Chapter 1
Collaboration Across the Enterprise:
An Ontology Based Approach for Enterprise Interoperability

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ABSTRACT

In the current competitive industrial context, enterprises must react swiftly to the market changes. In order to face this problem, enterprises must increase their collaborative activities. This implies, on the one hand, high communication between their information systems and, on the other hand, the compatibility of their practices. An important amount of work must be performed towards proper practices of standardization and harmonization. This can be defined as the concept of interoperability. Interoperability of enterprises is a strategic issue, caused, as well as enabled, by the continuously growing ability of integration of new legacy and evolving systems; in particular, the context of networked organizations of the reconciliation of the communicated business semantics is crucial to success. For this, nondisruptive reuse of existing business data stored in “legacy” production information systems is an evident prerequisite. In addition, the integration of a methodology, as well as the scalability, of any proposed semantic technological solution are equally evident prerequisites. Yet on all accounts current, semantic technologies as researched and developed for the so-called Semantic Web may be found lacking. Still, semantic technology is claimed about to become mainstream, as it is promoted by enterprise interoperability needs and increasing availability of domain specific content (for example ontologies) rather than pulled by basic technology (for example OWL) providers. In this chapter, we will present a methodology, which has resulted in the implementation of a highly customizable collaborative environment focused to support ontology-based enterprise interoperability. An additional key issue addressed by the particular platform is the variety and number of different resources that concur to achieve a cross-enterprise business service. A second key issue is the diversity of agreed (e.g., meaning negotiation when creating online contracts) models, and the difficulty in adapting its integrated features and services to different

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situations. These problems are addressed with a flexible solution, avoiding rigidity that occurs in the implementation and maintenance of existing cooperation platforms and their integration with an advanced semantic repository. The proposed platform operates at two levels: at the front end, it enables the end users to access seamless collaborative (e.g., synchronous, asynchronous, and semisynchronous), as well as individual mode tools and services to extract valuable information; at the back end, it uses a sophisticated ontology framework to support and record the collaborative work, enhancing interoperability among different enterprises and other service providers.

INTRODUCTION

Collaboration and knowledge sharing have become crucial to enterprise success in the knowledge-intensive European Community and the globalised market worldwide. In this market the trend in innovation of products and services is shifting from mere production excellence to intensive, collaborative and meaningful interoperability (De Leenheer & Meersman, 2007).

Industry and especially SMEs in Europe are under great pressures due to the increasing competition from the global market. Large companies can react by setting-up subsidiaries around the world. However, SMEs have to concentrate on setting-up cooperation and collaborations within the global market. Increasingly global supply chains are being established. Industry engaged in this cross regional supply have to handle costs, quality, trust, transactions etc. in efficient way to be competitive and at the same time be attractive for possible collaboration partners. Consequently, collaboration methods and tools have to be developed and adapted for Enterprise demands to reduce the costs for, and to handle, the worldwide collaboration processes supporting knowledge availability, persistence and sharing focusing on reducing interoperability costs in the Enterprise and collaborative business processes.

An important challenge at this point is to understand each other on different levels. This is difficult using the same language and within one culture but it becomes extremely critical between very different cultures, languages, industrial traditions, tools, laws and business rules. This constrains possible fruitful co-operations between organizations.

Enterprise modeling is used today mainly by large enterprises to clarify, analyze and implement business processes. Enterprise modeling is intended to achieve a common understanding across stakeholders. It enhances the stakeholder understanding of the co-operation however, the EM delivery need enhancing, perhaps with advanced conferencing technologies.

The availability of natural resources becomes more and more critical for the future of an enterprise, and the whole product life cycle becomes more and more the focus of interest. So interoperability is not only required in the workflow between companies during the production, but it also is a prerequisite for the whole Product Life Cycle Support (PLCS) between the various enterprises involved.

The technical support of business will be realized with the integration of smart agents/services creating the required connection between enterprises. The connections are built to meet business demands. Knowledge about, and of, enterprises will be used to facilitate interoperability dynamically during cooperation (might be temporary) e.g. a knowledge profile of an enterprises might be provided in a standard way describing which knowledge services are available as well as the conditions to access these services. Visual, easy understandable enterprise models, bridging