Interaction Standards in E-Business

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INTRODUCTION

A standard is a framework of specifications that has been approved by a recognized standards organization (de jure standard), is accepted as a de facto standard by the industry or belongs to the open standards (Hawkins, Mansell, & Skea, 1995). According to Rotem, Olken, and Shear (2001), there are two types of communication standards encountered in the e-business: infrastructure type standards and interaction type standards. Infrastructure type standards such as TCP/IP are important for almost any application that uses the Internet and are not the focus of this chapter. Interaction type standards address communication content and interfaces between e-business systems with the goals of facilitating system interoperability and process integration. These standards cover issues such as data dictionaries, message structure, and remote object invocation.

BACKGROUND

E-business interaction standards began in the 1980s with the emergence of electronic data interchange (EDI). EDI's structured document format enabled the systems of one firm to directly communicate with those of other firms. This earlier form of business-to-business (B2B) e-commerce, however, was difficult for small-to-medium enterprises to adopt due to its high cost and complexity (Chau & Jim, 2002).

With the growth of the Internet-based e-commerce, there was increasing need for business systems to be able to communicate with each other over the Internet. The need for systems of different organizations to interact with each other in ways beyond just sending structured documents also emerged. For instance, the systems of one organization may need to invoke the processes of systems of another organization. With the increasing reliance on the Internet as a medium for conducting business, it is likely that interaction standards will become an important element in e-business systems. This article provides an overview of these standards.

E-business partners have interactions at different levels of society. Accordingly, e-business standardization can happen from individual level and company level to industry or association level and national level (Verman, 1973). Due to the huge number of these standards bodies, this article has chosen standards bodies or groups at international level as its discussion targets.

TYPES OF INTERACTION OF STANDARDS

Most e-business interaction standards can be categorized into one of the following five categories: message structure, data dictionary data guidelines, remote object invocation, registries/repositories, and business processes. The following describes each of these areas and some of the main standards that have been developed in them.

Message Structure

Despite the emergence of successors, traditional EDI continues to be widely used. An EDI message consists of a series of data elements, each representing a single fact, such as a product ID or price, separated by a delimiter. The entire series is called a data segment. One or more data segments framed by a header and trailer form a transaction set. This is what is sent via EDI and is equivalent to a message. This message would tend to consist of what would normally be contained in a typical business document.

The main version of EDI used in the United States follows the ANSI Accredited Standards Committee (ASC) X12 standard developed by the Data Interchange Standards Association. Since 1987, chartered by ANSI, the Data Interchange Standards Association (DISA) has served as the secretariat for the X12 standards development process. ASC X12's strategy direction is to "embrace collaboration with domestic and international organizations while continuing to forge ahead to ensure ASC X12 member companies' electronic data interchange (EDI)

requirements are met" (Cover, 2003). A closely related international standard UN/EDIFACT was developed by the United Nations Centre for Facilitation of Procedures and Practices for Administration, Commerce and Transport (UN/CEFACT). ASC X12 and UN/EDIFACT are closely coordinated standards.

ebXML (electronic business XML) is an emerging, open and Internet-based standard that is supplanting traditional EDI. ebXML is intended for the exchange of business documents globally among firms of any size, and in any location, by securely exchanging of XML-based messages (Chiu, 2002). ebXML is the result of a project that was jointly launched by UN/CEFACT and the Organization for the Advancement of Structured Information Standards (OASIS, 2005). OASIS is a not-for-profit international consortium of vendors, users and specialists whose membership includes 75 companies, including major IT vendors and trade associations throughout the world.

Since ebXML uses existing standards such as HTTP, TCP/IP, MIME, SMTP, FTP, and XML, it can be deployed on virtually any platform. This, along with the use of the Internet instead of proprietary networks makes ebXML relatively inexpensive and easy to use.

BizTalk, an alternative to ebXML is a result of an industry initiative headed by Microsoft to promote XML as the data exchange language for e-commerce and application integration on the Internet. While not a standards body per se, the group is fostering a common XML message-passing architecture to tie systems together. In the BizTalk Framework, a message is embedded inside an envelope that includes additional information such as origin, purpose, and destination.

Data Dictionaries

Data dictionary standards may include guidelines about how specific elements are represented or which segments of data may coexist, or are mutually exclusive. Such guidelines appear in the EDI and RosettaNet message standards. The following are some standards related to data dictionaries:

1. ASC X12 data element dictionary represents the collection of basic building blocks on which all electronic data interchange (EDI) transaction sets are constructed.
2. The UN/EDIFACT data dictionary defines each data element and its cross-reference to all UN/EDIFACT messages in which it's used, including all available codes and attributes.
3. RosettaNet is a nonprofit consortium dedicated to the development and deployment of standard elec-

tronic business interfaces (Hamilton, 2004). These standards include common partner interface process (PIP) and data dictionaries. RosettaNet encodes messages as well-formed XML documents. RosettaNet was formed in 1998 by leading companies in the electronic sector, is a nonprofit consortium of more than 500 organizations working to create open e-business standard. Because RosettaNet is widely supported by companies in the IT industry, its standards are expected to be widely adopted. Once adopted, there is some evidence showing that interaction standards such as RosettaNet have considerable potential for altering the way firms in industries interact with each other (Malhotra, Gosain, & El Sawy 2005).

4. The Open Applications Group (OAG) has developed the business object document (BOD) architecture that provides the framework to communicate messages or business documents. BOD consists of two major components: control layer and business data layer. The OAG work group has provided the specification to develop a set of OAG-compliant document type definitions (DTDs) to support their eXtensible Markup Language (XML) messaging requirement. Both the XML messages and its DTDs make up the BOD.
5. The ebXML core components project team is working on a method to develop a common business data dictionary. The goal is to develop a syntactical neutral data dictionary where it can support numerous syntax such as XML, X12, EDIFACT, etc. This is a work in progress.

Remove Object Invocation

Trading partners often need interoperability among their systems. The dominant standards in these areas are Microsoft's component object model (COM) and COM+, common object request broker architecture (CORBA) by OMG, and Sun's Enterprise JavaBeans (EJBs).

SOAP (simple object access protocol) provides methods for a program running under one operating system to communicate with a program in the same or another operating system using the hypertext transfer protocol (HTTP) and XML as the mechanisms for information exchange (Alexander & Zhang, 2005). SOAP specifies how to encode an HTTP header and an XML file so that a program in one computer can call a program in another computer and pass it information. It also specifies how the called program can return a response. Because HTTP requests normally are allowed to pass through firewalls, SOAP communications are typically able to communicate with programs anywhere.

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