A service-oriented approach for the *i** Framework[1]

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Abstract. The *i** modelling framework is widely used for organizational modeling. The framework focuses on strategic relationships between actors in order to capture the social and intentional context of an enterprise. Nowadays, many research projects exist that use the *i** framework in different applications domain. However, despite well-known theoretical advantages of the *i** modeling approach, there are certain issues that still need to be improved to assure their effectiveness in practice. In this paper, we propose a service-oriented approach in order to address the detected weaknesses of *i**. The business services can be used as the basic granules of information that allow us to encapsulate a set of *i** business process models where actors participate in actor's dependency networks through interfaces defined in the business service specification.

1. Introduction

New application areas such as e-Business, application service provision and peer-to-peer computing all call for very complex software systems which effectively support "on line" enterprise processes. To build such systems, practicing software engineers are discovering the effectiveness of using organizational modeling techniques for facilitating the elicitation of requirements for organizational information systems and also for guiding and supporting the software production process.

In this context, the *i** Framework is one of the most well-founded organizational modeling techniques today. In this framework, the focus of the modeling activity is placed on: a) the representation of the social and intentional relationships among the network of actors of an Enterprise, and b) the representation of the internal behaviors required to satisfy actor's dependencies. The *i** Framework supports the description of organizational networks made up of social actors that have freedom of action, but that depend on other actors to achieve their objectives and goals.

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The *i** modeling concepts have been used in a wide range of application domains. In all applications, *i** concepts have been used to capture social and intentional elements of each specific domain, thereby supporting software development. However, even considerable research has been devoted to use the *i** concepts of very different domains, less attention has been paid to propose mechanisms to manage the complexity of the modeling activity and for improving the usability and scalability of the *i** models

In this way, despite the advantages of the *i** modeling approach, there are certain issues that still need to be improved to assure their effectiveness in real-life case studies. Solutions for these weak points are proposed in this research work as an initial response to the results of a previous empirical evaluation [1]. This research work explores the use of a service-oriented architecture for the *i** Framework in order to give a partial solution to the detected problems. To make the practical application of the service-oriented approach possible, this work presents the definition of the conceptual modeling language, the service-oriented architecture and the modeling method associated with the service-oriented proposal.

2. Objectives of the research

As main conclusion of previous practical evaluations of *i**, what is clearly requested is the need to extend the *i** framework with mechanisms to manage granularity and refinement in real-life projects. These mechanisms must allow us to create and represent an organizational model in a modular way. As solution to this problem, in this research work we have introduced a method that deals with the current drawbacks of *i**. Our proposed solution is founded on the concept of business service as a high-level concept that encapsulates fragments of an organizational model as composite business processes.

The main idea of this proposal is the representation of an organizational model as a composition of business services, where these services represent the functionalities that the organization offers to potential customers. In this context, the business services become the basic building blocks that allow us to represent a business model in a high-level, three-tiered conceptual architecture. Business services, business processes, and business protocols are the hierarchically interrelated three tiers that compose our service-oriented architecture.

In the proposed approach, the organizational modeling process starts with the definition of a high-level view of the services offered and requested by the organization. Each business service is then refined into more concrete process models according to the business service method introduced in this research work. The main advantage of this proposal, is that it provides a solution to manage granularity, refinement and reuse in the *i** Framework.

The aim of this proposal was to attempt to make the modeling process simple by making the social an intentional characteristics of *i** hidden for novel analysts, at least in early elicitation stages [2]. In order to do this, the proposed method uses a well-known elicitation mechanism, such as goal analysis, to construct a goal structure that is built in such a way that contains the organizational knowledge without explicit

social relationships. Thus, a method has been proposed as part of the service-oriented method in order to transform the goal structure into an *i** strategic models

We argue that expressive power of the conceptual primitives that we have introduced in the *i** Framework enables the analyst to the better managing of the complexity of organizational modeling in practice.

Furthermore, the proposed method makes it feasible to use *i** as the starting point for a full software production process. In this process, the elaboration of the organizational model can be the cornerstone of the software process, because requirements modeling and conceptual modeling will be the result of a precise model transformation process where organizational aspects are correctly represented in the corresponding lower-level models. Given the advanced model-based software production tools that currently exist on the market, having extended tools to support a full software process that covers all the activities from organizational modeling to its corresponding final software product can become a reality [3][4].

3. Contributions

One of the main contributions of this work is the definition of a new methodological approach to address the enterprise modeling activity using *i**. The new approach is based on the use of building blocks for encapsulating organizational behaviors through the concept of business services.

In the context of the definition of the service-oriented modeling language, one of the contributions is the analysis of the current *i** modeling concepts in order to propose a revisited version of the concepts according to the proposed service-oriented architecture. The proposed modeling language overcome some of the problems that were detected in the empirical evaluation concerned with the current definition of the *i** modeling concepts.

Our research work proposes a specific modeling method according to the concept of business service. As a key point of the method, we proposed an extensive use of goals structures as an elicitation mechanism instead of starting the modeling process directly with the intentional concepts of *i**. The idea of hiding the intentional characteristics of *i** (at least in early elicitation stages) is to make the method more suitable for non-expert analysts in the use of *i** concepts. Therefore, another contribution of this work is the definition of a method to derive the goal refinement structures into the strategic models of the *i** framework in an automatic way. This proposal, that joins a goal-based elicitation process with the social aspects of the *i** strategic models, represents one of the contributions of this work over the current goal modeling techniques.

4. Conclusions

The *i** modelling framework is widely used for organizational modelling. The framework focuses on strategic relationships between actors in order to capture the

social and intentional context of an enterprise. This paper presents our work on improving *i** as a business modeling technique based on a service-oriented approach.

Our solution is founded on the concept of a Business Service Architecture where encapsulated organizational units can only participate in actor dependency networks through well-defined interfaces. Our research work is based on the hypothesis that it is possible to focus the organizational modeling activity on the business services offered by the enterprise to their customers. Following this hypothesis, the proposed method provides mechanisms to guide the organizational modeling process based on the business service viewpoint. The proposed service-oriented architecture for the *i** framework permits that the monolithic structure of the *i** strategic rationale model can be broken down into several business services. The service are the building blocks that encapsulate a set of *i** business process models. This should help *i** to be successfully applied in real-life, complex projects.

5. Future work

With the proposed modifications made in this work, our intention is to overcome the current limitations that practitioners face when using *i** in its current state. In fact, these modifications are intended to both solve the problems that were detected and to make the practical application of the method easier. It is certainly necessary to evaluate whether these conclusions can be generalized in practice, making this the direction of our future work.

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