XML and Electronic Commerce: Enabling the Network Economy

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There has been a lot of talk about how the Internet is going to change the world economy. Companies will come together in a "plug and play" fashion to form trading partner networks. Virtual companies will be established and new business models can be created based on access to information and agents that can carry it around the world using computer networks.

We totally believe in this grand vision and are confident that it will begin to happen in the next few years. We are also realistic and understand that there are still many barriers to enabling the vision. EDI, although a success for some, has not been accepted by the majority of the business community as a way to do business electronically. Even though there have been extensive efforts to standardize EDI transactions, it remains too expensive and the software developed does not make it easy to leverage implementations across different trading partners.

These barriers to adoption of EDI leave many businesses with paper-intensive, manual, costly processes to exchange business documents, forms and messages with their trading partners. Neither EDI nor a manual paper process can change at the same pace as the dynamics of a business. Any solution that is targeted at enabling the network economy must be one that insulates businesses operating computer systems from the daily changes that occur in a business.

For this reason, our approach to enabling the network economy is to make the business documents, forms and messages that flow between businesses, comprehensible to each business no matter what computer system is used and even if each business is using different computer systems. XML used in Electronic Commerce is an enabling technology that makes it possible for business documents forms and messages to be interoperable and comprehensible. XML is one of the key ingredients that will accelerate the reality of a network economy and new business models based on the Internet. Early work with XML and electronic commerce is happening in the area of procurement, distribution, supply chain management.

So why is XML a good enabling technology?

The features of XML are:

- A markup specification for creating self descriptive data
- A platform and application independent data format
- A way to validate the structure of data
- A syntax that can be understood by computers and humans
- An incremental way to advance web applications used for electronic commerce

The benefits of XML to business are:

- Businesses can describe services in a manner that can be widely understood
- One set of documents, forms and messages can be exchanged by businesses with different internal business systems
- Errors in re-keying data are reduced because data can be transformed through gateways
- Frequent changes in business process can be handled without substantial engineering cost
- Leverages investment in legacy systems and can be used with latest Internet technology

To further understand the benefits of XML, it is important to compare it with today's use of HTML. HTML, a simple markup language for display, has limited facilities for distinguishing between content, structure, style or relationships. In order for the existing electronic commerce applications to function, many proprietary tag sets and extensions to HTML have been developed. However, the resulting lack of standards makes the content with these applications incapable of inter operating with the applications of trading partners.

In the following HTML description of a computer it is not possible to distinguish the structure of the description from the way it is displayed. Thus there is no way to mark up important information in a meaningful way for use by an application.

```
<TITLE>Laptop Computer</TITLE>
<BODY>
<UL>
<LI> IBM Thinkpad 560X
<LI> 233 MHz
<LI> 32 Mb
<LI> 4 GB
<LI> 4.1 pounds
<LI> $3200
</UL>
</BODY>
```

For example, if a catalog search application (or application component) got the input:

“Find laptops with at least a 200Mz processor, more than 800K of disk space, and less than 300,000 yen” the search would not be able to return this HTML page unless there was rigid (and expensive) parsing code for the content of the page. Even though the laptop meets all the requirements, the markup isn’t “smart enough” to support the transformations of data units needed to match the query.

In contrast, the same computer description in XML provides a much more usable description of the same information.

```
<COMPUTER CLASS=“Portable”>
<MANUFACTURER>IBM</MANUFACTURER
>
<FAMILY>Laptop</FAMILY >
<LINE>Thinkpad</LINE>
<MODEL>560X</MODEL>
<SPEED UOM=“MHz”>233</SPEED>
<DISK UOM=“GB” >4</DISK>
<WEIGHT UOM=“lb”
STANDARD=“ISO”>4.1</WEIGHT>
<PRICE CURRENCY=“USD”>3200</PRICE>
</COMPUTER>
```

In this case, is easy to understand each atom of the document thereby making intelligent processing of the document possible. Processing “XML anywhere” is a more achievable statement than what Java will ever be able to produce. Because XML is declarative data, processing issues are not as complex as they are with running Java everywhere. An example to processing XML anywhere can be derived from the previous computer description.

- The schema for computers can be validated by one of the XML processors on the market (some for free). Validating XML processors are becoming more widely available as XML gains market momentum.
- The XML tags provide a logical container for extracting and manipulating <COMPUTER> information as in the case of a sorting algorithm associated with a catalog search.
- It is possible to sort by <MANUFACTURER>, <FAMILY>, <LINE>, <SPEED>, <WEIGHT>, <PRICE>, etc.
- There is an explicit identification of each part that enables its automated processing such as converting <PRICE> from “USD” to “Yen.”

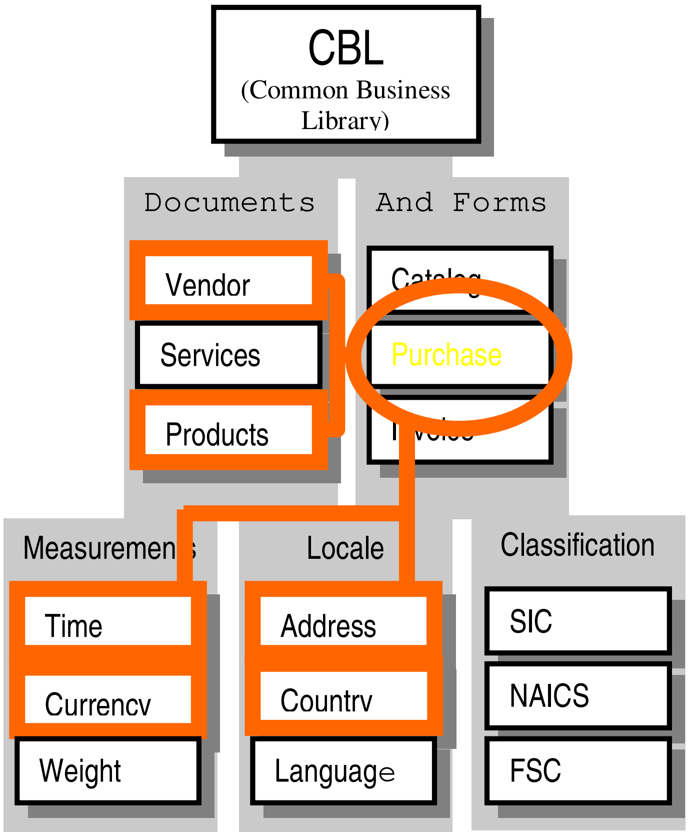
Not only does XML make it easier for computer to process information, it is good for humans and can be used to produce the same “web for eyeballs” that exists today and will continue to exist into the future. XML and XSL (a standard XML Style Sheet Language Specification under development) will make it very easy for web servers to serve XML document and XSL style sheets to browsers that will actually be transformed to HTML, DTHML and Java script when rendered within the browser environment. The following diagram is a representation of the “web for eyeballs.”

The fact that XML is good for humans and good for computers can not be overlooked. Going back to EDI, a major complaint from experts is that the disconnected systems are the result of errors. Reduction of errors has a direct impact on the company's bottom line. Therefore routing information to humans for decisions as part of a business processes is a desirable concept. EDI makes this difficult because there is not enough information in the transaction sets for a human to understand without a thick binder of implementation documentation to accompany the transaction sets. Using an XML markup representation of the EDI transaction documents, it is possible for interactive web application to be woven into the existing EDI processes. For example, an XML system integrated with EDI would make it possible for an EDI document to be posted on web sites for browsers, passed around between disparate ERP systems, e-mailed to humans for review and editing, and become part of other EDI transaction documents. There are already efforts underway through Commerce Net and the XML/EDI working group to create standard tag sets for the EDI X.12 transaction documents.

XML enables anyone to develop tag sets and definitions for a domain-specific language based on a standard. This flexibility is a wonderful thing. However, this feature of XML can become a liability if not managed. If every company were to develop its own language, there would be no interoperability and years of hard work and understanding from the EDI standardization process would have been thrown away. This knowledge is too valuable to waste, so we are attempting to engage the electronic commerce community at large in the XML standardization process. The goal is to create the most robust, open framework for electronic commerce based on XML. So far this has been the effort of Veo Systems Inc., of Mountain View California, to create a Common Business Library of XML components for use in electronic commerce applications.

Every business should NOT have to figure out how to use XML to express universal concepts like "address" to include in all of its documents that require an address. Through standards organizations such as ISO and ANSI, the world has agreed-upon ways of expressing concepts like address. Veo Systems, with help from an Advanced Technology Program research award from the National Institute for Standards and Technology, has expressed these standard commerce transaction documents in XML using an architecture that makes it possible to compose documents from smaller document "building blocks."

The following diagram shows a simple example of how it is possible to compose a purchase order form from smaller markup components.



Veo has offered its Common Business Library for public use, free of charge. In September 1998, CommerceNet, the leading industry association for electronic commerce (hundreds of corporate members in over twenty countries), formed a working group whose charter is to develop an open framework for electronic commerce based on CBL. The group consists of XML, electronic commerce, and standards experts from over 20 corporations and standards consortia. The group will take the baseline version (1.1) of CBL and work to establish the appropriate intersection of concepts, a standard vocabulary and set of tags for the concepts, and an architecture that works for the development of domain specific languages.

The following diagram illustrates how the Common Business Library will be used as a foundation for other commerce languages and protocols.

Over time, the Common Business Library will grow with contributions from different vertical industries. Veo Systems is committed to providing products and services that use the Common Business Library to create Internet trading communities and marketplaces that are open and interoperable.