

Executive Summary

SOA or SOS?

Rationale for a Semantic Service-Oriented Infrastructure

by Arun K. Majumdar,
Senior Consultant,
Cutter Consortium



The accompanying *Executive Report* provides an architecture for semantic service-oriented infrastructures (SSOIs), addressing communication, coordination, cooperation, collaboration, command and control, interoperability, and scalability. A detailed look into barriers and concerns is included from John F. Sowa and Cutter Consortium Senior Consultants James Odell, Ken Orr, André LeClerc, and Mike Rosen.

Service-oriented architecture (SOA) is the new sword for business process management (BPM), promising to cut through the problems of enterprise application integration (EAI) and clear the path for interoperability among heterogeneous systems. Unfortunately, there is a growing panoply of choices, recommendations, suggestions, standards, vendor positions, and approaches that mystify and muddy core issues. SOA solutions, which are supposed to be the ultimate weapon for solving problems, have exacerbated the situation with new buzzwords. If we mix and match vendor solutions, techniques, and architectures without a principled understanding of all the issues, we end up with a house of cards that can be blown away by the next gust of wind.

The report provides the following three essential keys to success:

1. A list of 15 key nonobvious pitfalls and traps to overcome in an SOA/SSOI effort
2. The models and metamodel elements for SSOI

3. The essential maps to navigate the geography of architecture in SSOI and Semantic Web design elements

The report provides you with knowledge from the high level and mid-level as well as some of the critical low-level details to be able to begin an architecture practice to assess, develop, and deliver an SSOI.

Do service architectures between commercial, military, national infrastructure, and emergency services share a common ground? Does SOA enable coalitions between various NATO governments to interoperate safely, securely, and effectively in the face of natural disaster, terrorism, or nation building? Yes. But there are differences in approach as well as barriers to overcome; my colleagues and I point to the middle-out method to identify the differences and quickly cut to the result. However, one does not have to look beyond borders and boundaries: Imagine what would happen if the entire national power grid infrastructure failed. What could be put in place so that such a critical infrastructure would resist damage and continue critical power service delivery? While electricity and SOA on first glance may seem dissimilar, the effect of SOA is like the effect of electricity: it is a deep, profound, and revolutionary concept that is life changing.

What is the key to success with SSOI? Does it begin with a commitment to emerging standards or to current technology solutions? What method or technique is needed to

**Cutter Consortium
Enterprise Architecture
Executive Summary
Vol. 9, No. 1**

provide the following key values in an SOA effort?

1. End-to-end business contextual business services within a mission theme
2. BPM as dynamic service orchestration, transformation, and failover
3. Total system responsiveness and event-driven reactivity
4. Service and supply chain dynamics (optimizing strategies and exceptions)
5. Visualization (an end-to-end view of the service and process supply chain)

We have identified the following 15 obstacles because of their ability to propagate, crosscut, and impede any and all efforts in architecting SOA solutions:

1. Design pattern paradigm conflicts
2. Disaster propagation (aka the domino effect)
3. Schema interoperability conflicts
4. Architecture versus infrastructure aspect conflicts
5. Representation conflicts (agent/document/object models)
6. Interface and event-driven conflicts between state loss
7. Semantic and syntactic mismatch conflicts
8. Service choreography conflicts
9. Process orchestration context conflicts
10. Model Driven Architecture (MDA) conflicts
11. Mission theme (MDA to federation pattern impedance conflicts)
12. Business rules interaction conflicts
13. Intensional/extensional identity, credibility, and trust conflicts

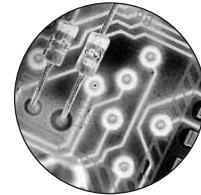
14. Arbitration and event exception conflicts
15. Conflicted nonfunctional network influences

SOA differs from the EAI technologies in the concept of binding. The idea is that services are not pre-glued together like monolithic applications. Binding is what dynamically connects services and components that render services to each other. The binding model is deeply dependent on the service-level agreement (SLA) and the service-level specification (SLS) between components. An SOI provides operations based on control policies (SLA/SLS) on a uniform, system-wide service access abstraction layer called the Enterprise Service Bus (ESB).

For example, in a business context of high-volume globalized trading, just-in-time (JIT) inventory control, supply chain, logistics, and inventory flow control may be orchestrated for short-term perishable goods over the ESB. In a military context of network-centric warfare, formation of mobile tactical coalition forces requires that network elements preserve national political control over individual force centers while simultaneously operating under unified military command and control. In commercial and military environments, networks cannot assume equivalent levels of trust or knowledge, yet must interoperate. The SLA/SLS must be configured and tailored at runtime to access multilevel security (MLS) fitting the "need to know" within a mission theme. The only way to achieve this is through the use of contexts, constraints, and semantics to embed need-to-know knowledge and risk/trust mechanisms into the ESB.

The problem is that semantics are not met in current vendor ESB offerings; confusion exists because several vendors have competing viewpoints about ESBs. IBM leads the position that ESBs are an architectural pattern, and BEA leads the position that ESBs are infrastructure products.

Therefore, the creation of a complex SOI/SOA is hampered because of a ready supply of conflicted solutions and a rigorous lack of well-explained "how to solve it" recipes, agreements, or standards that derive from a pragmatic understanding of integrating semantics within software. The solution is a combination of strategies and techniques that together represent a holist approach to SOA and SSOI.



About the Service

ENTERPRISE ARCHITECTURE ADVISORY SERVICE

SENIOR CONSULTANTS

Michael Rosen, Practice Director; Scott W. Ambler; Douglas Barry; Don Estes; Clive Finkelstein; Pierfranco Ferranato; Michael Guttman; Paul Harmon; David Hay; Tushar Hazra; J. Bradford Kain; Bartosz Kiepuszewski; André LeClerc; Jean Pierre Lejacq; Arun K. Majumdar; Tom Marzolf; Jason Matthews; James Odell; Ken Orr; Wojciech Ozimek; Oliver Sims; Borys Stokalski; Sandy Tyndale-Bisco; William Ulrich; Jim Watson; Tom Welsh; Bryan Wood

FOR MORE INFORMATION

For more information on Cutter Consortium's Enterprise Architecture Advisory Service or its other services, contact: Tel: +1 781 648 8700 or, within North America, +1 800 964 5118; Fax: +1 781 648 1950 or, within North America, +1 800 888 1816; E-mail: sales@cutter.com.

The *Executive Summary* is a supplement to the Enterprise Architecture Advisory Service's *Executive Report*. ©2006 by Cutter Consortium. All rights reserved. ISSN: 1530-3462. Unauthorized reproduction in any form, including photocopying, faxing, and image scanning, is against the law. Reprints make an excellent training tool. For information about reprints and/or back issues of Cutter Consortium publications, call +1 781 648 8700 or e-mail service@cutter.com.

CUTTER
CONSORTIUM