Service Registry Design:  
An Information Service Approach

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ABSTRACT

A service registry is a Service-Oriented Architecture (SOA) component that keeps a ‘catalogue’ of available services. It stores service specifications so that these specifications can be found by potential users. Discussions on the design of service registries currently focus on technical issues, while service registries should take into consideration information needs of business domain users. In this regard, the authors consider service registries as information services and develop a comprehensive framework for designing service registries. This framework introduces aspects that determine a design space for service registries. In this design space, the authors identify views, requirements, processes, and means in the design of a service registry that supports the lifecycle information of a service. A vital part of these requirements is further implemented and demonstrated in a prototype built as a ‘proof-of-concept’ for the framework. This paper also discusses a case study used to evaluate the prototype. In this case study, a registry prototype has been populated with realistic services of a large insurance company, and 21 experienced IT and business professionals from a consultancy organization evaluated the prototype for its user satisfaction.

Keywords: Design Science, Information Services, Service Discovery, Service-Oriented Architecture, Service Registry, SOA Governance

INTRODUCTION

Service-Oriented Architecture (SOA) has been introduced with the promise that by offering functionality as services, business processes supported by these services can be more easily composed and executed (Papazoglou, 2008). However, a successful SOA implementation depends on various factors, like a structured decomposition of processes into services, appropriate management support, and SOA governance (Mahajan, 2006). SOA governance offers the measuring and steering capabilities that help organizations reach the objectives of their SOA implementations. A particular aspect of SOA governance involves service offerings, which should comply with organizational policies and norms. An overview of the services available in an organization should be in place, in order to avoid redundant offering of services with similar or identical functionality, or offering of services that are not relevant for any business process. Service lifecycle information is valuable for...
service developers, owners and providers and should be supported by the registry.

In SOA, a service registry is an architectural component that enables a service provider to publish service descriptions and enables a service consumer to find services based on their descriptions (Alonso, Casati, Kuno, & Vijay, 2004). Consequently, a service registry is like a ‘Yellow Pages for services’. Service registry implementations based on standards like UDDI and ebXML mainly store technical information on services by means of a flat data model with limited search capabilities (Luo, Montrose, Kim, Khashnobish, & Kang, 2006). Service registries developed according to these standards are mainly suitable for runtime service users, which are interested in interface definitions and the technologies to reach the service at runtime. However, service specifications are also supposed to be used by enterprise architects, application developers and business process engineers, amongst others (Li et al., 2009). These service registry users often need other sorts of information than runtime users, such as the service goals or business value, which correspond to meta-information about the service (Ran, 2003). Furthermore, this information is meant to be understandable for (non-technical) human users, as opposed to the more technical information supported nowadays (Samavi, Yu, & Topaloglou, 2009).

The work reported in this paper has been motivated by the opportunities offered by service registries with respect to SOA governance once these registries are properly designed, and the need to improve the methods available to design these registries.

This paper provides a framework to design and implement service registries for storing, managing and disclosing service specifications. This requires a design that addresses both the technological and business means necessary to implement service registries that are more suitable to support SOA governance than the service registries available today. We consider a service registry as a special case of an information service, which transfers information goods from suppliers to consumers. We define a design space consisting of aspects (content, use features and revenue) and layers (design problem, business, process, infrastructure, prototyping and exploitation) that are relevant for developing effective information services (Wijnhoven & Kraaijenbrink, 2008).

We consider service registries as information services in order to enhance the satisfaction of the consumers of service specifications. We test the validity of our framework by:

1. Assessing the feasibility of designing useful service registries with this framework. Other approaches could be used for designing service registers, but we believe that by considering service registries as information services we can obtain registries that offer the highest value for their users. This is because the service design theory forces the designer to systematically include the actual business requirements in the service registry design and to consider the actual value of the information goods (service specifications) that a service registry is expected to deliver to its users.

2. Assessing the relevance of this approach by solving a concrete real life problem with a service registry in a case study. This is achieved by building a service registry prototype as a proof-of-concept that supports part of the aspects covered in our framework.

3. Performing a utility test in which registry users provide feedback by scoring their user satisfaction with the service registry prototype.

These steps correspond to the generate-test cycle (Hevner, March, & Park, 2004), as shown in Figure 1.

Furthermore, we evaluate our results against design science guidelines of Hevner et al. (2004), such as artifact construction (we define a design methodology and build a concrete service registry), relevance (we address real-life problems) and utility (we test our results). We also contribute to design foundations
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