



Software AG Architects Sophisticated SOA Management

Analyst: Anne MacFarland

Management Summary

With the technology assists available to business, many of the processes supporting operations have become, quicker, easier and cheaper. However, there is always more to be done. In a challenging economy, competitive tactics – such as product design decisions, partnering, distribution schemes, pricing, marketing campaigns and publicity – must be deft, effective and constantly revisited. It is no wonder that the “as a service” concept has caught the attention of business decision makers, be it delivered as cloud, as software as a service (SaaS), or as SOA.

As a service is an approach to both the conduct of, and the IT support of, business activities. The effectiveness of a service depends on how well its pieces work together. The devil is in the details. If the services are atomic (to maximize reuse and save licensing costs), then the litanies of services needed to fully support business process become more flexible and more easily evolved. However, there are many details in these litanies, the business consequences of which are not always easily discernable. They become more difficult to govern from a business point of view.

The quest for more profitability sooner, achieved by innovation, or by being more things to more kinds of customers, or both – has led to a kind of organizational *speed dating*. New markets are identified as existing markets start to stagnate. New external partnerships form often and opportunistically. These new partners are inevitably fussy about confidentiality and data exposure, and the ruggedness of the processes in which they participate. *Oops*, and, particularly, litanies of *oopses*, will not do.

Governance is needed. A concept called Dunbar number is the number of relationships that a person can maintain without enforced norms. As humans, we hit that number quickly, and often form tribes of friends or colleagues that resist further growth. As organizations, we fragment, fork and do things differently than our colleagues for many reasons. Businesses, however, must get beyond tribalism if they want to expand operations to a comfortable breadth. As with human societies, some form of comprehensive governance is required. In human societies, laws are augmented with unspoken policies and consequences. In service-oriented architectures, governance comes as policies, discipline, and systems thinking.

As the nature of business careens to a more atomic – but broadly repeatable – business deliverable, the infrastructure that supports business operations must be architected to provide sophisticated controls that can keep all parties secure and working together well. With the release of webMethods 8.0, Software AG has evolved its SOA product set to provide the sophistication needed to support well-mediated, secure services across organizational boundaries. For more details, please read on.

IN THIS ISSUE

➤ Semantic-Gov.org	2
➤ Accommodating Business Collaboration in a Service Environment	3
➤ Sophisticated SOA Elements.....	4
➤ Conclusion	5

Semantic-Gov.org

Consider, first, an example of a Software AG customer whose extreme requirements embody the challenges of inter-organizational SOA. This case dates from 2007 and 2008, but demonstrates, by its nature, why standards, openness, and a systems approach that includes well-designed sophistication are compellingly useful in building good SOA.

[Semantic-Gov.org](#) was developed by the European Union with the goal of supporting pan-European eGovernment services. These services include things as prosaic as purchase of property in a country other than one's country of residence and also more complex business coordination across facilities in several countries. Nothing about this challenge is simple. The many parameters that pertain even to a simple event are quite prescriptive.

Vast amounts of detail are critical elements of all national systems. No national government will change centuries of bureaucratic traditions to comply with some theoretical normalization. At the same time, all governments are evolving their own bureaucratic norms to become more responsive, efficient, and effective. And, for obvious reasons, they want to keep control of their own processes. These factors shaped a sophisticated solution.

The architecture of the Semantic-Gov Registry/repository is based on two tiers of peer groups: One comprises all super peers (one from each member state) as well as the Semantic Gateway (think large scale ESB) that belongs to the group as a whole. The second tier is of peer repositories *within* each member state. Together, they form a bridge between any super peer and the many domain-specific repositories in each and every state.

Common ontologies are stored in all super peer repositories. All other artifacts (ontologies, services, etc.) that are owned by a member state are stored *locally* in the domain of a specific repository peer, if they are local in scope and in *all* repository peers of a member state if the artifacts do not belong to a specific domain.

Federation of all repositories supports polling. This polling discovers new objects in individual repository peers. These new objects are transferred to the Semantic Gateway node. There, impact analysis can be done using all

relevant artifacts. This is a critical step, as the aggregate rate of new service introduction is very high.

The Semantic-Gov.org solution uses Software AG *CentraSite* for a distributed semantic¹ registry/repository, using JXTA.² Artifacts are not just *stored* in one repository, but also *semantically parsed* and *registered*, including their dependencies.

Mediation is used to translate the ontologies of different member states, and map them to each other. Service creation is based on discovery of services, and centralized impact analysis, rather than on a constructed and constantly updated model, based on views, because of the extreme complexity of the situation. A model would become an intolerable burden to maintain.

Each government entity is responsible for its own services and their registration. Any government entity can model the full ramifications of what-if situations, either inside *CentraSite Control* or in an *Eclipse IDE*.³ The runtime portal is based on *Tomcat* and *Liferay*. The WSMX open source semantic execution environment supports arbitrated access to Semantic-Gov.org distributed repositories.

Services can be simple or complex. A simple service is a standard Web Service with a semantic wrapper. Composed services are an orchestration of multiple steps and may include mediation in any one of these steps. In addition, public administration services, which have their own support ontologies, complete the system. This use case embraces far more complexity than is found in most organizational SOAs, but it illustrates well some of the capabilities that are needed for intra-organizational arbitration.

¹ Semantic, in this case, refers to the taxonomies and ontologies of each participant nation that were reconciled through – you guessed it – mediation. Taxonomy and Ontology can be defined glibly as the relevant concepts and the relationships between the concepts. Reconciling these is the precursor to negotiating anything.

² JXTA stands for Juxtapose, a protocol introduced by Sun. It supports XML-based messaging and data exchange across any network and can be used by C, C++, Java, or C#, using PIPES. Pipes does support secure Unicast.

³ Semantic-Gov design is based on Eclipse 3.3 deployed to a repository based on CentraSite 3.1.8.

Accommodating Business Collaboration in a Service Environment

The ability of a system to arbitrate a service contract between each service provider and every service producer – one that fully satisfies the requirements of both parties – is a key part of satisfactory operations. In Semantic-Gov’s experience, stakeholder-specific semantics as well as national and local taxonomies and ontologies were essential to mediation. Tiered repositories were essential to non-disruptive evolution⁴ of local policies. **Usually, neither of these is considered part of a basic SOA, but both were needed to address the “business” requirements of a multi-national organization.**

Working across organizational boundaries is an essential part of most businesses. In some cases, the paradigm of a multi-national organization may be appropriate. A pragmatic approach to business partnerships entails reconciliation of intention as well as overt demonstration of control and security. The frequency of change that competitive tactics demand can exacerbate their concern, and requires a same-page common model that all parties can use to enter new requirements and parameters and to sunset stale services safely. It creates a need for granular and enforceable governance policies as well.

These days, an understanding of the ramifications of inter-organizational cooperation is important. Any consideration of multi-sourcing operations or IT systems (such as SaaS or cloud), once such an initiative goes beyond temporary needs with a defined sunset, requires a more comprehensive assumption of riskiness, and a strategy to mitigate the risks.⁵

SOA is not an area where minimalism pays off, even if you are desperately trying to reduce capital outlays and operating costs. Shortcuts, such as point-to-point integrations, initially may be more inexpensive and more convenient but, over time, the penalties they incur in terms of performance drag and the need to be managed outweigh the benefits. Even sensible approaches can run out of steam. Some Software AG

customers have found that what works within an organization must be rethought once the SOA domain crosses the organizational boundary. A customer that started from a business process management perspective, and built stateful services based on that perspective, then found process change to be hard. It may be better to focus on the system of services, rather than to think of the whole as a particular architecture.

The Advantages of a System Approach

Systems of various types are built, according to one pundit, when the situation no longer can be described on the back of a T-shirt. Systems happen every time you draw a diagram, or add arrows to a list. They are what you turn to when the scope of your SOA grows to a point where no pilot project will predict the success of the entire initiative. As Miko Matsumura, VP and Deputy CTO of Software AG, put it, “System thinking is what you turn to when simpler approaches run out of steam.”

In business, a system approach often is used when there is a need to reconcile requirements of multiple partners or diverse processes. A system has structure, connections, and behavior. It is best understood via a model of the whole. Often elements are represented as abstractions and the whole is seen only as views representing the concerns of each stakeholder.

So, once you have built everything into a system, how do you avoid the system becoming a straight jacket?

- You design the system with the assumption of change, like designing an automobile to make repairs and headlamp changes easy.
- You add more flexibility in the form of mediation. If the situation requires it, you can enhance mediation with the semantics of taxonomies and ontologies, as Semantic-Gov.org did – or with XBRL metadata tagging.⁶
- You enforce discipline in service design, together with the collaboration to validate common assumptions.
- You include a testing and validation system that includes key stakeholders.

This can facilitate the frequent changes that

⁴ While bureaucracies may seem immovable, they actually twitch with some frequency, usually in ways that are imperceptible to an outsider.

⁵ In light of new recognition of internal threats, this circumspect attitude is valid, in many cases, even within organizations.

⁶ XBRL stands for eXtensible Business Reporting Language, an open standard used internationally in financial reports filed with government agencies.

any business system inevitably must support. It also places new demands on SOA components that may have been originally formulated for a closed system of trusted and trusting elements. More sophistication, not just more elements, usually is what is needed.

Sophisticated SOA Elements

Service Mediation

Business does not happen by extrusion, like a garlic press, ricer, or other kitchen implement (think “pasta maker”) that magically transforms input into the desired result. Rather, it is frequently an arbitrated solution, usually based on contracts. The frequent change of SOA mandates that a way be found to build service contracts that are not burdensome.

Mediation is so important in cross-organizational operations, because, over time, the participants will change. Support for bi-directional mediation is key to satisfaction of all participants. Adding data governance and security as a part of mediation allows the needs of each consumer-provider pair to be more fully addressed. This is a forward-looking enhancement. Data security parameters will probably get more stringent. All participants will want assurances of process integrity and security. As collaboration expands the field of participants, this becomes even more important.

Software AG *CentraSite X-Broker*

Enforcing security and data governance at the point of mediation [the ESB] is efficient. It also supports atomicity of policy. Therefore, Software AG has evolved the webMethods’ *X-Broker* from an XML-handler that supported bilateral mediation to a multi-dimensional arbitration that also includes data governance, data masking, and security. In addition, the webMethods platform now features a single configuration tool for the entire platform that speeds deployment of services.

Repository, Unified Model, and Collaboration

The repository of services and a unified model in which stakeholders can discuss potential changes must work closely together. The repository is the lynchpin of SOA.

The unified model, understood via role-based views by all stakeholders, together with a collaboration capability, is critical to keeping all parties in sync and in accord. By using an

Eclipse-based IDE, webMethods supports a policy-authoring environment accessible to both IT and BPM. In addition, the CentraSite repository now includes business intelligence tools that allow stakeholders to leverage historical data to take a longitudinal view of their SOA.

CentraSite ActiveSOA

CentraSite ActiveSOA integrated business service repository – the joint registry for business process and IT SOA service descriptions. This breaks down a silo that has impaired the evolution of SOAs. The BPM/IT functionality is enhanced further by collaborative workspaces where the human-to-human mediation issues can be effectively resolved.

Software AG also now offers *AlignSpace*, a Web-based collaborative space for the BPM Community, offered as SaaS. Customers of AlignSpace (there are over 50) find access to a larger community of people working on the same problem can be very helpful.

SOA, IT Operations, and Cloud

On an IT operations level, the flexibility of a SOA-structured system must be complemented by the management (inherent in the system) to determine when a particular service is over-committed and must be cloned. Bringing data semantics into the mediation process pushes the system from a *Just a Bunch of Web Services* string-the-beads paradigm to an integration paradigm, which is, by its nature, more richly endowed with an awareness of the pragmatics of context and governance. In that paradigm, some well-evolved tools can be leveraged.

Another useful strategy is to instrument the SOA system properly. Over time, IT has been designed to minimize arbitration and points of human decision – but business governance, as well as data governance, requires that instrumentation include business checkpoints. These checkpoints protect stakeholder information from undue exposure, and in multi-stakeholder systems, protect those stakeholders from over-commitment of their resources. Surfacing business-side metrics via dashboards can build stakeholder confidence in the SOA and also indicate areas of business-side stress before they become an operational problem.

Additional finesse can be added by grouping services with mutual dependencies into a coarser grained service where possible, for

simpler manageability and better performance. As seen in the Semantic-Gov example, intermediate-level organizational tools can tame chaos nicely.

Adoption of a services approach to process support also makes inclusion of SaaS and cloud services an easier transition than if you maintain an asset-based approach. The ability to envision and support a combined on-/off-premises solution is a significant challenge. A system approach makes the challenge more feasible.

Conclusion

In business systems, there is an uneasy relationship between trust and convenience. In business, trust always comes with the corollary of “but verify.” Software AG’s Business Infrastructure gives you the convenience of SOA with the assurance of intrinsic governance. That lets app parties both trust and verify.

With webMethods 8.0, it has added the sophistication to its SOA. *CentraSite* has expanded to become a full Business Service Repository that includes security and governance – and, in fact, all the elements of the webMethods suite. It supports all governance interactions (i.e., policy support). The interoperability supported by the Software AG approach makes it a neutral mediator that can integrate with services of heterogeneous origins.

In any competitive situation, it is easier to survive where there are some common rules, and where new ones can be negotiated as situations arise. WebMethods 8.0 makes a *CentraSite*-based SOA such a sophisticated place. Think of how this kind of governance can help your tribes work together.



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- ***The Clipper Group can be reached at 781-235-0085 and found on the web at www.clipper.com.***

About the Author

Anne MacFarland is Director of Information Solutions for The Clipper Group. Ms. MacFarland specializes in strategic business solutions offered by enterprise systems, software, and storage vendors, in trends in enterprise systems and networks, and in explaining these trends and the underlying technologies in simple business terms. She joined The Clipper Group after a long career in library systems, business archives, consulting, research, and freelance writing. Ms. MacFarland earned a Bachelor of Arts degree from Cornell University, where she was a College Scholar, and a Masters of Library Science from Southern Connecticut State University.

- ***Reach Anne MacFarland via e-mail at Anne.MacFarland@clipper.com or at 781-235-0085 Ext. 128. (Please dial “128” when you hear the automated attendant.)***

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