

Cultural considerations for SOA adoption in the federal sector

Skill Level: Intermediate

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Look beyond the technical aspects of Service-Oriented Architecture (SOA) adoption. This article focuses on the cultural considerations across organizational boundaries in the federal sector. See examples of how you can build blocks of SOA while maintaining adherence to appropriate organizational cultural aspects.

Introduction

My recent developerWorks series, [Work with Web services in enterprise-wide SOAs](#), covered notifying Web services and Enterprise Application Integrations (EAI), integrating radio frequency identification (RFID) Web services into EAI applications, and developing risk management Web services. In the same series, I looked at migrating legacy service components as discoverable Web services, developing Repository Web services for the Service Integration maturity model (SIMM), and capturing object patterns and relationships for UML modeling.

My other developerWorks series, [Use SLAs in a Web services context](#), talked about mitigating risks for vulnerabilities and integrating Web services into EAI, all with an Service Level Agreement (SLA) guarantee.

While all of these items show that SOAs are associated with Web services, you can implement SOA using any service-based technology with loose coupling among interacting software agents. All show SOA as a paradigm shift from IT as a technology provider to IT as a business enabler, and the resulting cultural shift in the way IT is done.

This article looks closely at the cultural considerations involved with SOA

development and implementation in the federal sector. Here you learn:

- The process of adopting SOA with an SOA reference model, an SOA maturity model, and SOA governance.
- What's missing from the Federal Enterprise Architecture (FEA).
- Suggestions for managing cultural changes in the federal sector.

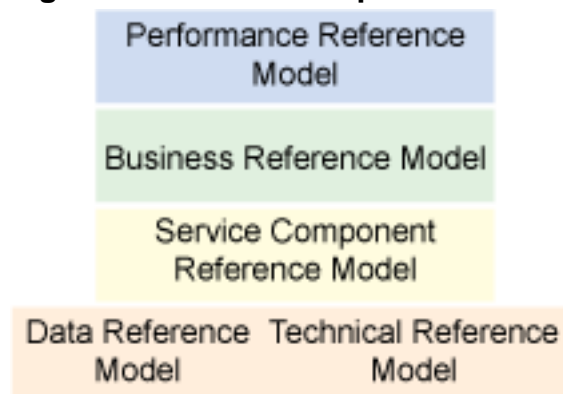
SOA reference model

The SOA reference model provides a foundation for building discoverable, reusable services central to a federal agency's mission. On top of this foundation is the SOA maturity model to gauge the quality and maturity of SOA adoption by the agency. SOA governance provides the mechanisms to control the desired behavior of the organization as the SOA adoption matures.

One model example is the Office of Management and Budget (OMB) FEA. Also known as the Component-Based Architecture (CBA), this model focuses on providing services to citizens, not to other SOA participants.

As illustrated in Figure 1, the FEA starts with the Performance Reference Model (PRM), followed by the lower layer of the Business Reference Model (BRM). Next is the Service Components Reference Model (SRM), which is built upon the Data Reference Model (DRM) and Technical Reference Model (TRM), plus a security and privacy profile that describes how to integrate information security requirements into the reference models.

Figure 1. Federal Enterprise Architecture



The following sections focus on these layers.

Service Components Reference Model

The SRM is structured across horizontal and vertical service domains that can

provide support for the reuse of applications, application capabilities, components, and business services. It's independent of business functions.

Business Reference Model

Immediately above the SRM's layer is the BRM, which describes and analyzes the day-to-day business operations of the federal government. While many models exist for describing organizations, such as organizational charts, location maps, and so forth, the BRM presents the business with a functionally driven approach for providing services to citizens.

Performance Reference Model

The next layer is the PRM, which provides the framework for measuring the performance of major IT investments and associated assets. As of this writing, a few agencies haven't yet submitted a list of what the results should be, as there might be differences in the way outcomes are developed during the agency budget and strategic agency planning process.

Technical Reference Model

Below the SRM layer is the TRM to categorize the standards, specifications, and technologies to construct, deliver, and exchange business and application components. The TRM includes service requirements for hosting that refers to the service provider who manages and provides availability to a Web site or application, often bound to an SLA.

Data Reference Model

Next layer down is the DRM, which provides a framework to describe, categorize, and share data in a standard way. The standardization of describing data provides a means for an SOA community to agree to the interoperability of both the structure (syntax) and meaning (semantics) of the data. For information-sharing infrastructures to be successfully implemented, problems with different contexts and their associated meanings between content owners using SOAs must be resolved.

What's missing from the FEA

What's apparently missing from the FEA is the SOA Security Reference Model (SSRM), which allows it to go beyond the security and privacy profile. The SSRM helps to address the security requirements of the SOA due to increased exposure to risks and vulnerabilities of loose coupling of the services and operations across organizational boundaries.

SOA security must be factored into the SOA life cycle, reflecting the fact that security is a business requirement and not just a technology attribute. By including security in

SOA life cycle management, all documents must be evaluated to ensure that security requirements are met. An SSRM helps address the security requirements of SOA, as security is applicable to the entire SSRM—across infrastructure, application, business services, and development services.

This model consists of IT security services, security policy infrastructure, business security services, and security enablers. Governance and risk management provide the mechanism to implement and enforce security policies within the larger SOA environment. The SSRM has also been the subject of interest in military software engineering.

SOA maturity model

To find out where your agency stands in adopting SOA, the first step is to employ an SOA maturity model. In each maturity stage, your agency's measurements should point out its strengths and weaknesses as well as gauge its improvements. One problem is that the model can't skip a stage as it moves up the maturity level or go backwards to update process activities as a result of the changes in the organization's role (such as major reorganization).

One solution is to develop Web services to supplement the maturity model, such as the IBM Service Integration Maturity Model (SIMM), considered the most flexible of all Capability Maturity Models (CMMs). Because of this flexibility and the SIMM's ability to adapt to changes in service integration process activities as a result of new technologies and the cultural aspects of the SOA, developers can build Web services (see [Part 16](#) in the *Work with Web services in enterprise-wide SOAs* series) as a supplement to the SIMM's simple, composite, virtualized, and dynamically reconfigurable services.

SOA Governance

In SOA the consumers and providers of services run in different processes, are developed and managed by different departments and agencies, and require a lot of coordination to work together successfully. To achieve the desired behavior of an organization as the SOA adoption matures, you need to apply an SOA governance model to establish and enforce agreements between the providers of services and the consumers of those services. These agreements tell the consumers what they can expect and the providers what they're obligated to provide to get multiple applications to share common services and make those services reusable.

SOA governance determines and plans for:

- Who is responsible for making decisions.

- What decisions need to be made.
- What policies are necessary to guide the organization to meet its goals.
- What measurement technique is needed to gauge the effectiveness of governance.
- What control mechanisms are required to ensure compliance.

SOA governance guides how the services change over time. It's important to keep all required parties informed on governance issues, such as compliance to changing standards or laws; setting compliance, performance, and security policies; change management of the cultural shift; and ensuring quality of services.

Handling cultural aspects

Here are some recommendations for handling cultural aspects of the SOA:

1. Evaluate an agency mission if it's focusing on GUI-based services for citizens or GUI-less intrajoint services.
2. Consider the SSRM to address security requirements for the SOA.
3. Supplement an SOA maturity model with Web services to update changes in process activities of a service provider.
4. Make sure standards guarantee interoperability both at the syntactic and semantic levels.
5. Get the service provider and consumers to agree on testing methods to ensure correctness of services in the SOA.

Conclusion





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You need a team of developers, testers, system administrators, and potential federal SOA participants to consider cultural aspects of SOA adoption. To handle the cultural aspects, you must plan developing, testing, and deploying federal SOA projects ahead of time. Resolving these issues makes your job handling cultural aspects of SOA adoption a lot easier. You can use IBM® Rational® ClearQuest®, IBM Rational Tester for SOA Quality, and IBM Rational Functional Tester to increase productivity by reducing testing and defect tracking time as well as the costs of test labs in an enterprise SOA development project.

Resources

Learn

- Check out the [Work with Web services in enterprise-wide SOAs](#) series by Judith M. Myerson.
- Read Judith's series [Use SLAs in a Web services context](#) for details on service-level agreements.
- IBM Redbooks®: Learn more about SOA Security Reference Model in "[Understanding SOA Security Design and Implementation](#)."
- Collaborate with others who are interested in SOA in the federal sector in the [Federal SOA Institute - SOA Certification Mentoring](#) discussion forum.
- Read Judith M. Myerson's [The Complete Book of Middleware](#), which focuses on the essential principles and priorities of system design and emphasizes the new requirements brought forward by the rise of e-commerce and distributed integrated systems.
- Get the business insight and the technical know-how to ensure successful systems integration by reading [Enterprise Systems Integration, Second Edition](#).
- Bring your organization into the future with [RFID in the Supply Chain](#), which explains business processes, operational and implementation problems, risks, vulnerabilities, and security and privacy.
- IBM Redbooks: Go into the nuts and bolts of developing a service-level agreement in [Tivoli® Manager for Domino V2.1: Fulfilling Service Level Agreements Using Tivoli Technology](#).
- The [SOA and Web services zone](#) on IBM developerWorks hosts hundreds of informative articles and introductory, intermediate, and advanced tutorials on how to develop Web services applications.
- Play in the [IBM SOA Sandbox!](#) Increase your SOA skills through practical, hands-on experience with the IBM SOA entry points.
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 - [Building SOA applications with patterns](#) with Dr. Eoin Lane
 - [Client Insights, Concerns and Perspectives on SOA](#) with Kerrie Holley
 - [Service-Oriented Architecture and Business-Level Tooling](#) with Simon Johnston
 - [SOA, ESB and Beyond](#) with Sanjay Bose

About the author

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Judith M. Myerson is a systems architect and engineer. Her areas of interest include middleware technologies, enterprise-wide systems, database technologies, application development, network management, security, RFID technologies, and project management.

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