Management of SOA in Public Administration: A case study

Thomas Keller[1,2] , Martin Dietrich [2]
1 School of Management&Law, University of Applied Sciences Zurich, Switzerland
2 Bint GmbH, Winterthur, Switzerland

Abstract: The concept of business integration as the combination of business process management [9,10,14] and enterprise application integration [19,21,22] may seem old hat and already well understood [16]. In practice, however, many project managers struggle with the complexity and interdisciplinarity of business integration, especially in the context of a service oriented architecture. Specialized management frame-works are scarce in this field but are crucial to the success of projects. This paper introduces such a management framework on the basis of a case study.

Keywords: Business Integration, SOA

1 Introduction and Motivation

Service-Oriented Architecture (SOA) promises to increase the maturity level of enterprise applications. Standards for the co-operation of software components paired with the necessary governance make it possible for standardized services (consisting of standardized software modules) to offer user functionalities without the need for proprietary applications [1,2,3,4].

The Swiss Canton (federal state) of St.Gallen (SG) early on identified SOA as a strategically important approach for its system engineering to improve the co-operation of its business and IT processes [16,23], its administration, and its citizens and enterprises [5]. In fact, SG's public administration had already implemented a strategic, norm-based IT architecture on the hardware and basic-software levels. To expand the SOA approach into user applications and therefore to decrease operating complexity, SG commissioned a study to analyze the need for the SOA approach in public administration, as well as potential barriers. In addition, the study was to determine possible additional advantages of a co-operation in this matter between public administration and the public health sector (mainly hospitals).

2 Challenges in the Public Sector

At the start of the SOA Study, the visions of the stakeholders of SG were identified [7]. To put those visions into the overall context, we identified the following parameters for each group of stakeholders: the impact of SOA, the current situation including the shortcomings of the current situation, the vision, and the resources needed to move along the path to SOA (see Table.1 below).

The starting points of the different groups of stakeholders are as different as their visions. However, a few aspects keep repeating themselves, e.g. cost-efficiency, co-operation, high service quality, etc. With these requirements, a solution needs to be developed to show ways to fulfill the visions.

3 Solution Approach

3.1 The four Levels of the Bint Framework

The meaning of the respective levels is described in [17,18]. The BINT Framework always views the four levels in terms of the following aspects as expounded below (see Fig.1).

People

The 'people' aspect concerns itself with the employees in a particular organization and thus with the corporate culture, competence management, behavior patterns towards support of strategies and concepts, training and professional development, and instruction in the system.

Organization

The 'organization' aspect deals with the organization of the enterprise within the enterprise itself and how it co-operates with other organizations and partners.

Technology

This aspect handles practical / technological matters within the organization.

Data

'Data' addresses all questions arising from information available to the enterprise.

3.2 Derivation of organizational objects

BINT methodology operates within the BINT framework, providing it with content both necessary and helpful to integration projects while representing in a concrete way the problems shown above. BINT methodology therefore includes templates, advancement plans, check lists, tools and further aids to map out the organizational objects in a consistently precise manner, with relevance to the customer/project context.

3.3 Procedure: Application of BINT methodology for SOA St.Gallen

As Fig.2 shows, we have applied a top-down method for the Canton of St.Gallen SOA Study. Firstly, the administrative representatives responsible had to agree on the co-operation of eGovernment and eHealth (1), respectively putting this vision into a working brief. Subsequently, we identified the stakeholders (2) and conducted interviews with them, resulting in the outcomes (chart) described above.

	Impact of SOA	Current situation and shortcomings	Vision	Resources needed
Public administration, public offices, public health	Efficiency improvements due to optimized co-operation with other offices	High dependency on software suppliers. Complex, non-standard and expensive software solutions	Individual best-of-breed applications, well integrated with other offices at less cost	Transparent and documented business processes. Resources to optimize processes and assist change.
IT coordination office, decision makers	Enabling more co-operation between public offices and health and less complexity by setting enforceable standards	Short-term cost increase of standardization is not recognized as a mid- and long-term cost saver. The recommendations of the coordination office are not strictly enforced.	The coordination office leads the coordinated development and operation of SOA architecture and enforces its standards.	Personnel to define, pass on and enforce the relevant standards and to assist project management as well as business management during the decisive phases
Business partner health (doctors, hospitals, health insurance companies, etc.)	Standards make co-operation between all partners in the overall patient process possible, i.e. doctors, insurance companies, hospitals, etc.	Today, it is not clear who will profit from the efficiency improvements, who will pay for them, and if the added transparency will help any of the partners.	SOA leads to a win-win situation and a real partnership in a B2B rather than a customer-to-supplier relationship and improves cost-efficiency as well as quality in the patient process.	Transparent and documented processes of all partners. Suppliers need to adhere to the international standards.
Business partner government (communities, townships, regional administration)	Standards make co-operation between all stages of government possible and help reduce redundancies and inefficiencies.	Co-operation has already become a reality on a daily basis. Tangible results (e.g. from pilot projects) are required.	SG and its business partners in government are co-operating units with compatible IT and a common benefit analysis.	Transparent and documented processes of all partners. Agreement about who will profit from the resulting benefits and who will pay for the necessary investments. Use of existing services developed by others.
Confederation	The Swiss Confederation has recognized the impact of SOA and wants to take the lead.	Confederation and cantons co-operate well, regional public offices are not involved enough. Switzerland being a confederation, the involvement of regional public offices is critical to the success of the mission.	All stages of government co-operate and work with compatible infrastructures. A joint strategy is formulated.	Involvement of SG and incorporation of its requirements. Enough speed so SG is not slowed down and does not need to wait for national decisions.
Citizens, enterprises, patients	SOA should provide location- and time-independent e-services at higher quality and cost-efficiency while guaranteeing data privacy.	Only few, if any, e-services exist. The greatest challenge is the different requirements of very different customer groups.	A great number of location- and time-independent e-services exist. Quality, cost-efficiency and data privacy is guaranteed.	Citizens use e-services but are not willing to spend additional resources. Enterprises need to incorporate existing services into their own solutions.

Software partners, solution partners, technology partners, suppliers	Software partners are used to building applications for business sub-processes. SOA requires them to share functionalities with competitors. They need to 'be integrated' rather than 'integrate'.	The orientation of the software suppliers can only be partly influenced by SG. Changes towards SOA require a considerable financial investment and cultural change.	Software partners co-operate in service modeling and create services built on standards rather than applications.	Software companies need to define which services they will offer and which services they will outsource. They will need to open up their services and allow them to be integrated.
Politics	Politicians want to lead change and want to provide citizens and patients with cost-efficient, secure services	SOA is not well known, and regional interests play a bigger role than overall optimization.	The benefits of SOA are well known, and politicians support SOA implementation.	Politicians need to support SOA initiatives and find cost-splitting models and ways to pre-finance necessary investments.

Table.1 SOA Stakeholder Analysis

©bint

Fig.1 Bint SOA Management Framework

Only during the third stage was the role of IT within the context of SOA defined on a fundamental level. This concerned itself with questions such as 'Who is permitted to issue instructions?', 'Which IT components have to be used?', 'Are eGovernment and eHealth obliged to use the same IT components?' etc. Following this, a definition was developed as to which data/information should be shared. Only once these questions had been clarified at the normative level did we proceed to the next stage. Now the specifications were transferred from the highest level, broken down and handled on a more detailed level. The result of this was a recommendation concerning the SOA organization in the Canton of St.Gallen that eGovernment and eHealth combine forces, and suggestions relating to IT architecture including ideas, parts of which should be resolved together and parts separately. Finally, two pilot projects were identified, which should yield first benefits in terms of SOA.

4 Results

Based on the SOA Study in Public Administration, the following principles for the introduction of SOA to public administrations have been derived:

Step-by-step approach rather than 'big bang'

A comprehensive propagation of SOA is not expedient owing to the high number of legacy systems in current use and a wide degree of variation in the advancement of departments and processes. It would seem more prudent to follow a step-by-step approach in which upcoming projects can be subject to SOA standards, which they should be able to meet.

Top-down and bottom-up functioning simultaneously

While eGovernment is 'bottom-up' driven to create solutions in the different departments and when necessary to demand comprehensive parameters and general frameworks, eHealth is organized as a 'top-down' process. For many decades, eHealth has been accustomed to norms and standards, in particular international ones, and to aligning itself to such guidelines. Accordingly, a mix of top-down and bottom-up has been chosen for SOA implementation, in which experiences can be regularly exchanged, and to expedite completion of the workload.

Pilot project: quickly visible benefits

The definition of two (comparatively smaller) pilot projects should quickly demonstrate the benefits of SOA and generate interest in further projects.

Financing model

The implementation of SOA will incur a greater financial outlay in the initial stages because standardized solutions for the additional specifications have to be reached in order that they can then be reused later. Only in the course of time can cost savings be realized through the repetition of services and, in particular, the replacement of the old system. This additional cost should not be counted against the initial projects, as otherwise SOA would never be implemented. For this reason, Public Administration has agreed on an appropriate financing model whereby the accumulated additional cost at the initiation stage is to be pre-financed.

Organizational structure

In order to ensure the efficient and effective implementation of SOA, a suitable organizational structure with sufficient decision-making power and competence has to be created. At the very least, the SOA specifications must be applied to the projects. In a special situation, the Canton of St.Gallen would also have to ensure the efficient collaboration of eGovernment and eHealth.

Procedure

In the run-up phase, the basic principles for the implementation of SOA were established in the pilot projects. In particular, an SOA Design Guide was created. These basic principles were designated in the pilot projects as realization requirements. In the pilot projects, the basic principles should be verified and, if need be, re-adjusted so that they can be transferred to all new projects afterwards.

5 Conclusion

The utilization of collective best practices, organizational recommendations, concepts and methods for the praxis application of specialist knowledge makes a substantial contribution to the speedy professionalization of the integrated task. This accelerates integration plans considerably while reducing cost and lowering the risk factor.

For corporate leaders and IT managers

The Bint Framework provides managers with a tool enabling them to describe the integration strategy clearly and in its entirety, to dictate guidelines / safe working limits and to direct strategic projects in the field of business integration. They receive a 'language' with which they are able to stipulate, measure, and make demands regarding the quality of the integration tasks. The design objects, formulated for all levels of user, serve as a content matrix for the strategy (enabling the full provision of information without going into details) and provide bridges to actual implementation.

For IT architects, coordinators

The company-specific framework for integration tasks (architecture, processes, assembly organizations,

operation) can, in the varying levels of detail required for day-to-day work, be quickly presented and implemented. In other areas, the framework can be utilized without special modification; the aim, however, is that the client-company can make it its 'own' through individual adaptation.

For project managers

The tools and specifications available support the project manager in the carrying out of the project by means of standardized procedures and a wide range of aids such as checklist templates, practical examples etc. The integration parts of the specialist project can therefore be more effectively planned, calculated and led, thus bringing with them a reduced risk factor.

For specialist divisions / users

The Bint Framework contains a variety of methods and tools to make the integration task more transparent and easier to both explain and understand. Specialist divisions receive more concrete coverage of data flows, process quality, etc., and can accept more responsibility. Improved transparency concerning the data and processes available to others promotes synergies. The methods and tools in the 'people' field help those affected by integration plans to become properly incorporated.

References

[1] BACH, N., Zukunftsfähige Organisation – Stand und Entwicklungstrends der Organisation deutscher Unternehmungen und Verwaltungen. In: soFid Organiations- und Verwaltungsforschung 2002/2

[2] BECK, M., Service-Oriented Modeling: Service Analysis, Design, and Architecture, John Wiley & Sons, 2008

[3] BOHN, N., Ein Beitrag zur Weiterentwicklung von Evoluationsstrategien für die virtuelle Produktionsentwicklung, VDI Verlag, 2008

[4] BURNS, P., Corporate Entrepreneurship: Building an Entrepreneurial Organization, Basingstoke, 2008

[5] CHANG, J. F., Business Process Management Systems, Auerbach Publications, 2005

[6] HAMBLETON, L., Treasure Chest of Six Sigma Growth Methods, Tools, and Best Practices: A Desk Reference Book for Innovation and Growth, Prentice Hall, 2008

[7] HARRISON, A., VAN HOEK, R., Logistics Management and Strategy: Competing Through the Supply Chain, Harlow, 2008

[8] Informatikstrategie Organ Bund ISB,Hermes, Führen und Abwickeln von Projekten der Informations- und Kommunikationstechnik (IKT), Systementwicklung, Ausgabe 2003, Auflage 2004, BBL

[9] JESTON, J., NELIS, J., Business Process Management: Practical Guidelines to Successful Implementa-tions, Elsevier, 2008

[10] KELLER, Th., Nutzenpotential flexibler Prozesse, Dissertation, University of Zurich, 2008

[11] KNÖPFEL, H., Beurteilungsstruktur (IPMA Ebenen A, B, C und D), Swiss National Competence Baseline (Swiss NCB). Verein zur Zertifizierung im Projektmana-gement

[12] LOSHIN, D., Business Intelligence, Morgan Kaufman Publishers, 2003

[13] O'ROURKE, C., FISHMAN, N., SELKOW, W., Enterprise Architecture, Thomson, 2003

[14] ÖSTERLE, H., WINTER, R., Business Engineer-ing, Springer, 2003

[15] Project Management Institute, A Guide to the Project Management Body of Knowledge. 3rd edition, Global STANDARD, 2003

[16] REUTER, B., Flexible Kooperationen steuern, EUL Verlag, 2004

[17] RÜEGG-STÜRM, J., Das neue St. Galler Management-Modell, Haupt, 2003

[18] RÜHLI, E., Unternehmensführung und Unternehmenspolitik, Haupt, 1996

[19] SCHEKKERMAN, J., How to Survive in the Jungle of Enterprise Architecture Frameworks, Trafford, 2004

[20] SCHELLE, H., OTTMANN, R., PFEIFFER, A., ProjektManager. Deutsche Gesellschaft für Projektmanagement, IPMA, 2. Auflage, 2005

[21] SCHEER, A-W., ABOLHASSAN, F., JOST, W., KIRCHMER, M., Business Process Automation, Sprin-ger, 2004

[22] SCHELP, J., WINTER, R., Integrationsmanagement, Springer, 2006

[23] SCHMIDT, G., Methoden und Techniken der Organisation, Verlag Dr. Götz Schmidt, 2003