

EbXML STANDARD FOR B2B TRANSACTIONS

Ivan Matasić, FER Zagreb¹; Marina Šimunić, Agrokor, Zagreb²

¹Faculty of Electrical Engineering and Computing

University of Zagreb

Unska 3, HR-10000 Zagreb

Telephone: +385 1 6129 748; fax 01 6129 616;

e-mail: ivan.matasic@fer.hr;

²Agrokor d.d.

Trg Dražena Petrovića 3, Zagreb, Croatia

Telephone: +385 1 4894 161

marina.simunic@agokor.hr

Abstract

To improve position on the market, companies implement new ways of engineering business processes. One part of engineering the business is to re-model and implement processes in enterprise applications. As typical business depends on other businesses, the need for streamlining and automating communication with other business is obvious. To insure interoperability and efficiency, B2B applications must easily integrate into enterprise applications. There are several B2B frameworks at the market, ebXML being one of them. Market position of ebXML is getting stronger due to its interoperability.

This paper describes ebXML standard, and gives an action plan of implementing ebXML.

Keywords: B2B frameworks, interoperability, ebXML

I INTRODUCTION

Large number of companies is turning into new economy enabled with evolving digital media. Several standards for B2B (Business to Business) collaboration have been pushed into market by leading software companies, supported by big industrial companies or branched consortiums. Most popular of those was RosetaNet, standard established for collaboration between large high-tech companies.

The problem space in such kind of implementation of different "private" B2B models is obviously in interoperability. Partner companies need to implement B2B models established by industry leaders, so they are often forced to change their own business models to conduct B2B transactions. Complexity in implementing different business models to comply with business models for each new partner discourages companies, especially small and medium sized ones, to transfer to B2B collaboration. Development costs, as result of absence of standardised B2B model, are also a huge problem.

As it can be seen from the previous section, B2B model [1] has to be flexible, expandable and interoperable, and above all standardised. EbXML (ebXML – Eng. electronic business XML) is already globally accepted standard for B2B communication. EbXML as a standard is a solution to a variety of problems in business communication between business partners that emerge as a result of current systems incompatibility.

II EbXML BASICS

Figure 1. presents technical view on ebXML standard.

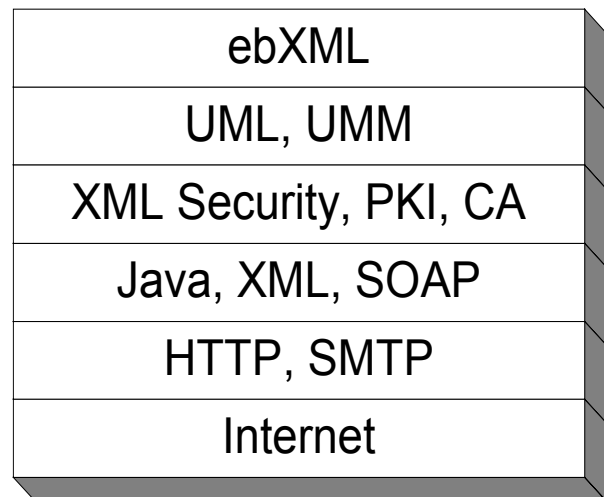


Figure 1. EbXML – technical view

Large number of highly sophisticated technologies based on Internet, combined with web services, provides solution to B2B transactions in ebXML. XML [2] is used primarily for document standardisation and description of information through ebXML, but it also improves transport and security solutions. A laboratory [4], established in faculty of Electrical Engineering and computing,

University of Zagreb, is conducting series of experimental projects regarding ebXML and security solutions.

Conceptually, ebXML defines following:

- Standard mechanism for Business Process description and appropriate information model
- Standard mechanism for registration and storage of Business Process and Information Meta Models, so that they can be stored, interchanged and reused
- Discovery service which includes descriptions for each party, such as:
 - a. Supported business processes.
 - b. *Business Service Interface* used
 - c. Business Messages implemented in Business Service Interfaces.
 - d. Technical configuration of transport, security and coding protocols.
- Registration mechanism that enables storing information's about all above mentioned parameters and specifications, and enables searching for appropriate business partners through standardised search methodology
- Collaboration Protocol Agreement – CPA and Collaboration Protocol Profile - CPP

- Standardised Messaging Service that enables interoperable, secure and reliable transfer of messages.
- Sophisticated mechanism for messaging service configuration

III EbXML architecture

As global standard for electronic trade, ebXML [6] consists of five architectural components (Figure 2.): TRP (Transport, Routing and Packaging), Registry/Repository, TP (Trading Partner), BP (Business Process) and CC (Core Components). We need to mention that, compared to others, Core Components are still not completely defined part of ebXML standard. All ebXML components fit together in fulfilment of ebXML. For example, EbXML TRP uses informations defined in ebXML TP, while ebXML TP can be stored through ebXML Registry. EbXML BP is implemented through ebXML TRP, TP and Registry. All components have elements of transport and content security implemented.

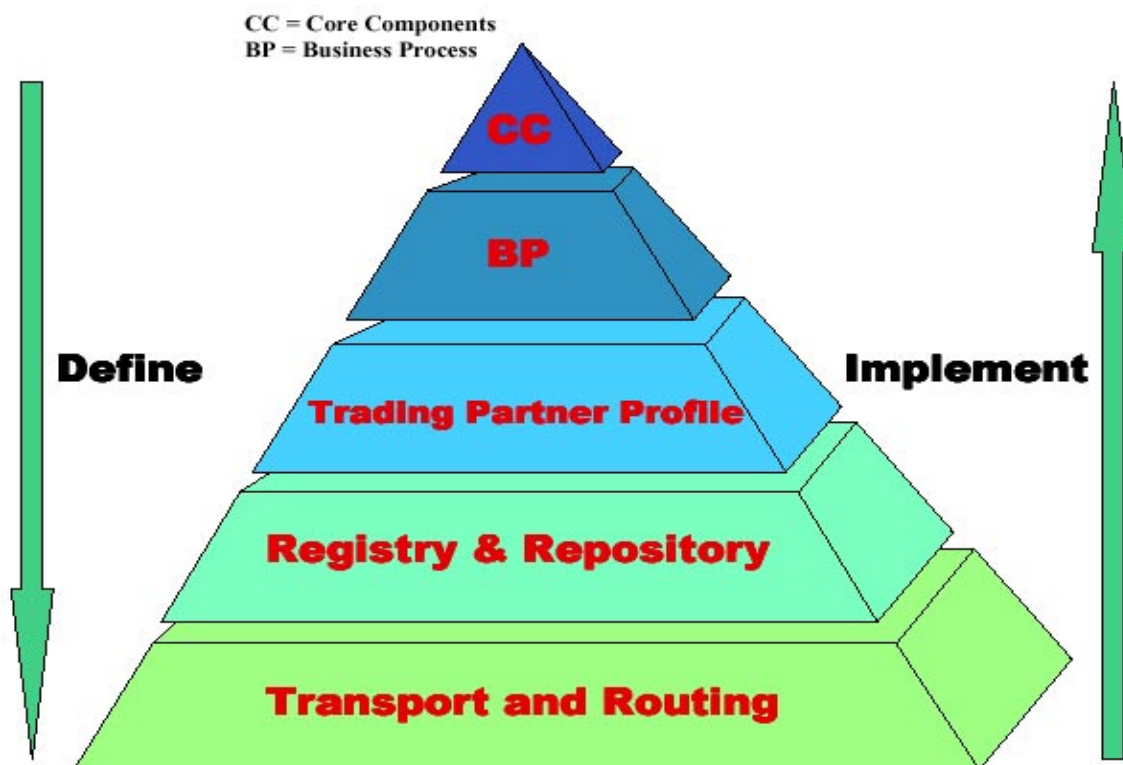


Figure 2. EbXML specification 'pyramid'

CORE COMPONENTS

Business processes determine characteristics of business documents to be transferred between business partners. Although many documents will contain information (attributes) that are universal most of industries (e.g. 'purchase order' document contains quantity of goods ordered, regardless of business partners

conducting this transaction). Some parts of business documents will vary significantly, due to specifics of the goods or services described. Business documents semantically describe business transactions in all its detail. This is why ebXML makes special effort in defining Core Components.

Core Components solve above-mentioned problems through combination of structured information that use context information for interpretation.

The Core Components structure uses layers designed to define general descriptions of business processes, and layers which define specific details using context arguments. Context is description of processes in which a specific usage will be implemented. E.g. if business process is defined as ,hammering my car, the difference in the statement is if the context is ,my car is at the mechanics'.

As stated, Core Components are still not completely defined part of ebXML standard.

BUSSINES PROCESSES

Business processes describe roles, responsibilities and relationships between business partners in business collaboration.

Business collaborations are made up of Business Transactions which themselves are composed of requesting and responding Business Actions. Business Action is a message between two partners and is analogous to a business document.

Business Documents can be created combining reusable Business Information Object. Those can on the lower layer of complexity be created as a combination of Core Components.

BPSS

Business process models for electronically trade need to be transferred into programming components. EbXML specification schemes ensures nominal set of specification elements needed to specify collaboration between business partners

Business Process Specification Schema (BPSS) is an additional view to ebXML Business Process and Information Meta Model. BPSS is one of the key elements in ebXML and as a model is defined and created from the data model, extracting information's required to define and specify number of elements needed to configure run-time stage in implementation of ebXML business.

CPP and CPA

To conduct e-business, potential business partners need mechanism to provide information of business processes and technical solution they implement.

This has been achieved through implementation of Collaboration Protocol Profile (CPP). CPP contain vital information's on business partner such as contact information, industry classification, supported Business Processes (referencing appropriate BPSS), messaging service requirements etc. Once created, CPP is stored in an ebXML Registry, so that business partner searching for e-business collaboration in appropriate fields can find it. Example of a CPP document is given in figure 3.

```
<CollaborationProtocolProfile
  xmlns="http://www.ebxml.org/namespaces/tradePartner"
  xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
  xmlns:xlink="http://www.w3.org/1999/xlink" version="1.1">
  <PartyInfo> <!--one or more-->
    <PartyId type="..."> <!--one or more-->
      ...
    </PartyId>
    <PartyRef xlink:type="...", xlink:href="..."/>
    <CollaborationRole> <!--one or more-->
      <ProcessSpecification name="BuySell" version="1.0">
        ...
      </ProcessSpecification>
      ...
    </CollaborationRole>
    <Certificate> <!--one or more-->
      ...
    </Certificate>
    <DeliveryChannel> <!--one or more-->
      ...
    </DeliveryChannel>
    <Transport> <!--one or more-->
      ...
    </Transport>
    <DocExchange> <!--one or more-->
      ...
    </DocExchange>
  </PartyInfo>
  <Packaging id="ID"> <!--one or more-->
    ...
  </Packaging>
  <ds:Signature> <!--zero or one-->
    ...
  </ds:Signature>
  <Comment>text</Comment> <!--zero or more-->
</CollaborationProtocolProfile>
```

Figure 3. Example of a CPP document

Collaboration Protocol Agreement (CPA) is a document agreement between business partners that defines collaboration details between business partners. CPP and CPA are well described in [3], so we will not going to further elaborate on them.

EbXML REGISTRY/REPOSITORY

EbXML Registry can be described as ebXML brain, as it stores all information that ebXML business partners need (e.g. information on business partners and their CPP). Figure 4 describes ebXML Registry/Repository architecture.

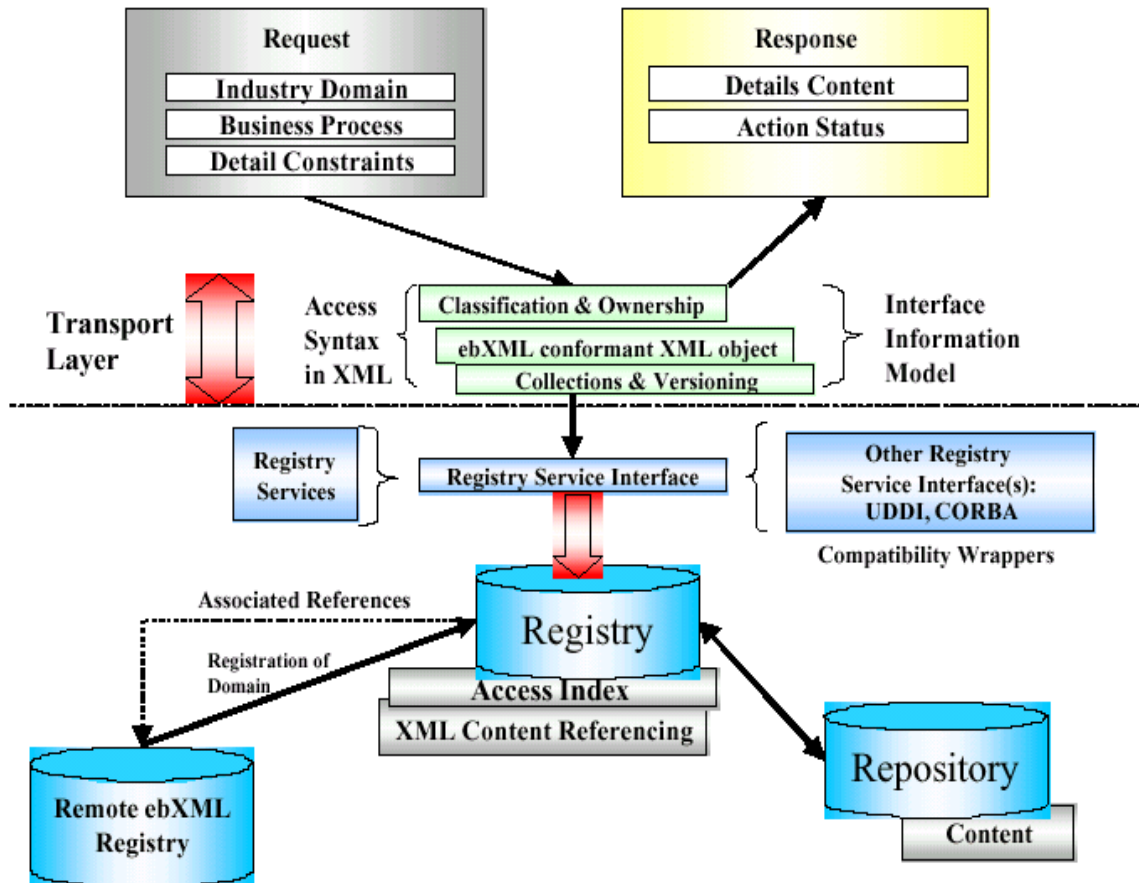


Figure 4. EbXML Registry/Repository

From the figure 4 it is obvious that term Repository describes mechanism for data storage, while Registry describes interface services through which repository objects can be reached. Data in repository is viewed, inserted, stored and deleted through user requests on registry. Registry and repository services are separated so that one can use repositories from multiple different clients through only one registry interface.

Two specifications define Registry/Repository service:

- *Registry Information Model* describing objects that can be stored in repository, Meta data on those objects, and structure of repository
- *Registry Service Specification*, describing detailed view on interfaces for users, as well as functionality of registry services in those interfaces.

Functional view to a Registry information model is given in figure 5, in form of a UML Class diagram.

Registry service specification defines interfaces for user interaction with Registry using ebXML Messaging service. Interfaces are defined for Registry Service, and Registry Client. There are three possible Registry Client architectures depending on where Registry Client interface has been implemented:

- 'thin client' uses web interface implemented on server side
- 'fat client', with Registry Browser application implemented on client side
- Non-human interaction.

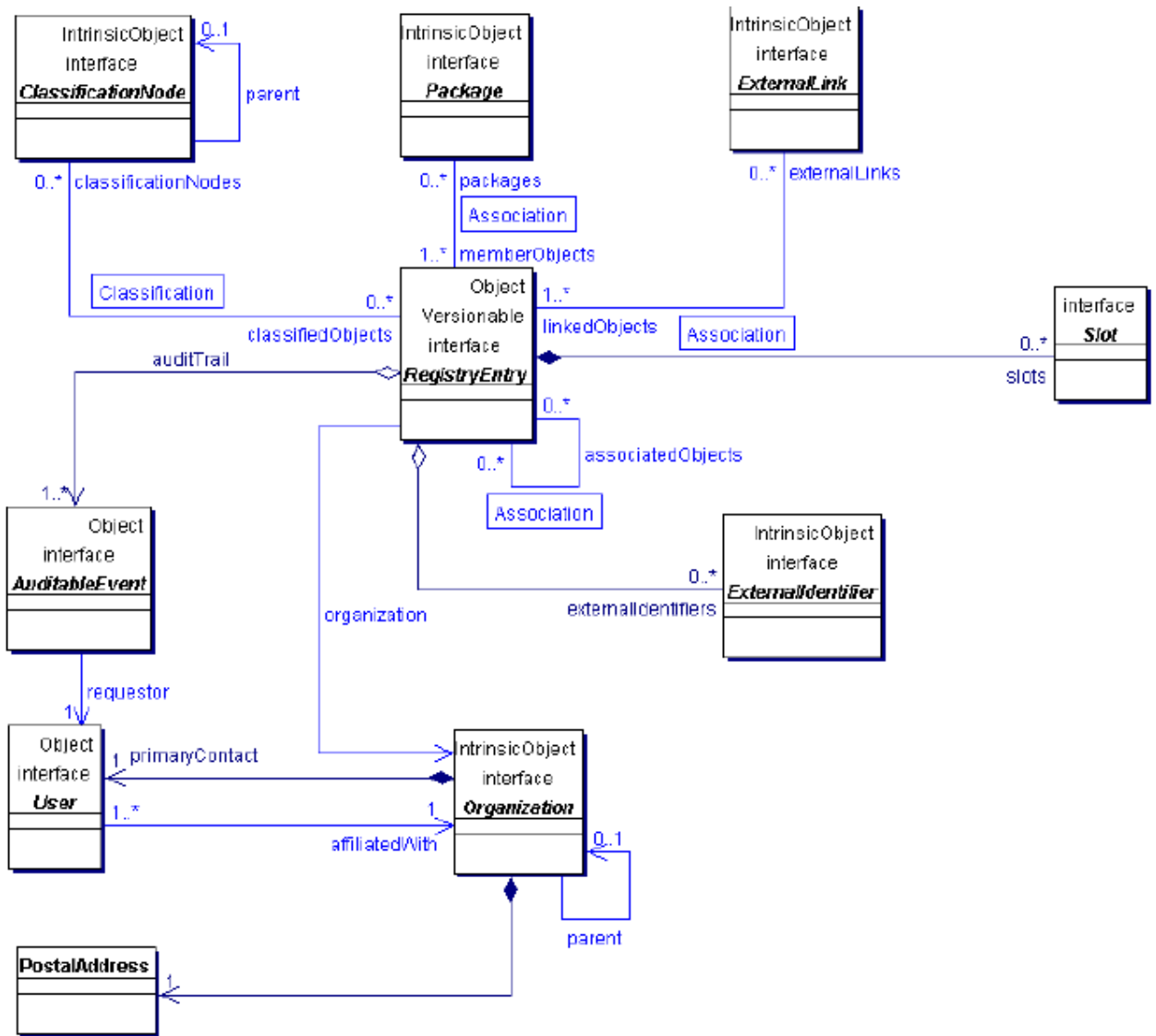


Figure 5. Registry information model in form of a UML Class diagram.

EbXML Message service

EbXML Message Service defines standardised Business Document transport between business partners. Message enveloping as header structure is pre-defined, and is transferred through communication protocols such as HTTP, SMTP etc. Messaging service is a layer added to Simple Object Access Protocol (SOAP) and SOAP Messages with Attachments specifications, widely accepted in telecommunication. EbXML adds security and reliability characteristics into SOAP and SOAP Messages with Attachments, which are vital in e-business.

Messaging service can conceptually be divided into three layers as shown in figure 6.:

- Service Interface
- Message Service Handler, MSH
- Mapping to a lower layer transport service

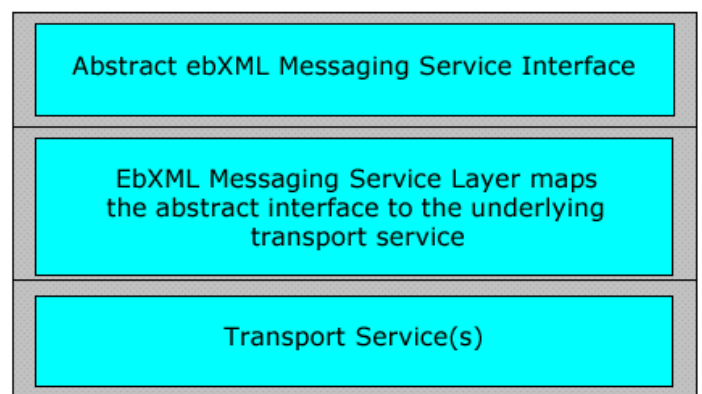


Figure 5. Messaging service layers

Messaging service as well as the SOAP protocol is described in detail in [5].

IV CONCLUSION

EbXML is a set of specification that together enables a modular electronic business framework. The most important value provided by ebXML is its ability to formalise all aspects of B2B relationships and express these formal specifications as XML documents.

EbXML infrastructure provides the opportunity to integrate business partners and its applications at the business process level and that is a big advance in the realm of B2B.

EbXML enables a global electronic marketplace where enterprises of any size and in any geographical location can meet and conduct business with each other through the exchange of XML-based messages over the Internet.

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