Chapter 31

Semantic Alignment of E-Business Standards and Legacy Models

Janina Fengel
University of Applied Sciences Darmstadt, Germany

ABSTRACT

For decades, companies have been sharing data electronically. Especially the popularity of the World Wide Web has helped e-business to develop further. Nevertheless, integrating business in and between enterprises often still requires extensive manual preparations. The basis for engineering businesses is their comprehensive and accurate description. Support is often provided by e-business standards offering guidelines for describing business data and logic and through the use of models. However, caused by the use of differing modeling languages and the multitude of the e-business standards available, the adoption of a standard still is a major effort. Aligning a company’s legacy models to one or even more standards’ specifications often involves extensive manual work for semantic analysis and the search for semantic correspondences. For easing this workload, in this chapter it is suggested to apply semantic technologies and a method presented developed in providing automated support for the semantic alignment of models and standards.

INTRODUCTION: ENGINEERING E-BUSINESS

Already for many years the operation of electronic transactions between market partners can be performed electronically. Thereby, the realization of e-business in the broadest sense is understood as the initiation and processing of business transactions supported by IT (IW, 2008b, p. 3). Both intra- and inter-organizational business processes are automated and executed over computer mediated networks, facilitating digital data exchanges and processing (European Commission, 2008b, p. 9). The goal is to optimally managing relationships...
Semantic Alignment of E-Business Standards and Legacy Models

with customers, suppliers and business partners in today’s dynamic, complex and competitive markets. The enablement of processing transactions such as procurement and sales electronically allows to access, provide and share information in business networks on a global level (European Commission, 2008b, p. 9).

However, usually extensive initial efforts are required for mapping information structures and their contents as well as for agreeing on the sequence order of the business document exchange required for executing market transactions. Very often this needs to be done by humans for each individual business relationship. For easing this task, numerous differing e-business standards have been developed for describing products and services, documents or business processes. These standards provide agreed-upon terminology and formatting rules for describing sequences of business activities and the subsequent information exchange. Depending on their orientation, it can be differentiated between technical and business standards (IW, 2008b). The latter are of interest for engineering the business. In this, e-business standards serve as conceptual models. They are developed as a means to providing common guidelines for business design and its description and thus ultimately as a means to interoperability enablement (UNECE, 2010). Usually, adhering to a standard provides support for formatting and naming business information and in this choosing commonly understandable designations for the domain specifics. Harmonizing processes, procedures and information flows lays the groundwork for facilitating national and international transactions (UNECE, 2010).

However, in the course of market transactions, different information is being communicated at different points in time. Product specifications, catalogues, requests, offers, orders, delivery notes and invoices are to be exchanged in a certain order. Business processes describe the flows of activities required to be performed for conducting a market transaction and the exchanging or sharing of the various information required, while data specifications or models describe the information involved.

Unfortunately, for describing such information and processes, often several differing e-business standards for the same purpose exist. Furthermore, next to official standards, also various proprietary standards are presently in use. As a result, not only various dissimilar standards are available for formatting information and describing business conduction protocols, but are even used in parallel. Even the exclusive usage of public e-business standards cannot solve the problem, as the multitude of standards available and actively in use at the same time moves the question of interoperability only onto a higher level (Rebstock, Fengel, & Paulheim, 2008, p. 64ff). Hence, despite the development of e-business standards, the integration of business processes and business information is still a non-trivial issue, as business partners often use different e-business standards or their own individual language for describing their processes (Fengel, Paulheim, & Rebstock, 2009). Therefore, caused by this heterogeneity, seamless interoperability without preparation efforts is not yet in sight.

Nevertheless, enterprises need to be able to couple their business processes and exchange business information dynamically without huge preparation efforts. Over the last decades, the usage of models for describing data, processes and organizations has become an indispensable means. Nowadays, process and data models are the basis for engineering and managing e-business processes and the subsequent IT-support. These already existing models are actively in use and can therefore not be easily amended according to each individual business relationship’s requirements or to each upcoming of another standard. Therefore, aligning a company’s legacy models to the various standards in use for establishing similarities and discrepancies helps in identifying commonalities and correspondences (Fengel & Rebstock, 2010a).

Based on the outcome of such an alignment, the necessary next steps for preparing the electronic