Implementing RosettaNet E-Business Standards for Greater Supply Chain Collaboration and Efficiency

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Abstract

B2B Collaborative Commerce creates value for companies by replacing expensive, manually executed, physical inventory flows with automatic, real-time information flows.

A company's demand management, direct material procurement, logistics, part management and order fulfillment processes are closely linked to supply chain partners. Value is created by close integration of these processes among the company's suppliers, logistics & service providers and customers. Collaborative processes that provide visibility to forecasts, inventory levels, order execution, and shipments between trading partners achieve this.

The collaborative process is hampered by lack of industry-wide processes and data standards that enable system-to-system automation of core processes ranging from supplier relationship management (SRM), supply chain management (SCM) and customer relationship management (CRM).

Initial attempts to establish such standards revolved around Electronic Data Interchange (EDI), which saw limited adoption due to the complexity and cost of the software required to implement these standard transactions.

Fortunately, an alternative is emerging for companies interested in automating supply chain interactions with their trading partners. RosettaNet, an independent industry consortium formed in 1998, provides open platform e-business process standards in XML, allowing trading partners to exchange business information via the Internet. RosettaNet was the first to recognize the importance of defining B2B process and data standards and already has extensive implementation experience within the Information Technology (IT), Electronic Components (EC), and Semiconductor Manufacturing (SM) industries.

Adoption of RosettaNet standards could well be a critical factor in bringing the high technology dream of dynamic value chain management to fruition.

In this paper, we will examine the drivers for inter-enterprise collaboration, the importance of standards, and present RosettaNet's conceptual model for XML-based B2B integration.

Introduction

In today's competitive world, well-oiled and responsive extended supply chains are increasingly becoming a foundation for competitive advantage. No longer can companies restrict their focus on increasing supply chain efficiencies within the four walls of the enterprise. The supply chain that extends beyond a company's organizational boundaries increasingly determines its effectiveness.

There is an increasing dependence on "collaboration" as key to bridging the boundaries – not only within the enterprise, but also between enterprises and across industry boundaries.

A collaborative supply chain is one that is able to eliminate inter-company bottlenecks, while maintaining security and trust between trading partners. Supply chain partners have employed slow, expensive, manual collaboration tools, such as phones and facsimile systems, to exchange information and process transactions.

Enabling an automated collaborative supply chain poses several business and technological challenges. First, it requires supply chain partners to agree to a standard protocol for exchanging information and executing transactions. Second, it requires a reliable and secure data exchange medium. Third, it requires supply chain partners to understand the "lost-value" due to uncoordinated decision-making. Fourth, supply chain partners need to identify what information needs to be shared as well as the information exchange process flow to facilitate decisions to be made more intelligently. Finally, trading partners must determine how the generated value will be shared between the enterprises such that both have the incentive to participate in the changed process and make the more intelligent collaborative decision.

Many early attempts at collaboration never grew beyond automating existing processes and communication between trading partners. Initial attempts to introduce data standards revolved around Electronic Data Interchange (EDI). Standards bodies such as the American National Standards Institute (ANSI) defined standards formats for common business documents to enable electronic exchange of these documents over private Value-Added Networks (VANs). While EDI is an obvious improvement over manual techniques, it has seen limited adoption due to complexity and cost of the software required to interface internal systems to VANs, in addition to the high transaction-based costs of the VAN itself.

These solutions did not come close to integrating the decision-making processes of a company and its trading partners. Companies complained about the inflexibility of EDI in representing their business processes. EDI's penetration remained limited to only the largest 20% of trading partners. Small and medium-sized companies found it difficult to justify the investment in EDI. Information hubs published data directly from ERP systems, but trading partners were concerned about the quality and correctness of the data, and received no decision support capabilities. Phone, fax and email were too error-prone and simply not scalable. Finally, none of these approaches completely addressed the costs of developing, managing and maintaining the right infrastructure to support truly collaborative relationships with supply chain partners.

Many of these solutions had limited success because they did not unlock the new source of efficiency that companies were after: making better decisions through collaborative inputs from trading partners.

With the advent of the Internet, business documents could now be quickly and easily exchanged. This eliminated the need for expensive connectivity, but still required companies to establish step-by-step processes for information exchange and transactions. To eliminate the need for bilateral negotiation between trading partners, RosettaNet focused mainly on inter-company processes, and has developed standards and guidelines for

automatic system-to-system exchange of business information and transactions to enable collaborative decision-making by companies in the high technology supply chain.

Breaking through Enterprise Silos

Some forward-looking companies have initiated collaborative efforts, but have failed to generate the expected results.

Some cross-enterprise efforts provided a means for information exchange that revealed the resulting uncoordinated decision-making, but then failed to provide a collaborative decision-making process to address this problem. Others did provide a mechanism for collaborative decision-making, but very few of those provided the incentives to drive the decision-making. Without incentives, too often the primary beneficiary was left with reluctant trading partners who were not really making the necessary decisions, although they were begrudgingly participating in the process.

For example, supplier companies do obtain forecast information from their customers today. However, there is nothing binding those customers to the forecasts. There is no incentive for the customer to stick to those numbers; invariably, they will change the numbers as required at the last minute due to their own inefficient planning processes, and/or last-minute changes from *their* customers. In fact, the customer is motivated to over-forecast in order to raise the likelihood that the supplier will have enough material should the customer find that more is needed. Suppliers, therefore, still have to guess customer behavior and position inventory to protect against the variation in customer behavior. Suppliers need to encourage customers to abide by their decisions as well as share them.

Similarly, customer companies have some collaborative processes in place where they get information on allocations from suppliers. However, there is nothing binding the suppliers to those allocations. If the supplier's situation changes, it could change the allocation at the last minute. To protect against this unreliability of supply, customers must position higher inventory of component parts to protect their own throughput. To drive suppliers to provide reliable allocations at the right prices and abide by them, customers must provide them with value for such behavior.

Therefore, the very basis for cross-enterprise collaboration is resident in the understanding between supply chain partners that there could be lost value in uncoordinated decisions. The decision process in need of coordination should be identified, as well as the information that needs to be shared to enable those decisions to be made intelligently. Finally, both trading partners should have a vested interest in the process. These include joint incentives and penalties to participate and share the value generated by collaborative decision-making.

Collaboration: Myth and Reality

The term "collaboration" has been misused in the marketplace. It has been applied to any solution that involves communication. This definition dilutes the significance of collaboration.

Collaboration is any process by which two or more separate authority domains coordinate their decisions, resulting in plans that are superior to the plans they would have likely made without coordinating their decisions.

Coordinating decisions is the essence of collaboration. If there is no coordination of decisions, there is no collaboration. It may still be a useful process, but it is not collaboration.

A decision is made by one authority domain, and that decision is published to another authority domain. Based on that information, the second authority domain makes a different decision than it would have otherwise. As a result, it publishes that decision back to the first authority domain. The first authority domain, seeing the decision of the second (which is an indirect result of its previous decision), will possibly make a different decision. The process continues until both authority

domains are satisfied with their collective decisions, or until one of them decides to execute to the best decision so far.

Collaboration is a decision-making process. And although sharing information or creating visibility might support or even facilitate decision-making, it is not by itself decision-making. To achieve collaboration, trading partners must have decision-making on each side of the collaboration, and they must specifically engineer the communication between them such that it facilitates more intelligent decisions.

Collaborative Framework

The key to engineering collaborative solutions is agreeing what information should be shared to influence the decisions made on each side. The information may be more than simple visibility; it could involve other direct incentives. Incentives, however, cannot be ad-hoc. It is necessary that both trading partners be prepared for the incentives. The collaborative decision support solutions on each side of a transaction or interaction will need to be engineered together with the collaborative protocol working between them.

RosettaNet Partner companies are increasingly realizing that, although consortium Partner Interface Processes (PIPs) specify the process only at the point of interface between the trading partners, the full value is in aligning internal decision systems with the PIP specifications.

The RosettaNet Solution

RosettaNet comprises more than 400 companies from around the world and has technological and corporate support at the highest levels of the technology industry's largest corporations. RosettaNet Partners contribute significantly throughout the standards development process, from concept to implementation, providing technical input, process methodology expertise, technology, best practices, project management, implementation services, support and solutions. This unique organizational structure ensures that the best minds from the most notable companies in the high technology industry contribute to standards that meet the needs of all. The motivation, expertise and leadership enables RosettaNet to develop and deploy standards with accelerated speed.

Implementation Experience

RosettaNet has taken an important and dramatic lead over other standards initiatives in terms of implementation experience. A case in point: the consortium announced more than 450 documented Partner connections using RosettaNet standards worldwide in early 2002. These production implementations were achieved by major information technology, electronic components, semiconductor manufacturing and solution provider companies, and were the result of the consortium's 2001 Milestone Program initiatives, which set aggressive industry-wide implementation goals in key strategic business processes within the high technology supply chain. These Programs have served as unifying forces within the industry –- driving collaboration to solve critical supply chain challenges, aligning priorities within the high technology trading partner and solution provider communities and speeding development and production implementation of PIPs. This record achievement represents aggressive growth in the industry as it relates to XML and e-business standardization across the global trading network. The number of connections are only those RosettaNet has collected from its Program Partners. The consortium acknowledges the actual number of connections is greater when all non-programmatic connections are considered.

Understanding XML Convergence: A Conceptual Model

RosettaNet has surveyed the XML–related standards space and, as a service to the industry, has developed a conceptual model that enables the comparison of horizontal (universal) and vertical (supply chain- or business model-specific) XML standards efforts. Using a model that identifies nine

distinct components required to provide a total e-business process, RosettaNet's goal is to bring clarity to various industry efforts. It is possible to identify efforts that are complementary as well as areas where possible overlap -- and thus convergence opportunities exist. RosettaNet acknowledges that there may be differing views or alternative perspectives to the model.

Full Component Set Required to Support XML-Based E-Business Process Interoperability Between Supply Chains

Although interoperability within a supply chain is an important goal, interoperability *between* supply chains is equally important. A company rarely interacts only within a single supply chain, but rather must connect with several supply chains as product offerings and business dictate. To support the highly specialized needs of a given supply chain, and at the same time optimize interoperability between supply chains, RosettaNet recognizes the need for both horizontal and vertical XML-based components. In developing its model, RosettaNet has endeavored to identify components layers that are ideally universal (i.e. they may be used uniformly across all supply chains) as well as those that are supply chain- or business model-specific (i.e. they must be unique to meet specialized requirements).

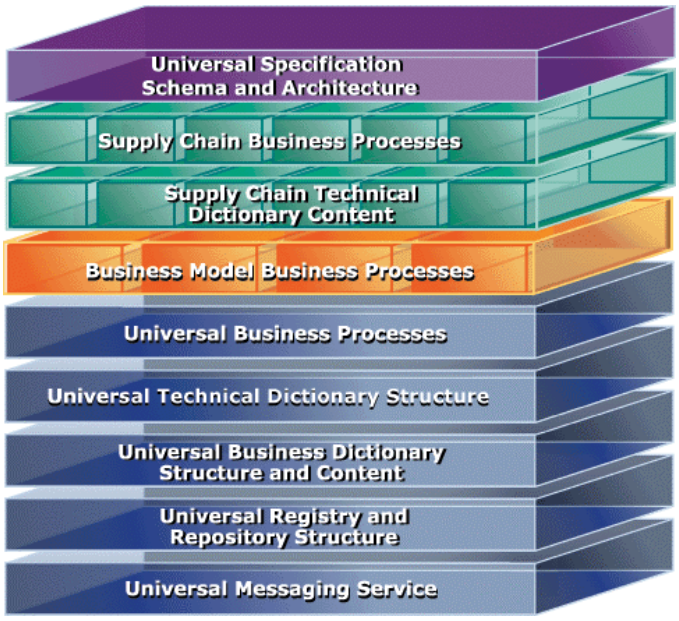

Figure 1:
Full Component Set Required to Support XML-Based E-Business Process Interoperability Within and Between Supply Chains

Universal Messaging Service

The messaging service layer is the foundational layer component that specifies how a business message is to be packaged, transferred and routed between trading partners and trading networks. The messaging service layer component is also referred to as the TRP, or Transfer, Routing and Packaging layer.

At the business process component level of the model, a set of business content is defined. The business content can then be packaged, transferred and securely routed securely with digital signatures in a standard, commonly accepted way and when sent to a company's trading partner.

Universal Registry & Repository Structure

Registries and repositories serve an important function in e-business. They are most easily thought of as electronic versions of the White Pages for business. A commonly used registry and repository structure allows companies to register the

attributes of their e-business environment: who they are, how to find them, and the types of business relationships they can support. It is a structured way for companies to discover trading partners, determine their capabilities, and then begin a business relationship in a plug-and-play way.

Trading Partner Agreements (TPAs), which specify the terms and conditions of a trading partner relationship, are also considered part of the Universal Registry & Repository Structure within this model.

The Universal Registry & Repository Structure, therefore, specifies the structure of the registries and repositories that trading entities can access to discover each other's capabilities and services electronically.

Universal Business Dictionary Structure & Content

The Universal Business Dictionary Structure & Content specifies structure, and is also the aggregation of all content fields, elements, constraints, code lists and objects used within electronic business processes. It describes all of the business content, attributes and relationships between elements that exist in all business documents.

Field descriptors for a price and availability query, for example, would be: product quantity, product identification, global currency code, and monetary amount. Each of these descriptors contain, among other things, a data type value (whether it is a string or integer) and a minimum and maximum value, where at least one choice may be mandatory. All of this information is structured and stored in a universal business dictionary standard.

Universal Technical Dictionary Structure

This component manages the structure for defining form, fit and function of any product or service, regardless of the industry. Specifically, the Universal Technical Dictionary Structure specifies the structure of the specialized technical dictionary or dictionaries used to obtain commonly used domain-specific terminology and accepted values. The pre-defined structure is used as the basis for defining supply chain-specific technical dictionary content (i.e. form, fit, & and function attributes).

Universal Business Processes

Universal Business Processes contain the minimum amount of specificity required to support core business processes across all geographies, all business models and all supply chains. For example, in almost any industry, it is common for a company to purchase a product or service from a supplier. In that exchange, a purchaser typically asks a supplier for information regarding product price and availability, places an order, and then asks for an acknowledgement of that order. Across industries, supply chains, regions, and business models, a relatively simple purchasing business process could be defined that might support 80 percent the majority of the world's B2B purchasing transactions.

For trading partners to complete a transaction on on-line, business process standards should specify both the structure and format of the business content of a message (also referred to as a payload) as well as the message exchange choreography (also referred to as dialog).

Business Model Business Processes

Specific business models influence business processes. The Business Model Business Processes component specifies business process definitions specific for a particular business model. For example, the manufacturing processes and informational requirements of a manufacturer of discrete products (computers) may differ significantly from those of a process-based (semiconductor) manufacturer. Build-to-Order models often have different business processes and information requirements as compared to Build-to-Inventory models. Often, there may be a range of business models used within a supply chain, and it is

common to see the same business models being used across several industries.

For trading partners to complete a transaction online, business process standards should specify both the structure and format of the business content of a message as well as the message exchange choreography.

Supply Chain Technical Dictionary Content

To support many B2B e-business processes, a supply chain must agree on a common set of attributes that describe the form, fit and function of each product within its supply chain. An agreed upon technical dictionary is particularly important for business processes attempting to automate the update of electronic catalogs and support of end-user product-based parametric searches over the Internet. When describing a disk drive, for example, the computer industry must agree upon a common set of attributes that can be used consistently by any company that manufactures disk drives (e.g., capacity, access speed, form factor, electrical current, etc.). Whenever a disk drive manufacturer introduces a new product, it then must describe it in terms of the attributes as prescribed by the supply chain's technical dictionary.

Supply Chain Business Processes

The Supply Chain Business Processes component identifies the business process that are is unique to a particular industry or supply chain. For example, the business process and informational needs in the computer supply chain are quite different than those of a pharmaceutical, clothing, or book- publishing supply chains. Each industry or supply chain has different ways of designing, forecasting, ordering, manufacturing and distributing their products. Most of these differentiating factors are concrete and non-debatable.

For trading partners to complete a transaction online, business process standards should specify both the structure and format of the business content of a message as well as the message exchange choreography.

Universal Specification Schema & Architecture

The top component describes the complete overarching architecture of the universal e-business process, including how universal components relate to supply chain- and business model-specific components. The Universal Specification Schema & Architecture represents the interactions between all of the components in the model.

RosettaNet's Convergence Strategy

Over the last two years a number of universal, XML-based standards initiatives have been initiated and are in various stages of development and acceptance such e-business XML Initiative (ebXML). These initiatives are not industry specific. RosettaNet seeks to leverage its leadership role within the e-business standards space and its significant production implementation experience to reduce confusion and bring clarity around the various B2B initiatives in the marketplace. Working closely with B2B standards groups that have complementary goals, RosettaNet seeks to support, converge, or migrate to complementary horizontal standards initiatives that have the greatest potential for universal acceptance.

RosettaNet believes such convergence efforts will both contribute to greater supply chain interoperability and allow RosettaNet to concentrate its efforts on the business process requirements unique to the high-technology supply chain and the various business models used within it. Working closely with other standards organizations, RosettaNet will ensure that its standards efforts are compatible with accepted universal, horizontal standards. In areas where a universally accepted horizontal component does not exist, RosettaNet will continue its work in that area to ensure an integrated, XML-based business process solution for the high-technology industry.

Companies directly benefit from more widely accepted and interoperable B2B standards by being able to implement solutions more cost effectively. RosettaNet seeks to ensure that lower-cost implementation solutions are made available for small- to medium-sized enterprises around the world as a result of its convergence strategy.

Current Solutions for RosettaNet Supported Supply Chains

In the absence of proven, universally accepted horizontal standards, RosettaNet developed a number of horizontal components in order to provide a robust, complete solution for its supply chains. Today, RosettaNet has standards efforts in each of the following areas:

Universal Messaging Service: RosettaNet developed the messaging services component, called the RosettaNet Implementation Framework Core Specifications, to supports its production implementations.

Universal Registry & Repository Structure: RosettaNet does not have any formal, unique efforts in this area.

Universal Business Dictionary Structure & Content: RosettaNet has defined a universal business dictionary, called the RosettaNet Business Dictionary, that is being used across the IT, EC, and SM supply chains.

Universal Technical Dictionary Structure: RosettaNet, working with Silicon Integrated Initiative (Si2), has developed a universal technical dictionary structure for use by the high technology industry.

Universal Business Processes: RosettaNet is in the process of developing universal business processes that could be used across a wide range of supply chains.

Business Model Business Processes: RosettaNet is developing a number of business model-specific business processes commonly used in the high technology industry. RosettaNet is also working with the National Electronic Manufacturing Initiative (NEMI), and this joint effort will enhance the development of manufacturing business model business processes.

Supply Chain Technical Dictionary Content: RosettaNet, in conjunction with Si2, International Electrotechnical Commission (IEC) and Japan Electronics and Information Technology Industries Association (JEITA), has developed technical dictionary content, called the RosettaNet Technical Dictionary, which supports the IT, EC, and SM industries.

Supply Chain Business Processes: RosettaNet is currently the only organization focused on supply chain business processes. Many of RosettaNet's PIPs are already in production between trading partners in the IT, EC, and SM supply chains.

Universal Specification Schema & Architecture: RosettaNet has developed a universal specification schema and architecture to support its efforts.

Conclusion

Companies seeking to more closely align their business processes with their trading partners are well served by employing RosettaNet e-business standards, which can provide greater visibility to forecasts, inventory levels, order execution, shipments and content. EDI standards do not provide the solution due to complexity and cost of software required to implement standard transactions. The key is collaboration. Companies must focus on supply chain efficiencies beyond their organizational boundaries and coordinate the decision-making processes with their trading partners. Supply chain integration requires both horizontal and vertical XML standards in order to support both business process complexity as well as interoperability goals between supply chains. RosettaNet has developed a conceptual model for identifying the components of business process that allows for the direct comparison of all XML-based standards. Although many XML standards initiatives are complementary, the sheer number of standards initiatives has created confusion among end users. RosettaNet will continue

to play a role in several components of the e-business process, but expects to converge efforts with other horizontal standards organizations.

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About RosettaNet

RosettaNet is an independent, non-profit consortium dedicated to the collaborative development and rapid deployment of open Internet-based business standards that align processes within the global high-technology trading network. More than 400 companies representing over $1 trillion in annual information technology, electronic components and semiconductor manufacturing revenues currently participate in RosettaNet's standards development, strategy and implementation activities. A complete list of member companies and more information on RosettaNet is available at www.rosettanet.org.