Capability as a Service: 
Method and Tool Support for Context-Aware Business Services

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ABSTRACT

Modern enterprises have to respond to the challenge of changing competitive situations by being able to adapt their business models and the supporting IT systems. Service-orientation and cloud computing offer established approaches for achieving flexibility in the use of computing resources and sourcing strategies. This requires promoting systematic development and management of capabilities to key activities. To ease the adaptation of business services to changed business needs a complementary abstraction layer, namely, “Capability as a Service” (CaaS) should be considered. The primary purpose of this layer is to support the capture and representation of the factors that are decisive for flexibility in business services. The main contributions of this paper are (1) motivating the additional capability-focused abstraction layer by an industrial application case, (2) the concept of CaaS including methodical aspects and technology for delivery, and (3) an initial model of capabilities for the industrial application case from utilities sector.

KEYWORDS


INTRODUCTION

In industrial areas and service sectors with highly dynamic market requirements and changing competitive situations enterprises have to be able to quickly adapt their business models and the supporting information systems (IS). From a business perspective, systematic development of core competencies and management of business capabilities have been identified as promising approaches to facilitate organizational flexibility. From an IT perspective, service-orientation and cloud computing offer practicable approaches to achieve more efficiency in the use of computing resources and more flexibility with respect to sourcing strategies. Model-based development and IT governance are approaches to support better alignment of business and IT in order to adapt the provisioning of IT for business needs.

In this paper, which is based on earlier work published in (Sandkuhl et al., 2014), the focus is on a specific aspect of service orientation and cloud computing architectures, namely, how to ease the adaptation of business services to changed business needs. From a methodical perspective, the...
authors propose to not only consider the specification and implementation of business services but also to explicitly analyze their delivery contexts. The aim is to capture the factors that are decisive for flexibility, dynamics, and variability in business services by modeling both, the service and the context. As a contribution to achieve this aim, the authors argue that an additional abstraction layer should be considered in cloud computing, namely, the layer of “Capability as a Service (CaaS)”. It should be seen as a complementary layer to “Business Process as a service (BPaaS)”. The term capability is used in various industrial and academic contexts often with somewhat different meanings. However, most conceptualizations of the term share a common trait that capability denotes the ability of doing something (know-how, organizational preparedness, appropriate competences) and the capacity for the actual delivery of that in a certain application context. The systematic management of the capabilities of an enterprise, which has to include the business services offered to clients and the IT services implementing them, is increasingly considered as a key activity for achieving efficiency. To this end, a methodology focusing on capability design and delivery has been proposed under the name of Capability Driven Development (CDD) (Bërziša, Bravos et al., 2015).

The main contributions of this paper are (1) an industrial application case offering Platform, Software and Business as a Service and motivating the additional capability-focused abstraction layer, (2) the concept of Capability as a Service including the CDD methodology aspects and technology for delivery, and (3) an initial model of capabilities for the industrial application case. These contributions advance the state-of-the-art in capability management by proposing and evaluating an approach (the CDD methodology) that explicitly separates the context of business services from the actual services. This new approach eases adaptation to changed business needs and allows for “capabilities as a service”.

The remainder of the paper starts with a brief discussion of related work followed by the research approach and an industrial application case from the utility sector. This case focuses on business process outsourcing (BPO) and motivates the shift from business processes towards capabilities. Subsequently, context-based business processes and the CDD methodology are presented. An example for a capability design in the industrial application case follows, which includes context model and business service. The final two sections summarize the evaluation results as well as provides concluding remarks and outlook on future work.

**RELATED WORK**

The work at hand considers cloud computing architectures, capability management approaches as well as context modeling as most relevant areas to the development of CDD. They are discussed in this section.

**Cloud Computing Architecture**

Cloud computing has established itself as distributed computing infrastructure for rapid delivery of computing resources in a dynamic and virtualized way. The basic aim is to make better use of distributed resources and to orchestrate them to achieve a higher throughput and better scalability. Architectures of cloud computing are often described in a layered manner with different categories of cloud services, see, e.g. (Rimal, Choi, & Lumb, 2009), provided to the service user (consumer). A selection of frequently used service layers is:

- Infrastructure as a Service (IaaS) provides technical infrastructure components including processing, storage and networks. The consumer can use IaaS for deploying and running operating systems and applications on the provisioned resources.
- Platform as a Service (PaaS) enhances IaaS by adding operating systems, application server, database management systems or other platforms and tools that give the consumer the possibility to deploy and run own applications.
Fault Tolerant Architecture to Cloud Computing Using Adaptive Checkpoint
www.igi-global.com/article/fault-tolerant-architecture-cloud-computing/60409?camid=4v1a

Identification of Vulnerabilities in Web Services using Model-Based Security
www.igi-global.com/chapter/identification-vulnerabilities-web-services-using/43977?camid=4v1a