Ontology Driven Business Processes Integration – a Position Paper

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1. Introduction

The aim of this paper is to describe our position in relation to the use of ontologies. We will present our research in the areas of health care processes, B2B integration, and web services. The paper will briefly introduce our work in those areas and we will pose our stand as to how ontologies relate to and can be used in those two areas of application. Hence we wish to focus our work towards the practical application of ontologies.

2. B2B integration

Our areas of research involve business to business integration and the potential use of ontologies to remedy some of the problems that we outline. In order to set the scene we will briefly introduce the important themes in our research efforts: business processes and standards. We will also relate these concepts to each other.

A business process is a partially ordered set of action types that has been designed in order to deliver some kind of value to someone, e.g. to receive and fulfill a customer order

A business is a collection of business processes that have been activated within a certain organizational context in order to achieve some purpose, e.g. to conduct some kind of enterprise.

2.1 Standards and process integration

A B2B standard is defined as guidelines for how communication and information sent between companies should be structured and managed. Firstly, a standard can be referred to as an approved model, to be used for comparison or judgment, and of established authority (Information Services, 2001). Secondly, a standard can be defined as a document that provides guidelines or characteristics for activities or their results (ISO-IEC, 1996). There are a number of other concepts used in relation to standards. In order to bring clarity to what the relationships between these concepts

are, we will present them in a concepts model (Figure 1). A standard is made up of a number of specifications. A *specification* is most commonly defined as a thorough, concrete document of requirements and definitions of a certain item (Information Services, 2001).

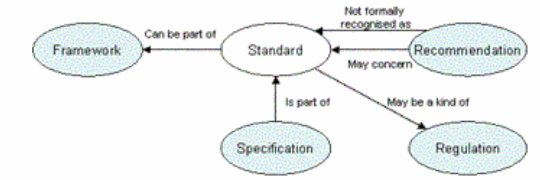

Figure 1: Concept model of standard and related concepts

Standards may also be part of a more general framework. *Framework* can be defined as a skeletal structure for several parts that combined make up an item or the solution for a problem (Information Services, 2001).

2.2 Process integration in the health care sector

The health care sector is an example of an application area where the there exists numerous interoperability problems to resolve. The VITA Nova project .(Wangler et al., 2003) is focusing on the patient process, and includes the communication between the healthcare providers and healthcare units. The goals of the VITA Nova project are to develop a methodology for and to investigate the potential of an IT architecture based on process manager technology. Like most businesses of today, healthcare is functionally organised in e.g. primary care units, hospitals, and home healthcare units; each with its own more or less isolated information systems.

More precisely, these systems are characterised by the fact that they: firstly, support single organisational functions very well, but with little adaptation to a process oriented way of viewing things, i.e. where the intra- and inter-organisational processes can be efficiently co-ordinated; and secondly, have been created at widely differing points in time and hence by using different development paradigms, and by using different software and hardware platforms.

In this context we identify an interoperability problem in terms of orchestrating the different and heterogeneous parts of this process. The *healthcare process* is a partial order of manual tasks, which are performed by human actors and based on (business) rules, decided by the healthcare units. Examples of manual tasks are treating a patient, or using a computer.

A new type of process oriented integration architectures has been developed by means of what may be referred to as process managers, which closely reflect the business processes. These are software devices that visualise the integration by means of graphical and easy to understand process models that also facilitate management and monitoring of the processes and their integration requirements. A process manager visualises, manages and executes the communication between IT systems and human actors (Linthicum, 2001). In that way it is possible to study, model, simulate

and change the communication by using a graphical interface against process models (Dayal, 1999).

Although not yet finished, the VITA Nova project already offers important insights concerning healthcare processes and the potential benefits of using process manager technology for systems integration, for facilitating data transfer between healthcare providing organisations, and for streamlining the patient process in general.

3. Our Position Statement

In this section we will present our research intentions in relation to the use of ontologies. We are interested in applied ontologies, more specifically in the areas of health care and B2B standards. In particular we aim at developing methodologies for the integration of IT support. We pose the following questions: 1) In what ways can ontologies aid business process integration in the health care sector? 2) In what ways can enterprise modelling contribute to the evolution of ontologies which are useful in the context of business process integration in the health care sector?

In a broader sense, we aim to direct our efforts in the area of B2B standards. We pose the following questions: 3) What (kinds of) ontologies, if any, are used in the development of B2B standards, and what role do they have in this development? 4) What role can ontologies play in the development of B2B standards? 5) What type of tools are useful in the planning of B2B standard implementation?

One purpose and a main advantage of having B2B standards is that they facilitate a common language (Söderström, 2004)[1]. If such a language is to become a reality, it needs to be based on a common ontological basis.

The implementation process for B2B standards is complex, with many links to adjacent processes in the standards life cycle, and several potential problems that may occur. Many organisations have a very little knowledge about standards and how to use them. Successful implementation is a pre-requisite for a successful use of standards and technology. A tool for assisting organisations in planning for their implementation projects may therefore be valuable to increase the likelihood of implementation success, and to raise the level of knowledge about standards in organisations.

We propose the use of participative enterprise modelling as a powerful instrument when negotiating enterprise concepts and processes. There are standardisation efforts for certain parts of the health care sector. One such example is the VIPS standard for health care documentation. However, we foresee problems when trying to agree on such standards. From a national point of view we only see the possibility of creating high level agreements. On the operational level we rather anticipate bilateral agreements, which obviously have to be negotiated between the parties involved. It is in this context that we find enterprise modelling efforts crucial.

In the Eriksson and Penker methodology (Eriksson and Penker, 2000) methodology, the enterprise model corresponds to four modelling views: the *Business Vision View*, the *Business Process View*, the *Business Structure View* and the *Business Be-*

[1] www.serviam.se

haviour View. Each view comprises a set of modelling (diagramming) techniques adapted from UML. The views get more technical as the modelling proceeds. The goal of modelling the four views is to capture and describe the collective intention of the software service stakeholders. The process of doing this is further described in Wangler et al. (2003).

In particular, software development practitioners claim that EM is effective for gathering business needs and high-level requirements. In the participative approach to EM, the stakeholders in question collaboratively develop Enterprise Models in facilitated group sessions. This type of participation is *consensus-driven* in the sense that it is the stakeholders who "own" the model and hence decide on its contents. In contrast, *consultative* participation means that analysts create models and that stakeholders are then consulted in order to validate the models. The participative approach to EM is described and discussed in Wangler and Persson (2002)

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