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Right from the Start: SOA Lifecycle Governance

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Executive Overview

Service-oriented architecture (SOA) promises unlimited agility and organizational flexibility. However, achieving these benefits is entirely contingent upon the ability to effectively manage the SOA environment across the enterprise. This paper presents an overview of strategies and practices for governing the transformation to, and the evolution of, SOA. In particular, it explores the role of governance throughout the SOA lifecycle as well as the technology enablers that help organizations develop and maintain an SOA that delivers measurable, sustainable business value.

The SOA Transformation

Not so long ago, corporate governance was a static, memo-driven process. Governance meant making sure the right people signed off on paper requests that made their way through the office. Fast-forward to today. Everything has changed: the rules, the business environment, and the players. Technology regularly redefines every aspect and action of the modern enterprise. This new reality demands a change in both the mission and the method of corporate governance. Governance must go beyond people to permeate the technology and the processes that define and drive the business.

This is particularly true as companies turn to SOA as the means to gain the agility necessary to thrive in a shape-shifting global marketplace. SOA is about facilitating change, about gaining and leveraging agility for competitive advantage. SOA governance is about managing change to maintain that agility and to ensure that it consistently serves business objectives and delivers return on investment (ROI).

The transformation to SOA is a shift in the enterprise ecosystem, and governance measures can be effective only when they apply across that entire ecosystem and reach into the lifecycle of the services that comprise the SOA. Anything less risks failure. In an ever-changing, increasingly unforgiving business environment, where agility is survival, the repercussions cannot be overstated. The transformation to SOA is a smart move. The smarter move is to guide that transformation, and the subsequent evolution of SOA, through effective governance.

Recognizing the Challenge

SOA has entered the mainstream, and many organizations have begun reaping the rewards of transformation efforts. Most organizations, however, face significant challenges along the path to SOA, their efforts complicated by a confluence of cultural, organizational, and technological challenges:

- Rocky business/information technology (IT) relationship
- No SOA road map
- Confusing priorities
- Cultural resistance to change

- Lack of visibility into service/asset portfolios
- Ineffective operational processes and practices
- Infrastructure sprawl
- Multiple SOA silos
- Inefficient means to apply or enforce standards compliance
- Insufficient information to make informed investment and project decisions
- No means to measure progress or ROI

These issues are the symptoms of ineffective or altogether absent governance.

The Role of SOA Governance

Governance is the creation and administration of policies for the purpose of influencing and enforcing actions and behaviors that align with business objectives. Building an SOA on a foundation of effective governance is critical. Lacking such governance, rampant development redundancy, uncontrolled infrastructure complexity, and ineffective or nonexistent reuse will strangle the SOA on a proliferation of services and other assets of questionable utility, reliability, and business value.

SOA governance must be a dynamic, fluid process that establishes and maintains a direct connection between business objectives and the production and consumption of services. It must connect with existing governance processes and extend throughout the SOA lifecycle.

Governance: Align and Integrate the Organization

SOA governance has implications beyond the confines of SOA. For any organization that has adopted SOA as its primary approach to enterprise architecture, it must be the conduit that connects and aligns corporate, IT, and enterprise architecture policies and standards.

Throughout this process, communication, collaboration, and the two-way flow of information are critical in ensuring that the SOA remains inextricably connected to the enterprise, in order to deliver sustainable business value. Information on compliance and performance must be looped back to relevant stakeholders at the corporate, IT, and enterprise architecture levels. This information will guide investment, project planning, and other decisions to ensure that the SOA remains in continuous alignment with changing business needs. The SOA promise of increased business agility depends entirely on the ability to quickly and continuously translate and transmit business strategy and requirements into the policies and standards that will guide the evolution of the SOA and, through it, the evolution of the enterprise.

The Governance Framework

Governance cannot be achieved simply by throwing technology at the problem. A successful governance framework requires the right mix of people, process, and technology. The formula for that mix begins with a clear understanding of governance goals, and how they are to be achieved.

Once the appropriate governance goals are established, the supporting processes, policies, and roles must be created. Within many organizations, existing roles can be repurposed to support the newly defined SOA governance processes, making costly reorganization unnecessary. The various areas of responsibility, including vision and strategy, execution, and requirements, can be mapped to the appropriate roles. The creation of virtual teams can facilitate this process. Figure 1 illustrates Oracle's SOA governance framework.

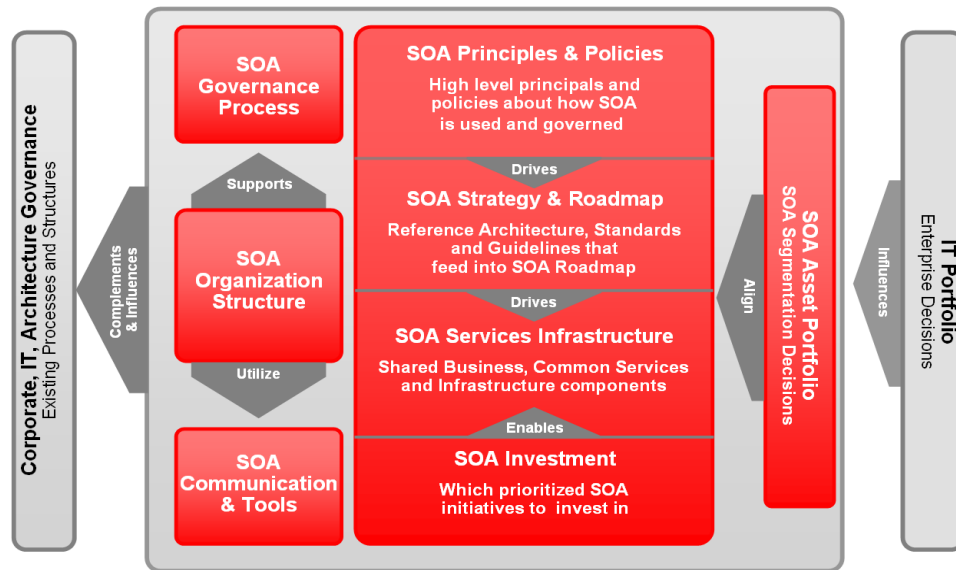
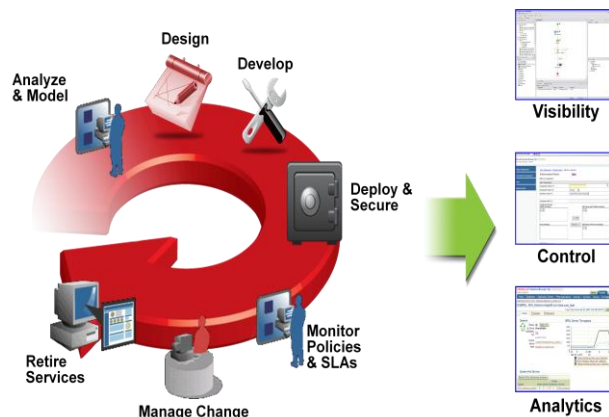


Figure 1: A successful governance framework requires the right mix of people, process, and technology.

The SOA Lifecycle

The SOA governance framework must span the entire SOA lifecycle, bridging and connecting the unique stages. Each lifecycle stage encompasses a distinct yet interconnected set of assets, actors, and activities, from the planning, development, and quality assurance testing of services to their deployment and consumption. Gateways, checks and balances, controls, and other processes and practices can be established throughout the SOA lifecycle. This helps ensure that SOA stays aligned with business needs and delivers ongoing value.

Figure 2: SOA Governance – Closed-Loop Lifecycle Management



Start at the Beginning

SOA is based on the deconstruction of yesterday's monolithic applications and infrastructure into a matrix of discrete, standards-based, network-accessible services. The process of transformation requires the organization, identification, repurposing, and, in some cases, retirement of elements and artifacts of the existing infrastructure.

Governance 101: Visibility into the Asset Portfolio

The transformation to SOA begins with an analysis of the IT infrastructure to identify the applications, business processes, and other software assets that, individually and collectively, will become services, or will otherwise support the SOA. This process requires visibility into the portfolio of assets and the traceability of the assets within that portfolio.

Every stakeholder—from executive to developer—must have a clear, easily understandable view of these assets and of the relationships and interdependencies that connect the assets to each other, to the policies that govern their use, and to the projects that produce and consume them.

When stakeholders can see which services and other assets are in development; which is on hand; and when, where, and how they have been used, the asset portfolio is consolidated, redundancy is eliminated, and agility-robbing complexity is reduced. This is governance at its most basic, but with far-reaching effects.

This visibility, when coupled with the ability to automatically track, measure, and communicate the value of asset usage and other key ROI metrics, provides the vital information necessary for accurate impact analysis, project planning, resource allocation, asset retirement, and IT investment decisions in support of the SOA.

The DNA of SOA

Software assets are the DNA of SOA. Managing and ensuring their compliance with standards and policies is essential. But so is the reuse of those assets.

Reuse is a vital element of a successful SOA, but it should not be limited to the runtime reuse of services. The systematic reuse of compliant assets in the creation of a service makes that service an instrument of governance. Leaving the reuse of these assets to chance breaks a critical link in the governance chain. The remedy is prescriptive reuse.

Prescriptive reuse is a powerful governance practice. The process involves the selection and assignment of appropriate architectural standards, services, and other required assets during project planning. Project members are notified of the selections, and the assets are delivered directly into the development environment. Through this process, reuse becomes not just a transparent part of the development experience, but also an invisible weapon in the defense and enforcement of architectural standards, policies, and requirements.

Ensuring policy compliance during the design and creation of services—for example, those related to general interoperability, WS-Basic Profile, Sarbanes-Oxley, quality, and security—can head off the

business impact of interruptions to a live service. When policy- and standards-compliant assets are prescribed for use in SOA projects, the governance gene carried by those assets is passed on to the services those projects produce.

This dynamic form of governance is ideally suited for maintaining an agile SOA environment. It is far more effective than static governance documents at establishing and maintaining the vital connections between the various SOA stakeholders and the various software assets they leverage in achieving their objectives. Governance applied in this manner, at this stage, permeates the entire SOA lifecycle, with positive repercussions for business alignment, quality assurance testing, and the subsequent reliability of services as they are deployed in production and consumed in applications.

Role of Governance in Service Reuse

SOA represents a paradigm shift in application development. In the past, it was possible to maintain ownership and control over every aspect of the development of an application, from who had access to the application, to the data required, to how communication was established. The new service-oriented application development paradigm is defined by reuse and the abstraction of complexity, and by a change in the nature and scope of ownership and control.

Services can be produced by another development team, another division, or even an organization outside the enterprise. Regardless of its point of origin, a service must be made available to potential consumers, and those consumers must trust its ability to meet business requirements. Proper consumer management, policy enforcement, and compliance tracking are essential in providing the information necessary to build this trust in the available services. Trust drives reuse, reuse drives agility, and agility drives business value. Establishing the necessary level of trust requires visibility into and control over service operation and consumption in the production environment.

Service reuse hinges on the definition, control, and tracking of the appropriate service levels over the course of a project. When implementing or reusing services, the need to analyze Quality of Service (QoS) metrics becomes paramount in order to plan for growth, minimize risk, and justify additional investments. This review and analysis must also include the proactive discovery and resolution of potential QoS issues. This aspect of SOA lifecycle governance begins with the definition, by the appropriate governing bodies, of the QoS and service-level agreement (SLA) policies that will ultimately determine the required service levels.

Optimized Service Reuse

Software reuse, as it occurs within an SOA, is “black box” in nature. That is, applications can be created by combining individual services without adaptation or modification. This plug-and-play style of application development is made possible by SOA’s ability to mask the complexity of the underlying architecture.

In SOA, the ability to use services should require little or no knowledge on the part of service consumers of the supporting architecture. The focus is on the services themselves, which are discrete, self-contained chunks of fully operational, deployed functionality ready to be wired together into composite applications. The services within an SOA are already running on the network and can be

shared by multiple applications. This fundamental change in the nature of application design, development, and deployment is what gives SOA its power.

But this change shifts the time frame for decisions regarding service access, data transformation, and routing to runtime. Policies governing these aspects are enforced only when a service request is made. In this scenario, simple changes in policy definition can affect application behavior. The application and enforcement of the relevant policies requires the appropriate service infrastructure.

The service infrastructure must be focused on increasing both the reusability *and the reuse* of services by also managing the creation and application of policies regarding service access, service security, SLAs, and other requirements that directly affect when, where, how, and by whom services are used. SOA lifecycle governance must take into consideration the unique nature of services to also focus on managing and monitoring service consumption, behavior, and performance.

This focus requires end-to-end SOA visibility through a comprehensive view of the constituent services, including metadata addressing deployment and other characteristics of the various service types. Such a perspective must also compare services that have been tracked through the design stages of the SOA lifecycle with those that have not, to enable a complete view of the service network.

A holistic view of the service network enables proper management of the SOA environment and efficient monitoring of its operation. Through this process, information is gathered on throughput, availability, response times, faults, SLA violations, exceptions across a choice of intervals, and other issues, providing vital closed-loop feedback. That information, when combined with a closed-loop approach to gathering and dissemination of software asset production, usage, and other information from earlier lifecycle stages, makes it possible to identify trends and revenue opportunities for the continued evolution and refinement of the SOA.

Spanning the SOA Lifecycle

The survival and evolution of SOA is completely dependent on governance over the entire SOA lifecycle. Governance must apply to the definition and development of services to ensure that no service is published until ready. Once services are published, governance must continuously manage and validate service performance to ensure that use of the services drives the business toward its goals.

The SOA lifecycle is a “food chain” of sorts. Certain species of software assets are consumed during the development of services. Those services, in turn, are consumed during the creation of composite applications. Each of these entities, from the smallest, simplest software component to the most complex composite application, represents a different type of software asset—and each an investment.

Understanding and managing the development and use of these services and assets—and how they relate to each other, to the overall infrastructure, and to business objectives—is the mission of SOA lifecycle governance. That mission requires the visibility and traceability of assets throughout the entire SOA lifecycle. It requires the creation, validation, and enforcement of policies across that lifecycle. And it requires the means to measure and report on policy compliance as part of the metrics that will define and verify the business value of the SOA.

Key Enablers for SOA Lifecycle Governance

Successful SOA governance requires an understanding of the levers that can be adjusted to reach the desired outcomes.

SOA Asset Management

It is through SOA asset management—the collection of services and supporting assets—that an organization can ensure alignment with architecture and prevent the SOA from becoming tomorrow’s legacy nightmare. SOA asset management must

- Provide the means to centrally manage the metadata for any type of software asset—from business processes and Web services to patterns, frameworks, applications, and components
- Map the relationships and interdependencies that connect software assets to the SOA, and the SOA to business objectives
- Support project planning, impact analysis, investment decisions, collaboration, and reuse by providing stakeholders with visibility and traceability of services and their supporting artifacts
- Provide the means to apply governance policies to assets and to systematize reuse of those assets
- Include tools and metrics to measure and communicate both compliance with governance policies and the ROI of the SOA transformation effort

Policy Management and Enforcement

Policy management and enforcement measures are essential for effective SOA lifecycle governance. These measures must

- Centralize management of policy artifacts for versioning and change control
- Support distributed enforcement across the infrastructure
- Enable continuous design time policy validation
- Ensure policy compliance throughout the lifecycle
- Enable direct control over the SOA lifecycle

Consumer Management

Consumer management supports the creation and enforcement of usage agreements between service consumers and providers. It is essential in preserving and sustaining agility and alignment with architectural standards and business objectives. Service consumer management technologies must

- Provide structured workflow for consumer/provider contracts
- Enable policy-based terms of usage
- Automate enforcement of contracts via SLA and security policies
- Provide the foundation for a shared services model

SOA Monitoring and Management

Effective SOA lifecycle governance requires proper SOA management and enforcement to ensure that constituent components operate as intended, within design parameters. This is critical for visibility into policy compliance and QoS metrics. Such visibility, in turn, enables the SOA to continuously evolve and mature. SOA monitoring and management must

- Centralize management of distributed, heterogeneous SOA
- Provide end-to-end visibility into service networks
- Track enforcement of service contracts and QoS
- Support decision-making with metrics and analytics

Putting it all together: People, Process & Technology

Governance is essential to a successful SOA. That success, as determined by measurable business value, requires a structured approach that must extend from the earliest stages of the transformation effort throughout the entire SOA lifecycle. This approach must be based on key technological building blocks, and must be guided and empowered by experience and expertise.

This is the very definition of Oracle's SOA governance solution. By combining the expertise of its people with integrated leading-edge technologies and proven SOA practices, Oracle provides organizations with a solid, holistic foundation for SOA. Oracle's SOA governance solution encompasses people, process, and technology to help organizations align SOA with business, maintain compliance and control, and demonstrate measurable ROI.

Oracle's Key SOA Governance Enablers

Oracle's technology enablers for end-to-end governance of the SOA lifecycle, automate key governance processes, to provide comprehensive control. These products provide embedded best practices and automation to get you up and running and to guide your SOA efforts from any point in the transformation.

Working together, the products that comprise Oracle's SOA governance solution provide the means to easily and efficiently plan, define, design, build, manage, and control the SOA and associated service portfolios. They deliver the capabilities needed to maximize the reuse of valuable assets; analyze the impact of change; and monitor, manage, and control services in production, along with their performance.

Key enabling technologies in Oracle's SOA governance solution include the following Oracle products and services:



Figure 3: Oracle SOA Governance Products

- **Oracle Foundation Pack** A set of common integration artifacts; implementation independent business objects and services and reference business process models for more than a dozen common business processes.
- **Oracle Enterprise Repository** A comprehensive enterprise metadata repository manages the entire service lifecycle, providing visibility, traceability, and governance of the enterprise service and asset portfolio to ensure business and architectural alignment and measurable ROI.
- **Oracle Enterprise Manager SOA Management Pack EE** Manages the health and well-being of SOA to ensure QoS, while providing operational visibility and control.
- **Oracle Web Services Manager** Manages, enforces, and tracks policies applied to SOA for automation of governance across the lifecycle, while providing a foundation for shared services through consumer/provider contract management.
- **Oracle API Gateway** As you incorporate more cloud services into your infrastructure, there is no need to modify your core integration platform inside your firewall. Simply add Oracle API Gateway into the DMZ to deliver critical protection needed between un-trusted and trusted zones

Conclusion

The unique nature of SOA and its unprecedented agility necessitate equally unique and agile governance practices. As the business environment continues to evolve, effective SOA lifecycle governance will ensure that services can continue to be combined and recombined at will to meet constantly changing business demands.

Careful, informed management of the production and consumption of services will allow organizations to remain adaptable, and constantly and consistently focus that adaptability on delivering business value.



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