Chapter 17
Co-ordination and Specialisation of Semantics in a B2B Relation

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ABSTRACT
To date, the B2B paradigm includes the publishing of rigid message and process standards by organisations such as GS1, BME, UBL, and UN/CEFACT. Businesses are expected to obey those standards, which may not reflect their commercial or business niche. In this chapter, a mechanism is described to simplify and formalise negotiations on bilateral information semantics and process definitions bilaterally, due to support by automated tools. The mechanism is based on ontology engineering and speech act theory. It results in XML schemas that may directly be implemented in B2B communication. Interfaces with back end systems are created on the fly. Work for this chapter was supported by the European Commission through the 7th FP project ADVANCE (http://www.advance-logistics.eu/) under grant No. 257398.

INTRODUCTION
It is virtually inconceivable to us now, but twenty years ago most administrative activities in the business world and in government mainly involved rewriting or typing information on forms. Data was copied from an order form onto a sales order, onto a production order, a warehouse pick slip, a consignment note, an invoice, etc. Order lists and production reports were updated by hand. This applied to all businesses, from large to small, from specialists to confectioners. Large companies had many employees who were dedicated to routine administration. For civil servants, it was even the most important part of their tasks.

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These days, in most large companies and organisations data is only entered once in a computer system, which then triggers the work processes, produces the outgoing forms and can usually supply up-to-date management reports at the ‘press of a button’. In smaller companies, too, the use of computer systems – mostly in the form of servers or PCs – has increased enormously. Information technology has caused a spectacular performance boost to the (global) economy.

What 20 years ago applied to the administration within companies, still applies to interaction between companies: there are considerable amounts of (repetitive) administrative activities, which are performed manually at both sides of a commercial relation. It therefore seems reasonable to expect that the use of computer systems in inter-organisational processes will also lead to, at least, the same improvements as within companies. The computer systems of companies must then be interconnected and nowadays this is quite possible with the global and simple means of communication known as the internet.

Despite the advantages recognized or acknowledged by many parties, the expectation of substantial improvement in inter-organisational exchange has not been met until today, even though data exchange between organisations has been automated for years in a number of industry sectors. In these sectors, Electronic Data Interchange (EDI) is deployed, a technology that was developed even before the internet emerged. EDI, the exchange of structured messages between application systems that are formatted according to standards, such as EDIFACT or ANSI X12, is today being replaced by XML messaging and by web services that also use XML formatting.

N.B.: Throughout this chapter, the term ‘B2B communication’ is used, both for traditional EDI and for the exchange of XML formatted information between application systems of different organisations.

Statistics show that in 2008 in the Netherlands no more than 25% of the companies (with 10 employees or more) had connected their IT systems to the systems of one or more suppliers for ordering (CBS, 2009). On a European scale in 2006, 12% of the companies in 10 selected industry sectors had interconnected their IT systems with suppliers (e-Business Watch, 2006).

Emmelhainz (1992) assessed the situation in 1992 as follows: “EDI has been set to ‘take off’ for a number of years. Following its introduction, EDI was anticipated to become the norm in business first by 1985, then by 1987, then by 1990, then by 1992, and now (in 1992) by 1995 and beyond”. Today, 2011, it can be concluded that inter-organisational system interconnections are still exceptions rather than the rule.

The present paradigm for B2B communication encompasses the publishing of rigid message and process standards by standardisation and sector organisations such as GS1, BME, UBL and UN/CEFACT. Businesses then are expected to obey those standards. Often, however, in practice, the message structures and the process flow need to be adapted when establishing a specific B2B relationship. The business process conducted with a specific trading partner usually requires a (slightly) different information exchange. Programming or configuring an interface per trading partner, appears only to be cost effective for a few stable partners with high message volumes.

Steel (1994) identified 8 problem areas for the slow penetration of B2B system integration. Translated to the present context, the problems he identifies are:

1. It takes far too long to navigate the standardisation process.
2. There are multiple standards organisations involved.
3. When standards are updated, users stay with the version they are using, multiplying the number of ‘standards’ in use.
4. In each local industry, working parties produce Implementation Guidelines which