

II. Current State of Technology

XML Standards

The primary standard to consider when discussing XML is the specification of XML itself. Currently, XML 1.0 is a “Recommendation” of the World Wide Web Consortium (W3C).

To provide some background, the W3C is an organization with more than 400 Member organizations from around the world, devoted to developing common protocols, and ensuring the interoperability of the World Wide Web. Standards at W3C go through the following stages:

Working Draft: A Working Draft represents work in progress and a commitment by W3C to pursue work in this area. A Working Draft does not imply consensus by a group or W3C

Candidate Recommendation: A Candidate Recommendation is work that has received significant review from its immediate technical community. It is an explicit call to those outside of the related Working Groups or the W3C itself for implementation and technical feedback.

Proposed Recommendation: A Proposed Recommendation is work that (1) represents consensus within the group that produced it and (2) has been proposed by the Director to the Advisory Committee for review.

Recommendation: A Recommendation is work that represents consensus within W3C and has the Director's stamp of approval. W3C considers that the ideas or technology specified by a Recommendation are appropriate for widespread deployment and promote W3C's mission.

XML 1.0 achieved “Recommendation” status in February 1998. Although improvements have been considered by the W3C, the organization has concentrated on areas that impact XML deployment, and has chosen to not update XML itself. Thus, while companies are developing implementations that rely on different and potentially conflicting sets of these emerging standards, it seems that all are remaining compliant with the base XML specification.

Following is a partial list of related XML-related areas being worked on at W3C:

- **Associating Style Sheets with XML documents** Version 1.0
Recommendation -- W3C [June 29, 1999]
Standardized syntax for using an xml-stylesheet processing instruction to associate an XML document with an XSL or CSS stylesheet.
- **Authoring Tool Accessibility Guidelines** Version 1.0
Recommendation -- W3C [Feb. 3, 2000]
Guidelines for web authoring tool developers to assist in the design of authoring tools that produce accessible Web content and in the creation of an accessible authoring interface.
- **CSS1**
Recommendation (Revised) -- W3C [Jan. 11, 1999]
CSS1 is a simple style sheet mechanism that allows authors and readers to attach style (e.g. fonts, colors and spacing) to HTML documents.
- **CSS2**
Recommendation -- W3C [May 12, 1998]
Level 2 of the Cascading Style Sheet mechanism
- **DOM Level 1**
Recommendation -- W3C [Oct. 1, 1998]
Document Object Model Level 1
- **Namespaces in XML**
Recommendation -- W3C [Jan. 14, 1999]
Provide a simple method for qualifying element and attribute names used in XML documents. This is accomplished by associating a particular tag set by associating a prefix with a URI reference.
- **PICS**
Recommendation -- W3C [May 27, 1998]
Standard format for making digitally-signed, machine-readable assertions about a particular information resource
- **PICS Rules**
Recommendation -- W3C [Dec. 29, 1997]
- **RDF Model and Syntax**
Recommendation -- W3C [Feb. 22, 1999]
A foundation for processing metadata; it provides interoperability between applications that exchange machine-understandable information on the Web.
- **XHTML 1.0**
Recommendation -- W3C [Jan. 26, 2000]
A reformulation of HTML 4 as an XML 1.0 application and three DTDs corresponding to the ones defined by HTML 4.
- **XML Path Language (XPath)** Version 1.0
Recommendation -- W3C [Nov. 16, 1999]
Provide a common syntax and semantics for querying and addressing the contents of XML documents that could be used by XSLT (XSL Transformation Language), XLink, and XPointer.

- **XML v. 1.0 DTD**
Revised XML Recommendation DTD -- W3C [Sept. 10, 1998]
A revised version of the XML Recommendation's DTD.
- **XML XPointer Requirements**
W3C [Feb. 24, 1999]
- **XSL Transformations (XSLT) Specification Version 1.0**
Recommendation -- W3C [Nov. 16, 1999]
A language used to "transform" (or reconstruct the structure of) the data structures contained within XML documents.
- **XInclude**
Inclusion Proposal (proposed for XML version 2.0)
Fragments of content from external resources are included in a documents content along with the content residing at the actual URL being accessed (sort of like a server-side include).

Solution Providers

Although the standards-making process for XML has been fairly orderly, the implementation of those standards to enable business-to-business communication has been chaotic. Software vendors and customers have aligned and realigned in a variety of efforts to provide XML solutions. For example, the XML/EDI Group has been incorporated into the ebXML initiative. Software vendors have been busily incorporating XML features into their offerings. One would be hard-pressed to find a shrink-wrapped software product today that did not contain XML somewhere in its list of capabilities. Of course, actual functionality often does not match the hype contained in sales brochures. Nevertheless, it is apparent that the software that matters the most to the natural gas industry, the X12 translators, are generally able to read and write XML documents already. Furthermore, the tools that developers use, such as compilers and database management systems, already 'speak' XML, and this technology is becoming increasingly ingrained in these tools.

Following is a list of the major efforts underway to 'standardize' XML-based B-to-B applications:

RosettaNet

RosettaNet is an industry coalition of organizations from all segments of the computer industry including chip manufacturers (e.g. Intel), computer manufacturers (e.g. Dell), distributors (e.g. Ingram Micro), solution providers (e.g. Microsoft), and others. The group mission is to produce a set of industry-wide electronic business interoperability standards.

RosettaNet uses XML to define the format and structure of business documents used in supply chain operations. The original concept was to utilize existing EDI data element names, definitions and structures, within a XML document, effectively creating an XML document with tag names based on EDI element names. This approach proved difficult to implement and was abandoned in favor of a new dictionary of XML tag names, document structures and process definitions (PIP's).

The first production deployment following the RosettaNet specifications occurred on February 2, 2000. Version two of the RosettaNet specification (RNIF V2) is under development, and these efforts are in close coordination with the ebXML efforts to define a global E-Commerce standard.

ECo Framework (CommerceNet)

The primary focus of eCo Framework Project is to demonstrate the value of the integration of three common components-based electronic commerce services. These services are semantic integration of multiple database types with multiple data constructs and data libraries; trusted open registries; and agent-mediated buying. These core services will provide the interoperability among many commerce services and serve as a foundation to operate web based trading communities. XML is one the tools used in this integration project. The working group of eCo includes 35 different companies from various technology industries such as 3 Com, American Express, Berkeley National Lab, Cisco Systems, Compaq, GEIS, HP, IBM, Intel, Microsoft, Novell, Netscape, Royal Bank of Canada, Sun, NEC, etc.

Commerce XML (cXML)

Ariba, Inc. developed cXML version 1.0 to provide a simple XML-based protocol between entities engaged in Business-to-Business eCommerce transactions or the Internet. Ease of implementation is the focus, together with emphasis on prototype implementation to discover remaining issues. The documentation claims to contain all the information needed to implement any of the supported transactions from either the client or server system perspective. Protocol specifications indicate it primarily deals with request-response type transactions.

Distributed Management Task Force

DMTF is the industry organization that is leading the development, adoption and unification of management standards and initiatives for desktop, enterprise and Internet environments. They work with key technology vendors and affiliated standards groups to enable a more integrated, cost effective and less crisis-driven approach to management through interoperable management solutions. They claim to pioneer the use of XML as the transport encoding for their Web Based Enterprise Management (WBEM) initiative.

Open Applications Group

The Open Applications Group is a non-profit consortium focusing on best practices and process based XML content for eBusiness and Application Integration. It is the largest publisher of XML based content for business interoperability in the world. This groups members have over 5 years of extensive experience in building this industry consensus based framework for business software application interoperability and have developed a repeatable process for quickly developing high quality business content and XML representations of that content. The does this by leveraging XML, best practices in integration technology and architecture, and by providing an impartial forum for all stakeholders to work together to accomplish common goals.

BizTalk Frameworks (Microsoft)

BizTalk is an industry initiative championed by Microsoft and supported by a wide range of organizations, from technology vendors like SAP and CommerceOne to technology users like Boeing and BP/Amoco. BizTalk is not a standards body. Instead, it is a community of standards users, with the goal of driving the rapid, consistent adoption of XML to enable electronic commerce and application integration. They are defining a set of guidelines for how to publish schemas in XML and how to use XML messages to easily integrate software programs together in order to build new solutions. The design emphasis is to leverage what exists today - existing data models, solutions and application infrastructure - and adapt it for electronic commerce through the use of XML.

ebXML

The United Nations body for Trade Facilitation and Electronic Business (UN/CEFACT) and the Organization for the Advancement of Structured Information Standards (OASIS) have joined forces to initiate a worldwide project to standardize XML business specifications. UN/CEFACT and OASIS have established the Electronic Business XML (ebXML) initiative to develop a technical framework that will enable XML to be utilized in a consistent manner for the exchange of all electronic business data. Industry groups currently working on XML specifications have been invited to participate in the 18-month project. 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.

- ebXML Value
 - Provides the only globally developed open XML-based Standard built on a rich heritage of electronic business experience.
 - Creates a Single Global Electronic Market enabling all parties irrespective of size to engage in Internet-based electronic business.

- Provides for plug and play shrink-wrapped solutions.
- Enables parties to complement and extend current EC/EDI investment expand electronic business to new and existing trading partners.
- Facilitates convergence of current and emerging XML efforts.
- ebXML delivers the value by
 - Using the strengths of OASIS and UN/CEFACT to ensure a global open process.
 - Developing technical specifications for the open ebXML infrastructure.
 - Creating the technical specifications with the world's best experts.
 - Collaborating with other initiatives and standards development organizations.
 - Building on the experience and strengths of existing EDI knowledge.
 - Enlisting industry leaders to participate and adopt ebXML infrastructure.
 - Realizing the commitment by ebXML participants to implement the ebXML technical specifications.

Data Interchange Standards Association (DISA), the ASC X12 Secretariat, publicly announced its support for the ebXML effort in a press release dated 10/18/1999.

Industry Initiatives

With all the hype surrounding XML, it should not be surprising that many industries are looking for ways to utilize this technology to reduce costs and improve productivity. Following are some of the major industry initiatives in progress:

Utility Industry Group

The Utility Industry Group (UIG), an industry action group dedicated to the advancement of electronic data interchange within the electric, gas, and combination utility industry, has just published a draft version of a white paper on

XML. The UIG understands the importance of XML, and is trying to decide how it will fit into its electronic data interchange strategy.

Travel (Open Travel Alliance)

The Open Travel Alliance (OTA) will produce a standard capable of exploiting the low-cost, fast communications that have arrived with the Internet. To use the Internet along with established channels, the industry needs a common standard for the communication of information. The OTA is building an industry standard that provides a format for communicating data between travelers and travel-related businesses, as well as among the businesses themselves. This standard will encourage development of systems that can help create new collections of services to better meet the demands and expectations of travelers and the travel industry. When implemented, the standard will encourage the exchange of trip-centric information between all industry participants, regardless of how connected.

Companies currently participating in the OpenTravel™ Alliance are: Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, Midwest Express, Northwest Airlines, Trans World Airlines, United Airlines, Vanguard Airlines, Bass Hotels and Resorts, Hilton Hotels, Hyatt Corporation, Marriott International, Sterling Hotels, Swissotel, Alamo Rent A Car, Avis Rent A Car, Budget Rent -A-Car, Dollar Rent A Car Systems, Inc, The Hertz Corporation, National Car Rental, and Thrifty Car Rental.

The final product of the alliance is a dictionary of common usage terms used through out the industry. This dictionary of terms will then be compiled and put into XML standard transactions.

OTA is participating in the development of global E-Commerce standards through the ebXML initiative.

Healthcare (Health Level 7)

Health Level Seven (HL7) is one of several ANSI-accredited Standards Developing Organizations (SDOs) operating in the healthcare arena. HL7's domain is clinical and administrative data. Headquartered in Ann Arbor, MI, HL7 is a not-for-profit volunteer organization. Its members include providers, vendors, consultants, government groups and others who have an interest in the development and advancement of clinical and administrative standards for healthcare. HL7 has launched an effort to create XML based standards for Patient Medical Records.

Mayo Clinic, Rochester, Minnesota has made a substantial commitment to the use of XML in the development and implementation of key components of its electronic medical record, locally referred to as Mayo Integrated Clinical Systems (MICS). Mayo Clinic is a large group practice with over 1500 physicians in

Rochester, Minnesota. The practice sees over 300,000 outpatient registrations per year and has approximately 2000 inpatient beds. To date, the XML use focus is the domain of Clinical Document Management. The XML-mediated MICS Clinical Documents work consists of two project groups: CDM Reports and MICS Clinical Notes-II, both managed by a common oversight body and sharing development and support resources.

Mayo is committed to participating with the HL7 body to help define and support this important standard, with the intent of being close enough in our initial software releases to support the HL7 PRA and XML medical document standards in future releases