

Service Description in Business Value Networks

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Abstract. Service description is an important issue for service platforms. It is the base for discovery, composition, monitoring, and replacement of services. Current approaches focus mainly on functional service description, while non-functional properties are rarely considered. In this paper we argue for the need of a service description framework enabling a holistic view on services to support the management of the full service lifecycle. A focus will be put on service monitoring. We will present an overview of related work in the field and identify existing painpoints. An outlook on future work will be presented at the end.

Key words: SOA, service description, non-functional requirements

1 Introduction

The Service-oriented architecture (SOA) as a base for enterprise software is currently a hot topic in the industry. One important example is SAP's Enterprise Service-oriented Architecture (ESOA) [7]. Applications are built from reusable components - services - which are stored in an enterprise service repository. Now, the idea of Business Value Networks [11] is emerging. The goal is to make services tradable. A platform should be established enabling providers of services to offer their services and make them available for service consumers. The offered services may be fully created by the provider or be built from existing services available on the platform. They can be purchased and used for building new services. Functionality for publishing, searching, composing, and monitoring is provided by the platform.

To offer services and making them tradable, it is important to describe them in such a way that potential clients can make an informed decision if the service is what they really need. Different researchers have stated that there is a strong need for service description including not only its functionality but also its non-functional properties [10, 1] such as quality of service aspects, support for legal issues (e.g. terms of use) as well as pricing and payment models for service consumption, to only mention a small selection. This could lead to improved

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service discovery and composition. When services are seen as tradable goods, as it is the case in the TEXO project, business and legal issues play a very important role. Users of the platform will need information such as how much a service costs and how they can pay for it. Will they need to subscribe to a service and pay a monthly fee or will it be possible to pay for each call. Legal aspects include issues such as conditions under which it is possible to use a service or if the user has the right to integrate the service into a new service composition where the consumed service is offered as part of the new functionality.

Once a rich description of services is available it is necessary to establish contracts between service clients and providers formalizing a set of agreed parameters for the interaction. These parameters need to be monitored during the interaction process to show if the service delivers the promised parameters. In the case of failing to do so there may be sanctions. The importance of service quality management is emphasized by [1]. The authors argue that an automatic monitoring of service properties is highly valuable for making the vision of tradable services come true.

Today's approaches to service description and monitoring are rather limited and focus on technical aspects and service functionality. Few approaches to describing non-functional properties of services exist [10, 8]. However, they have the limitation that they do not support automatic monitoring which would be needed for the vision of tradable web services.

In this paper we present an overview of the state of the art regarding service description and monitoring service properties. Shortcomings are identified. Based on that a problem statement and an approach for tackling it is presented.

2 Related Work

Traditionally, service description was based on the Web Service Description Language (WSDL)[2]. WSDL is used for describing the functions of a service that can be called, its interfaces, and input and output data types. Such a technical description has the limitation that it does not allow a machine to reason about and understand what a service does. To overcome this problem, a strong effort was put into enhancing web services with semantic technologies. The European Semantic Systems Initiative [5] bundles several research projects working within this field. One project, which is more closely related to our work, is SUPER[12]. It combines semantic service description with business process management. Within SUPER the Web Service Modeling Language (WSML) is used to semantically describe web services [4]. WSML provides the means for describing non-functional properties of a web service [6]. Within the SUPER project non-functional properties are used for service discovery. The support for business aspects is very limited, though. Legal aspects are not considered at all.

Within the Advanced Services Grid (ASG) project a framework for service monitoring was created. The work is limited to technical parameters, though. Business or legal aspects are not considered. [3] The same is true for [13] where

a semantic framework for non-functional properties of component based systems is presented. It is limited to technical aspects such as response time.

In his doctoral dissertation O’Sullivan [10] has provided a rich taxonomy for describing the non-functional properties of services. He specifically does not put a focus on web services but generalizes to any type of service in the real world. Included in his work are business aspects such as pricing and payment, security and trust issues, and availability, only to mention a view. An approach for automatic monitoring of these non-functional service properties is not provided. Nevertheless will this taxonomy form the base for our work.

A further approach for describing realworld services is provided in the Publicly Available Specification 1018 [8]. While there is some overlap with the non-functional properties presented by O’Sullivan, this approach has its focus on service description for tender offers. It is not limited to non-functional properties but also includes functional aspects. It can thus serve as a good source of inspiration for important features of tradable services.

The IEEE has provided a standard on specifying software requirements [9]. It provides a rather technical view on the problem space. Although the specification is mainly concerned with software quality and does not have a direct link to service technology, it is a good starting point and enrichment for our work.

3 Problem Statement

Many current approaches to describing services provide no or only limited support for formally describing non-functional properties of services. Some approaches provide a good starting point for service description but do not support the automatic monitoring of service properties. To the best of our knowledge, there is no suitable service description framework available, which would allow for a comprehensive service description and support the automatic monitoring of service properties. This would be needed as a base for the vision of tradable services.

In order to fully describe services, a holistic view on all its facets is necessary. An integrated framework for service description, which could provide a sound base for finding, comparing, monitoring services and finally enable trading of services, should include a description of the service’s functionality and non-functional properties with focus on business and legal aspects as well as quality of service requirements. Furthermore, there is a need to take special care in the design of such a framework to enable using it as a base for automatic service monitoring.

4 Research Approach

A number of different approaches to describing realworld services were mentioned before. These approaches need to be evaluated in more detail in order to derive the fundamental factors needed to describe tradable services. Further aspects, which are interesting for service descriptions but are not covered in existing

approaches (e.g. legal aspects, user feedback), need to be identified and added as extensions. Also, existing standards and technologies from the web service community will be taken into consideration. Based on that a service description framework will be established.

Within our project, there are a number of scenarios representing the vision of tradable services in Business Value Networks. Based on these scenarios a sample implementation of a service will be created applying the service description framework. This will serve as a first validation of the service description approach, informing the further development process and leading to refined versions of the framework. In addition we will execute a survey among technical and business people for further validation.

In the further progress of the project, the service description framework will serve as a base for a monitoring component. Since the service description will provide a comprehensive view on services it will allow for the monitoring not only on a technical level but include business level and legal aspects. Special care will be taken to allow for automatic service monitoring. It is important to state here that it is currently not fully clear which service aspects with regard to business and legal aspects can be monitored. This will be further evaluated during the course of our project. The monitoring component will be developed as a part of a service platform.

Finally, an overall demonstrator will be implemented based on the project scenarios. It will be a showcase demonstrating, among other things, the service description and automatic monitoring of service properties.

5 Conclusion and Outlook

In this paper we have discussed the problem of service description and monitoring within Business Value Networks. We have argued for the need of having a systematic description not only of functional service aspects but also including non-functional properties. An important constraint is the enablement of automatic monitoring of service properties. In our work we will focus on building the base for a service description framework enabling the vision of Business Value Networks. A comprehensive service description approach along with the ability to monitor the service properties is a key success factor for this vision.

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