

Identifying Services in SOA

ir. L.I. Terlouw,
Enterprise Architect
linda.terlouw@icris.nl

dr. A. Albani
Scientific Researcher
antoniam.albani@icris.nl

Abstract

Though many organizations are aware that a good service portfolio is important, only few can explain what they actually mean by “good”. Often, the service identification process is performed in an ad-hoc manner resulting in an unbalanced or incomplete service portfolio. Currently no method for service identification exists that can be followed like a recipe in a cook book, but research is progressing. In this white paper we discuss the pros and cons of several service identification approaches. We show two of them (i.e. the goal-driven approach and the component-based approach) in more detail and give examples of an insurance case study.

1 Introduction

Around the year 2005 many organizations took their first steps into the world of SOA. Their main concern was which ESB to choose. After deciding whether to use the ESB from Tibco, Cordys, IBM, Oracle, or Microsoft, they thought the hard part was over. They started building web services like crazy and ended up with JABOWS (Just A Bunch Of Web Services) instead of a decent SOA. In 2008 Ligthart, Hubbers, and Terlouw published a high-level overview of ten frequently used approaches [3]. In this white paper we summarize these ten methods and describe the two most advanced approaches in more depth. We provide some concrete examples using an insurance case study.

2 Ten Methods to Service Identification

Reflecting upon our practical experiences in SOA projects in which we participated from 2005 to 2008, we can distinguish between roughly ten different methods for service identification. In Table 1 we have listed the methods including their pros and cons in random order. Even though these methods are listed

individually, in practice they can be combined. Further study learned that methods 5 (business goals) and 6 (components) are most thoroughly described in books and/or papers. In the next two sections we discuss these methods in detail.

Table 1: Summarizing Ten Approaches to Service Identification [3, 9]

METHOD 1: BUSINESS PROCESSES	
Description	The business process is subdivided into sub-processes or decomposed into granular activities and tasks. The lowest level tasks can consist of small, cohesive logical units of work that are supported by the functionality offered by distinct services.
Pros	<ul style="list-style-type: none"> • This results in services that are very demand-driven • Method is intuitive
Cons	<ul style="list-style-type: none"> • The gap with existing application can be quite large • Functional duplicates can come into existence • Services can get very fine grained, which makes reuse more complicated for the consumer
METHOD 2: BUSINESS FUNCTIONS	
Description	The relatively stable business function model acts as basis for service identification
Pros	<ul style="list-style-type: none"> • Services are usually more stable compared to the ones identified from the business process model • No functional duplicates can come into existence
Cons	<ul style="list-style-type: none"> • Few organizations have a completely described business function model
METHOD 3: BUSINESS OBJECTS	
Description	<ul style="list-style-type: none"> • The business object model is used to identify CRUD-type services
Pros	<ul style="list-style-type: none"> • Early in the process people think about the semantics of services
Cons	<ul style="list-style-type: none"> • Analysis paralysis can occur if people try to create a complete corporate data model • Services only cover CRUD-functionality
METHOD 4: EXISTING SUPPLY	
Description	Services are created by using tools and wizard on existing systems
Pros	<ul style="list-style-type: none"> • Services can be made quickly • Services are identified by an analysis of queries and transactions/operations of existing front-office applications
Cons	<ul style="list-style-type: none"> • Does not give good results if the existing application landscape does not conform to the functional requirements • Services are closely tied to the existing application landscape. For this reason it can be difficult to replace applications
METHOD 5: BUSINESS GOALS	
Description	Business goals are subdivided till a supporting service can be made
Pros	<ul style="list-style-type: none"> • Strong traceability between services and organizational strategy
Cons	<ul style="list-style-type: none"> • Goals are subjective, which leads to duplicates (a certain functionality can be used for multiple purposes) • Not all functionality can be directly be related to business goals
METHOD 6: COMPONENTS	
Description	IT functionality is divided in "chunks" with maximum cohesion and minimal coupling. These components interact by calling each other's services
Pros	<ul style="list-style-type: none"> • Components are truly self-contained units of functionality
Cons	<ul style="list-style-type: none"> • Cannot always be applied in buy-before-build policy. COTS packages are not always structured component-based
METHOD 7: FRONT-OFFICE APPLICATION USAGE ANALYSIS	
Description	Services are identified by an analysis of queries and transactions/operations of existing front-office applications
Pros	<ul style="list-style-type: none"> • Services can be made quickly

Cons	<ul style="list-style-type: none"> • Input for the design process is often quickly available by talking to administrators and applying automated analysis • Poorly designed applications do not provide a good basis for designing services (garbage in, garbage out)
METHOD 8: INFRASTRUCTURE	
Description	Technical infrastructure forms the division between services
Pros	<ul style="list-style-type: none"> • None, only to be applied if there is no other way
Cons	<ul style="list-style-type: none"> • Services become dependent on their underlying technology
METHOD 9: RESPONSIBILITIES	
Description	This is not a real method. In fact, it is applying the principle that every service has to have an owner who is completely responsible for the service
Pros	<ul style="list-style-type: none"> • No questions exist about the ownership of the service
Cons	<ul style="list-style-type: none"> • Functional duplicates in different domains can come into life • It requires a certain maturity in the area of governance that is still lacking in many organizations
METHOD 10: NON-FUNCTIONAL REQUIREMENTS	
Description	Non-functional requirements define the boundaries between services (not a real method, mostly an addition to other methods)
Pros	<ul style="list-style-type: none"> • This can be the only method that makes it possible to comply with certain requirements
Cons	<ul style="list-style-type: none"> • If a non-functional requirement (e.g. performance) is an important criterion for the division of services, it may be the case that SOA is not very suitable for the organization

3 Goal-Driven Approach

The goal-driven approach [7] derives services from business goals. Traceability between IT services and business goals is provided by a Goal Service Graph. The first step consists of defining boundaries in terms of business processes. Let us say that we need to design a service portfolio for an insurance company. Its business process division is as follows: *Product Portfolio Management*, *Customer Relationship Management*, *Quotation*, *Policy Management* and *Reinsurance*. Our company has two main goals for the next 5 years, i.e. (i) *increasing customer satisfaction* and (ii) *standardizing their product portfolio*. Customer satisfaction is low because it takes a long time to process changes to a policy. Also, clients are complaining about the lack of support of self service through the Internet. The client has to contact the company by phone or mail. The second goal aims at solving the huge policy management problems that exists because the company tends to create new products for almost every corporate client. The company wants to improve its product management process and restrict the freedom of sales employees in defining their own new products.

From these two business goals we construct the Goal Service Graph depicted in Fig. 1. We decompose the business goals until we get a set of services that will achieve a certain goal. In the service allocation step we assign services to the business process division. We can map the *Calculate risk for product* and the *Check for duplicate products* services to the *Product Portfolio Management* process division. In the process of developing a new product, we need to calculate the risk involved in a certain product (mostly by statistical analysis). The second service is used in the process of adding new products to

1. Standardize product portfolio
 - (a) Migrate expired policies to new standardized products based policies
 - *ConvertPolicy*
 - (b) Apply strong product management
 - *Check for duplicate products*
 - *Calculate risk for product*
2. Increase customer satisfaction
 - (a) Decrease change processing time
 - *Search for policy*
 - *Calculate effects of change*
 - (b) Enable self service through the Internet
 - *Request quotation*
 - *Request policy*
 - *Change policy*

Figure 1: Goal Service Graph [8]

the portfolio to decide whether it is sensible to start working on a new product.

4 Component-Based Approach

The component-based approach identifies “chunks” of IT functionality with maximum cohesion and minimal coupling. These components interact by calling each other’s services. Usually, it uses process models and business object models as input. Several variations of this method are available. In this white paper we focus on BCI-3D [2, 1]. This method uses clustering algorithms to automate the service identification process. It comprises the following phases:

- **Enterprise Ontology Modeling**
During this phase the business models are constructed. Usually, they are modeled by applying the Design & Engineering Methodology for Organizations (DEMO) [4]. This is, however, not required; other methods, like ARIS, can also be used for business modeling.
- **Relationship Weight Definition**
As an input for the algorithms the weight between the different modeling elements need to be defined. BCI-3D takes into consideration the following relationship: relationships between business process steps, relationships between business objects, and relationship between business process steps and business objects. In practice these weights are based

on architectural principles. An example of such a principle is “information objects with a parent-child relationship should reside in one component”. This principle would result in a very high weight for the relationship between information objects having a parent-child relationship.

- Application of Clustering Algorithm
Finally, an algorithm is applied. This algorithm starts with a pre-defined solution and generates better solutions through iterations

Let us assume that the clustering algorithm defines payment management and policy management as components. In that case ‘Commission Payment’ could be a service offered by the payment management component to the policy management component, because this policy management component needs to issue a commission payment to an agent after a policy binding.

5 Conclusions

In this white paper we have presented a summary of previously published work on ten methods that can be used for service identification. We have explained two of them in more detail, i.e. the goal-driven approach and the component-based approach. Also, we have given some examples of identified services using an insurance case example. This paper only showed some highlights of our scientific research, written for a broad audience. For a more thorough insight into the methods, we suggest to read the following publications by Antonia Albani [1, 2, 5, 6] and Linda Terlouw [8] or to contact us to discuss our training and consulting offerings.

References

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Related offerings

Service Identification Overview Course

If you want to learn more about the basics of service identification, ICRIS proposes to follow the service identification overview course. The course starts out with an explanation of the global services design process and the role of service identification in this process. Then the participant will get familiar with several methods for service identification, which they can immediately apply to a real-life case.

BCI-3D Course

If you are an experienced modeler and want more in-depth information about identifying services using a component-based approach, ICRIS proposes to follow the BCI-3D course. BCI-3D is short for Business Component Identification - A Three Dimensional Approach. This method is developed by the Delft University of Technology (The Netherlands) together with the University of Augsburg (Germany). It is applied by several companies. Depending on the experience of the participants DEMO, ARIS or another business modeling method can be used as a starting point.

Service Portfolio Assessment

If your organization already has a service portfolio, ICRIS can perform an assessment on it to determine its quality. ICRIS applies its service portfolio maturity model, checks for common pitfalls, and gives advice on how to proceed.

Contact details

ICRIS B.V.

Martinus Nijhoffhove 2
3437 ZR Nieuwegein
The Netherlands

Phone: + 31 62 438 09 62
Fax: + 31 30 604 79 89