Chapter 3.18
Ontologically Enhanced RosettaNet B2B Integration

Paavo Kotinurmi
Helsinki University of Technology, Finland

Armin Haller
National University of Ireland - Galway, Ireland

Eyal Oren
Vrije Universiteit Amsterdam, The Netherlands

ABSTRACT

RosettaNet is an industry-driven e-business process standard that defines common inter-company public processes and their associated business documents. RosettaNet is based on the Service-oriented architecture (SOA) paradigm and all business documents are expressed in DTD or XML Schema. Our "ontologically-enhanced RosettaNet" effort translates RosettaNet business documents into a Web ontology language, allowing business reasoning based on RosettaNet message exchanges. This chapter describes our extension to RosettaNet and shows how it can be used in busi-ness integrations for better interoperability. The usage of a Web ontology language in RosettaNet collaborations can help accommodate partner heterogeneity in the setup phase and can ease the back-end integration, enabling for example more competition in the purchasing processes. It provides also a building block to adopt a se-mantic SOA with richer discovery, selection and composition capabilities.

CURRENT SITUATION

Information and communication technologies are increasingly important in the daily operations of organisations. In the current networked business

environment most information systems need to interoperate with other internal and external information systems. Such interoperation is not easily achievable and therefore causes significant costs. For example, Brunnermeier & Martin (2002) studied interoperability in the U.S. automotive supply chain and estimated the cost of poor interoperability in product data exchange alone to be around one billion dollar per annum.

Standards such as RosettaNet or ebXML facilitate Business-to-Business (B2B) integration (Shim et al., 2000). These standards support electronic commerce over existing Internet standards and lead to cost and extensibility benefits. The aim of B2B standards is to facilitate integration with less implementation effort for each e-business partner organisation. Many B2B standards employ XML technologies and the Internet to standardise document exchange and ease the implementation effort of collaborations (Nurmilaakso & Kotinurmi, 2004; Shim et al., 2000). However, there are many competing B2B standards that are not mutually interoperable. So the choice for a particular B2B standard also forms a potential integration bottleneck.

Emerging Semantic Web technologies enable a business integration that is more adaptive to changes that might occur over the lifetime of B2B integrations (Fensel, 2003; Trastour, Preist, & Coleman, 2003). This chapter will describe existing B2B standards and focus on an extension of RosettaNet that uses Semantic Web technologies. The usage of this extension for B2B integration and the added flexibility that is gained with it will be demonstrated in a practical integration scenario.

EXISTING STANDARDS FOR B2B INTEGRATION

Many relevant standards have been introduced to alleviate B2B integration issues such as data heterogeneity and process heterogeneity. We describe XML and RosettaNet, and explain the remaining issues in practical B2B integrations even when using these standards.

XML AND ROSETTANET

XML (Extensible Markup Language) is a language for describing and exchanging data. Before the introduction of XML, business partners needed to accommodate various file formats, such as flat files or different EDI (Electronic Data Interchange) versions, and setup a parsing/management infrastructures for each format used by a partner. The introduction of XML lowered the integration barriers between organisations, as partners could reuse their XML infrastructure for all exchanged documents between all partners. The main two schema languages associated to the XML standard are DTD (Document Type Definition language) and XSD (XML Schema Definition language). These schema languages enable business partners to validate whether incoming and outgoing documents conform to a required structure.

The use of XML as such does not resolve interoperability issues in B2B integrations, since the exchange of XML documents does not mean that the documents are understood similarly. Therefore, standards are needed that guide how XML is used in B2B integrations. RosettaNet[1] is one such XML-based B2B standard; already in 2004, RosettaNet had over 3000 documented implementations (Damodaran, 2004). Other common B2B standards include OAGIS[2], ebXML[3] and UBL[4].

RosettaNet is an industry-driven consortium that aims to create, implement, and promote open B2B integration standards. The member organisations represent the information technology, electronic components, semiconductor manufacturing, telecommunications, and logistics industries. The most important components in RosettaNet are Partner Interface Processes (PIPs), dictionaries and the RosettaNet Implementation Framework (RNIF). All three are described in the following paragraphs.

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