



## **The role of SOA quality management in SOA service lifecycle management.**

*An end-to-end approach to improving software reusability and  
addressing regulatory compliance*

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**Introduction**

For many chief information officers (CIOs), the much touted flexibility and reuse benefits of a service-oriented architecture (SOA) are compelling. However, CIOs whose companies have adopted or are considering adopting an SOA are also all too aware that the SOA approach doesn't magically eliminate complex regulatory and cross-departmental software compatibility challenges.

Consider a large U.S. insurance company that recently adopted an SOA. Operating with many business units across the country, the company needed to find a way to help a team of several hundred analysts, developers and testers deliver the systems that the organization relies on to meet business needs and comply with evolving state and federal regulations – while keeping costs under control. To overcome these challenges, the company implemented tools and processes to support SOA quality management – an extension of SOA governance and service lifecycle management strategies. And the benefits were compelling. Since adopting the quality management process, the company has passed numerous internal and external compliance audits without a problem. It's better able to govern development efforts. And communication among teams has improved, resulting in less rework, higher-quality services and faster time to market.

To be clear – the new SOA quality management approach that this insurance company implemented is about much more than just testing software at the end of the development cycle. It's about how quality is built into the entire SOA governance lifecycle.

Good governance is the foundation of a successful SOA. SOA governance is what enables diverse business units and IT stakeholders to ensure that development activities and goals are properly aligned so the SOA they collectively design is truly cross-enterprise. A lack of appropriate governance makes it very difficult to gain the business process agility and time-to-market advantages that maximize the business value of an SOA.

Without appropriate governance, SOA initiatives will almost certainly fail to deliver long-term business benefits. Moreover, by failing to account for the needs of disparate organizations within the enterprise, SOA without governance becomes yet another stovepipe application. Many IT analysts are saying that SOA governance is more critical to SOA success than SOA technology itself. In fact, as Danny Sabbah, general manager of the IBM Rational® group, put it recently, “SOA is 1 percent services and 99 percent governance.”<sup>1</sup>

Service lifecycle management is the application of SOA governance to the actual construction of your SOA and the SOA services being created and deployed. And while establishing the SOA governance framework is a joint business and IT activity, managing the service lifecycle is still primarily the purview of the technical staff—the team responsible for turning your vision into reality. Service lifecycle management is by necessity closely aligned with SOA governance because it is critical that the players at every step of the software delivery process—from the business analysts and architects to the developers, testers and operations professionals—validate that what is being built is aligned with the stated business needs of the enterprise.

SOA quality management, the topic of this paper and a discipline that cuts through all stages of the delivery lifecycle, is one aspect of service lifecycle management. SOA quality management is the process that enables you to determine whether services meet business requirements by validating service functionality and operations throughout the SOA lifecycle.

This white paper examines how SOA governance, service lifecycle management and SOA quality management relate to one another; it also looks at the best practices you need to establish to support those initiatives. The focus is on service lifecycle management—the implementation of SOA governance<sup>2</sup>—in general, and on SOA quality management in particular.

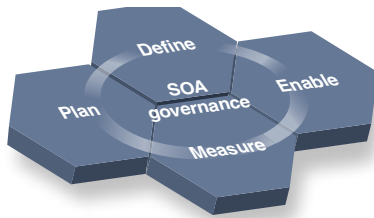


Figure 1: The SOA governance foundation

### SOA governance: the foundation of service lifecycle management

Effective governance serves an integrative function across people, processes and technology. IBM sees the essential governance activities that relate to the SOA lifecycle in terms of the plan, define, enable and measure phases, which are linked by an iterative process flow as illustrated in figure 1.

The goal of the iterative, four-phase SOA governance process is to refine and enhance governance process and policy effectiveness and optimize business value for the SOA initiative.

- **Plan.** In this initial phase, stakeholders collaborate to establish and commit to the need for SOA governance and its overall scope, as well as to plan project scope, ownership and funding. In many cases, it's also a good idea to establish a center of excellence to oversee the SOA project. In subsequent iterations, planning will identify areas where SOA governance could be improved or new areas where it should be implemented, and it will reveal necessary changes that need to be applied to the governance plan.
- **Define.** After identifying opportunities for improved governance, business and IT stakeholders collaborate to define new governance policies and processes. The types of steps included in the define phase include delineating additional SOA capabilities, agreeing on policies for service reuse across lines of business, and establishing processes to guarantee service levels.
- **Enable.** In this phase, policies defined in the define phase are rolled out to the various stakeholders across the enterprise. During the enable phase, organizations communicate their policies to the decision-making community, enabling them to better ensure that their needs are being met and that their organizations are poised to benefit from the SOA.
- **Measure.** Governance policies and processes (for example, service-level agreements [SLAs], reuse levels or change policies) are monitored and updated in this phase. The policies and processes are evaluated against success and effectiveness criteria (established in the define phase), and a new iteration of SOA governance activities is initiated on the basis of those discussions.

In many ways, the most challenging aspect of an SOA initiative can be the plan phase. The difficulty lies in getting stakeholders from different areas of the business on board and working together. (Organizational change projects are a good way to overcome this challenge and drive the transition to SOA.) However, the plan phase is critical because, for preliminary efforts to be successful, many different departments and organizations must cooperate to define the scope of the initiative, to empower the various organizations involved and to determine how to measure success.

**Service lifecycle management: SOA governance applied to software delivery**

By moving through multiple iterations of plan, define, enable and measure activities to establish SOA governance, organizations will have instituted a solid foundation of best practices that better facilitate the actual construction of the SOA implementation. Improved policies yield better metrics, which empower stronger planning.

It is important to note that the SOA governance process is ongoing. Successful service implementation requires constant validation and updates based on the original SOA governance framework. Services must be built according to plan. And plans that cannot be met must be modified. SOA governance supports and guides the iterative SOA implementation cycle of service lifecycle management.

If the SOA governance phases embody business compliance and decision-making requirements, then the corresponding service lifecycle management phases guide the technical “building out” of those requirements. For example, an SOA governance requirement that states, *We want order entry to take no more than five minutes*, might lead to a service lifecycle management metric that states, *The system must respond to input X in 100 milliseconds or less*. In both cases, however, activities are managed in relation to the original business plan.

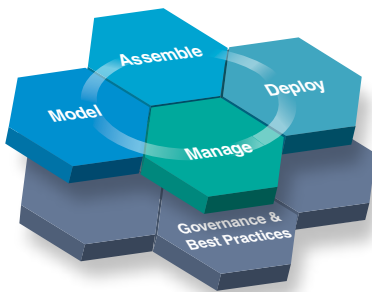


Figure 2: SOA service lifecycle management

Like SOA governance, SOA service lifecycle management is an iterative process as illustrated in figure 2. This process is ongoing for the duration of the SOA lifecycle.

Although they support implementation more than governance, the phases of service lifecycle management are very much analogous to the SOA governance phases.

- **Model** (validate against the plan). Architects collaborate to review the current SOA governance plan and use it as a basis for modeling the SOA implementation.
- **Assemble** (validate against the definition). Developers assemble the reusable service assets, which the architects have modeled, to create service-oriented applications that automate and integrate business processes.
- **Deploy** (validate against enablement). Testing and release management functions deploy the services.
- **Manage** (validate against measurement). The operations team manages the services in production.

Within each of the four SOA service lifecycle management phases, practitioners continually validate their activities and outcomes against the original business requirements. In this way, governance ensures that business requirements drive all aspects of the service delivery lifecycle and that the implementation remains constantly aligned with business objectives. For example, during the deploy phase, the testing team would validate that the deployed service works as expected for its intended user community based on metrics agreed upon as part of the governance process. Naturally, requirements can be modified based on what the implementation team is actually encountering as it delivers the services.

### **The road to SOA quality management**

Service reuse is one of the key factors driving cost savings and business agility in SOA implementations. However, if a number of composite business applications are consuming a service, the quality and performance requirements for that service will be significantly greater than for many of today's vertically integrated applications. In addition, the promise of reuse is charged with potential risks. For example, a service created for one business area may violate security or compliance policies in another area. And services can interfere with the operation of one another. As a result, it's important to balance the risk and the value of service reuse through a process known as SOA quality management.

Historically, testing at the end of the software development process has been the final phase of a waterfall-style release plan. Given the high quality demands of SOA, however, teams building an SOA must validate what they're architecting, building, deploying and managing against business requirements for performance, reuse, regulatory compliance, security and more – at every phase of the SOA implementation lifecycle. To validate an SOA, organizations need to test components at the service level as well as at the level of composite applications. They also must address the control issues that are inherent when teams spread across different departments, practices and even geographies work together.

In the face of these requirements, SOA initiatives have driven the evolution of quality management within the software development process, as illustrated in figure 3. Moving from traditional software testing to business-driven quality management is the next step forward in business and IT cooperation, and the trend is accelerating. Software testing is still critically important in this context, but it is just one component of managing quality across the entire SOA environment to optimize business flexibility and cut overall costs.

**The function of SOA quality management in service lifecycle management**

SOA quality management is an important aspect of service lifecycle management because of the need to address different service-level requirements across multiple SOA implementations and composite business services. IBM defines SOA quality management as the *process of validating service functionality and operations across the SOA lifecycle to assure that services meet business requirements.*

IBM is focused on delivering end-to-end SOA quality management across the model, assemble, deploy and manage service lifecycle management phases. SOA quality management concerns far more than just conventional software development and testing. It encompasses all the ways in which the business and IT organizations collaborate in relation to services, as well as the lifecycle from the conception to the retirement of services and composite business applications.

IBM SOA quality management delivers the following key capabilities:

- *Enables a quality management focus through the SOA lifecycle using tools and best practices*
- *Underpins business agility by enabling the functional and performance testing of business services to address compliance with business and regulatory requirements*
- *Helps optimize and automate workflows across business processes by streamlining and eliminating process redundancies*

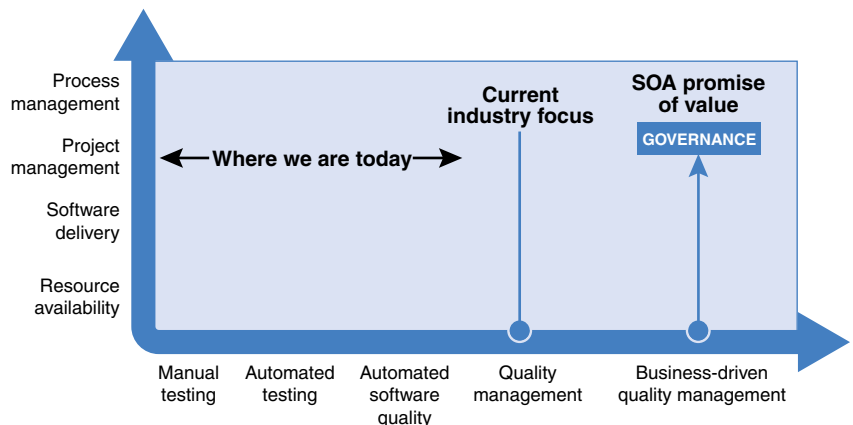


Figure 3: From software testing to business-driven quality management



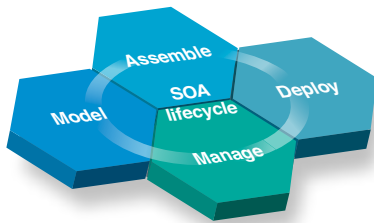


Figure 4: SOA quality management informs SOA service lifecycle management.

Figure 4 illustrates how SOA quality management activities inform SOA service lifecycle management. The quality management activities within each service lifecycle phase are iterative and designed to help ensure that the business requirements defined in the SOA governance foundation are validated and addressed at every stage of the SOA lifecycle. The SOA quality management processes within each service lifecycle management phase include the following activities:

#### Model

- *Validate business requirements.*
- *Discover and assess the requirements against current services.*
- *Model the service requirements.*

#### Assemble

- *Create the service update plan.*
- *Create or modify the service to meet the business requirements.*
- *Assess the service against governance rules.*

#### Deploy

- *Assure the quality of the service by testing the service for:*
  - *Functionality*
  - *Performance*
  - *Compliance*
- *Approve deployment of the service.*

#### Manage

- *Manage and monitor the service throughout its lifecycle.*
- *Track the service in the registry.*
- *Report on the service against SLAs.*

**Why IBM for SOA quality management?**

The fundamental value proposition of the IBM approach to SOA quality management is that it can support end-to-end software delivery lifecycle management among distributed teams and across distributed environments. And a combination of IBM software capabilities helps make this vision a reality. As figure 5 illustrates, IBM uses five key solution areas to enable SOA quality management.

IBM can help companies implement a business-driven – or quality-driven – management environment for SOA by providing proven tools and process guidance that simplify and accelerate business process modeling and the assembly, deployment and management of an SOA.

IBM’s ongoing enhancement of SOA governance capabilities helps companies to:

- *Increase quality by helping them ensure that business requirements drive the modeling and assembly of the services that automate and integrate business processes.*
- *Repurpose existing assets as services to extend the services’ utility and assemble them into new solutions.*
- *Deliver high-quality, services-based solutions on time and under budget.*

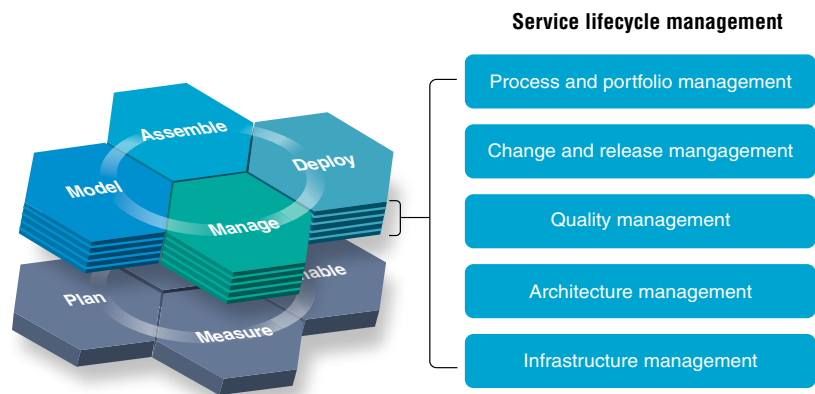


Figure 5: SOA service lifecycle management

IBM has several new tools and capabilities that enable SOA quality management, including a tool that provides automated regression and functional testing for graphical user interface GUI-less Web services, and a tool that supports performance testing for Web service-based applications. These new products feature a host of SOA-centric features, such as a visual test editor delivering both high-level and detailed test views; support for testing non-GUI services; flexible modeling and emulation of service consumers; collection and visualization of server resource data; and automated test generation from Web services Business Process Execution Language (WS-BPEL) business processes.

IBM also now offers a tool designed to help monitor, manage and control the Web services layer of IT architectures. A key focus area for the tool is tracking, monitoring and reporting on service usage. With the help of this product, you can also simplify change and configuration management. For example, you can reroute services by making changes and upgrades while staying in full production mode. And you can monitor the health of SOA components, including the enterprise service bus (ESB), process server, and integration and security appliances.

Of course, SOA quality management entails process change in addition to new technology. And IBM aims to provide organizations with the necessary best-practice support and tools to effectively manage quality throughout the SOA lifecycle. This capability is essential not only to help ensure integrity for composite applications, but also to help reduce costs, protect investments and align the SOA with business strategy.

In the end, a successful SOA strategy will depend upon bringing quality to the forefront at all phases of the SOA lifecycle – not just a validation at the end. IBM can help you implement a complete approach, infrastructure and processes to enable you to optimize your SOA. So you can be confident that your services meet the needs of individual departments across the company and comply with government regulations. And we can help you get started today.

**For more information**

To learn more about the IBM SOA vision, visit:

[ibm.com/soa](http://ibm.com/soa)

For more background on IBM SOA governance solutions, visit:

[ibm.com/software/solutions/soa/gov/index.html?S\\_TACT=107AG01W&S\\_CMP=campaign](http://ibm.com/software/solutions/soa/gov/index.html?S_TACT=107AG01W&S_CMP=campaign)

To learn more about IBM Rational products for SOA quality management, visit:

[ibm.com/software/rational/offerings/testing.html](http://ibm.com/software/rational/offerings/testing.html)

For more information on the IBM Rational strategy for supporting SOA initiatives, visit:

[ibm.com/software/info/developer/solutions/soadev/index.jsp](http://ibm.com/software/info/developer/solutions/soadev/index.jsp)



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<sup>1</sup> *The future of software delivery*. White paper by Danny Sabbah, Ph.D., February, 2007.

<sup>2</sup> For more information on SOA governance as it relates to the overall topic of SOA, please visit [ibm.com/software/solutions/soa/gov/index.html?](http://ibm.com/software/solutions/soa/gov/index.html?)