



GAS INDUSTRY STANDARDS BOARD

XML SUBCOMMITTEE REPORT TO THE EXECUTIVE COMMITTEE

EVALUATION OF XML FOR GISB STANDARDS

[DATE]

EXECUTIVE SUMMARY

[To be provided after the remaining parts of the report are supplied.]

I. OVERVIEW OF XML

XML introduces a framework of standardised business-to-business electronic transactions that will improve the competitive landscape of the deregulated retail energy industry. Electronic business transactions amongst trading partners are complex, data-intensive communications that are usually costly to establish and maintain. By implementing an XML-based electronic business transaction standard for deregulation, the barrier of entry for Market Participants is lowered by providing a cost-efficient, reliable, and 'open' means of communication between Trading Partners. Some of the benefits of using XML include:

XML's ease of development allows small and medium sized participants to maintain flexibility while interacting with a wide range of trading partners.

XML creates a richer structural and semantic environment to express the many roles and relationships among Market Participants.

XML's extensibility is key to fulfilling its promise of simplified standards. Ease of parsing and validation allows developers to quickly adapt to changes in the industry.

XML is designed for use on the Internet, allowing Trading Partners to minimise their costs.

XML is widely accepted across many industries.

XML is readable and easily parsed by computers.

XML is available in a wide variety of low-cost tools, such as Internet Explorer.

XML is a tag-based framework used primarily to organize data in a universally understood format. XML is a subset of the Standard Generalized Mark-up Language (SGML) and is similar to Hyper Text Mark-up Language (HTML). The use of XML facilitates the transmission of information from system to system, independent of platforms. XML was created to deliver structured, readable, usable information over the Internet platform. It is a generalized mark-up language that is platform-independent and extremely flexible. XML can be used to specify the presentation of a document (font size, indentation, etc.) or to specify structure of the document through Document Type Definitions (DTDs) or schemas. XML is designed for Web usage and introduces a new class of documents that do not require a predefined document type. The benefit of XML is that it provides a standard that allows the capacity for processing information by non-proprietary software such as search engines, browsers, and

parsers. As the interest in E-commerce and EDI over the Internet increases, XML is proving to be a leading factor in enabling business-to-business electronic commerce.

II. CURRENT STATE OF TECHNOLOGY

The primary standard to consider when discussing XML, is the specification of XML itself. 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).

INDUSTRY INITIATIVES

There are as many ways to implement XML as there are programmers sitting in front of keyboards. Unsurprisingly, a number of consortiums have sprung up that have attempted to provide a unified approach to the development of business-to-business applications. Some of these initiatives, (such as BizTalk),

are based on the groundwork laid by a single company. Some initiatives (such as XML/EDI) have been incorporated into other groups (ebXML). 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 a 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.

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

BizTalk Frameworks (Microsoft)

BizTalk is an industry initiative started 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 have today - existing data models, solutions and application infrastructure - and adapt it for electronic commerce through the use of XML.

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. East 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.

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 Enables 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.

SOFTWARE PRODUCTS

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 to the natural gas industry, such as the X12 translators from most vendors are already able to read and write XML documents. Furthermore, the tools that developers use, such as compilers and database management systems already 'speak' XML, and this technology is becoming increasingly ingrained.

III. ENERGY INDUSTRY PERSPECTIVES

Services Segment

Third-party software providers and energy marketers in the services segment of GISB are faced with similar challenges of enabling seamless, standardized data exchange between different classes of software and different operating systems.

This, combined with the traditional challenges of architecting and designing a complex information infrastructure, drives the effort to develop a true common standard for electronic exchange of data. XML, eXtensible Markup Language, is a fairly new innovation which some parties believe will meet many of the requirements for a common set of standards for information exchange in the deregulated natural gas and electric industries.

Energy marketers also want one common set of communication standards to allow communication with utilities, suppliers and in some cases, customers. These standards ideally would be the same from state to state, wholesale and retail, electric and gas. The alternative is to develop different systems for each different area. This alternative is prohibitively expensive, drives up ultimate costs for the consumer, and may prevent marketers from entering areas where the customer base is insufficient to recoup the necessary investment.

In addition to the challenges faced within the energy industry, software providers desire to build systems that may be utilized across different industries. Therefore, acceptance by industries outside of energy carries an equal level of importance. This allows software providers to gain leverage on development costs by offering the same, or a significantly similar, product line across industries.

Clearly, interoperability across industries represents an advantage for energy marketers too. Like any company, large or small, there are undoubtedly supply chain transactions within the company, ordering, receiving, invoicing functions, perhaps regulatory filings as well as salary and benefits related transactions. Having a common e-commerce system and language - a real possibility with an XML based system - allows for significantly increased efficiency and a straight dollar savings through elimination of duplicative systems.

In addition, many companies are developing or planning development of systems which utilize XML as the company's internal standard to facilitate data exchange between multiple back office systems. Over time, this trend appears to be increasing. Utilizing XML as the external standard to facilitate data exchange between trading partners would not require development of a separate "external" system. This would save development time and effort, reduce the cost, and allow systems to be brought on-line sooner.

To the above points (and as detailed elsewhere in this paper), various derivatives of XML are either being used, or in the process of development, for use by the following industries: Architecture, Engineering and Construction (aecXML), Automotive, Education (MathML), Financial Services (FinXML), Accounting (AICPA), Banking (OFX), Health Care (HL7), and Human Resource Management (HRMML).

Interoperability is an important decision variable in data format is chosen. Like GISB's current Electronic Delivery Mechanism standards, XML is designed to send information over the Internet using the TCP/IP protocol. In addition, XML defines a data format so it can be sent over any transport mechanism (similar to EDI), including a Value Added Network (VAN).

These apparent advantages to XML must however be weighed against the "cost" of transitioning from X12 EDI to XML. These costs include straight financial

costs involved in the development and/or purchase of XML compliant products, including the related hardware costs, salaries and benefits, training and related expenses. There are also opportunity costs and timing considerations which weigh heavily on the decision as to whether to develop XML solutions or not. If an XML solution is developed, and the market does not transition, the development costs represent a wasted investment. If on the other hand vendors or market participants wait for acceptance before developing products, it becomes a "chicken and egg" issue for transition to XML by the energy industry.

Software vendors in the wholesale gas industry are the tail of the dog in some respects, developing products to fill industry needs, not necessarily driving the marketplace through release of new products, as is sometimes the case in the desktop software market. Therefore, if the industry transitions to XML, it seems a sure bet that software vendors will develop and offer innovative XML compliant products. That said, many software providers are already in the process of developing, or planning development, of XML enabled products.

The promises and potential values of XML appear great. In it's future form, XML represents the broadest type of global information exchange. One standardized set of formats, true content independence, computer to computer, human to human (or human to computer and vice-versa for that matter), the same way, all over the world.

Pipeline Segment

The use of XML in the gas industry for communicating data would give the customer another method to send/receive data to/from the service provider. The physical route that the data takes in getting to the service provider's database could be through the existing route used by the X12 and FF format files. Using this path would cause the least changes needed by the service provider. It would require that the customer have capabilities of posting and receiving datasets and the encryption and decryption of them. The service provider would need to create a method of then posting/extracting the data to/from their database.

Another possible method of using XML would be for the application creating the XML data to convert it into a X12 document. This document would then be transmitted like the current X12 documents.

If the current EDM method were not used to transfer the data, the service provider would need to create another way to transfer the data. This could take additional resources for the service provider that would then be reflected in the rates charged to all customers when the service may only be used by a few.

How many customers will be using this method? How many transactions will be sent this way? If the transactions are sent one at a time, this could cause many files (transmissions) to be sent to the service provider using a batch method of communications. The response time for this EDM process is 15 minutes. Will the customer want to wait that long for a response?

There is an overall concern on support which needs to be answered. How many different methods of receiving/transmitting data is the service provider going to be required to support? Currently there is X12, FF and the customer activity screens.

LDC Segment

[to be supplied – not yet received.]

End User Segment

[to be supplied – not yet received.]

Producer Segment

[to be supplied – not yet received.]

IV. STATUS OF OTHER XML STANDARDIZATION EFFORTS

[To be supplied – not yet received from Sylvia Munson and John Tsucalas]

V. COST FACTORS AND BENEFITS OF XML

[To be supplied – not yet received from Richard Hamilton, George Heal and Gerri Daggett]

VI. RECOMMENDATION

[To be provided after the remaining parts of the report are supplied.]