XML: To Be Or Not To Be?

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ABSTRACT

In the fast changing world of e-Business and e-Commerce, the word du jour is XML. Many who currently trade electronically and those who wish to do so in the short term, are asking questions about XML. Does XML imply the death of EDI? Will XML completely replace EDI? Is it safe to implement using EDI? Is it safe to implement using XML despite the lack of standards? What are the tradeoffs of using XML versus EDI? This paper traces the evolution of EDI and XML. It also provides a look at the pros and cons of each and offers alternatives to consider when evaluating electronic communication with trading partners.

Introduction

Market is changing

Electronic commerce (e-Commerce) and electronic business (e-Business) are not new. The primary goal of e-Commerce is to eliminate manual trading processes between different companies. It does so by allowing different applications to communicate directly with each other for exchanging information. Based on this definition, corporations have been using Electronic Data Interchange (EDI) and Value Added Networks (VANs) to conduct e-Commerce for 25 years to enable these electronic links for communicating, sharing and processing business information among trading partners.

The definition of e-Business extends e-Commerce. It is a discipline and infrastructure to conduct business transactions with business partners strictly over the Web. E-Business automates and web-enables the entire trading value chain. The market perception has been that reliance on EDI and VANs has made the e-Business infrastructure and its processes expensive to implement and difficult to manage. Consequently, some view EDI as a tool that only large companies can afford due to the cost and complexity.

The Internet and its global availability are causing companies to rethink how they engage in traditional business practices and procedures. There is increased competition both in the United States and abroad. Customers are demanding higher quality in the information that they receive. In addition, there is increasing importance of quick and accurate information exchange both within and between business entities. The Internet opens up the electronic market so that companies of all sizes can take advantage of what electronic trading has to offer. According to Rachel Helm in a recent eAI Journal article (November/December 1999), market analysts predict that competitive pressure will push businesses to increase their use of the Internet. Moreover, pressure to improve customer loyalty will result in pressure to optimize the supply chain.

Internet

The Internet enables us to change the way that we do business. Its widespread availability, accessibility, and bandwidth offer new options. The Internet facilitates real-time actions, which improves turnaround time. The existing EDI environment has traditionally been batch-oriented. The accessibility of the Internet greatly widens the scope of a business beyond its physical storefront. This makes it possible to trade with others around the world, not all of which use the same spoken language or even the same computer language. In terms of EDI, we see this translate into the need for using not only the X12 standard but EDIFACT as well. The bandwidth of the Internet introduces new possibilities for data transfer. EDI has grown up as a standard (or format of codes) that represent a shorthand of sorts. It requires a highly skilled person to

decipher. The new bandwidth capabilities enable us to send more data faster and cheaper thus minimizing the concern over the number of characters actually sent.

These Internet components of availability, accessibility, and bandwidth can serve to lower the entry point costs and make Business-to-Business (B2B) transactions available to more companies if an alternative to EDI exists. The eXtensible Markup Language (XML) is being touted as the perfect alternative to EDI. XML is born of the Internet finding its roots in SGML and HTML. It is easy to learn, easy to use, and easy to understand. On the surface, it seems to many, that a replacement for EDI has arrived.

This paper explores the notion put forth by some believers that EDI is dead and XML is the new way to implement B2B. It reviews where we have been with the history of EDI, introduces XML as the new kid on the block, compares EDI to XML and finishes with a review of how the evolution of B2B can actually occur.

Where Have We Been

World traders have always looked for common ways to communicate – language, currency, and international treaty. Without a means to communicate directly from application to application, information preparation for these paper-based systems was labor intensive and slow. Furthermore, the manual processes of data entry and editing at both the sending and receiving ends of a business transaction could be very error prone. The manual processes could produce incomplete information as well. Communication took place through the mail. The entire process added costs and time to operate properly. The introduction of EDI to automate the process made it much more efficient. Automation utilizes business data more effectively, reduces the flow of paper and its inherent error rate, and substantially shortens the sales-purchase-pay cycle thus changing the face of trading partner communications forever.

EDI is the first and currently the prevalent means of data transformation to support B2B data interchange for electronic trade. It has been around for about 25 years. Typically, EDI is a batch-oriented system that supports a set of standards. The data communication is through dial-up connections to Value Added Networks (VANs) that provide mailbox capability. However, EDI is not a ubiquitous solution. Many companies do not support EDI or may trade with partners who do not support EDI. According to the XML/EDI Group, only an estimated 80,000 of the 6.2 million businesses in the United States have an EDI system in place.[1]

In those cases where there is no EDI, many of the data preparation processes remain manual. There has been an upgrade to the communications, though. Today, e-mail and fax replace mail, which speeds the process dramatically.

Creators of EDI were concerned about the size of messages.[2] This was directly linked

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[1] World Trade Magazine, 2/21/00, "Goodbye EDI, Hello XML?", Eric J. Adams
[2] XEDI.ORG White Paper, "XML and EDI: Peaceful Co-Existence", Ricker, Munro, and Hopeman

to communication charges from the VAN, as the bandwidth for EDI networks is expensive. To deal with the size issue, EDI formats are compressed. In addition, EDI was implemented with mnemonic codes to represent complex values. Consequently, metadata is stripped from the message making it difficult for a non-EDI person to read and debug.

EDI Standards

It is possible to accomplish EDI using human intervention at each end of the communication, the sender keying data and the receiver printing data. However, this type of stand-alone EDI application does not draw data from an application at the sending end. And, it does not feed an application at the receiving end. The result provides very little benefit other than being faster than the mail. One goal of EDI is to provide direct computer-to-computer links at both ends to eliminate human intervention. However, each partner either uses a different application or a different variation making it difficult for the data coming in to be recognized by the receiving application.

Another goal of EDI is to share just enough data to transact day-to-day business. Much of this data is similar across companies, industries, and countries. Those engaging in the early forms of EDI felt that it was easier to agree on a document than a complete application interface. To support the many documents across industries, a common vocabulary grew to identify and define each document type. The vocabulary evolved into a standard for exchanging data between trading partners. Today, there are two primary EDI cross industry standards, ANSI X12 and UN/EDIFACT. The X12 standard is very prevalent in the United States, while EDIFACT applies more to international trading. Each supports subsets for various vertical industries such as the Uniform Communications Standard (UCS) for the grocery industry and ODETTE for the European automotive industry.

ANSI X12

The American National Standards Institute (ANSI), Accredited Subcommittee X12 has been charged with developing the architecture and syntax rules for the X12 standard. This group also determines the format and content for all business transactions that can be converted to EDI. The mandate for all X12 transaction sets is that they be applicable across industries. The committee has been developing X12 since 1980 and it updates the X12 standard on a regular basis. Updates add new transaction sets and modify existing transaction sets. The most current version of the X12 standard is 004030.

Because the X12 standards support functionality that is cross industry, the transactions tend to be more complex than any single industry standard. Their standard also supports more types of transactions than any one company or industry uses to conduct business. The depth of the standard allows a company to trade with partners from several industries utilizing the same standard while developing only a single application link between their application and their trading partners. The complexity of the X12

standard has been cause for many industries to limit the standard by specifying which components of the standard they will use to support their business requirements. Several industry guidelines exist that limit the fields to a subset of the whole standard.

UN/EDIFACT

There is also an international standard to support trading companies in many countries. The United Nations/Economic Commission of Europe has administrative control and responsibility for the EDIFACT standard. EDIFACT is a standard for administration, commerce, and transport. It contains data requirements for carrying on international trade. The EDIFACT data element dictionary is identical to the United Nations trade data element dictionary and the standardized code lists match the International Standards Organization (ISO) code lists.

Unlike X12, EDIFACT concentrates on business functions rather than specific documents. Transaction sets develop as a series of segments that contain all of the information strings necessary to transact a particular business function.

Value Added Network (VAN)

EDI software enables a company to transform application data into a standard format to share with a trading partner. It also enables a company to receive EDI data from a trading partner and transform the data into a format acceptable to an application. These transformations utilize an application link. The EDI standards simplify this process. However, the EDI standards do not address the complexities of data communications, their configurations, and the support required. A VAN is a company that provides a service to act as the middleman to simplify the process and make the transmission of data to one or more trading partners more convenient.

A VAN provides several basic services to both the sender and receiver of EDI data. First, as a communications intermediary, the VAN is a pipe for the transmission of data that enables a company to trade with many trading partners while supporting only a single communications protocol. Second, the VAN provides an electronic mailbox for each customer to support the deposit and retrieval of EDI data. Last, the VAN provides control reports that track the flow of EDI data to and from the mailboxes.

A VAN can provide other services such as routing options, in network translations, and links to other messaging products. These additional services are beyond the scope of this paper.

EDI: The Good and the Bad

While EDI has had a significant impact on how businesses conduct inter-company e-Commerce, not all of the results are positive. There are both pros and cons.

Pros

There are four primary benefits of EDI:
- Standards
- Cost reductions
- Increase in speed of information exchange
- Shorter business transaction cycles

Standards

The availability of EDI standards, both X12 and EDIFACT, has been a positive influence. People know exactly what to expect. Both share an element (field) dictionary as well as segment definitions and layouts for various standard documents. The standards work and it is possible to rely on them. Critical systems run using the standards and many application packages today come with an available EDI application link or gateway that eases implementation.

Cost Reductions

EDI eliminates data entry and the errors introduced during that activity. EDI may also eliminate other manual tasks such as sorting, matching, filing, and mailing. However, EDI alone, does not eliminate costs. An EDI implementation that coincides with business reengineering to take advantage of what EDI offers optimizes the reduction in costs.

Re-engineering provides a long-term cost reduction benefit. There are other short-term tangible cost reduction benefits as well. The use of EDI reduces paper, envelope, postage, telephone, and courier charges associated with paper delivery systems. You can also reduce storage space requirements.

Increase in speed of information exchange

Eliminating mail delivery and decreasing the amount of time to process a business transaction increases the speed of information exchange in most cases. However, care must be taken to ensure that a company automates EDI processes as much as possible, manages send and receive functions efficiently, and corrects exceptions speedily.

Shorter Business Transaction Cycles

The business transaction cycle has several components. The advantage of a shorter cycle is that when a trading partner receives an EDI order transaction sooner and it is more likely to be correct and complete, then product should be picked and shipped sooner. This leads to earlier product and invoice receipt. In turn, this should lead to earlier payment authorization and payment receipt.

If a company were to change the way things are currently done by eliminating EDI, this would disrupt crucial systems. The disruption could have substantial financial and procedural impacts on trading partners. It would require the creation of new application links at a minimum. This could also affect business processes and the way transactions execute. These types of changes imply time, effort, programming costs, and possible re-training of key trade process personnel. It would definitely be a challenge to integrate "legacy" business applications into a new structure.

Cons

As is the case in every comparison, there are negatives to consider, as well. Most of the negatives surrounding EDI relate to cost. There are three primary cost factors:
- Message size
- Lack of automated computing systems
- Batch versus Real-time/interactive

Message Size

EDI message size affects cost as it relates to communication and VAN charges. Therefore, the EDI message is compressed using codes to reduce its size. These cryptic message formats require the stripping of metadata from the message. Therefore, the message is hard to read. Because of this complexity, it makes it more difficult to train employees to become EDI literate.

Lack of Automated Computing Systems

A second cost concern is that a small company handles its trade volume completely on paper. There may not be sophisticated computer systems in place. A trading partner in this position needs more manpower to handle the information by computer in addition to sophisticated translation software. The translation software may require additional hardware as well as resources to support the configuration. These software, hardware, and employee resources can be costly. Thus, EDI becomes an added cost burden.

Batch versus Real-time/interactive

Lastly, EDI processes run in batch mode. Some feel that as a result, the EDI approach

doesn't provide enough flexibility or scalability for real time interactive processes that get the right items to the right place at the right time. The world of the Internet demands a much more responsive system. This delay in time is not cost effective today, despite the fact that EDI, as indicated above, shortens business transaction time.

What Is New Today

The global availability of the Internet changes how we think and conduct business. Hence, the view of EDI as complex and costly results in the search for dynamic alternatives that can take advantage of new technology such as the Internet. The more promising alternative today is XML. Some believe that XML can't get here soon enough and that it will solve all enterprise interoperability needs. According to a recent study by IDC, B2B commerce over the Internet will grow from a $100 billion industry in 1999 to $500 billion in 2002 and $1.3 trillion by 2003. Marie Wieck, IBM's Director of XML Technology, says that XML is, "really going to allow that integration of the Web with the business systems."[3]

What is XML?

XML is a subset of Standard Generalized Markup Language (SGML). It has been called a "sibling" of HyperText Markup Language (HTML), which is a specific application of SGML. Those readers familiar with the creation of Web pages recognize HTML as a tag language that has become the standard method of describing presentation, or how data displays on a page. XML differs from HTML. The primary difference is that instead of being a simple tag language (like HTML), it is actually a "meta-language". This means that it is a set of rules for creating tag languages. The other significant difference is that the tag languages that can be defined in XML describe content rather than form. They organize data rather than simply display data. As a meta-language, XML enables a user to design his/her own markup language (tags) to define the document. This flexible use of tags makes it easier to create not only Web documents, but also almost any kind of data. In the end, XML merely encapsulates data in a platform neutral way and is just a special kind of text file.

In the last six months, XML has gone from obscurity to the forefront of most articles written about applications and data exchange. XML gets visibility for many purposes including enterprise application integration (EAI), inter-departmental communication, and as the silver bullet to replace EDI and simplify all Business-to-Business (B2B) and e-Commerce applications. XML is ubiquitous and allows you to collect data from anywhere over the Internet without the use of a VAN.

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[3] XML magazine, Winter 1999/2000

Much of this visibility and hype stems from the facts that XML is human-readable as well as machine-readable and adheres to an open standard. Before we discuss the viability of XML as the silver bullet, let's look at what a tag language actually is.

Tag languages look similar to HTML because a beginning and ending tag surround all data. As an example, let's think about an XML document that describes a PC monitor. The XML statement,

<Monitor>VGA</Monitor>

is one way to tag all monitor products in the document. However, since no standard exists to define the tags, the statement

<Monitortype>VGA</Monitortype>

might be used by another company to describe the same thing. A tag in XML can mean anything that you want it to be. In addition, if one doesn't exist for your purpose, you can make up a new one.

In order to allow companies to share information, a Document Type Definition (DTD) may accompany an XML document. The DTD is a collection of rules that describes how the document uses the various tags and standardizes the structure of the XML documents being exchanged. The DTD also describes the document's hierarchy. It identifies which elements, or tags are mandatory, and which are optional. The syntax of the DTD is defined in the XML 1.0 specification, but a DTD is not actually written in XML. Another newer and more comprehensive way to define the content of an XML document is by reference to an XML Schema, which is written in XML. Since XML schemas are still not yet a recommendation of the W3C, most usage of XML to date relies upon DTDs. However, the XML Schema Working Group has published a draft specification, which may reach recommendation status by the summer of 2000.

How does XML compare to EDI

The use of user-defined tags makes XML easier to read than EDI data, which is cryptic in nature. However, XML is much more verbose than EDI. Figure 1 displays a portion of an Invoice in EDI format. Figure 2 displays a portion of the same Invoice in XML format.

```
ST*810*000000001+
BIG*000608*000101.000**114,477*20000608105238210000119993+
N1*ST**92*201/847-1200+
N3*795 Franklin Avenue+
N4*Franklin Lakes*NJ**US+
N1*BT**92*201/847-1200+
N2*Accounts Payable+
N3*795 Franklin Ave.*2nd Floor+
N4*Franklin Lakes*NJ**US+
IT1*1*1474*EA*63.58***44HVV9406**155110036+
PID*F+
```

Figure 1. Invoice Sample EDI Format

```
<?xml version="1.0" ?>
        <transactionSet code="810" version="003050">
       <name>Invoice</name>
         <segment code="ST">
           <name>Transaction Set Header</name>
           <element code="143">
             <name>Transaction Set Identifier Code</name>
             <value code="810">X12.2 Invoice</value>
           </element>
           <element code="329">
             <name>Transaction Set Control Number</name>
             <value>000000001</value>
           </element>
         </segment>
         <segment code="BIG">
           <name>Beginning Segment for Invoice</name>
           <element code="373">
             <name>Date</name>
             <value>000608</value>
           </element>
           <element code="76">
             <name>Invoice Number</name>
             <value>000101.000</value>
           </element>
           <element code="324">
             <name>Purchase Order Number</name>
             <value>114,477</value>
           </element>
           <element code="328">
             <name>Release Number</name>
             <value>20000608105238210000119993</value>
           </element>
         </segment>
```

Still XML, like EDI, has its positives and its negatives.

Pros

Almost every positive connotation surrounding XML relates to simplicity and cost. More often than not, these two advantages are tightly coupled. The components of simplicity and cost in this context are:
- Availability
- Metadata
- Extended use

Availability
XML uses generic software tools to create it. The general availability of the technical skills to use these tools eliminates the need for specialized EDI resources. To produce an XML document using the tools requires minimal training. If you have any familiarity with HTML, then it is easy to understand and create XML documents. Consequently, XML makes document exchange more cost effective.

Metadata
XML is also rich in metadata. Therefore, it is easy to read and debug. Because of this, it becomes easy to train programmers in the use of XML. The ease of use and lower learning curve will eventually make XML support widely accepted. This will cause the cost of diverse application integration to drop dramatically.[4]

Extended Use
Another advantage of XML's simplicity and cost is that it allows large trading partners to extend their electronic trading community beyond those who can afford EDI. This idea, along with availability of the "lower cost" Internet for communication transport helps to further expand a business in this global economy beyond its physical storefront. Trading communities then become a component of B2B Internet commerce. A trading community offers a buyer the largest set of possible suppliers.

Cons

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[4] Commerce One, Inc., "How XML Enables Internet Trading Communities and Marketplaces", Dr. Robert Glushko

One of the biggest negatives to XML will likely resolve itself over time. However, for today, it actually adds a layer of complexity to the use of XML. At this time, there are many different XML standards. Since XML has wide applicability, only some of these standards truly relate to e-Commerce adding to the complexity. In addition to the lack of standards, there are four other negatives to XML:

- Universal use
- Structure
- Internet transport
- Translation

Lack of Standards

Several XML standards come from vertical industry groups. For example, OFX is the Open Financial Exchange standard that is applicable for actions such as checking account transfers, credit cards, and fund transfers. The Interactive Financial Exchange (IFX) standard allows the sharing of information for banking by phone, voice response, ATM control, and PDA control. Other financial standards include FinXML for the automation of capital markets, FpML for interest rate and foreign exchange data, and FIXML for equities market data transfer. Microsoft sponsors the BizTalk standard, which emphasizes document sharing between applications. It also supports document sharing between businesses.

There are several groups that actively work on creating XML standards or providing the business community with information about XML. The Electronic Business XML (ebXML) group began its work in September of 1999. It is working on a specification it hopes will work for the masses rather than individual vertical groups. This body has several project teams made up of industry volunteers. They meet regularly and hope to have a standard available within the next 12 to18 months. One of the positive attributes of ebXML is that members are from the United States as well as abroad so that there is global input with the hope that the emerging standard will be applicable wherever business is conducted.

The Organization for Advancement of Structured Information Standards (Oasis) is a non-profit consortium. It operates a public registry of standard DTDs for the exchange of documents between businesses.

There is also the XEDI.ORG, which has published a very simple XML standard that combines EDI with XML. XML/EDI refers to the EDI and XML combination put together by these business framework groups. Other standards in existence today include Commerce One's CBL (Common Business Library), RosettaNet (IT Supply chain), and Ariba's cXML (Commerce XML) for catalogs and Purchase Orders.

Universal Use

In order for XML to succeed, it must be usable everywhere in the world. However,

the tags that several standards groups recommend may cause a problem. Usually, the tags are in the English language. So while EDI codes are language neutral, XML labels may not be. Therefore, it would be difficult to use the "XML standards" for multi-national implementation.

Structure

Fadi Chehnde the former CEO of RosettaNet, an XML consortium for the IT Supply Chain industry, says that XML is like an alphabet. It still requires a grammar and vocabulary to become a viable language. RosettaNet has an XML specification. It currently has 5,000 words. Of these, 3,500 are unique to products only found within the IT supply chain. Examples of these unique words are "mouse pad" and "semiconductor".

EDI, on the other hand, offers more than the syntax that XML provides. It also combines semantics. EDI defines how to structure data, not just how to package and transmit it.

Today, standard EDI messages are never used "as is". Trading partners customize the messages to create subsets for a particular relationship. Moving to XML does not eliminate this. An XML message within any of the new standards will only apply to a pre-existing relationship. Because the message will require changing, there is little to gain beyond the cost savings of using the Internet.

One final structural concern relates to delivery destination and information about workflow. Many in the XML field suggest the need to separate content from addressing because there may be better technical approaches. However, to date, there are no standards that identify how you should "wrap" an XML document with delivery information.

Translation

A major area of concern and one that adds complexity to XML deals with interpreting messages. There are many diverse applications available today. They run on different hardware platforms. They use different data models. In order for XML to integrate these disparate applications, it would be necessary to modify them to accept the same data fields in the same format as an application link, or gateway. Since each application today uses different formats, translating the incoming XML to fit the application could be difficult. While XML has the potential for application-to-application integration as the glue that binds, it is not possible today.

Laura Walker, executive director of OASIS, says there are thousands of XML initiatives underway to develop XML standards. Most industries are developing their own vocabularies and formats. One difficulty that arises is the need to share XML across industries. In order for the sharing to take place, it will be necessary to bridge the gap between the various XMLs. This is especially true for companies with horizontal trading that can intersect multiple vertical industries. In these situations, it is possible that it will be necessary to translate dozens of different XML versions.

While IT is hoping that the translation between the various versions of XML will be relatively easy, it will still be necessary for someone to map data and integrate it into the application. This can be done manually, or it is possible to use a parser, or translator to transform an incoming message into the appropriate database format. An XML translator to handle the mapping and conversion from one version of XML to another is no different from the need for EDI data translators today.

Volume and Security

The high cost of VAN usage has always been a concern to users of EDI. Use of the Internet for the transport of XML seems to be a way to reduce this cost. However, a sample of XML data is about 1,000 times larger than the same data sent in traditional EDI format.[5] This could imply that EDI is more efficient for large volumes of data. This is especially true since the Internet is not yet extremely reliable.

While the Internet acts as a highway for the transfer of XML traffic, there still need to be rules or laws on how to handle the messages to keep things running smoothly. Use of the Internet for XML message traffic requires recovery mechanisms to handle Internet failures. There is also the matter of securing the data via encryption and key usage to ensure privacy. Both utilize software solutions. Introducing additional software components adds to the complexity as well as the cost of implementing XML.

Will XML replace EDI?

Some believe that all of the XML hype means that EDI is dead. This is a simple and uninformed view from both a business and technical perspective. While XML offers alternatives for companies who feel that they cannot engage in EDI for trading, those who currently use EDI will not abandon it without good reason. It works, providing much benefit to inter-company trade communications. Moreover, the change from EDI to XML will not be free. There will be a need to re-map transactions to XML. Alternatively, it will be necessary to rewrite the back end interfaces to generate (or accept) XML. This is not a trivial task.

Rather than replace EDI, it is more likely that we will see EDI users begin to also use XML. When they do, they will preserve as much of what they have as they can. This will lend itself to an XML/EDI hybrid at the very least. When the flexibility of XML combines with the structure of EDI, then XML will show commercial potential.

XML is currently unable to replace EDI in the marketplace. There are several causes for this. First, we note that it will be at least 6 to 18 months for any type of standards to settle in. However, the promise of XML lies in its openness and extensibility. Second, XML is verbose. There is no knowledge at this time of how

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[5] News/400, March 1999, "XML/EDI: A New Generation of EDI", Nahid Jilovec

XML will actually handle the transfer of large transaction volumes over the Internet. Third, a parser is required to interpret the various documents. How is this different from the need for data translators we find with EDI?

What can we do?

The primary concerns about the use of EDI are cost, complexity, and technology changes in relation to use of the Internet. While new technology and ways of doing things are available through the Internet, many business entities are not ready to give up the ghost and declare that EDI is dead. Until then and while we wait for the XML marketplace to settle in, there are things that data transformation companies can do to enhance their existing products to modernize them and make them more acceptable to the masses.

Cost

Cost continues to be a key issue in considering the use of EDI. It is expensive to purchase a data transformation tool, purchase a machine that can run the software, hire a qualified EDI coordinator, and hire the necessary staff to support this machine. Moreover, these costs are ongoing rather than one time as several components require maintenance or support contracts. One way that the industry addresses these particular challenges is by providing data transformation software that runs on platforms with lower Total Cost of Ownership (TCO). EXTOL like other predominant EDI vendors now offers products that run on UNIX and NT as well as the AS/400. However, EXTOL differentiates itself in this area. Not only is the EXTOL Integrator capable of running in all three environments, it is the same product on each. EXTOL is the only vendor that can offer product uniformity. The advantage to uniformity is scalability and portability to support growth without incurring additional learning curves as a company switches its transformation product from one operating environment to another.

The EXTOL Integrator family of products is also completely interoperable. This puts the EXTOL Integrator in a unique position to provide a platform-neutral solution within the company computing environment. A site can develop transaction maps on an NT platform, for example, but run the maps on an AS/400 without any changes at all. This drastic reduction in time saves substantial effort and rework.

To minimize staffing costs, most vendors now offer out-tasking and/or outsourcing services. In out-tasking, the customer owns the software license but does not incur the staff costs for the EDI coordinator because the vendor provides all trading partner set up as well as map creation and testing. In an outsourcing environment, the vendor also performs all trading partner interaction as well as operations management. One option is for vendors to bill daily operations at a fixed monthly

rate with additional services provided for time and materials. Billing for daily operations can also be on a transaction basis. In either case, the annual cost can be less than one half of that incurred when a company hires its own staff. This provides a perfect opportunity for smaller shops to participate in EDI.

Another cost saver involves the use of an Application Service Provider (ASP). When using an ASP, the company may or may not own the software license. The company utilizes the hardware and IT infrastructure of the ASP for a monthly hosting fee. This also greatly reduces the entry costs for the smaller company that wishes to share data electronically with trading partners. In some instances, it is possible to combine outsourcing and out-tasking with the use of an ASP. EXTOL offers outtasking, outsourcing, and ASP services enabling companies of all sizes to enter the world of B2B using EDI at a lower cost point.

Complexity

Complexity of the EDI application in terms of use has been a concern to many over time. To make the software easier to use, vendors can make it a point to advance their products in this direction.

EXTOL leads the way in simplifying the use of data transformation tools. The EXTOL Integrator includes features such as an Advanced Automap facility that reduces the time it takes to create a map by 85%. It automatically creates the trading partner and map records based on test data. The version conversion and application conversion features within the Integrator enable a user to convert maps with little to no manual intervention. This works well when X12 and EDIFACT release new standards, applications change, or different trading partners require the same transaction with dissimilar versions of a standard. Extensive support for both formula and business rules within the EXTOL Integrator virtually eliminates the need for any external interface programming. User View enables a non-EDI literate person to view EDI data with descriptions so that the data can be understood. With EXTOL Integrator's e-send capability, these views can be sent to anyone via email, thus shortening the time it takes for users to resolve issues without IT intervention. Moreover, with over 100 reports (including graphics capability) delivered with the system, the EXTOL Integrator provides the user with access to the data required to easily manage day-to-day operations.

Modernization and Technology

It is also possible to modernize EDI translation solutions so that they insulate the user from complexity and fit more easily into the Internet. In this way, they begin to bridge the gap between what was, and what will be. Several options for modernization include:

- Web enablement and web forms
- Real-time/interactive processing

- Internet communications
- Fax and email support

Web Enablement and Web Forms

Generally, EDI applications support a client/server model with a fat client. This means that each user installs a substantial component of the product on a PC. While common, this model does require additional support to ensure that the PC, or client, is running the same version of software as the server. It may also require additional software on each client to provide access to the server.

It is also possible to Web-enable the application and use a thin client model. Using nothing more than a browser, the user can run and access all components of the product. This works well for a company that has many users and does not want the headache of software distribution support. It also makes it easy to decentralize operations. The machine resides in one location with the various users dispersed in other locations. The EXTOL Integrator has been offering support for a JAVA based thin client for some time, giving users the option of how they wish to deploy their software.

The use of Web forms is an extension of this model. We know that the perception of EDI is one of complexity making it more difficult for smaller shops to adopt. If the transformation tool provides Web forms that look like common documents, such as a Purchase Order and Invoice, to supplement the EDI tool, this simplifies matters. The trading partner manually completes the familiar looking form and submits it for processing. There is no need for in-depth EDI knowledge. All of the EDI transformation work takes place in the background behind the custom form. This type of support lends itself very well to both the outsourcing and ASP environments. It also works well in a hub and spoke environment. The larger trading partner, or hub, provides the spoke with the pre-defined form. Several vendors, including EXTOL, offer Web form processing.

Real-time/Interactive Processing

One concern about using EDI in today's world revolves around its batch orientation. The Web and Internet tend to support a more real-time/interactive process rather than a batch process, that runs only once a day at a specific time regardless of activity level. It is not necessary for EDI to just process data in batch. The EXTOL Integrator is unique in that it supports a feature we call Pipelining. This enables a site to process any translated data in a real-time interactive mode without incurring the traditional overhead associated within the translator for starting each batch. It is perfect for companies who process high volumes of small batches of transactions daily.

Internet Communications

Another technology area many consider ripe for modernization is communication.

Trading partners are seeking the ability to transmit data via the Internet rather than use costly VANs. They also prefer FTP to the older technologies of Async and Bisync communications. Many vendors, including EXTOL support Internet connectivity as well as the older communication methods giving users a choice in how they communicate with their trading partner. Encryption and secure transmission continue to be important considerations when using the Internet to communicate between trading partners. Most vendors also offer options to ensure that data transmits securely.

Fax and e-mail Support

Two capabilities that supplement communications are fax and e-mail. While they do not completely eliminate paper, both automate various components of the business transaction process and do serve to shorten communication cycles and reduce costs. If a product can include these features then it becomes easier to share information about transactions both within the company as well as between trading partners both large and small. Several vendors include functionality of this type within their products. EXTOL includes both e-send and e-fax as components of the EXTOL Integrator. These features within the EXTOL Integrator also go a step further and enable a company to identify specific trading partners so that information is automatically sent via either technique.

Evolve EDI tools for co-existence

Beyond taking steps to ensure that translation tools support modern technology, there is the alternative of actually evolving the tools to co-exist with the new XML technology. Many vendors have already introduced new features that offer XML support in some fashion. There are several ways to support and co-exist with XML while still maintaining traditional support. These coexistence features are a true bridge in that they do not require the cost and time of re-working existing applications and interfaces.

Two of these co-existence features are EDI-to-XML transformation and XML-to-EDI transformation. At EXTOL, we see two tangible advantages to XML when used in electronic commerce:

1. When publishing a document to be read by a person (as opposed to an application to application exchange of data), the only software required to read the document is an XML enabled web browser.
2. Because XML is extensible, users can express their exact meaning in XML formatted data, rather than being forced to fit their data into a rigid standard such as EDI.

EDI-to-XML

EDI-to-XML transformation has several implications for our users. First, it allows the EXTOL Integrator to send any transaction as an XML document. The document can be sent as data, attached to e-mail, or can be part of a fax. Second, if the EXTOL Integrator receives a document in EDI format, it will also be able to transform that into XML to be used with e-fax or e-send. This can supplement our current User View functions.

At this time, the EXTOL products support EDI-to-XML transformation. Our transformation will take the standard EDI element IDs and convert them to XML tags. Because XML is not a formatting language, this will not create a document that is very user friendly. To correct this, we will create and use XML style sheets to accompany our documents. This will allow any user to look at the data in a very readable format.

As XML standards develop and the industry consolidates, EXTOL will support the accepted specifications. Until then, EXTOL will be prudent in its use of XML, as will the other vendors in the data translation space, because it is not possible to build a house if there is no design or plans do not exist.

XML-to-EDI

The opposite of EDI-to-XML transformation is XML-to-EDI transformation. The evolution of the EXTOL Integrator line of products is very customer and market driven. As the market for XML matures, we will continue to adapt our product to those requirements and support XML-to-EDI transformations. EXTOL believes that EDI is not dead but is evolving as a necessary complement to XML. As such the EXTOL Integrator will also continue to evolve to support the market needs for new transformation technology as it relates to EDI-XML and XML-EDI.

EXTOL sees EDI-to-XML and XML-to-EDI translation as a means of providing a temporary XML "fix" to those who need to say they support XML. The EXTOL Integrator will easily perform these transformations. In our opinion, though, the real transformation need will be XML-to-XML and XML to and from various types of application database structures, both flat and hierarchical. The XML-to-XML transforms will connect XML "enabled" applications. The XML-to-Any and the Any-to-XML transforms will connect XML applications to non-XML enabled applications.

XML to XML

In our opinion, the real transformation needs will be XML-to-XML and XML-to- and from various types of application database structures, both flat and hierarchical. The XML-to-XML transforms will be needed to connect XML "enabled" applications. The XML-to-Any and the Any-to-XML transforms will be needed to connect XML applications to non-XML enabled applications. In order to handle this type of transformation, existing transformation products may not serve the purpose.

In the long run, vendors will develop new data transformation tools that specifically handle the various connectors of:

- XML-to-XML
- EDI-to-EDI
- EDI-to-XML
- XML-to-EDI
- XML-to-ANY
- ANY-to-XML
- ANY-to-ANY

This will be necessary so that the tool is platform independent, cohesive, and efficient. Count EXTOL among those vendors. Any new products that we introduce will be built entirely around XML. They will be multi-platform by design and will support Internationalization from day one.

Summary

Philip Russom, the Director of Data Warehouse and Business Intelligence at the Hurwitz Group sums up XML properly when he says that it is not a panacea. "It is merely an enabling technology. XML is nothing by itself. It is a small bolt in the e-Business machine," albeit an important bolt. Nahid Jilovec, a noted expert in the field of EDI echoes that sentiment when she says that, "XML isn't a revolutionary technology that will replace EDI; it is merely the evolution of EDI to a Web-based environment."

So, what are we to do? XML does lower the entry barriers to e-Commerce in terms of complexity. It may or may not lower these barriers in terms of cost. So, XML is not the end of EDI. XML can extend EDI to bring e-Commerce to small and mid-size companies. As such, XML complements EDI.

The industry needs to be prepared to handle the evolution and growth of XML but not abandon what has worked for so long. There is a tremendous cost associated with making such a wholesale change. As a vendor, EXTOL believes that it should continue to evolve and modernize its transformation engine to provide features that fit with current technology such as support for Internet communications, Web forms, real-time/interactive processing, thin client GUI and Web support, as well as fax and e-mail support. At the same time, EXTOL will continue moving toward the future with some support for XML today and full support for XML as the standards become clear and application software makes modifications to support XML as well. EXTOL further believes that vendors should continue the evolution of their transformation products to support ease of use features such as EXTOL Integrator's User View, e-fax, and e-send to minimize the complexity and cost point of using EDI.

This paper points out the strengths and weaknesses of both EDI and XML. Both technologies are of value in the right environment. Yet, we see more today about XML. Despite the XML hype and the negatives of EDI, it continues to grow. Deregulation, for example, causes companies in the energy industry to increase their EDI partnerships.

This is because the states are requiring that EDI be the medium to exchange data. Similar state regulated changes are occurring within the health care industry as well.

Research conducted by Faulkner & Gray's Electronic Commerce Research Group in Chicago found that EDI volume is still rising at an annual rate of 15%. That is healthy growth. Giga analyst Ken Vollmer says that, "There's a definite dichotomy between popular press and what's going on in the real world. If it's not new and sexy, no one wants to talk about it. But for people in the (EDI) trenches, I don't think we're going to be able to pry them away from it."[6]

Yet, XML still seems to be the direction in which the industry is moving. Before taking the XML plunge, though, it is important to reiterate, and therefore consider several XML myths.

The first of these is that XML will eliminate the need to map. That just isn't so. A company will still have to go through the process of connecting the XML data to the specific application fields that need to interpret it. In the early stages of XML's life, we will not see the direct integration of applications across companies via an XML format. This is the result of application heterogeneity with different data models.

Another myth is that XML will make costly VANs disappear. It will still be necessary to provide a means of transport for the XML files between trading partners. A VAN can provide this transport mechanism. It is quite likely, though, that as transport options evolve, so will the VANs. They will offer different services that better serve the needs of an Internet based economy.

The third myth is that XML is real-time and EDI is not. Real-time is a function of the software's ability to handle small frequent groups of messages efficiently. It can also be the function of service level agreed to with the VAN. It is only by choice today that users connect with the VAN periodically. They do this to manage costs. As we note above, VANs will evolve their services. In this evolution, they will most likely address the cost issue so that they can remain in business.

Finally, there is the belief that XML is better than EDI because it is human readable. The simplicity and readability of XML are useful. However, these reasons alone are not sufficient to choose a new technology for trading partner communications. It is important to remember that XML's flexibility enable it to be used for many purposes in addition to trading partner communications. With the availability of Web forms to insulate users from the complexity of EDI and XML, the readability feature of XML is probably more useful within other office productivity products.[7]

Is XML to be? Only time will tell. In the meantime and with the right products, "Long live EDI".

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[6] Computerworld, May 1, 2000, "Firms Wait on XML, Increase Use of EDI", Carol Sliwa
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