Business Driven SOA-Service Candidate Identification

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Abstract: Service Oriented Architecture (SOA) is nothing new. Using SOA in the company's IT-Landscape gives the ability to drive IT-Evolution through business and to enable better business operations through a more flexible, agile and low maintenance IT. Hence it's amazing that an SOA landscape is quite rare in globally operating companies. IT-Landscapes of global companies are often historically grown and therefore complex, not agile and need a lot of maintenance. So the question is how a company can adapt an SOA within their existent IT-Landscape realizing good benefit in an effective way. The approach described in this Methodology-Pattern deals exactly with that question and helps planning an SOA-Transformation with good benefit, which is consistently aligned to the business. Therefore, the newly developed SOA-Landscape has to be business driven. Hence SOA-Services will only be implemented where SOA-Service makes sense and SOA-Services are designed in a business-need-oriented way to guarantee good business support.

1 Introduction

The method BUSINESS DRIVEN SOA-SERVICE CANDIDATE IDENTIFICATION (BUSINESS DRIVEN SOA SCI) deals with an effective usage of Service Oriented Architecture (SOA) for architecture transformation. This approach addresses the strategic planning of an SOA-Transformation, which is consistently aligned to the business targets and needs. SOA-Transformation in this context means the initial transformation of an application oriented architecture to SOA. Additionally, some parts of this method can also be used for the evaluation of an already implemented SOA. One result document of this method comprises an overview about the most relevant business areas of the company with regard to the business strategy. Furthermore, these relevant business areas are evaluated concerning their SOA-Potential. Therefore, using the results of this method may help Chief Information Officers (CIO) to set a new strategic direction concerning the IT-Architecture and will ensure a transparent IT-Value-Add. Additionally, IT-Business-Alignment will be achieved, because all tasks mentioned in this method are performed with close contact to the business. Hence SOA-Services will only be implemented in

areas, which have a positive strategy impact and gain advantage to the business. Beyond this, the information of the analysis can be used as base for the future-oriented SOA-Roadmap.

2 Business Driven SOA-Service Candidate Identification

The principal attraction of SOA is its ability to drive IT-Evolution through business and to enable better business operations through a more flexible, agile and low maintenance IT [De05]. An approach which helps to transform an existent IT-Landscape to an SOA-Landscape with strict regard to the business strategy and business demands is documented in the method BUSINESS DRIVEN SOA SCI. The focus of this method is the transparent business-driven identification of SOA-Services without regard to the manner of their implementation. Thus the result of this method is an SOA-Service candidate portfolio. In consequence the implementation of theses identified SOA-Services will lead to a newly business-driven SOA-Landscape. Due to the consistent business-orientation this SOA-Landscape ensures good business support. Remark the implementation process of SOA-Services is not described in this method.

2.1 Example

Global enterprises have big IT-Landscapes, which are characterized by a lot of complex and heterogeneous systems. Normally, such an IT-Landscape is not agile or flexible, because it is often difficult and extensive to adapt complex and heterogeneous systems to new business requirements. But characteristics like agility and flexibility are requested by the business. Implementing an SOA within your IT-Landscape will help to fulfil these requested demands [He07, p.124]. In consequence some parts of an enterprise IT are already captured by SOA-Services following the process, the company's IT-department uses to identify a new requirement and starts designing and implementing the new service. Additional new requirements are announced by the business and the IT generates new SOA-Services. Thus a lot of SOA-Services exist unmanaged and are not evaluated concerning their benefits and business support. Additionally, the business value added by SOA-Services is not transparent.

2.2 Context

A large enterprise is facing the challenge of an SOA-Transformation, which is driven by bottom-up initiatives and not necessarily linked to the overall business targets.

2.3 Problem

You feel the risk of an unmanaged SOA-Landscape without being aligned consistently to the business. In consequence your SOA-Landscape is driven bottom-up by a few experts, who know the need for action. This landscape is composed of a large number of SOA-Services, however, it is not assured that all services of the enterprise IT are identified in the right business area and implemented in the right way. Identification in the right business area implies that SOA-Services should be implemented within areas where SOA will achieve good benefit and implementation in the right way denotes that SOA-Services should be exactly designed according to business needs. Concluding, a top-down enterprise view is missing and therefore probably strategic goal relevant topics are not covered by SOA-Services.

How can you assure business-oriented SOA-Service identification and implementation in the right business areas within a global SOA-Transformation?

The following forces influence this situation:

- **Top-Down vs. Bottom-Up:** On the one hand a top-down approach assures that SOA-Services will only be implemented in business areas, which have significant impact on the strategic goals. In consequence possibly lower important topics (which may have high SOA-Potential) won't be cared about. On the other hand using a bottom-up approach will lead to SOA arrangements in areas which possibly don't have significant impact to strategic goals.

- **Business-driven vs. IT-driven: Who is the driver of an** SOA-Transformation?

- **SOA vs. non-SOA:** SOA exhibits positive characteristics like e.g. flexibility, reusability, loose coupling and agility. Nevertheless it has to be checked if some of the announced positive SOA characteristics are needed by the business functionality which is discovered in the various business areas.

- **Established roles vs. new roles:** Are the established roles sufficient for a business-driven SOA-Transformation? Do you need additional roles to ensure a business-oriented SOA-Transformation?

2.4 Solution

Using a top-down approach in an SOA-Transformation with regard to effectiveness is necessary for realizing significant benefit for the company. Hence the SOA-Transformation process has to assure that SOA-Services will be identified in the right business area (with regard to business strategy and SOA-Potential) using a top-down approach and will be implemented appropriately to the business needs (business-oriented). Consequently, these SOA-Services, which are in detail specified by people working in the relevant business unit, guarantee good business support for this area [cf. Of08, p. 463ff.], [cf. De05].

A global business-oriented SOA-Transformation can be structured in the following four parts. First part **Strategic Business Alignment** discovers top-down business areas and highlights those, which have strong impact on the strategic goals. This discovery is followed by an SOA-Potential evaluation of selective business areas which have high strategy impact. The second part **Operationalization** discovers functional and non-functional business requirements in the selected business area and gives an implementation recommendation concerning its target architecture (SOA/non-SOA). In the **Implementation** part a person with good business understanding, good IT knowledge, especially in the area of SOA and modelling experience (in the following this role is called Business Integration Engineer) specifies in detail these requirements and implements the SOA-Service. This part is only mentioned for completeness but will not be discussed in detail, because the intention of this method is only the business-oriented identification of SOA-Services free of their implementation modality. Part four **Governance** influences all above mentioned parts and deals with the planning and controlling of the SOA-Transformation. The results of this method support the planning part in governance. Therefore these results should be used as input while planning the SOA-Transformation. Figure 1 illustrates the interrelationship of these four parts within an SOA-Transformation.
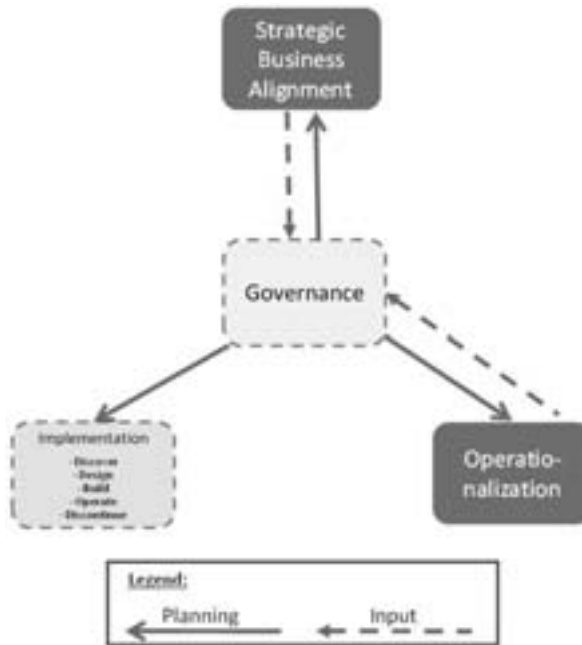
Figure 1: Interrelationship of the four parts within an SOA-Transformation

The execution of all parts is planned by the IT Strategy department which is owner of the governance part. Strategy changes influence the part *Strategic Business Alignment*. Therefore the IT Strategy should link the planned execution of this part to the time, where a business strategy update will be released. Typically the periodicity of business strategy updates is annually. For light business strategy changes, the IT Strategy should plan a light execution of part *Strategic Business Alignment*. This means that the result document of this part (generated in the initial complete execution) has to be checked against changes and has to be updated selectively in cooperation with the business strategy responsible. The execution of this part is also a trigger for (re-)planning activities of part *Operationalization* and *Implementation*.

In the following, the main parts of Business-Driven SOA SCI, *Strategic Business Alignment* and *Operationalization* will further be detailed.

2.4.1 Strategic Business Alignment

The base for the method Business Driven SOA SCI is the *Functional Domain Model* (Figure 2). This model provides a common entry point to IT-Architecture for business and IT. It structures areas of activity of IT-Architecture using the language of the business and consists of business domains like 'Supply Chain Plan', 'Procurement', 'Monitoring and Controlling' etc**.**
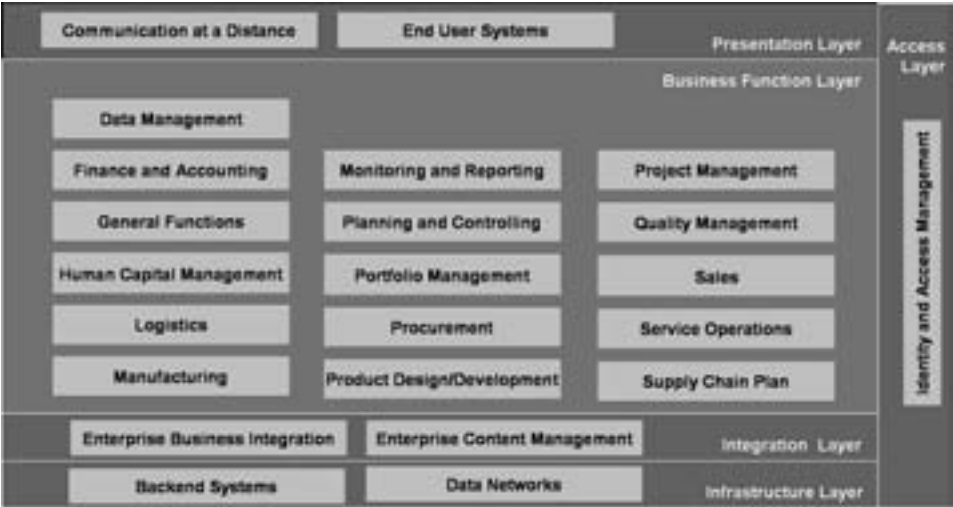
Figure 2: Siemens Functional Domain Model (Source Siemens AG : CIT)

By using this Functional Domain Structure you can enable IT-Business-Alignment. Every business function can be allocated exactly to one Functional Domain. A business function is a specific functionality, which is needed by the business and is exactly comprised within a Functional Domain (e.g. Personnel Administration inside the Functional Domain Human Capital Management). In addition to the *Functional Domain Model* the business strategy is required. *Strategic Business Alignment* correlates each Functional Domain of the Functional Domain Model with the business strategy. This part is divided into two steps: Domain ranking and SOA-Potential ranking (Figure 3).

Figure 3: Steps of part Strategic Business Alignment

Step one ranks every Functional Domain concerning its importance to reach the strategic goal. During this ranking activity, only business functionality covered by this Functional Domain is important. IT aspects and systems which support this area are not discussed. To support traceability every importance value holds a statement which describes why this value was determined by the business strategy people with regard to the corresponding strategic target.

A session with members of the business strategy department is used for ranking the Functional Domains. As result of part one you will get a ranking between all functional areas of the Functional Domain Model (Figure 4).

Figure 4: Excerpt of result document – Step1: Domain ranking

Every functional domain is ranked concerning its importance for reaching the strategic target. Every ranking will be performed using the question: "Which value proposition have the activities/functionalities covered by this Functional Domain for reaching the strategic goal?". Consequently, the most important areas for the company are identified. E.g. in figure 4 the important Functional Domains are "Data Management" and "Finance and Accounting" . All Functional Domains with significant impact on the strategy targets will be used as input for the second step of *Strategic Business Alignment*.

Step two evaluates the SOA-Potential of these important Functional Domains. Aspects concerning the benefit and effort are discussed to identify areas with maximum SOA-Benefit. The evaluation will be performed by hypotheses. These hypotheses give a hint to the SOA-Benefit and deal with topics about process-efficiency, flexibility and IT-efficiency. Topics like project costs and IT-running-costs will be used for evaluating the SOA-Effort. Figure 5 shows an excerpt of the hypothesis document.

Figure 5: Excerpt of the hypotheses document

Business people (Functional Domain Responsible, Enterprise Domain Architect) and Enterprise IT architects, have to choose together the most applicable hypotheses.

As result of the step *Strategic Business Alignment* all strategically important Functional Domains are evaluated concerning their SOA-Potential and will be categorized as *SOA sphere of activity*. All SOA spheres of activity are positioned in an SOA-Portfolio matrix with the two dimensions SOA-Potential and SOA-Effort. Concluding figure 6 summarizes the interaction of the two steps Domain ranking and SOA-Potential ranking.
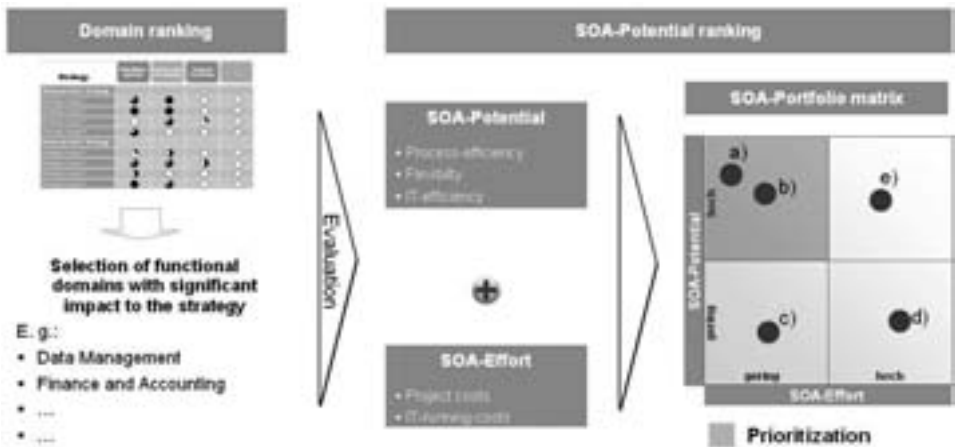

Figure 6: Interaction of step Domain ranking and step SOA-Potential ranking

In consequence, the information comprised in this SOA-Portfolio matrix can be used by CIO, IT Architects, IT strategy or other IT members as input for defining an SOA-Roadmap. This roadmap prioritizes the exploration of the SOA spheres of activity. Normally, such a roadmap is formulated by the IT strategy in cooperation with IT Architects. The exploration task is covered by the second step *Operationalization*.

2.4.2 Operationalization

Every area which is defined in the SOA-Roadmap will be explored. That exploration duty comprises three steps which are worked through consecutively (Figure 7).

Figure 7: Three steps of part Operationalization

All steps will be performed with members of the business department, who are responsible for the chosen business area and with members of the IT-Department. In the first step, all *business function trees* of that functional area have to be discovered using e.g. an existent process landscape. This process landscape comprises various functionalities, which are linked through workflow logic. A *business function tree* is a tree, which consists of one extensive main function (e.g. travel management) and its sub-functions (e.g. car booking, flight booking, hotel booking, train booking …) [cf. Mü06, p. 130].

Furthermore, functional and non-functional business requirements (raised by the business people) are collected and checked against the functions listed in the trees to identify the target architecture with modified old or discovered new functionality. *Function Cards* (excerpt shown in figure 8) help to document all raised information.

Siemens IT Solution and Services	Functionscard	Date

Block 1: General Information

| | Name | |
| | Parent Function | |

Block 2: Requirements

Nr.	non-functional
I	
II	
III	
IV	
V	
VI	

Nr.	functional
I	
II	
III	
IV	
V	
VI	

Result of the IT-Decision Template

Implementation manner		SOA	non-SOA	If implementation manner is SOA third block must be filled out.
Decision				

Block 3: SOA Business Process Service (BPS) Candidate Document

No.	Attribute	Description			
1	Trigger				
2	Function	No.	Short function description		
		I			
		II			
		III			
3	Contact (business)				

Figure 8: Function Card excerpt

This *Function Card* is a document, which is structured in three blocks. The first block provides general information about the business function, the second block lists requirements for the business function and the third block comprises the *SOA-Service Candidate Document*, which includes first specification details of the identified SOA-Service. Afterwards, all business functions, which need modifications or which are newly discovered will be evaluated concerning its implementation (SOA vs. non-SOA). This evaluation process is guided by an *IT-Decision template (excerpt is shown in figure 9)*, which contains expressions concerning topics like individuality, external connections, transactional functions, agility and complexity.

Figure 9: IT-Decision Template excerpt

Evaluating every requirement using the previous named IT decision topics will assure, that only SOA-Services will be designed, if SOA is suggestive. Therefore, good SOA-Benefit is realized. Requirements which are not advisable to be implemented as SOA-Service are not rejected. These requirements are also business needs and have to be handled. Hence these needs, which are already collected on the *Function Card*, will be handed over to e.g. a Demand Manager. All other pro-SOA evaluated requirements are picked and associated with newly discovered SOA-Services. Every new SOA-Service will be described more detailed in the third block (*SOA Business Process Service Candidate Document*) of the *Function Card*. This document will be further used by the *Business Integration Engineer*, who will create, with the help of business people, a more detailed specification of the discovered SOA-Service and is responsible for the SOA-Service implementation. Hence such a role must be established within the organisation.

The acceptance of this identified SOA-Service by a Business Integration Engineer changes the SOA-Service state from "Candidate" to "Discovered" and consequently initiate the SOA-Service implementation process (see Figure 1).

2.5 Implementation

In order to use this method, it is very important that the organisation has the willingness to plan an SOA-Transformation using the parts mentioned in BUSINESS DRIVEN SOA SCI (see Figure 1). Therefore, the organisation on the one hand must be qualified to accomplish every part and on the other hand must use the results of each part correctly. Additional required governance structures have to be created and adequate people have to be involved in every part.

Consequently the following roles are requested by this approach: *Business Strategy Expert, IT Strategy Expert, Enterprise Functional Domain Architect, Enterprise IT Architect, Functional Domain Responsible, Functional Domain IT Architect, Business Integration Engineer.* Additionally, this enumeration can be expanded with other people of your company, if you think their knowledge is also needed.

Step one in part *Strategic Business Alignment* requires the participation of people owning the role *Business Strategy Expert* and *Enterprise Functional Domain Architect.* Participants in step two of this part are *Enterprise Functional Domain Architects, Enterprise IT Architects and the Functional Domain Responsible.* People owning the role *Enterprise Functional Domain Architect are characterized to have a* global business view about the Functional Domains; the *Enterprise IT Architects* are characterized to have a global view about the IT supporting the Functional Domains; the Functional Domain Responsible has an excellent knowledge about the business activities (business functions) which are comprised in a specific Functional Domain.

The next step *Operationalization* is performed by people owning the role *Functional Domain Responsible, Business Integration Engineer, Functional Domain IT Architect.* To identify, whether the specific functional or non-functional requirement should be implemented traditionally or with SOA-Technology input of the *Functional Domain IT Architect* is needed. Accountable for this step is the *Functional Domain Responsible.* The *IT Strategy Expert* moderates both parts *Strategic Business Alignment* and *Operationalization. Furthermore the IT Strategy Expert* is accountable for part *Strategic Business Alignment.* Additionally the IT Strategy department is responsible for the execution of Strategic Business Alignment and will be informed about the results of part *Operationalization* (SOA Service Candidates) to plan the implementation of the SOA-Service Candidates / Business Process Service Candidates [Ma09].

Further Top-Management support of this approach is needed and an escalation board has to be defined, which will solve problems concerning offense against the method or defined SOA-Roadmap. Figure 10 summarizes the above mentioned interaction between the roles using a RACI-Model.

Part / Role	Strategic Business Alignment		Operationalization
	Step 1	Step 2	
Business Strategy Expert	C	I	I
IT Strategy Expert	R A	R A	R
Enterprise Functional Domain Architect	C	C	A
Enterprise IT Architect	I	C	I
Functional Domain Responsible	I	C	C
Functional Domain IT Architect	I	I	C
Business Integration Engineer		I	C

C = Consulted, R = Responsible, A = Accountable, C = Consulted, I = Informed

Figure 10: RACI-Model of method BUSINESS DRIVEN SOA SCI

2.6 Know Uses

The approach documented in method BUSINESS DRIVEN SOA SCI is in use in the following company:

- Siemens AG - Siemens IT Solutions and Services

2.7 Consequences

This approach deals with a lot of different people of business and IT. So it has to be considered that all people have to take activities requested by this method additionally to their main line activities. Hence it is very important that everyone, who is needed for this approach is well-informed about the benefits of using this approach and ideally the benefit for himself. In conclusion the availability of needed business and IT experts has to be checked and their attendance in the sessions has to be assured.

Top-Down vs. Bottom-Up: Traditionally a lot of IT activities are triggered by bottom-up initiatives, because IT Architects have great knowledge about their IT-Landscape and therefore seem to know where architectural changes (e.g. SOA) are needed. As already mentioned for realizing a good benefit for the company top-down initiatives are necessary. In conclusion a combination of both initiatives is needed. Consequently, it is suggestive to use the top-down approach and connect it to the bottom-up initiatives, which are already running. Thereby, transparency between bottom-up and top-down activities is established. For this reason important business areas for the company, which are not covered by bottom-up initiatives, are identified. Vice versa bottom-up worked areas, which do not have significant business impact, are also identified. To ensure good business benefit within an SOA-Transformation it is advisable to use a top-down approach. Thereby you get the ability to deploy your limited resources at the best concerning the business benefit and the waste of money in strategically insignificant areas is avoided.

Business-driven vs. IT-driven: An architectural SOA-Transformation only guided IT-driven is not accepted by the business. Thus business needs are not supported ideally and so business people are not willing to use the newly offered SOA-Services. In addition, an important target of a future-oriented IT-Architecture, IT-Business-Alignment, is failed. Therefore the driver of an SOA-Transformation should be the business and IT should consult the business with IT's technical expertise. An additional success factor for a business-oriented SOA-Transformation is that the SOA-Services specified by the business have to be exactly implemented according to the business specification to assure business support at the best. To assure this it is recommended to use documents which hold all information raised by the business. It is very important that the development of this SOA-Service document is performed by IT and business people, because both should have a mutual agreement concerning the content of this document. Furthermore this is the initial document for the SOA-Service, which is handed over to the IT. Due to the use of this document transparency between Service-Discovery by business people and Service-Implementation by people of the IT department is achieved. Accessorily this document ensures transparency between business and service view. In consequence traceability between SOA-Services and business needs is ensured.

Therefore, it is suggestive to plan such a new strategic IT direction with close contact to business people. One the one hand this yields to transparency between business strategy targets and the IT-Architecture and on the other hand business gets IT support at the best. Additional IT-Business-Alignment will be achieved.

SOA vs. non-SOA: Furthermore, SOA should not be an end in itself and should only be used in places, where usage of SOA is suggestive. Therefore *Functional Domain Architect, IT Architect and Business Integration Engineer* together have to check exactly, whether SOA-Technology is the right way to excellently support the business needs. If typical SOA characteristics are not requested by the business for the specific functionality it is suggestive to consider alternative implementation techniques than SOA.

Established roles vs. new roles: For a business-oriented SOA-Transformation special roles are needed. Roles requested by BUSINESS DRIVEN SOA SCI are often not established in large enterprises. Therefore it is advisable to check, whether all required roles are already established in your enterprise before starting with the approach described in this method.

2.8 See Also

In order to support the implementation of the method BUSINESS DRIVEN SOA SCI the following documents may help:

- Ranking template: This document is used for documenting the domain ranking and will lead to the portfolio matrix

- Function Card template: This document is used for documenting the functional and non-functional requirements

- IT-Decision template: This document comprises hypothesis which help to evaluate if SOA-Implementation is suggestive

- SOA-Service Candidate document template: This document comprises additional information, which is needed (in a first step) for implementing the SOA-Service

3 Acknowledgement and Outlook

This section includes acknowledgements to the people who supported the creation of this article and gives an outlook to the next steps in the development of BUSINESS DRIVEN SOA SCI.

3.1 Acknowledgements

3.2 Next Steps in BUSINESS DRIVEN SOA SCI

The method behind this Methodology-Pattern (M-Pattern) was developed within SIS for planning the global SOA-Transformation with consistent alignment to the business. In conclusion SIS is able to manage the SOA-Transformation in an effective way realizing good benefit. The first step of part *Strategic Business Alignment* has already been successfully applied. The first business reactions were completely positive. Due to confidentiality the results cannot be presented in this article.

Furthermore, IT-Business-Alignment was achieved, because business people realized that the IT department tries to supply IT-Services (SOA-Services), which are defined and specified by the business and therefore will guarantee business process support at the best. Further steps of this method will be performed in the actual calendar year within the SIS.

In order to improve the readability of this pattern a future revision will split the pattern in a composite pattern [Di97] describing the overall method and in two patterns specifically targeting the two documented parts.

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