Towards a Meta Model for Distributed Business Transactions

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The use of standards to support the electronic execution of parts of a business transaction could provide substantial benefit. However, underestimating the need to evaluate the fit between the business requirements and the capabilities of a standard to meet these requirements (at an early stage of a standard implementation project) can lead to problems and even project failure. Currently there is little research on how to evaluate this fit.

In this paper we propose to create a meta model to evaluate the fit between the business requirements and the characteristics of a standard. The meta model is to be used at an early stage of a standard implementation project and aims to facilitate early problem identification.

We describe the approach followed to construct the meat model. The actual construction of the meta model will be a subject of further research.

1. Introduction

The idea to support the electronic execution of parts of a business transaction[1] started more than 30 years ago with the introduction of EDI, followed by the development of the EDIFACT and X.12 standards. When disparate applications take part in a business transaction, we will refer to that business transaction as distributed business transaction or DBT. EDI standards promised significant advantages in facilitating the execution of DBTs by reducing errors, increasing speed, cutting cost, and building in competitive advantage (Wrigly et al., 1994; Jelassi & Figon, 1994, Sokol, 1995), even though for small and medium size companies, due to the high implementation costs, it was often no solution. However, in many EDI projects the focus was on how to provide technical tools, rather than to support the way people do

[1] We define a business transaction as an exchange of goods or services

business (Huang, 1998; Covington, 1997) and little attention was paid to business requirements. In the area of requirements engineering it is argued that mistakes made in an early stage of a project, due to poor requirements elicitation, can lead to serious consequences afterwards (Yu, 1997; Gustas et al., 1996).

The Internet promised new opportunities, providing interconnectivity at a lower costs and allowing also small and medium size companies to participate in the electronic exchange. To overcome some of the limitations of the EDI standards, new standards are currently developed. They serve different purposes while attempting to provide for interoperability. EbXML, for example, aims at providing an open, XML-based *infrastructure* to enable the global use of electronic business information. The UBL standard strives to support cross-industry business communication, using standard electronic business documents and standard cross-industry vocabulary. Other domain standards try to cover the more complex domain specific business communication in terms of process, content and data (RosettaNet, HL7).

However, in order to provide value for a specific business situation, a standard needs to be evaluated to what extent it could support the requirements of a specific business transaction. Failure to perform this evaluation at an early stage of a standard implementation project can lead to problems at a later stage. However, there is little or no support on how to evaluate the fit between business requirements of the situation and the characteristics of a selected standard.

In this paper we aim to outline an approach for the development of such a support tool for the identification of the fit between the business requirements and the characteristics of a standard. This support tool is intended for use at the requirements stage of a standard implementation project. Since direct comparison between the business requirements and the characteristics of a chosen standard is hard, due to the fact that they are expressed in very different terms, we propose to construct the tool in the form of a meta model to facilitate that comparison. The paper is therefore concerned with *how to construct a meta model to facilitate the identification of the fit and the possible mismatches between the business requirements and the solution provided by a standard?*

Part 2 of the paper describes the approach for the meta model construction. The conclusions and further research directions are outlined in part 3.

2. Towards a Meta Model for Distributed Business Transactions

2.1. Meta Models

The advantages of using meta models are widely discussed in literature (see Kiewiet & Stegwee, 1991; Slooten & Brinkkemper, 1993). For our particular case the main advantage of using a meta model is that it will help to reduce complexity, and will provide a common ground for comparison. Since both the business requirements and the standard are concerned with aspects of a DBT, the focus of our meta model will be to cover elements of DBTs.

2.2. How to Build a Meta Model for DBT?

To construct the meta model for DBTs we will use three different inputs, to ensure that we have several reference points to check the findings. We will extract elements of DBTs from theory, standards and practice.

Elements from Theory. We will define the elements of DBTs, looking at the concept of a business transaction from different perspectives. From a philosophical point of view we take the conventionalist stance that business parties need to reach a minimum set of agreements before starting a business communication (they need to agree on the goal of the communication, the meaning of what is communicated and the intention behind it). Furthermore, we will explore the concept of a business transaction from strategic (Porter,1995), economic (Willamson, 1979; McCarthy, 1982) and communicative action (Austin, 1962; Flores & Winograd, 1987) perspective. Based on the findings, the first version of the meta model will be constructed.

Elements from Standards. To extract elements from standards we will analyze different DBT. We will look at a number of standards that relate to a particular business transaction. For each standard we will identify (on a conceptual level) which elements of a DBT it covers. Then, we will describe these elements on a meta level. The meta model will be improved based on the new findings.

Elements from Practice. To identify elements of DBT from practice we will conduct case studies. We will conduct a case study where a standard implementation project has been carried out to automate part of a DBT. We will look at the problems that occur while using the solution provided by the standards. This will give an indication of elements of DBT that had to be, but were not covered by the standard. We will then describe these elements on a meta level. We will do that for a number of DBTs by looking at different cases. The meta model will be improved based on the findings.

The actual construction and validation of the meta model is not a subject of this paper. It is the aim of our further research.

2.3. How to Use the Meta Model for DBT

The meta model should be seen as a communication tool to facilitate and guide the discussion between the different stakeholders in a structured way. As the meta model will address elements of DBT, by walking through the meta model, the stakeholders will have to negotiate and express the business requirements in terms of the meta model. By walking through the elements of the meta model and reasoning about a specific standard, an evaluation of the standard can be made and its characteristics can be expressed again in terms of the meta model. Since both the business requirements and the characteristics of the standard will be expressed in the same terms, a comparison can be made. A mismatch will signal that there will be business requirements that will not be covered by the standard.

3. Conclusions and Further Research

At the beginning of this paper we pointed out that mistakes made at the requirements stage of a standard implementation project could lead to problems and even project failures. We pointed out that, at the requirements stage, little attention is paid and little support is available on how to evaluate to what extent a standard can meet the specific business requirements. We proposed to construct a meta model to be used to help identify the fit between the business requirements and the characteristics of a chosen standard. A mismatch between the business requirements and the characteristics of a standard will signal potential problems. An early identification of these problems can have an effect on the project time and cost and quality.

Our further research will be devoted to the meta model construction and testing.

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