process.

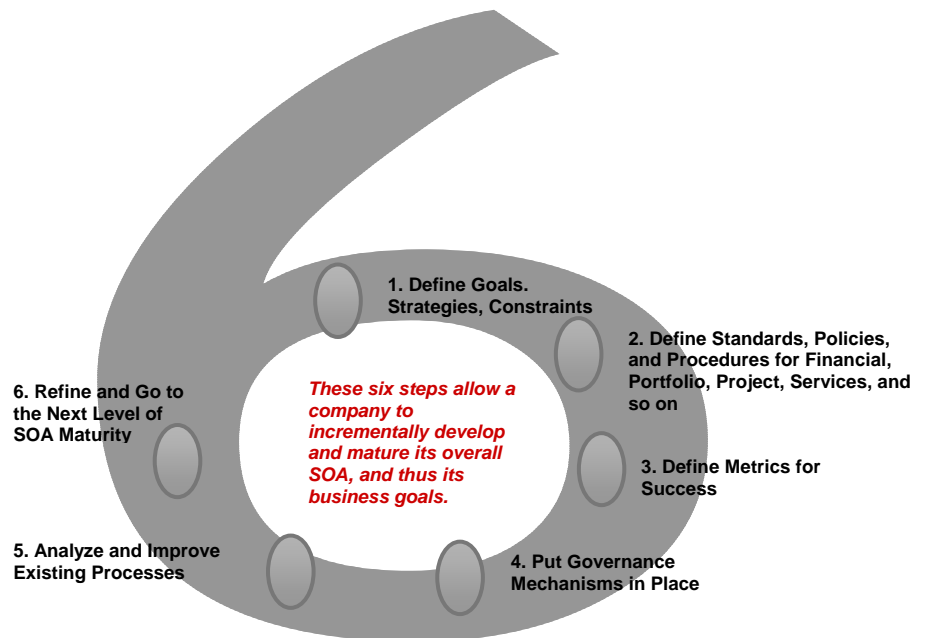


Figure 3: Six Steps to Successful Governance with SOA

Step 1: Define Goals, Strategy and Constraints

The first and most important step is defining the organization's SOA goals and strategies. These must be aligned with business goals and strategies for the SOA efforts to provide the greatest value. Most companies have goals around revenue, growth, DSO, margin, and time to

market. As part of this phase, it's also important to take into account applicable constraints, including resources, organizational readiness, budgeting, legacy and cultural issues. Without taking these into consideration, the policies that are defined in Step 2 may end up not being implemented.

Every policy, process, architecture, and decision should be traceable back to these business goals. Without first understanding and aligning with business goals, it is difficult to justify SOA efforts.

➔ Best Practice: Establish SOA goals and strategies that are tightly aligned with the business

Whatever SOA strategy your organization selects, in Step 2, you should clearly state who has decision and input rights in formulating specific governance policies, how the policies are communicated, how the execution of those policies is monitored, and how adjustments can be made to the policies based on real-life experience.

Step 2: Define Policies and Procedures

There is no “one size fits all” SOA strategy, thus there is no single SOA Roadmap, nor a single set of policies and procedures that constitute governance with SOA. The second step is to define standards, policies, and procedures that address the alignment of finance, portfolios, projects, and operations. Most companies begin their SOA journey using a project-based approach, meaning that the SOA efforts and tools are justified within the scope and budget of a development project. Many companies want to see success stories with SOA before expending the time and effort to fully align the various areas. Since the first SOA endeavors are project-based, these efforts typically leverage existing tools, such as application servers, Web service management platforms, portals, or other tools specific to the selected project. As subsequent projects are implemented, enterprises will add additional tools and infrastructures (such as BPEL process orchestration and business rules engines) based on project-level requirements. Governance begins with simple policies, procedures, and standards surrounding the use of these selected tools and doesn't venture much beyond the scope of projects.

As the SOA journey continues, companies tend to move to a more service-based or process-based approach. In a service-based approach, a company identifies the most sharable business services, develops and deploys them, acquires tools to manage and support them, and then starts to use them. ROI tends to increase as the company improves the scale of SOA and better leverages its investments. Whereas a project-based approach tends to be more “bottom-up,” a process-based approach is top-down, initiated through business architecture and business processes, and a service-based approach is more middle-out. The highest ROI in most cases is realized through a process-based approach, because it allows companies to clearly identify the business processes and services that have the highest impact and value to the company. However, the process-based approach does require significant buy-in across lines of business.

As companies move up the maturity model, they create more enterprise-based policies and processes around sharable services. Governance becomes more important and the scope of it widens as SOA becomes more mainstream and reuse increases. Each iteration through the

maturity model brings in more sophisticated policies and processes for better and more consistent use of services across the enterprise.

→ Best Practice: Establish SOA goals, standards, policies, and procedures proportionate to your SOA maturity

Step 3: Define Metrics for Success

Once you know what kinds of policies you need to focus on and where you are in the execution of your SOA strategy, you need to define the success factors and key performance indicators that will let you know you have achieved your goals and objectives. If you do not define metrics to measure the success of your SOA project, you are unlikely to establish the right governance mechanisms, and are equally unlikely to deliver on your SOA strategy.

Your SOA metrics—which should be part of your EA metrics—may include the creation and use of reference architectures, as well as projects that adhere to a scoring model (which includes reference architectures, standards, sharable services, LOB blueprints, and road maps); the number of exceptions and the reasons for each; the number of sharable services created; the number of applications leveraging the shared services; and the cost saved by reusing an existing service. These metrics should be communicated to the business and IT communities to clearly capture the business value of all the SOA activities and successes. Your initial metrics are likely to be very simple and almost anecdotal. As you mature on your SOA and EA journey and receive feedback from the business customers, your metrics should also mature.

→ Best Practice: Define clear metrics that are obtainable and can show your progress in maturing your SOA and EA efforts

Note that you need to make your goals (which you derive from your metrics) realistic; if you are in the early stages of SOA, then you need realistic reuse goals. The more aggressive these goals are upfront, the more effort and cost you need to invest at the early stages to put in place policies, infrastructure (such as registries and repositories), and incentives to change developers' behavior. Remember, if you don't know where you're going, you will never know if you're going to get there. Measuring your progress is key!

Step 4: Put Governance Mechanisms in Place

Step four of the SOA governance process involves the enactment of governance mechanisms, including how to obtain and evaluate metrics, how to enforce policies and procedures, and how to reward the architects and developers that create sharable services and the individuals or organizations that use them. While the process of collecting and measuring the metrics must be considered and planned in steps 2 and 3, this step represents the actual execution of those processes. For example, if one metric is the number of sharable services or the number of architectural assessments and their results, then actually putting in place the necessary policies to deliver the desired results is part of step 4.

→ Best Practice: Put repeatable and well-defined governance processes in place and capture the metrics defined in steps 2 and 3

Some governance processes may be automated, such as using tools to make sure that WSDLs for services are WS-I compliant. The more governance processes can be automated, the easier it is to scale enterprise-wide SOA efforts. Some governance processes have to be manual, but must be employed to ensure that everyone is moving in the same direction. SOA projects that are left ungoverned generally end up creating a junk drawer of services that leave an EA group no better off than before it implemented an SOA. When implementing governance policies, a best practice is to make education about the governance process and policies primary, and the actual enforcement secondary.

→ Best Practice: Automate as many of the governance processes and collection of metrics as possible

In order to make the procedures effective, you need endorsement from executives, to “encourage” the behavioral changes that SOA requires and to ensure the participation of the appropriate people. Also bear in mind that when you are setting up the governance mechanisms, governance overhead should be commensurate with the stage of SOA adoption and the size of your company. That is, you won’t need much when you’re starting out, but you should plan on progressively phasing in more policies as you increase your SOA maturity.²

Step 5: Analyze and Improve Processes

At this step, you should analyze the results of the governance policies that you put in place and gather metrics on the governance processes themselves, including their effectiveness. You should also measure the progress that you have made on your SOA Roadmap, relaxing overly restrictive policies where it makes sense and taking corrective action where necessary. A lot of companies separate “policies” (have to follow) from “guidelines” (should follow). Remember, you want to have an open environment in which people communicate their actions and experiences when they go off the beaten path.

One of the things SOA can leverage from the manufacturing space is the notion of kaizen, the Japanese word for “continuous improvement”—that is, focusing on process to remove the major obstacles to production efficiency. As you solve the largest problems, you encounter new, slightly smaller problems that either escaped your notice before or were lower in priority. As you continue to eliminate the highest-priority bottlenecks and hindrances, you can focus your attention on the next-highest-priority items. Eventually you will make improvements through tuning your processes, not through large or complete overhauls of them. As you keep improving your governance and overall EA practices, issues that had slipped through in the past—including communication of the metrics and even the metrics themselves—will rise to the top and command attention until they can be fixed, automated, or in some way improved. This includes communication of the metrics and even the metrics themselves. Remember that feedback from the recipients of the metrics (typically the businesses) is vital to improving this process.

For a full discussion of SOA maturity, go to oracle.com/soa and look for the Online SOA Assessment, or see our article, “The Path to SOA,” at www.ebizq.net/topics/soa/features/7193.html.

→ Best Practice: SOA and EA should leverage kaizen concepts from the manufacturing domain

Step 6: Refine Your SOA

Periodically, as your SOA matures, you need to create new policies and procedures that enable you to increase your SOA maturity while delivering on your business goals. You will re-evaluate and refine your SOA strategy, along with your SOA goals and objectives, and institute new policies and procedures that enable you to advance on your SOA Roadmap.

One example of continuous improvement is to implement a “Do no harm” governance policy. In the early stages, when the organization is learning about SOA and its impact on the architectural and business areas, the scoring model is just a prototype. Projects are evaluated against the reference architecture, business roadmap, and blueprints (if they existed at that time), and feedback provided to the architects and to the businesses. Feedback is also sought from the CIOs and their direct reports. Hence, at this stage – or Level 1 – SOA governance is primarily a communication and learning process, rather than an enforcement process.

At Level 2 of SOA governance, the organization begins to implement more education and some enforcement as policies and metrics are slowly created. At Level 3 of the SOA maturity model, the policies grow more formal, the assessments more complete, and the communication greatly improved.

→ Best Practice: Governance should be commensurate with the level of SOA maturity and the number of services in operation. Early on, organizations should avoid restrictive policies. As SOA maturity increases, policies should be enacted in order to deliver on SOA and business objectives

CONCLUSIONS

SOA is part of enterprise architecture, and should be driven by strategic and tactical business goals and objectives. To deliver on its business goals, a company should establish better alignment between architecture, technology infrastructure, information, portfolios, project execution, people, finance, and operations. As an organization matures in its EA and SOA efforts, these relationships need to become tighter. At the same time, the company can create a six-step governance process that starts simply and matures to become more effective and more efficient. Similar to the manufacturing kaizen process of the 1980s and 1990s, architecture – and in particular SOA – must take a similar approach of continuous improvement.

This article has described a framework and best practices for governing the SOA journey, and defined a six-step process that you can use to mature your enterprise SOA efforts, breaking down the barriers between businesses and maximizing the enterprise benefits from an SOA approach.

A final thought: without executive-level buy-in, it's hard to deliver on the full potential of SOA within your enterprise. So make sure you have executive buy-in for enacting cross-departmental governance policies, but don't make the governance regimes burdensome: let the enterprise innovate to help it move in the right direction!



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