

## Understanding ebXML, UDDI and XML/EDI

a report by

**David R R Webber**

*Co-founder, XML/EDI Group*

### Introduction

The past six months have seen an extensive and accelerating amount of work on providing practical implementations and technical specifications to enable the development of open interoperable business interactions. This work is focused around utilising the World Wide Web Consortium (W3C) XML syntax and the Internet as the underpinning technologies.

In this context, the focus of the ebXML (electronic business extensible markup language) initiative (<http://www.ebXML.org>) is to develop a single global electronic market based on an open public XML-based infrastructure enabling the global use of electronic business information in an interoperable, secure and consistent manner by all parties. A primary objective of ebXML is to lower the barrier of entry to electronic business in order to facilitate trade, particularly with respect to small and medium-sized enterprises (SMEs) and developing nations. The ebXML initiative is sponsored by United Nations Centre for the Facilitation of the Administration, Commerce and Transport (UN/CEFACT) and Organization for the Advancement of Structured Information Standards (OASIS) ([www.oasis-open.org](http://www.oasis-open.org)) and is an open public initiative with over 1,000 participants.

In contrast, the Universal Description, Discovery and Integration (UDDI) initiative was started by IBM, Ariba and Microsoft about five months ago as a means to create an implementation of their technologies that deliver the underpinning for the interoperation of Internet marketplaces and integrating business services using the Internet. UDDI (<http://www.uddi.org>) is based around the concept of standard registry services that provide yellow, white and green page business functionality, focusing on providing large organisations with the means to reach out to and manage their network of smaller business customers. The major issues facing UDDI are ones of acceptance and buy-in from businesses themselves, and implementation issues of scalability and physical implementation.

In contrast, the XML/EDI (electronic data interchange) initiative (<http://www.xmledi-group.org>) was started three years ago as a foundation

to promote the use of XML for e-business. The XML/EDI vision includes the concept of the fusion of five – XML, EDI, repositories, templates and agents – to create next-generation e-business. The ebXML and UDDI work represents embodiments of the XML/EDI vision and as such we need to understand how much further it needs to progress to fully deliver on the promise of XML and e-business.

### ebXML

In order to make sense of the technical architecture for ebXML it is important to first understand the conceptual thinking behind the initiative. From the outset, the technical architecture team approached the project from the standpoint of business workflow, selecting the objects common to many business processes, such as address, party and location. With the advent of XML, it was easier to identify and define these objects with attributes (data) along with the functions that could be performed on those attributes. A cornerstone of the project was allowing these objects to be reused so that ebXML could provide for the means to unify cross-industry exchanges with a single consistent lexicon.

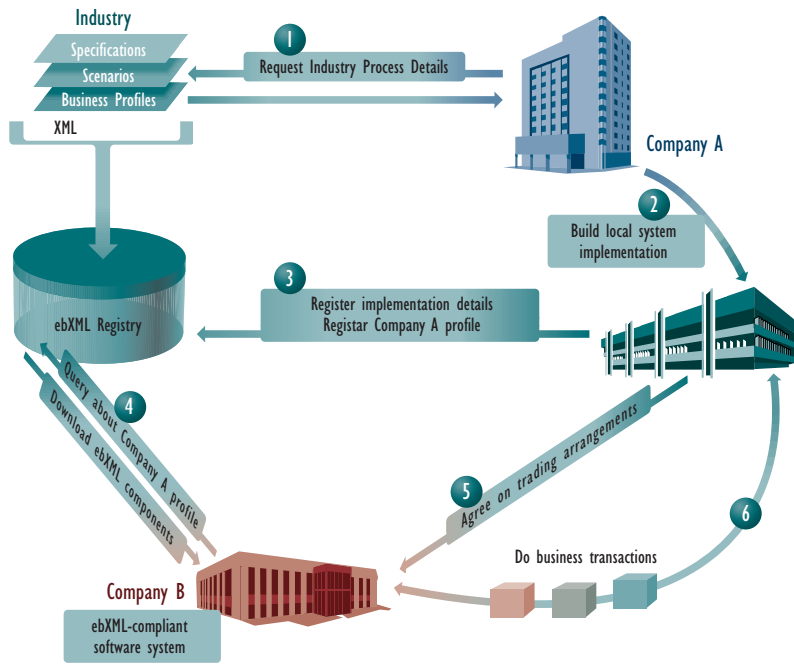
It is important to realise that the role of ebXML is not to replicate the reliance on electronic versions of common paper documents, such as purchase orders, invoices or tender requests, and to offer up and develop such examples of implementation. The ebXML specifications provide a framework where SMEs, software engineers and other organisations can create consistent, robust and interoperable e-business services and components seamlessly within an integrated global e-business market.

The actual architectural model of ebXML uses two views to describe the relevant aspects of all business interactions, which stem from early work on OpenEDI by UN/CEFACT. First is the business operational view (BOV), which addresses the semantics of business data transactions and associated data interchanges. The architecture for business transactions includes operational conventions, agreements and mutual obligations and requirements. These specifically apply to the business needs of ebXML trading partners.



David R R Webber is Co-founder of the XML/EDI Group and Director of XML Global Technologies Inc. He is an acknowledged authority on XML, lecturing in the US, Europe and Asia. Mr Webber has over 20 years of experience implementing business systems in a broad spectrum of industries. He has published numerous articles and multimedia on requirements for developing XML/EDI business solutions and is currently involved in several industry initiatives developing XML business schemes, and in the ebXML interoperability standards development. Mr Webber has a degree in physics with computing from the University of Kent, Canterbury.

Figure 1: The ebXML Approach – Automating Business-to-business Interactions

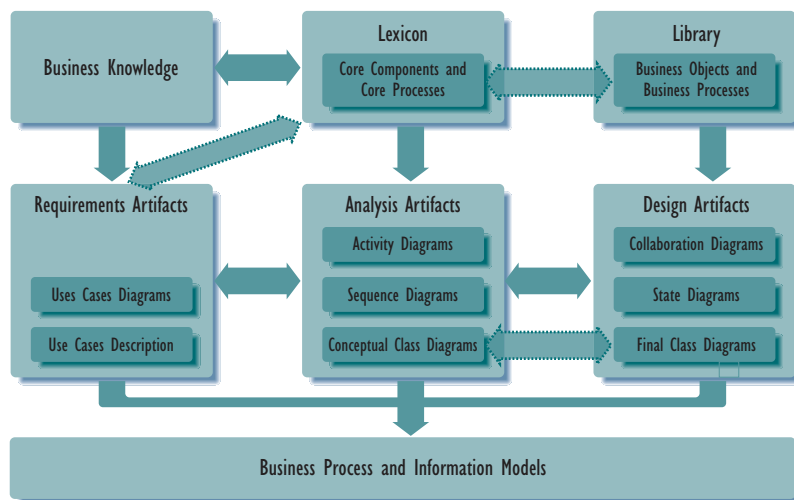


- capabilities for implementation, discovery, deployment and run-time scenarios;
- user application interfaces;
- data transfer infrastructure interfaces; and
- protocols for interoperation of XML vocabulary deployments from different organisations.

Integral to the ebXML architecture is the registry system which is necessary in order to deliver on the BOV and FSV. An ebXML registry provides a set of distributed services that facilitate the sharing of information between interested parties for the purpose of enabling business-process integration between such parties by utilising the ebXML specifications.

The shared information is maintained as objects in an ebXML repository that is managed by ebXML registry services. Access to an ebXML repository is provided by the application program interfaces exposed by registry services.

Figure 2: Business Operational View



Second is the functional service view (FSV), which addresses the supporting services and meets the deployment needs of ebXML. The implementation of the FSV of ebXML has three major phases; implementation, discovery and deployment followed by the run-time phase. The implementation phase deals specifically with procedures for creating an application of the ebXML infrastructure. The discovery and deployment phase covers all aspects of the actual discovery of ebXML-related resources and is self-enabled into the ebXML infrastructure. The run-time phase addresses the execution of an ebXML scenario with the associated ebXML transactions.

FSV focuses on the information technology aspects of functional capabilities, service interfaces and protocols including the following:

Architecturally, the registry and repository are tightly coupled components. The registry provides the access-services interfacing, the information model and reference-system implementation, while a repository provides the physical back-end information store. For example, an ebXML registry may provide a trading partner profile from the repository in response to a query; or an ebXML repository may contain reference document-type definitions (DTDs) or schemes that are retrieved by the registry as a result of searching a metadata classification of the DTDs or schemes. Figure 4 provides an overview of this configuration.

**UDDI**

The UDDI Project co-sponsored by IBM, Microsoft and Ariba was announced in September 2000. In addition to the sponsors, a selection of other companies have joined since September, including those focused particularly on directory services and enterprise-system integration. IBM, Sun and several others involved with the UDDI project are also committed to delivering ebXML solutions and to working with the associated groups, most notably OASIS, CEFAC and the W3C.

The fundamental difference between UDDI and ebXML is that UDDI is aiming to create a standard registry for companies that will accelerate the integration of systems around Internet marketplaces, while ebXML is working to standardise the way that XML is used in general business-to-business (B2B) integration. The core of the UDDI model is, therefore, focused particularly on middleware connectivity and using XML itself to describe the systems that companies use to interface with one

Figure 3: Functional Service View

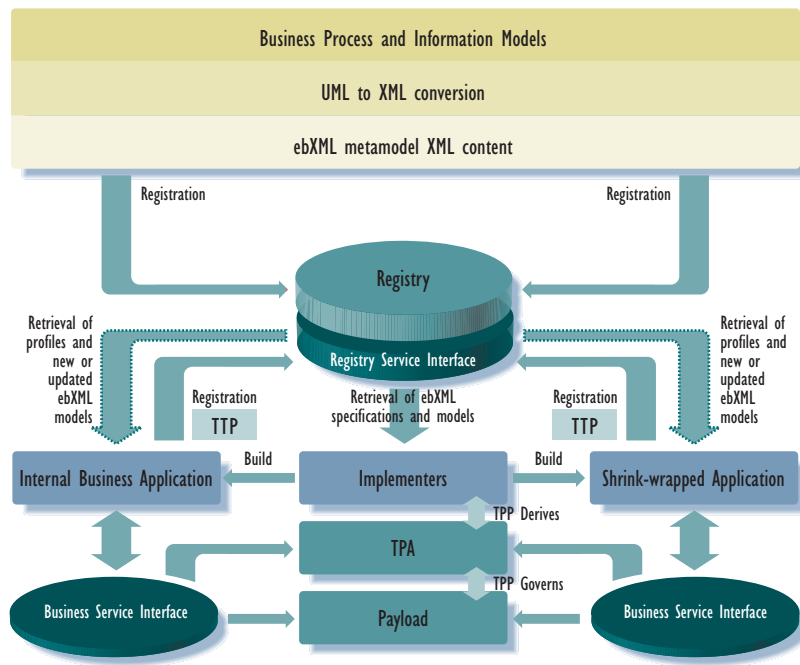
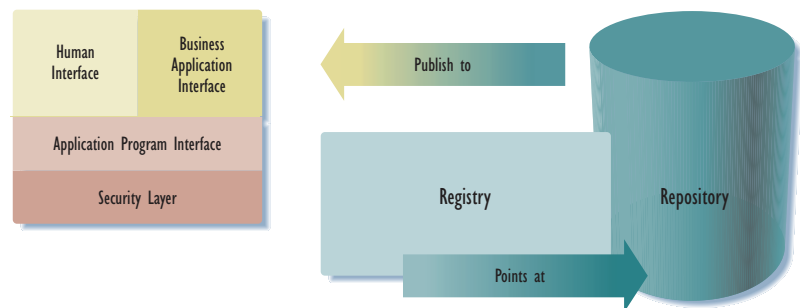


Figure 4: Registry/Repository Interaction Overview



another. UDDI plans to do this by storing information about companies' integration profiles and capabilities in a shared directory that other companies can access via a set of XML standards that are currently being worked on.

The initial UDDI registry system contains three types of information that is being referred to as the white, yellow and green pages. The white pages directory will allow companies to register their names and the key services they provide, and will allow other companies to search the directory by company name. The yellow pages component of the directory will categorise companies in three ways: by North American Industrial Classification System industry standards codes set by the US government, by United Nations/Standard Products and Services Codes and finally by geographical location. The final element of UDDI comprises the green pages, which is where companies will be able to interface with other companies in the registry using XML. As it will be clear from their search which formats are being supported, the companies can then communicate and send documents based on a specific XML format.

Therefore, it is apparent that ebXML systems will also be able to integrate to UDDI systems at this level, since ebXML provides the same capabilities. The UDDI initiative work was launched mainly because of internal time-to-market pressures on the three principles. The initiators decided they could not wait for ebXML to complete its work, but instead chose to rush to market with a proprietary solution and then use this work to drive the direction of the ebXML and W3C standards work at a later stage.

Over the next 18 months, the UDDI project aims to expand the number of categories and add more complete features to help smooth the searching capabilities of the B2B effort. Suggestions include customising the categorisation features and accommodating the needs of large corporations with a variety of business units focused on different goals. In addition, a number of vendors expressed interest in building up the standard as it progresses and developing registries with customised features that lie on top of UDDI. All these undertakings may cause confusion with major work by organisations, such as GCI, AIAG and RosettaNet, that are already committed to work with the ebXML initiative in these areas.

**XML/EDI**

While traditional EDI had proved the feasibility and efficiencies that are possible when using electronic business transactions, the limitations were found to be the cost of integration and deployment to the smaller business partners. The vision for XML/EDI, therefore, was to build a system that would allow organisations to deploy smarter, cheaper and more maintainable systems to a global audience. XML/EDI approached the problem by developing a system that allowed each trading partner to quickly synchronise their systems by exchanging not only the old structures of EDI data, but also process-control templates and business rules.

The central idea to XML/EDI is to add enough intelligence to the electronic documents so that they and the document-centric tools that handle them become the framework for electronic business commerce. By combining the five components together, XML/EDI provides a system that delivers not only data but, more importantly, information accompanied by the necessary processing logic. Thus, not only is data exchanged but also the enabling, underlying processing information.

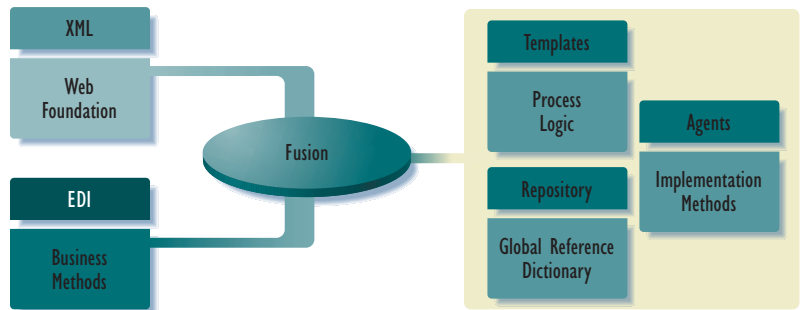
Examining the critical business parameters, as opposed to the technology, history has shown that traditional EDI failed to create a broad-based acceptance. To deliver a next-generation global EDI solution, the following capabilities must be addressed as the 10 most important business requirements:

- reduce the cost of doing business;
- reduce cost of entry into e-business;
- provide an easy-to-use tool set;
- improve data integrity and accessibility;
- provide appropriate security and control;
- provide extendable and controllable technology;
- integrate with today's systems;
- utilise open standards;
- provide a successor to X12/EDI for administration commerce and transport and interoperability for XML syntaxes; and
- make it globally deployable and maintainable.

To date, ebXML has the components to come closest to these goals. However, simply redefining the old EDI message formats in XML to make them Web-deployable is insufficient. The ebXML initiative has concentrated on modelling tools to capture the business processes, not just the transactions, and storing standard definitions in globally accessible registries (repositories). If this is carried out correctly, the small businesses can avoid having to undertake costly and complex modelling, while still being able to quickly and easily tap into existing process models and off-the-shelf application solutions. The XML/EDI guidelines have added two further key components – process templates and software agents – to assist in this. The idea is to provide dynamic software processes based on XML representations by using the ability of XML to define not just the data but also processing scripting systems. The ebXML work sees this as a second phase requirement; with the first phase being based on simpler, rigid, well-understood, more static interfaces.

Within the integrated XML/EDI system (see *Figure 5*), XML itself provides the foundation whereby XML tokens and frameworks are the syntax that transports the other components across the network. XML tokens replace or supplement existing e-business transactions and thereby enrich the capabilities and transport layers of the Internet in general. Process templates built using XML hold the whole XML/EDI system together. Without them it would not be possible to use the XML syntax exclusively to express all of the necessary work requirements. The templates are globally referenced, or travel along inside the XML as a special section and set of tokens where they can be easily read and interpreted. They also control and define the business context and process definitions that allow users to locate the correct components that they need. The ebXML classification work and ebXML business process metamodel are also now moving to implement these same capabilities within the registry indexing system, but as yet without the template and business token focus. This may change as the XML/EDI GUIDE (Global Uniform Interoperable Data Exchange) work (<http://www.xmlguide.org>) matures and provides synergy with the ebXML metamodel.

**Figure 5: The Power of Five – the Components of XML/EDI**



XML/EDI Internet repositories – referred to as registry/repository systems in ebXML – allow users to manually look up the meaning and definition of e-business elements. In addition, the concept takes this to the next level and provides automatic look-up interfaces, much like an advanced Internet search engine, e.g., (<http://www.goxml.com>). This XML/EDI repository component of the system provides the semantic foundation for global business transactions and the underpinnings needed by the software agents to correctly cross-reference entities.

Thus the software agents serve several functions: they interpret the process templates for performing the work needed; interact with the e-business transaction data definitions and the user business applications to integrate each specific task; and look up and attach the right template for existing jobs by accessing the global repository. An example would be an agent that can take an e-business transaction and examine the underlying global repository definitions and construct and determine display characteristics for forms to display the information to users.

## Conclusion

The development of e-business and the Internet has reached an interesting stage. The Internet has shaped our ability to develop open public standards across diverse groups of people who are geographically located on all the major continents. The emergence of pervasive networking and small personal computing devices are challenging previously understood limits of information delivery and utilisation. While the US continues, for now, to dominate the development of business standards, this is mainly because the US economy constitutes over 30% of the world economy. Within the software industry itself, countries such as India and those in Eastern Europe are already making significant in-roads into this domination as the labour pool for cost-effective development resources are stretched to the limit worldwide. Consequently, over the next five years, we can foresee that the industry is moving to an open global economy where new and profoundly different metrics will emerge. The measure of ebXML, UDDI and XML/EDI will be how well they are able to provide and satisfy these needs. ■