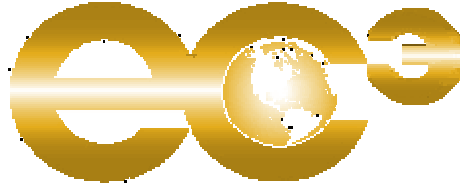


***Is the Lack of E-procurement Standards...
A Barrier to Implementation?***

A Government and Supplier Perspective



Exposure Draft

December 2001

NECCC BOARD

Chair

Carolyn Purcell,
TX CIO

NASCIO

Vice Chair

Hon. J. Kenneth Blackwell,
OH Secretary of State

NASS

Secretary/Treasurer

Richard B. Thompson,
ME Director of State Purchasing

NASPO

Immediate Past Chair

Hon. J. D. Williams,
ID State Controller

NASACT

NASACT:

Hon. Ralph Campbell, Jr., NC State Auditor
Hon. Jack Markell, DE State Treasurer

NASCIO:

David Lewis, Chief Information Officer,
Commonwealth of MA
Aldona Valicenti, Chief Information Officer,
Commonwealth of KY

NASPO:

Dave Ancell, Director, Office of Purchasing, MI
Department of Management & Budget
Denise Lea, Director, LA Office of State
Purchasing

NASS:

Hon. Mary Kiffmeyer, MN Secretary of State
Hon. Elaine Marshall, NC Secretary of State

ITAA:

Basil Nikas, CEO, InetPurchasing.com

NACHA:

William Kilmartin, Accenture

NAGARA:

Terry Ellis, Salt Lake County Records
Management and Archives

NASCA:

Pam Ahrens, Director, ID Department of
Administration

NAST:

Hon. Jack Markell, DE State Treasurer

NGA:

Thom Rubel, National Governors Association

The National Electronic Commerce Coordinating Council (NECCC)

The National Electronic Commerce Coordinating Council (NECCC) is an alliance of national state government associations dedicated to the advancement of electronic commerce within the states. The Alliance is comprised of the National Association of State Auditors, Comptrollers and Treasurers (NASACT), the National Association of State Chief Information Officers (NASCIO), the National Association of State Procurement Officials (NASPO), and the National Association of Secretaries of State (NASS). In addition to our four state association alliance members, there are four non-voting affiliated members that have joined the council. The Information Technology Association of America (ITAA), the National Automated Clearing House Association (NACHA), the National Association of Government Archivists and Records Administrators (NAGARA), the National Association of State Chief Administrators (NASCA), the National Association of State Treasurers (NAST) and the National Governors Association (NGA) are advisory members who represent state associations, private IT companies and the financial services and technology industries.

NECCC E-Procurement Work Group Standardization Sub-Group

NECCC Board Liaison

Richard B. Thompson
Director of State Purchasing
State of Maine

Public Sector Chair

Jim Passier
Procurement Manager
State of Connecticut

Private Sector Co-chair

Howard Freeman,
Business Manager
3M

Sub-Group Members

Larry Carr
E-Business Analyst
State of Minnesota

Richard Pennington
Purchasing Director
State of Colorado

Jim Craig
Unisys

Dixon J. Ross
Assistant Director, Procurement Svcs
State of New York

Rick Frye
State of Louisiana

Michele Sisler
NASPO

Gary Lambert
American Management Systems

Sandra Wright
Dun & Bradstreet

For More Information Contact:

Scott Etter - Program Manager - NECCC
859-276-1147 or setter@nasact.org
or visit <http://www.ec3.org/>

TABLE OF CONTENTS

I. INTRODUCTION	1
Methodology.....	1
II. SUPPLIER CONTEXT.....	2
Technology - Organizations are vested in legacy processes and systems.....	2
Expectations catapulted by the "dot.com" boom.	2
The "Squeeze" on Suppliers	3
Business Falling Behind Even Minimal Inflation	3
Multiple Approaches to Squeezing Suppliers	4
The Jury is Still Out	4
The Path to the Future	5
III. SUPPLIER CONCERNS.....	5
Catalog Creation – Content Management.....	6
"Standard" Digital Content	6
Process Related Content	6
Marketing Content.....	7
Maintenance	7
Supplier Impact	7
External Integration – Order and information transport.....	8
Punch-out.....	8
Channel Considerations - Co-branding	9
Technology.....	9
Internal Integration – Supply chain automation	10
Order Status and Other Contacts	10
Electronic Invoicing/Payment	10
IV. GENERAL CONCERNS OF THE PUBLIC ENTITY.....	11
General E-Procurement Goals	11
Need for Solutions that Span Business Size and B2B Sophistication	11
Aggregated Reporting and Analysis	11
Workflow and Control	11

Catalog Functionality and Public Entity Procurement Practices	12
State Term Contracts/Price Agreements.....	12
Commodity Code Categorization	12
Adequate Controls: Catalog Approvals	13
Public Entity Expectations About Useful Purchasing Functionality	13
 V. COMMODITY CODES.....	13
The Importance of Commodity Codes.....	13
Commodity Code Systems in Use.....	14
NIGP Commodity Code	14
UNSPSC	15
Commodity Codes Used in Various Implementations.....	16
Issues with UNSPSC.....	17
Future UNSPSC Code Management	17
Code Suitability for State and Local Procurement	17
Challenges Posed by Existing NIGP Code Implementations	18
 VI. E-BUSINESS INTEROPERABILITY STANDARDS.....	19
Ordering Integration: Electronic Data Interchange (EDI).....	19
eXtensible Markup Language (XML)	20
Open Buying on the Internet (OBI)	21
Vendor-Centric Solutions: cXML and xCBL	22
cXML	23
xCBL	23
Other Emerging Standards.....	23
Barriers to E-Procurement Interoperability and Standardization	24
 VII. OTHER AREAS OF STANDARDIZATION.....	25
 VIII. CONCLUSION.....	26
Continue Opening the Standards.....	26
Needs of small and regional businesses must be kept in mind.....	26
This discussion of the subject of standards should continue.....	26
 IX. RECOMMENDATIONS	26

I. Introduction

Individual state and local governments are involved in creating and/or implementing electronic marketplaces as a means to improve the effectiveness of the bidding process, as well as a means to process purchase transactions for goods and services under contract and on the open market. Typically, reduced acquisition costs, broader catalog availability, more dynamic pricing, improvements in government reporting, approval and spending controls as well as increased vendor and government efficiency are among expected benefits. The diversity of government implementations reflects the diversity of commercially available technologies, business models, and product coding schemes. This analysis examines issues affecting suppliers with a focus on "standardization" as a barrier to better adoption rates. The focus of this discussion is primarily on the e-procurement catalog portion of the systems and addresses the business (versus purely technical) issues.

The 2000 NECCC White paper titled "Funding E-Procurement System Acquisition" identified a number of supplier implications related to marketplaces including the following key challenge to the success of "Reverse Revenue" or Self Funded models:

Suppliers must use the system. States are learning that suppliers must conclude that the time and resource investment – as well as the fee – are offset by the efficiencies and other market advantages in being on the catalog.

This same statement is true of all eMarketplace funding models. The Standardization workgroup conducted research and followed up with states and suppliers for their thinking and experience on how efficiencies and market advantages affected supplier marketplace implementations and participation.

Methodology

Members of the Standardization workgroup participated in a workshop to identify possible areas of eMarketplace diversity. The product of this workshop was the identification of primary categories of barriers to e-procurement implementation which might impact suppliers and hamper implementation.

An oral interview survey approach was used to further explore the findings of the workgroup, as well as solicit comments from third party e-procurement vendors and suppliers to include in the survey process. Oral interviews allowed workgroup members to engage interviewees in open ended dialog as well as ensured a timely high rate of response.

The survey sample included procurement officials representing several states having on-line catalogs either being implemented or fully operational. The suppliers contacted included major national suppliers as well as local suppliers. Supplier perspectives gathered through routine contact and published eBusiness research were also considered.

The survey itself was developed to lead interviewers through open ended discussions exploring the interviewees' experience and perceptions of the barriers to eMarketplace implementation. There was an opportunity for interview subjects to rate the importance of the issues identified by the workgroup, as well as add their own issues to the list.

Results of the interviews and research were aggregated into the findings that follow.

II. Supplier Context

In order to appreciate the significance of standardization as a current barrier to supplier implementation of government electronic catalogs, or broader reaching eMarketplace solutions, containing bid submission, auctions, etc, it is helpful to consider the historical context. Describing the recent history and current state of all sizes of government and business could easily consume volumes. For our purposes, we will summarize the historical context and current state of U.S. public entities and private enterprises at a macro level.

Technology - Organizations are vested in legacy processes and systems.

Public entities and private sector enterprises have long-standing organizational and monetary investments in technology as a means to automate their manual processes. Early adopters of technology developed mainframe based, function specific, internal applications. Over time, organizations saw the value of developing interfaces between these applications to further streamline their processes. As the number of interfaces grew, organizations began to recognize the value of integrating (versus interfacing) systems, with the most ambitious enterprises embarking on early versions of Business Process Reengineering and Enterprise Resource Planning.

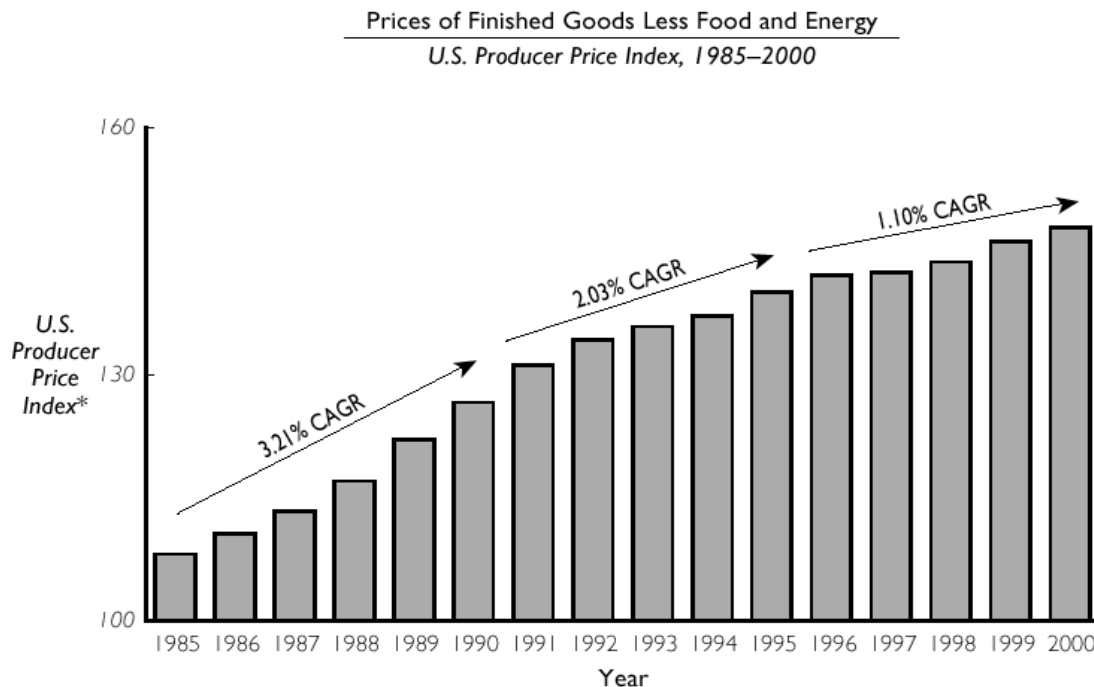
The scope of earlier uses of technology typically followed the size of the enterprise. All large organizations, and most small ones, have lived through much of what we've described to some extent. The implementation of functional infrastructure and commerce architecture has typically happened over years and come with a significant (for the time) investment. Even the smallest businesses and government entities have implemented some level of automation at commensurate expense, just to keep up with constituents, customers and suppliers. Enter the World Wide Web.

Expectations catapulted by the "dot.com" boom.

The advent of a standard programming language (HTML) and accelerated increases in affordable processing power and bandwidth fueled the dot.com revolution. Proclamation of "ubiquitous connectivity" and new or revised business and service models were the core of the revolution.

The general public accepted the Internet with frequently reported "unprecedented speed" compared to earlier technologies. In July of 2000, Nielsen/NetRatings reported 52% of US homes or 144 million people had access to the Internet. Expectations that goods and services, in addition to information, be available over the internet are evidenced by the overall growth of consumer internet spending over time. This has created significant pressure on public entities and the private sector to expand their online offerings.

When compared to the growth of consumer Internet spending, major analysts (Forrester Research, Gartner Group, and others) predicted growth of Business to Business (including Business to Government) Internet commerce would explode, quickly reaching trillions of dollars, with the inference that those not participating would be left in the financial dust.



The “Squeeze” on Suppliers

Venture capitalists and investors anticipated the fall of traditional financial valuation and invested accordingly. Dot com growth expectations overshadowed stalwart performance. Major analysts predicted the disintermediation of manufacturers' channels (The analysts later reversed themselves.) Competition with apparent low overhead business models caused bricks and mortar corporations all over America to re-evaluate or reengineer their value chains. In some industries, small business was competing with manufacturers selling direct, and new out of state or out of country direct competitors at the same time. Concurrent with the changing competitive environment, traditional procurement cost reduction measures (aggregating demand, competitive bidding, supplier rationalization, etc.) were expedited by the Internet. Meanwhile, historic price growth was slowing.

*Business Falling Behind Even Minimal Inflation*¹

"Across the past five years of so-called New Economy history, the pricing power story has grown more dismal, with firms unable to cover even minimal rates of general inflation with their price increases. The general interpretation of this phenomenon is that market transparency across the economy has increased to the point where producer surplus in most markets is deteriorating."

Source: U.S. Bureau of Labor Statistics.

CAGR - Compound Annual Growth Rate

* Indexed to 1982.

¹ Paragraphs and graphic by permission of Corporate Strategy Board from Optimizing Customer Performance, *Bringing Business Discipline to Customer Solutions Strategies*, (www.corporatestrategyboard.com)

*Multiple Approaches to Squeezing Suppliers*²

"Recently, business literature has stressed the role of new electronic markets in increasing product-pricing transparency and reducing producer-pricing power. But perhaps more important has been the rationalization of purchasing activities on the part of large organizations, which have been reengineering their supplier networks for simultaneous efficiency and cost gains."

Business pressures and lack of standards take their toll. According to the April 2001 NAPM/Forrester Report on eBusiness, which focuses primarily on procurement activities:

"Online efforts were slowed by economic downturn. When asked about obstacles to their Internet activities, organizations most often mentioned three items: the overall slowdown of their businesses; the difficulties of internal and external integration; and the lack of data standards."

Although reference to business conditions as an obstacle to e-procurement implementation was not as prominent in the following quarterly NAPM/Forrester report, the connection between business conditions and technology implementations remains a key issue for suppliers.

The Jury is Still Out

The much publicized "Fall of the Dot.Com's" left the survivors to question simple assumptions like "Self service on the Internet will reduce your service costs." In fact, general participation in eChannels has not had the anticipated cost cutting effect on service operations.

"Over the last few years, industry publications have proclaimed the e-channel as the ideal solution that will decrease workload and costs while increasing customer satisfaction and loyalty. This study largely debunks those myths by showing that while adding e-contacts, companies are seeing little decrease in contact volume through more traditional channels (phone and mail). The cost of handling an e-contact is only slightly lower than the cost of handling a phone contact and customer satisfaction and loyalty is much lower."³

This reinforces the need for continues scrutiny of technology solutions beyond promises or expectations to actual results.

² Paragraph by permission of Corporate Strategy Board from Optimizing Customer Performance, *Bringing Business Discipline to Customer Solutions Strategies*, (www.corporatestrategyboard.com)

³ Quoted with permission 2001 ICSA (International Customer Service Association) and eSatisfy/TARP Benchmarking Study of Electronic Customer Care (www.icsa.com)

The Path to the Future

Simply stated, businesses and government entities alike have a lot on their minds. Expectations are high. Economic conditions are more and more challenging. The migration of internally focused systems to deliver or procure information, goods, or services externally is an imperative to reduce cost, stay competitive, and meet expectations. Government entities, like businesses, are challenged to increase services and reduce costs with the lowest possible risk and expenditure. We cannot assume that technology will automatically reach these goals. We are in the midst of a technology revolution which futurists have compared to the Industrial Revolution in terms of its scope and impact on society.

Standardization plays an important role in containing the complexity and resulting costs of participation in public and private electronic marketplaces. Most suppliers who do not consider their ability to thrive in the technology quagmire a strategic advantage, would welcome standardization of the Internet to the uniformity we associate with telephone or television. More effort can then be dedicated on the message, and not the mechanism. On the other hand aggressively adopting technology is viewed by many as an important part of strategies for industry leadership. This has driven efforts to develop the winning use of Internet technology in value generation by some larger companies, and in the process has fueled the growth of 3rd party organizations specializing in enabling and delivering technology. Standardization of certain aspects of Internet commerce is in conflict with the proprietary positions of some of these technology leaders.

III. Supplier Concerns

It helps to understand a supplier's perspective regarding selling through an Exchange, eMarketplace, or Extranet if it is viewed like any other investment.

The benefit to eMarketplace buyers is well documented with hard evidence of lower prices and reduced procurement costs among the most common reported benefits. The strong financial incentive of reduced costs has prompted the majority of organizations to purchase some amount of indirect or direct materials using the Internet. The percentage of total purchases made using the Internet however is still quite small.⁴

Supplier benefits are more difficult to quantify. It is no accident that suppliers generally lag behind buyers on the move to the Internet. While the barrier to entry for simple selling on the Internet is low, and there are a few notable success stories, the number of companies who have not recouped their significant Internet investment over the past few years is not widely publicized. The complex business case for Internet sellers is not as easily quantified in the short term. Loss of control, process complexity, and lack of established standards are also mentioned as factors slowing suppliers from selling on the Internet. The strong business case for e-procurement buyers is "pulling" most suppliers onto the Internet. Just as some states are making participation in their electronic commerce solution a qualification

⁴ More detail on e-procurement adoption rates may be found at the National Association of Purchasing Management website (napm.org) in the quarterly NAPM/Forrester Research Report on eBusiness.

to bid, Suppliers who would sell to Ford, GM, or Daimler Chrysler will have to sell through Covisint at some time in the future.

These forces are at work at all levels. Many larger companies, driven by procurement economics and supply chain efficiencies, are more frequently requiring their suppliers and channel partners to do business electronically. Smaller companies are finding the need to develop electronic capabilities to be competitive or simply considered as a supplier. This applies to public and private sector suppliers alike.

There are many areas of supplier interaction which could be candidates for standards, depending on the industry. The impact of standardization (or the lack of standardization) is most significant when viewed in the context of the data requirements to support common business transactions.

Catalog Creation – Content Management

"Standard" Digital Content

Electronic catalogs are at the heart of e-procurement systems. All electronic catalogs are driven by product information used to support the search or browse functions. In most cases this information is provided by the supplier. In its simplest form product information includes a product name, catalog number or model number, product description, unit of measure, and a price. There are no standard field lengths or formats for providing this most basic information. Other common items such as "minimum order" or "quantity discount" are also not standardized.

Process Related Content

In addition to basic product information, typically some product classification scheme is used to organize products into hierarchies to control the path a user follows when browsing for products. There are several competing standards for this information (discussed later in this document), as well as many proprietary standards.

In addition to product classification, specific information is typically needed to support approval workflows, identify contract versus non contract items, or a myriad of other processing related fields.

One supplier, with experience supplying information to a number of private and government catalogs estimated that 85% of the item fields provided for the catalogs were unique to an individual catalog request (i.e.: not typically stored with the supplier's product information). Requests for different versions of established "standard" product classification schemes further complicate the matter.

Costs associated with developing and maintaining electronic catalog content is typically estimated using the number of items and the number of fields for each item. Costs, and savings, for suppliers are directly associated with the extent to which they can reuse their

catalog content, field by field. Standardization of catalog information at any level will reduce cost and complexity for large organizations, and make expansion into other markets more feasible for smaller businesses.

Marketing Content

With substantial purchases being made on the open market and multiple award contracts becoming more prevalent, a fear of suppliers is to be "Lost in a list". Most suppliers look for opportunities to differentiate themselves by presenting their features, advantages, and benefits. This roughly equates to a buyer's product comparison criteria. There is no standard for, and most often no opportunity to, present this information so the suppliers who are internet capable refer catalog customers back to their website for this information. Establishing comparison criteria for all commodities purchased would be no small task, and there are many other reasons a supplier may prefer a buyer visit their website. Both issues are discussed in more detail elsewhere in this document.

Items such as product pictures make it easier for people to use systems. Again, there are no standards, and in many cases no capabilities to include this information in a catalog.

Maintenance

To fully appreciate the effects of maintaining multiple catalogs driven by lack of standardization consider the following list of catalog related activities, prompted by relatively common events.

- Evaluate manufacturer changes to product offering to determine impact
 - Subtle changes to product. (Cosmetic, simple model migration, etc)
 - Major changes to product. (Chemical, hazard, major functional, etc..)
 - Additions to/elimination from product family offering
 - Product line extensions
- Evaluate external changes
 - Specification changes
 - Classification scheme changes (versioning)
 - Regulated materials changes

Creation of an electronic catalog is an event with a beginning and an end. The maintenance of that catalog is ongoing and can be complex, and time consuming. Again, the more complex and dynamic a product line, the greater the effort needed to keep the product offering up to date.

Supplier Impact

The supplier impact of the lack of standards in this area relates most directly to how many products the supplier sells, and how many catalogs they participate in. A small supplier has an advantage in this case. With a limited number of items, listed on one catalog, standards are not an issue. Although, as previously stated, the need to integrate with manufacturers or to purchase from their suppliers may also drive small suppliers to be further impacted by

standardization issues.

Suppliers who create and maintain multiple catalogs, or multiple Extranet "sites" to support "Punch-out" capability, make substantial investments in technology to store and deliver data that is unique to a given business relationship. Typically, larger suppliers are more likely to make the investment in systems or services that this requires. Standardization would reduce the cost of supporting this type of activity but would also potentially broaden the competitive base.

External Integration – Order and information transport

Punch-out

The ability for a user to “punch-out” of an electronic catalog, equates to a transfer of the user to the supplier’s system, after locating a product or service on in the user’s catalog. Punch-out capability is being included in many electronic catalogs. More discussion of punch-out issues for the public entity are included later in this document. Some of the reasons for punch-out and its pros and cons to buyers and suppliers follow:

- **Product Selector**

Product selector refers to applications that support the user’s selecting the proper product for a given application. Typically driven by specific characteristics, product selector enables a buyer to define specific application of a product (eg: Tires, Ford Taurus, 97, Model SHO) with the supplier either presenting the user with a list of specific product choices, or addition criteria (eg: All Season, Snow, Speed Rating, etc) to “drill down” further in the product line. Other deployments of product selectors allow the user to generally state a problem, (eg. Fill potholes) with the product selector offering a choice of solutions (eg: hot asphalt, hand tamper, steam roller, etc.) Complex products may contain many characteristics to support selection. These characteristics, considered in the aggregate of all products in any given catalog, exceed the capacity of any existing standard taxonomy convention.

- **Product Configurator**

Product configurators differ from product selectors in that they provide the ability customize products within established criteria, above and beyond selection from a fixed product line. As an example, a user may select a basic level of computer, and be presented with a list of options. These options may be driven by manufacturing capability (ie: what hardware/software works in that computer) or by buyer specified constraints (eg: we will only purchase the following standard configurations of hardware/software). Another example would be ordering an automobile. Configuration is driven by capability (all available options or packages) or by constraints (eg: only standard packages, or no premium sound systems, etc...)

- **Supplier and Buyer Punch-out preferences**

Ideally for buyers, product selectors would be integrated into product catalogs, versus kept on supplier sites. This would enable the user to comparison shop comparable offerings from competing suppliers. Due to lack of established standard taxonomy or standardized comprehensive definition of product characteristics, suppliers typically build and maintain this functionality on their systems. Buyers also need complete order history for reporting purposes and specific workflow controls. There is no standard method of handling that information in a punch-out configuration.

Suppliers benefit from having the user browse and configure products on their system, as it is more likely the user will select one of their (versus a competitor's) products. Hosting these functions also gives the supplier the opportunity to recommend upgraded (ie: Supersize that?) or "companion" (ie: Would you like fries with that?) products. There is little incentive for suppliers (typically larger suppliers) who have developed these complex capabilities to standardize them. The ability to keep the user on the supplier's site to perform these, and a myriad of other electronic marketing related functions is widely viewed as a competitive advantage. Some smaller suppliers are looking to manufacturers to provide selector and configurator capabilities, along with other needed digital marketing collateral (photos, Features Advantages and Benefits, etc).

Channel Considerations - Co-branding

As suppliers represent various manufacturers, they are challenged to aggregate appropriate information for inclusion in their catalogs. Likewise, manufacturers are concerned that their products are represented in the best possible light. This has led some manufacturers to provide content to suppliers for inclusion in their catalogs or websites. Suppliers, challenged to create original content, are asking manufacturers for this information. The format of information transferred between parties is not subject to any standards, making a supplier's job of aggregating a catalog difficult. By the time the information gets to the public e-catalog it can be second or third hand. Accuracy and frequency of update in these cases will be questionable.

As a solution to address this dilemma, there are tools available to deliver "co-branded" websites, combining supplier and manufacturer information on a common supplier page. This addresses the issue of errors introduced in catalog aggregation and eliminates delay in updating information. Unfortunately there is no one standard for this type of real time dynamic publishing, nor for incorporation of this inherently online presentation into electronic catalogs in a manner which consistently meets the buying organizations needs as outlined in the Concerns of the Public Entity section of this paper.

Technology

Issues covered in the Interoperability section of this paper are clearly a supplier concern, amplified by the need to pass business transactions internally and between multiple customers and channel partners.

Internal Integration – Supply chain automation

"Reduced administrative handling" is considered as a primary benefit of eMarketplace participation for suppliers. Elimination of repetitive transactions, including order entry transactions, is an important part of suppliers' challenge. Whether this is cost effective depends entirely the number and complexity of the transactions, and the suppliers' level of supply chain sophistication.

Typical automated order handling efforts include predetermination of standardized shipping locations. This enables the supplier to match the requested shipping address to a shipping address already in their system. Product catalogs must also be mapped to supplier's internal product numbers. In some cases, translation to a list of component products is also needed. Information provided in the electronic catalog must be linked to the supplier's system.

The more skilled effort needed to create and maintain these files must be considered by suppliers when calculating anticipated cost or savings from marketplace participation. As suppliers participate in multiple marketplaces, maintenance of customer specific information becomes a formidable task. Some standardization of product coding schemes or other item level information would reduce cost and complexity and be a welcome relief.

Order Status and Other Contacts

Frequently left un-addressed, some standardized approach towards order and inventory status inquiries would hasten adoption, improve service to users, and perhaps, at some point, reduce cost to supplier. As mentioned earlier eChannels do not necessarily eliminate work.

Electronic Invoicing/Payment

Some government eMarketplaces include facilities for requestors to record the "receipt" of goods or services. When integrated with Accounts Payable, this functionality has the potential to offer one of the most tangible returns to suppliers. Most government entities historically pay their invoices slower than their commercial counterparts. In many cases, suppliers bare the financial burden of extended government invoice payment. More rapid payment of supplier invoices would improve supplier cash flow and would benefit all sizes of supplier.

The number of options and issues surrounding the electronic presentation and payment of invoices is formidable and outside the scope of this report. It would seem however that financial returns to suppliers successfully reducing their DSO (Days Sales Outstanding) could be used to offset some of the expenses of participating in electronic marketplaces. Implementation of electronic invoicing and receiving electronic payment seems desirable but is typically left for suppliers to pursue outside of eMarketplace participation. Implementation of any electronic capability carries with it a level of investment. Any standardization achieved in the ordering process would be reflected in downstream activities, including invoice presentation and payment.

IV. General Concerns of the Public Entity

This paper opened with a summary of issues raised by suppliers engaged in third-party e-procurement implementations. The discussion of the current business environment and profit trends highlighted supplier concerns with costs of participating in these systems. Public entities have concerns as well about technical solutions that may or may not be fully consistent with their expectations and public procurement policies.

General E-Procurement Goals

Along with improving transaction efficiencies, there are four other common reasons that public entities implement e-procurement systems: broader availability of catalogs and more dynamic pricing for items on these systems; the ability to aggregate reporting across various enterprises and enable more strategic procurement analysis; the ability to achieve a single, maintainable user interface that has essential controls necessary for workflow, delegation and authorization; and the ability to more efficiently collaborate with suppliers.

Need for Solutions that Span Business Size and B2B Sophistication

So far, discussions about standardization appear to be led by large businesses or those with business-to-business ecommerce (B2B) experience. A set of technical standards that meets the needs of those suppliers has a better chance of making their catalogs available to public entities. And pricing can be more dynamic; supplies like computers have seen frequent, incremental price decreases. E-procurement systems -- many of which already exist in direct-to-site web sites of major suppliers -- provide a means of quickly providing updated pricing.

However, most states also have contracts with smaller, regional businesses having more limited capability to engage in B2B transactions. There is some lingering concern that establishment of standards or emergence of “de facto” standards may not meet the needs of smaller businesses.

Aggregated Reporting and Analysis

The interests of individual suppliers in maintaining individual electronic order fulfillment and catalog systems are not necessarily aligned with the interests of public entities. For example, public entities need the ability to aggregate the commodity/services ordering history across suppliers, which direct-to-web site purchasing does not provide. While these sites are improving their individual reporting capabilities, strategic procurement analysis still requires manual aggregation of individual ordering volumes. Third-party e-procurement systems promise to make procurement analysis across large supplier communities easier.

Workflow and Control

Workflow and control issues are seen as central to a public entity's ability to further decentralize purchasing authority and better leverage the use of these systems to achieve greater efficiencies. Workflow functions have only recently begun to appear in direct-to-web site supplier web site systems by some national suppliers. However, there is no standardization among suppliers in terms of that workflow or functionality, making the third party e-procurement systems more attractive from a training and administration perspective.

Similarly, to achieve true efficiencies in ordering, public entity accounting systems must be integrated into the process. Individual direct-to-site integrations with individual suppliers are not deemed practical or even advisable in the long term.

Catalog Functionality and Public Entity Procurement Practices

Public entities strive for efficiencies much like commercial industries. However, public procurement policy is unique in one important respect: the goal of providing equal opportunity for companies of all sizes to compete for public contracts. Catalog systems must provide the controls and functions necessary to satisfy both objectives.

State Term Contracts/Price Agreements

Most public entities establish term contracts or price agreements. Those agreements typically are awarded competitively. They usually are executed in commodities or services that are commonly used across the public entity or its political subdivisions. In some cases they are "mandatory" awards or requirements contracts, where pricing concessions are gained by satisfying all requirements through those suppliers. In other cases, they are "permissive awards," representing generally good prices and saving agencies the expense of learning how to source a specific commodity. In some cases, multiple awards are made, and individual public buyers make their own decisions about which supplier's terms are most favorable. Often, delegated purchasing authority is tied to whether items are on state contracts, with greater delegations permitted when orders are placed against term contracts/price agreements.

Public entities tend to draw distinctions in their business rules between price agreement/state contract items and other "open catalog" items. Public entities need the evolving technical standards to support these various distinctions. Public entities expect that e-procurement systems will facilitate broader decentralized buying by integrating term contracts or price agreements with more open trading communities, with safeguards to insure that competition rules can be enforced and open competition obtained where required. However, it is not clear whether emerging technical standards for remote catalog access or "punch-out" will include necessary control mechanisms. For example, there must be a method for including contract identifiers with line item/price descriptions so workflow engines can distinguish between term contracts/price agreements and catalog items that have not been subject to a competitive process.

Commodity Code Categorization

Any technical solution must have the capacity to categorize catalog line items in order to facilitate reporting and analysis, workflow and controls, and financial system integration. Financial systems typically also require commodity codes entry when orders are processed. Workflow is being developed that can distinguish between different commodity/service types in the routing and approval process. Current technical solutions or standards for remote access or punch-out appear to be retaining schema to accommodate transactions that will send the commodity code information with line items.

Adequate Controls: Catalog Approvals

Purchasing agents in central purchasing offices monitor their term contracts/price agreements. Printed catalogs – and the historically longer life cycle of catalogs – permitted contract administration and monitoring using traditional, manual methods. However, the dynamic pricing capabilities of electronic procurement systems create challenges. Especially as standards evolve that permit remote catalog access or punch-out, there is some uncertainty among purchasing agents about how catalog approval functions will be performed. At the very least, the standards used in third party systems must support post-transaction auditing.

Public Entity Expectations About Useful Purchasing Functionality

There is some concern among suppliers and third-party e-procurement system developers about the realism of public entity expectations. For example, as remote access solutions evolve, one immediate impact may be degraded system performance. Searches on hosted catalogs tend to run faster. Further, public entity expectations about achievable functionality may not be in synch with the maturity of these interoperability standards for remote access. Finally, there is still a disconnect between technical standards and public purchasing agent ideas of “value analysis” tools that catalogs are expected to provide.

Some public buyers expect that these systems will permit side-by-side product and price comparisons, a value analysis feature considered useful. Catalogs hosted by third party e-procurement vendors can provide this function, if the data is uploaded in a form required by the systems. But some suppliers express skepticism about whether those tools are useful in assisting buyers in making product and service selections based on overall value. And, as was pointed out earlier in this paper, suppliers that rely on product name recognition may not want side-by-side comparisons with competitors’ products. In any event, evolving technical standards for remote access or punch-out do not realistically support these product comparison functions. The standards will not support them until there is broad agreement on what commodity characteristics are most relevant to the buyer’s determination of “value,” characteristics that change with every kind of supply.

V. Commodity Codes

The Importance of Commodity Codes

Alphanumeric commodity code descriptions for purchased supplies and services are commonly used by public entities. A commodity code essentially is a numerical or other identifier that can be used to identify and categorize units of suppliers and/or services.

Accounting systems typically have a code structure to facilitate reporting. These systems usually require the entry of a commodity code at the time of purchase when the encumbrance or payment is recorded in the system. Unless the e-procurement system is intended to be the exclusive means of procuring goods and services, the accounting system will remain a “system of record” for expenditures, some of which will occur outside the system. Consequently, the e-procurement system must integrate with the accounting system, recording the commodity code as required in that system.

Inventory systems use commodity codes to identify supplies and materials that are warehoused. The inventory control module (which is commonly a part of accounting/ERP systems) must enable checking of availability of a supply or commodity. These categorization systems typically are the most “granular” in that they often identify separate models/part numbers of similar products (even by the same manufacturer) and usually permit addition of other identifiers (such as warehouse location identifiers).

Bid solicitation systems often use commodity codes to categorize solicitations. Vendors sign up for solicitation notification based on categorizations of goods or services that are organized using these codes. Purchasing agents categorize their solicitations using the same categorization structure. Emails then may be generated to notify the vendor when the solicitation is published. Commodity codes have become a common “engine” for developing the registration and solicitation categorization hierarchy.

Catalog systems use line item commodity codes to describe individual catalog line items. This categorization is helpful for analyzing historical procurement volumes.

Commodity Code Systems in Use

NIGP Commodity Code

The system most familiar to public purchasing professionals is the NIGP commodity code. It was created originally by the National Institute of Governmental Purchasing (NIGP) and is now maintained by a commercial code manager.⁵ This commodity code system is commonly used in bid solicitation systems as the engine for providing notice to interested vendors. Public entity accounting and inventory systems also commonly use a current, earlier, or hybrid NIGP commodity code structure.

The following are examples of the NIGP code hierarchy:

Hierarchy	Sample Code and Description
Class (3-Digit)	Class Class 615 Office Supplies, General
Item (5-Digit)	Class-Item Item 615-45 File folders, Regular, Legal, and

⁵ Information for this section was generally taken from the NIGP Code Manager web site, at www.nigp.com.

	Letter Sizes
Group (7-Digit)	Group 615-45-29 Folders, File, Double Tab, Legal size, Manila, Standard height. Overall 14-3/4 in. x 9-1/2 in.
Detailed Item Description (10-Digit)	615-45-29-028 One-third cut, 9-1/2 point, 100/box 615-45-29-040 Straight cut, 11 point, 100/box 615-45-29-470 One-half cut, 11 point, 100/box

As the NIGP code manager describes the code on its web site, the 3-digit (class) is most appropriate for periodic expenditure history by department for fiscal planning, budget execution, and accounting purposes. The 5-digit code is used for automated bidder selection/notification and to capture purchase history in order to produce management reports which reflect who is buying what, how much, when, and from whom. The 7-digit (class-item-group) can be used to develop specification files for many common-use items. The 10-digit (class-item-group-detail) utilizes all series of digits and is used to identify, by detail, purchase descriptions of the commodities and services to be purchased under term (requirement) contracts, capture more granular purchase history by quantities purchased, and to establish stock inventory numbers for items in stores or warehouses.

The NIGP code may be used without licensing at the 3-digit level. Use of the code at the 5-digit and more granular requires a license, the fees for which are based on procurement volume.

UNSPSC

UNSPSC is widely known as the United Nations Standard Product and Services Code. UNSPSC is an “open standards” system presently being maintained by an industry association, the Electronic Commerce Code Management Association (ECCMA). Descriptions of UNSPSC say that there is no license fee to use the UNSPSC code. Association membership fees give a member the right to participate in revisions to the UNSPSC code and to receive more current updates to the code. The free public code is updated quarterly.

Current information available on the internet reveals confusion about the governance of UNSPSC, though. There is competition for “ownership” of the code, even though the web sites maintained by both “governing” bodies describe the code as “open” and not subject to license fees.

ECCMA names the UNSPSC the “Universal Standard” Products and Services Classification (UNSPSC), and describes it as a global standard developed and managed through ECCMA by volunteer domain experts from around the world.⁶ ECCMA characterizes the UNSPSC as in the public domain and it can be used and distributed without restrictions or license fees.

⁶ www.eccma.org.

On the other hand, the United Nations Development Programme (UNDP), a subsidiary organ of the United Nations, describes on its “interim” web site its search for a new code manager for UNSPSC.⁷ According to this site, the United Nations Standard Product and Services Code was the result of a merger of the United Nations' Common Coding System (UNCCS) and Dun & Bradstreet's Standard Product and Services Codes (SPSC). Created by a team of analysts and researchers from both D&B and the Inter-Agency Procurement Services Organization (IAPSO) of the UNDP, UNSPSC is described by UNDP as an open standard. Companies and other organizations worldwide are encouraged to apply the codes in their business systems. UNDP expects the search for a new code manager “to be completed in the near future.” UNDP, through the United Nations Inter-Agency Procurement Services Office (IAPSO), is claiming exclusive ownership of the UNSPSC.

According to UNDP's web site, UNDP “pulled the UNSPSC” from ECCMA and informed ECCMA and UNSPSC Members in February 2001 that it would submit the services for the management, maintenance and update of the UNSPSC to a competitive selection process. UNDP maintains that it owns all rights to the UNSPSC and will take appropriate action to protect its interests in the UNSPSC.

Questions about governance aside, UNSPSC is a hierarchical classification. Each level contains a two-character numerical value that consists of segments, families, classes, and commodities sharing a common use or function.

For example, pen refills is part of a larger class of products “ink and lead refills” which in turn is part of a family of products “office supplies” which is itself part of a segment of products “office equipment, accessories, and supplies.” Each level of the hierarchy has its own unique number.

Hierarchy	Sample Code and Description
<i>Segment</i>	44 Office Equipment, Accessories and Supplies
<i>Family</i>	12 Office supplies
<i>Class</i>	19 Ink and lead refills
<i>Commodity</i>	03 Pen refills
Pen refills = UNSPSC classification 44-12-19-03	

Commodity Codes Used in Various Implementations

The standardization working group found no instances where the NIGP code was used in catalogs, although NIGP still remains the commodity code most used in bid solicitation systems, accounting systems, and inventory systems. As the examples show above, NIGP is more granular and better at distinguishing between commodities. The NIGP code from its inception has been used for solicitation notices, and use of codes in bid solicitation systems pose little of a resource challenge for suppliers. Suppliers sign up for bid solicitation notices based on broad categories, often at a higher hierarchical level in the code structure.

⁷ www.un-spssc.org.

In June 2001, the National Association of Purchasing Management's (NAPM) magazine reported UNSPSC as one of the most popular standards used for product classification in catalogs.⁸ This survey found the same. Some large national suppliers already maintain their catalog line item descriptions with commodity code tags using UNSPSC. Some are also already supporting multiple versions of the Code.

Commodity code implementations in catalogs pose a resource challenge for suppliers. Each SKU or line item is mapped against the commodity code. But, public entities typically do not have the resources to maintain supplier catalog descriptions and commodity code assignments in catalogs that may reach hundreds of thousands of line items. Likewise, third party e-procurement vendors generally rely on the suppliers in the first instance to maintain their catalog line item descriptions. Practically, suppliers ultimately have to assist in categorization, and there is cost associated with that effort. Standardization of the commodity coding structure allows suppliers to leverage their time and effort associated with maintaining their catalogs in multiple e-procurement systems or marketplaces.

Issues with UNSPSC

Even though there seems to be more supplier adoption of UNSPSC in catalog systems, issues remain.

Future UNSPSC Code Management

Concerns have been expressed about future maintenance of the UNSPSC. The support for the UNSPSC is composed of voluntary commercial members. The code already has undergone a series of revisions, and there is no real certainty about who will manage the code structure or how the disputes about governance and "ownership" will affect the code.

Further, even with the ECCMA-maintained code, while the scheme is "open," there is a distinction between the publicly available code (which is updated quarterly) and the up-to-date version made available immediately to members. The effect of that distinction on suppliers and third party e-procurement solution developers is unclear.

Code Suitability for State and Local Procurement

The NIGP commodity code was developed for state and local government procurement and better accommodates public entity purchasing categories, especially in services. For example, the following sample social services categories are typically procured by states (NIGP class 952, Human Services):

- 952 - 06 Alcohol and Drug Prevention
- 952 - 07 Alcohol and Drug Testing Services
- 952 - 15 Case Management

⁸ *Purchasing Today*, p. 64 (NAPM June 2001)

- 952 - 17 Child Abuse: Identification, Treatment, and Prevention (Including Sex
- 952 - 18 Child Care Food Program
- 952 - 20 Correctional
- 952 - 62 Mental Health Services: Vocational, Residential, Etc.
- 952 - 95 Youth Care Services

Some analogous UNSPSC codes are:

- 92.10.17.01 Jail or penitentiary services
- 85.11.16.16 Alcohol addiction prevention or control services
- 85.11.16.17 Drug addiction prevention or control services
- 85.12.16.07 Psychiatrist Services
- 85.12.16.18 Psychologist Services
- 91.11.19.01 Infant or child daycare services
- 93.14.15.09 Social problems analysis or management services

A search for child abuse treatment programs, child care food programs, and case management did not yield much in the way comparable UNSPSC codes.

So far, though, supplies appear to be most represented on electronic catalogs, so these distinctions may not be significant in the short term. But as more unit-priced services move onto electronic catalogs, UNSPSC may have to be modified to permit more relevant categorization in services commonly acquired by state and local governments. However, public entities do not appear to have much voice in the current management of UNSPSC; the list of association members did not include state or local governments.

Challenges Posed by Existing NIGP Code Implementations

NIGP code is more granular, and many public entities already use NIGP in their ERP and inventory systems. E-procurement systems are not intended to supplant those systems, but integrate with them. Translation tables are under development to map UNSPSC codes to varying NIGP commodity code versions. However, considering the difference in granularity in the codes, translation tables may not be perfect solutions. While mapping UNSPSC to NIGP 5-level codes may be sufficient for integrating transactions into accounting systems, inventory systems require more differentiation in the code than translation tables can support.

As a result, purchasing agents likely will have to become familiar with both code structures. Many already are familiar with NIGP codes. The NIGP code manager keeps a recurring update showing progressive public entity adoptions of the NIGP code. Public entities even publish search engines for NIGP codes to assist in their use.⁹ On the other hand, UNSPSC-based systems for detailed analysis of procurement data will require additional training.¹⁰

⁹ See, e.g., North Dakota's web site at www.state.nd.us. Other NIGP search engines can be easily located on the web using common search engines and "NIGP" as the search term.

¹⁰ The eccma.org web site has a robust search capability. However, the history of the various UNSPSC code revisions was not readily available on the site from the publicly available information.

VI. E-Business Interoperability Standards

Electronic integration or interoperability is not required for every e-procurement implementation, obviously. For example, suppliers having few transactions can simply log on most systems and download orders or receive them by email. Where content does not change frequently, and is not complex (as with sophisticated configuration options), catalogs can be maintained manually. But as transaction volume increases, there is a need to integrate to the order fulfillment system, and perhaps the supplier's catalog system as well. But,

... a business that wants to combine its services with others to create a trading community or marketplace might have to deal with an incompatible variety of implementations, protocols, and business processes. This diversity raises the implementation cost and limits the alternatives for companies who want to establish and maintain multiple business relationships.¹¹

There has been a great deal of discussion about the need to develop standards for interoperability as it pertains to ordering integration and electronic catalog access and "punch-out" techniques. In actuality, however, there has been an emergence of various techniques advocated by different organizations or vendors. Emergence of these methods, and perhaps others in the future, serves to complicate rather than simplify the realization of interoperability. There are no known efforts underway to achieve a single standard. Naturally, the supporters of the current methods have vested interests in having their approach become the "one" standard. At least one author has concluded though that "no vendor offers a comprehensive supplier management system."¹²

This workgroup agreed early on that it would not tackle a detailed analysis of the various technical standards. However, a working familiarity with the differences in the standards, as well as published accounts of their relative advantages and disadvantages, is helpful in order to understand suppliers concerns. Understanding the supplier's challenges is probably the first step in public entities' engaging meaningfully in this debate.

Ordering Integration: Electronic Data Interchange (EDI)

According to one author, the "world is clearly divided into two camps: EDI and XML."¹³ EDI is a well known, pre-internet protocol that permits electronically integrated transactions. The standard focuses on the actual order and acknowledgement process. EDI has been described as requiring "significant overhead for its implementation."¹⁴ There is general agreement that the standard is suited more for large company implementations; implementation typically requires use of a value-added network (VAN), with fees assessed

¹¹ B. Glushko, *How XML Enables Internet Trading Communities and Marketplaces* (www.ontology.org, June 23, 2001, first published in 1999)

¹² P. Mitchell and B. Parker, *The Problem with Supplier Enablement—A Supplier's View* (AMR Research, April 30, 2001), found at <http://www.amrresearch.com>.

¹³ A. Gregory, *XML Schema Design for Business-to-Business E-Commerce* (arofan.gregory@commerceone.com)

¹⁴ <http://backofficesystems.com> (Back Office Systems, L.C., 1999)(includes a useful link to other EDI and e-commerce web sites)

for both the originator and receiver. EDI is tried-and-true, however, with over ten years of history.

EDI is highly formatted and structured. The more negative aspects of EDI include inclusion of tags (data formats) that are not useful, leading to “bloating.”¹⁵ It is apparently difficult to learn and use, and most implementations only use a part of the data set. Even with extensive ANSI X12 standards, individual EDI implementations require analysis, mapping, and translation of information contained within the standardized fields, to successfully connect trading partners.

eXtensible Markup Language (XML)

On the other hand, XML has been touted as the next generation language or protocol that is rapidly becoming the enabling technology for internet markets and trading communities.¹⁶ The schema (or written structure) is human-readable. It also has good tools support from other applications.¹⁷ Unlike EDI, each relationship between a supplier’s catalog and “back end” processing system and a buyer’s purchasing application no longer requires a point-to-point custom integration; catalog content is available across marketplaces.¹⁸ However, as will be obvious in the following discussion, multiple versions exist for e-commerce implementations.

XML is reputedly weak in data typing and validation, i.e. controlling the type of data, such as integer, text, numerical, etc. To get an elementary idea of the difference between the two approaches, consider the following simple text transmission, using two common data formats:

Fixed Field	I					L	I	K	E		E	D	I		
ASCII Delimited	“I”, “LIKE”, “XML”, “BETTER”														

The fixed field format would have a data structure defined that permitted transmission of three data elements with five characters per “word,” with the first character positioned in the first space. The second is an example of ASCII delimited format, which does not map character positions but only defines the beginning and ending of each field using delimiters and separators, in this case the comma and quotation marks.

The first structure is more akin to EDI, and can accommodate definitions of data types (e.g. numerical and text) easier. It also can better handle “white space” or blanks by specifying how to treat data at specific locations. On the other hand, the ASCII delimited (which can be used in XML implementations) is more flexible. However, it is difficult to specify handling routines for pesky white space, because one never knows just where it may appear. This overly simple explanation illustrates the differences between the two kinds of approaches.

¹⁵ Ibid, Gregory, p. 4.

¹⁶ Ibid., Glushko, p. 1.

¹⁷ Ibid., Gregory, p. 5

¹⁸ Ibid., Glushko, p. 1.

EDI was not designed to operate outside of a point-to-point (buyer to seller) environment using value-added networks (VANs). On the other hand, XML accommodates a portal implementation, where a “middle man” services the trading community. Portals can serve as a place where value can be added in many different ways to support many types of transactions, from translation of catalog content to payment processing to tracking of shipping.¹⁹

XML defines “document type definitions” or DTDs to define the data elements. But that appears to be where the similarity between XML implementations ends. XML implementations include varying schema languages, some of which are intended to cure the weaknesses in data type validations and control.

One commentator has identified another challenge with XML, noting its strengths, “[b]ut the ease with which anyone can invent new XML models for particular industries or subject areas is both a primary attraction and a significant threat to the interoperability of messages within and between the trading communities.”²⁰

Open Buying on the Internet (OBI)

OBI is an internet developed protocol developed in 1997 that provides companies with a framework through which they can buy and sell goods with each other, using a set of internet-based protocols and technologies.²¹ According to one internet site, OBI does not currently address pre-purchase and post-purchase business processes.²² OBI has also been described as an attempt to map EDI transactions into Internet format. It may allow smaller companies to integrate into supply chains of larger or organizations in a way that previously required EDI and its associated costs.²³ It will permit establish of user preferences, purchase of products the Internet, and integrate with financial software.

Under OBI architecture, a *requisitioner* using a web browser connects to a local purchasing server at the *buying organization*. The buyer selects a hyperlink to the *selling organization*. The selling organization server *authenticates* the identity of the requisitioner. An EDI compatible *order request* is mapped using the *shopping basket* created on the seller’s server, which based on the buyer’s identity will provide a specialized catalog view applicable to that buyer. The order request is transmitted via an *OBI object* to the buying organization, which adds its administrative header information to the order. The completed and approved order (approved in the buying organization workflow process) is formatted as an *OBI order* and transmitted securely from the buying organization server to the selling organization via the Internet. The selling organization receives the coded OBI object, decodes it, extracts the order, and translates the order into its internal format.²⁴

¹⁹ Ibid., Gregory, p. 14.

²⁰ Ibid., Glushko, p. 1.

²¹ Ibid., Back Office Systems, p. 1.

²² Id., Back Office Systems, p. 2.

²³ Id., Back Office Systems, p. 3.

²⁴ Paragraph description from *Open Buying on the Internet (OBI) Technical Specifications* (found at www.cobra.commerce.net)

The OBI order format specification is based on the EDI X12 standards. The OBI order format has been designed to support the data requirements of low-dollar transactions generated by end users of the trading partners. It allows the use of only a subset of the available EDI X12 850 data segments, data elements, and codes.²⁵

The buyer applications must have the capacity to map data in a proper format to transmit the OBI order to the seller. The seller must be able to create “order requests” in the prescribed format and interpret the subsequent OBI orders, translating them into a format that can be used by the seller application. Obviously there is a resource cost associated with these transactions. The OBI specification documentation refers to a lexicon consisting of data segments, data elements, and codes, an outgrowth of the lexicon used in EDI transactions.²⁶

The documentation available at www.cobra.commerce.net says that OBI transactions were designed to support high volume, low-dollar transactions involving non-production goods and services based on existing trading partner relationships. These transactions typically involve only a few line items, next day delivery, pre-defined shipping, and terms and conditions that are based on existing agreements. The OBI format is not designed to support the coding of purchase orders which include terms and conditions, significant line item detail, complex delivery schedules, detailed shipping instructions, or the acquisition of production goods and services. OBI does support searchable catalogs that are remotely accessed by the buyer at the seller site.²⁷

OBI has been described as having supply-side emphasis.²⁸ For a selling organization to use OBI, it must:

- provide a web-based sourcing and pricing mechanism (e.g. a catalog) with ordering capability;
- be able to authenticate the requisitioners accessing the catalog;
- and be able to create, send, and receive (and translate) OBI objects.

Vendor-Centric Solutions: cXML and xCBL

It was not clear from the rather limited research for this white paper why OBI was not considered adequate for the larger marketplace vendors. The process used in cXML and xCBL-based solutions is very similar to the OBI process discussed. Apparently, the more comprehensive cXML and xCBL standards are better able to support portal applications with a wider variety of purchasing related functionality, such as inventory or shipping status support.

²⁵ Id., cobra.commerce, p. 23.

²⁶ Id., cobra.commerce, p. 23.

²⁷ Id., cobra.commerce, p. 24.

²⁸ Ibid, Gregory, p. 11.

The two most well-known XML catalog implementations are those used by Ariba (Commerce XML or cXML) and Commerce One (XML-based Commerce Business Language or xCBL).

cXML

cXML is described by Ariba as “free for all use,” published on the internet without use restrictions.²⁹ xXML has been characterized as “nothing more than the data structures used inside Ariba’s applications. . .”³⁰ However, the standard is described by Ariba as “open,” and our limited discussion with suppliers suggested that the publicly available documentation is sufficient for their implementations.

As recently as June 2001, Ariba was describing cXML as the “only way you can implement PunchOut today.”³¹ Ariba distinguishes its solution by saying that “most other XML B2B protocols are an attempt to translate the EDI business process and documents in to the syntax of XML.”³²

xCBL

xCBL is Commerce One’s schema language. It is intended by Commerce One to be open and useful for any e-commerce applications that are based on XML. It is designed to exist in portals, and does not assume that trading will be point to point (buyer to seller). xCBL has been used in implementations based entirely on other software packages. Commerce One describes its Common Business Library as “a set of XML building blocks” that was developed to provide the schema document framework that is needed for robust capabilities.³³ The Commerce Business Library is oriented toward persons having EDI backgrounds. Commerce One aims to provide compatibility with EDI standards and semantics, and provide companies with a migration path for transforming EDI applications to XML.³⁴

More recent versions of xCBL are described by Commerce One as “providing support for integrations and standards such as RosettaNet and OBI.”³⁵

Other Emerging Standards

- ebXML is an emerging standard arising out of a project of the UN/CEFACT, attempting also to harmonize EDI and XML by creating standard codes for representing EDI semantics in XML.³⁶

²⁹ *Commerce XML Resources FAQ* (www.cxml.org)

³⁰ Ibid, Gregory, p. 11-12.

³¹ Ibid, cXML.org, FAQ #2.

³² Ibid, cXML.org, FAQ #9.

³³ *xCBL FAQs, FAQ #3* (www.xcbl.org)

³⁴ Ibid., Glushko, p. 6.

³⁵ Id., xcbl.org, FAQ #16.

³⁶ Ibid., Glushko, p. 7.

- Industry-specific standards sometimes are used. RosettaNet, for example, is an industry-specific standard used in the electronic industry supply chain.
- BizTalk.org is a joint OASIS and Microsoft initiative to develop repositories for distributing various business schemas.

Barriers to E-Procurement Interoperability and Standardization

Understandably, considering the complexity of this brief introduction, suppliers favor use of widely adopted standards since this reduces their resource costs associated with implementation. That way they can achieve “economies of scale” in terms of training/experience. Additionally, it simplifies their overall operating procedures in the electronic catalog access arena. In practice however, many suppliers find that every implementation is unique. There are specific data item requirements that are solution and installation dependent, requiring in many cases custom mapping and attendant costs of development and maintenance. However, suppliers believe installations become easier once they gain familiarity with a standard, its lexicon, and the approach to implementation.

In researching the internet concerning this issue, there seems to be general agreement that successful business-to-business electronic commerce (B2B e-commerce) portals depend upon a flexible, widely-adopted protocol. But there is not much dialogue on the web about trying to get to a common standard because of the vested interests discussed previously. Two of the standards discussed here, cXML and xCBL, are vendor-based. It is clear from the standards documentation that each of these methods requires a great amount of IT training to learn the typography, lexicon, structure, etc. . Even a cursory review of the varying standards validates the conclusion that “[s]tandardization of . . . architecture is critical to achieving the promised return on investment (RoI) from Internet commerce.”³⁷ And “[t]he advent of XML Schemas . . . will do little to address the emerging problem of semantic incompatibility among XML models . . . and proliferation of multiple models for the same application or business process.”³⁸ Other than the basic XML structure, there is not much in common.

According to Ontology.Org, a group supported by industry and academic experts,

Since XML does not address ontology [vocabulary and precise definition of terms] there is the potential to create islands of interoperation and therefore limit participation by businesses in commercial opportunities, unless the underlying issue of semantics is addressed simultaneously, despite XML’s well documented and acknowledged benefits.³⁹

Our limited supplier survey validated the obvious challenges with learning these different systems. The emergence of software that supports various of these standards (WebMethods, for example) may make use of varying standards easier. This software

³⁷ *Frequently Asked Questions*, p. 2 (Ontology.Org 6/23/01)

³⁸ *Ibid.*, Glushko, p. 5.

³⁹ *Id.*, Ontology.Org, p.3

functions as a middleware product that serves to bi-directionally translate various XML protocols on a dynamic basis.⁴⁰

As these standards develop around vendor-centric catalog solutions, there isn't much opportunity for public buyers to influence the dialogue about how transactions could be changed to accommodate more "shopping" and value analysis functionality from a buyer perspective. Public buyers are not conversant with these standards for the most part. In short, the standards are evolving to give the buyers the data the sellers think they need to see. As discussed later, there may be an opportunity here for public sector officials to take the lead in development of basic standards more related to catalog item content than programming technique.

The scope of the "open standards" licenses of cXML and xCBL appear sufficient to permit necessary use of the standards. The license agreements are oriented only towards cutting off liability for defects in documentation, waiving intellectual property claims, and defensively prohibiting service name infringement and claims of ownership by users of the standards. One would hope that these public documents are also the documents being used by suppliers integrating with Ariba and Commerce One; otherwise the benefits from standardization are going to be lost if the implementation documentation is different. Limited discussions with web-enabled suppliers suggests that the documentation is adequate for implementation of these "open standards."

It still is unclear to what extent publication of these "open standards" will actually promote the benefits of standardization for suppliers and third party solution developers. There is still some uncertainty about how application-specific some of these interoperability standards are, in terms of how and which data is actually used in the individual fields of the transactions and how much customization suppliers will have to do even within the standards to integrate with multiple platforms.

There is an opportunity to more rigorously define the contents of a catalog transaction set to include descriptions, unit of measure, packaging etc. If developed and adopted such a standard could simplify the process of incorporating various supplier catalogs into e-procurement systems. Finally, the development of a standardized item description taxonomy or lexicon would serve to improve and simplify catalog search methods.

VII. Other Areas of Standardization

Suppliers often format their customer addresses and store that information on their legacy system. Some standardization of a "ship to" code in these systems will make their life easier, especially as political subdivisions are added. Their back-end systems typically use a code instead of a free-form address. Suppliers don't mind loading the code structure, so long as some standardized approach to maintenance of delivery addresses is implemented. The same process can be employed to "bill to" addresses and codes.

⁴⁰ See www.webmethods.com.

There is a need for a standard taxonomy that governs how catalog line items are described. This standard would define and control the use and placement of nouns, adjectives, part numbers, etc into a standard sequence and placement protocol.

Finally, while not a technical standard, the variety of funding models use by the government entities creates confusion and resistance from suppliers. Similarly, differing policies, statutes and regulations, among the states can create the need for unique procedures and approaches for dealing with each government entity.

VIII. Conclusion

Continue Opening the Standards

While it is too early to draw broad conclusions, agreement on a single technical standard is not likely to happen. But the standardization working group heard from suppliers that agreement on at least a core set of typography, lexicon, and structure will reduce the challenges to suppliers in terms of resources. And software systems like WebMethods make integration feasible with a variety of interoperability standards. At least to public entities, “opening” of solution-oriented – even vendor-centric standards like cXML and xCBL -- would appear to be in the interests of everyone.

Needs of small and regional businesses must be kept in mind

This debate and the evolution of standards cannot lose sight of one essential difference in public procurement: regional focus and equity in the opportunity to compete for public business. While commercial strategic sourcing and B2B decisions almost exclusively emphasize risk and cost impacts from different supplier chain models, governments likely always will promote opportunities for all suppliers to compete for public business. So any discussion about establishment of standards must not lose sight of small business. But establishment of open, flexible standards should provide a better environment in which smaller businesses can grow their businesses, develop B2B capabilities, and move more freely among marketplaces.

This discussion of the subject of standards should continue

There was general agreement among suppliers that this discussion – with public entity and industry participation – is long overdue. Participation by industry is key to educating public entities and their procurement professionals on B2B issues. To the extent that government expectations are unrealistic about the value of e-procurement solutions in enhancing the basic buying function – beyond simple transaction efficiency – industry must be part of the debate. Only they can illuminate their concerns about loss of product differentiation, perceived underemphasis of “value” as an element of the purchasing decision, and resource challenges posed by multiple catalog integration demands.

IX. Recommendations

This discussion of the subject of standards should continue.

The workgroup sees value in a continued discussion that will educate public entity officials who are setting the requirements that third party applications are satisfying. To this end public officials should consider convening to develop catalog item content, item description and naming convention standards with the help of e-procurement system providers. In general, standardization of these items does not affect system design to the extent that choosing a particular XML protocol does. Accomplishment of such standardization could also prove the ability of the public and private sectors to work together to reach agreement benefiting all parties. Such accomplishment might serve as a confidence and trust builder permitting the parties to then take on the more thorny issues of catalog access standards and protocols.

Standardization initiatives that make B2B more attractive to a broad range of businesses should improve supplier adoption, one key for success of public e-procurement initiatives.