

## Connecting to the global supply chain

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*Abstract: This article examines the need for companies to embrace e-business to establish business processes link with their key business partners so that they can remain competitive in their marketplace. The ability to exchange business documents electronically using computers is imperative in order to achieve process integration. However, integrating these heterogeneous systems is not easy.*

*Companies need to work with their business partners to define the data structure as well as processes for exchange. The determining factor is that data must be separated from process as well as applications and this data structures need to be easily converted to different structure while retaining their integrity. International standards are formed to standardize these data structures as well as language to describe the data. XML and Web Services are the result of the work of these standards committees.*

*In recent years, the manufacturing section has transformed from stand-alone manufacturing companies to connected supply chains. These supply chains are primarily driven by brand owners of end electronics products, usually the MNCs. Local manufacturing companies, SMEs, supporting these companies providing raw materials, components and services such as product assembly, distribution and logistics. These SMEs must be able ready to connect to these supply chain or risk loosing the business.*

*This article examines how SME companies can connect to these supply chains easily using XML and Web Services.*

### **Global Trends in Manufacturing**

In recent years, this sector has experienced major shifts that have changed the ways companies define their value-add and how they interact with their partners. Manufacturing activities centre on supply chains which are primarily driven by brand owners of end electronic products, usually large MNCs. Supporting these companies in the supply chains are local manufacturing companies providing raw materials, components and services such as product assembly, distribution and logistics.

### **Global Outsourcing**

Product companies are outsourcing more activities on a global basis so that they can focus on core competencies such as design, branding and high-end manufacturing. They no longer make any of their products in company factories preferring to outsource the manufacturing to a number of well-placed and highly competitive contract manufacturers. In Singapore, Hewlett-Packard outsources the building of whole printers to contract manufacturers such as Venture Corporation. Dell and Cisco also adopted similar strategies.

For outsourcing to work well, brand-owning companies need to strengthen and establish linkages in complex supply chains. Increasingly, the competition will be among supply chains rather than among individual factories or among individual companies.

These supply chain must be integrated and responsiveness to changing market demands. Manufacturing companies will have to upgrade their supply chain management capabilities in order to compete effectively in the global market.

SMEs, especially those in the lower levels of the supply chain hierarchy, are usually unable to fully participate in B2Bi collaborations as these typically require high levels of Information Technology know-how and hefty costs. For example, SMEs usually cannot afford costly B2Bi systems. This results in lost business opportunities for SMEs.

### **Critical Success Factors**

For the supply chain integration to take place, the following factors are critical:

#### **Data Exchange Format**

End-to-end process and application integration is not easy. Successful process integration requires company to develop an integrated front-end and back-end infrastructure. At the same time, the infrastructure must be flexible, agile and scalable when dealing with business partners. Established companies can lose market share if their application infrastructure lacks the flexibility to service customers quickly and effectively.

Integrating end-to-end processes and applications involve many aspect of cooperation between the parties involved. Standards are critical to the process of exchanging information. However, having too many standards can be just as chaotic as having no standards.

Separating data from process is needed to achieve a seamless integration of business process between two partners. International standard committees were formed to define the necessary standards to achieve this main objective. The result is an extension to the already the most accepted mark-up language (HTML) used on the web – XML.

XML offers the ability to separate the data from the processes that act on that data. XML provides a syntax that allows you to define each information object in an unambiguous way. By doing so, you can capture the information as one object and process it with many different applications depending upon the requirement at the time.

#### **International Standards**

XML is a data description syntax, which consist of a set of start and end tags. The meaning of each element that forms the XML document need to be further defined. You need to come up with a common vocabulary.

Who define this vocabulary? The easiest way is to get your trading partners together to define the vocabulary. Your Industry associations may have a set of standards that you can use.

To facilitate the integration of supply chains, we will need internationally accepted and standardised e-business process content that will allow product companies and their suppliers to communicate in a plug-and-play manner.

Rosettanet is an important standard to consider. Many electronics products manufacturing companies have adopted this standard for their data exchange formats. With the support of more than 500 companies representing US\$1 trillion in combined revenues, including the who's who of high-tech, RosettaNet has evolved into be the de facto standard for business to business communications in the high-tech industry. Originating in the US, RosettaNet has now established presence in Europe and Asian economies such as Japan, China, Korea, Malaysia, Philippines, Taiwan and Singapore.

### **Content Delivery**

In terms of content delivery, web services will become a very useful tool for integrating supply chains. The web services approach offers a flexible and lower cost option for automating business processes and integrating supply chains. In situations where the process is complicated and non-standard, as in multi-party sharing of product design or engineering information, web services can facilitate collaboration.

Web Services make up a set of standards, one of which is the object access protocol, SOAP. This standard defines the data structure to describe the web service interfaces.

The other components of Web Services are a set of API (application programming interface). The Web Service API is described using a language syntax called Web Services Description Language (WSDL). This language is used to define the methods and parameters of the component objects of the Web Service.

The standard to publish and maintain the registry is also defined. UDDI will provide the basic infrastructure for company to publish their web services and enable other companies to find business partners.

The ability of web services to discover each others' services dynamically for just-in-time scenarios is harder to realize unless there are credible agencies established to certify and audit companies providing web services.

### **How to connect to the supply chains?**

Business Partners can implement applications that provide computer-to-computer communication software interface.

Figure 1, shows how the customer's purchasing system can be integrated with the supplier's Order Entry system using B2Bi gateway.

The documents formats used for exchange are in XML format. The Purchasing Organization (#1) sends its purchase orders to the respective suppliers using XML format.

The B2Bi gateway data format can adopt Rosettanet's format. Rosettanet has defined all the necessary data formats for the purchasing process. At the buyer and supplier ends, the B2Bi gateways are used to transfer and handle the exchange protocols of the whole process.

The Data Transformation process is included to convert the incoming XML document to the format compatible with the Order Entry software and vice versa (refer to #4 and #5). Company can then focus on its internal business process and have the outsource partner to take care of managing the integration tasks with its business partners.

Many purchasing companies have applications such as MRP, ERP that were designed before the advent of Internet (#1). Typically, most companies have streamlined business applications that link their internal business processes that have proven to be efficient. It is imperative that companies continue to use these applications and focus on building the "bridges" to link these processes to their business partners. The advantage of this approach is that they can leverage on existing investment.

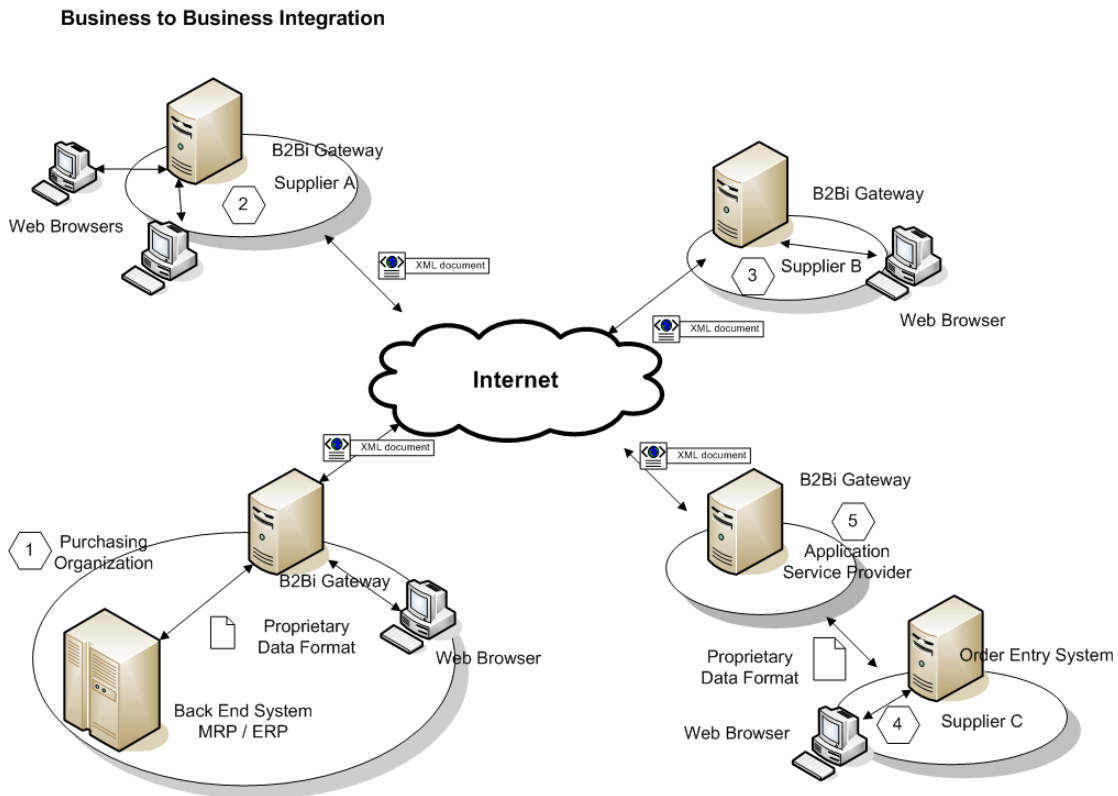


Figure 1: Business to business partners integration

The advantage of this design is that it isolates the back-end system from the front-end and adds security and flexibility.

The B2Bi gateway also provides web access for users to perform queries and configuration using standard web browser software.

Singapore Institute of Manufacturing Technology (SIMTech) has developed a B2Bi Gateway to ease integration with business partners. SIMTech works with Intrinix Networks and Cybersite, to provide complete solution to companies planning to connect to their customers' supply chain. The B2Bi Gateway leverages on the Internet and open-standard platforms to help bridge the gap between full-fledged complex implementations at MNCs and SMEs. The B2Bi Gateway can be used for simple two-party or multi-party collaborations and can be customised according to process steps and messages involved in each process.

To lower the initial investment company can opt for the ASP (Applications Service Provider) model which consists of one time setup charge to set up the gateway and monthly hosting charges. The gateway is hosted by Cybersite. Intrinix provides additional software to transfer documents generated by the company back-end system. Other value-added services provided include training and system maintenance.

## **Conclusion**

SMEs, especially these at the lower levels of the supply chain hierarchy need to fully participate in the B2Bi collaborations so as not to lost business opportunities. SMEs need to connect to the supply chain easily and quickly. Unlike MNCs, SMEs prefer lower initial setup cost and ASP model is suitable for them. SMEs need to adopt open and international standards to be able to connect to global supply chain.

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