

Using XML for supply chain integration

business case and technical issues

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Abstract:

There is a strong business case for integrating suppliers, customers and partners into a seamless supply chain. The advantages are dramatic, reducing time and costs while increasing quality. You've heard about it – now learn the detailed business case, and how to do it, using XML, which is an ideal enabling technology. This presentation will start by explaining the overall concept and the business advantages of supply chains, and then focus on the key technical issues which must be solved to make this work. Although this impacts many industries, examples will be given from the automotive industry, which has been an early adopter of XML.

The business case for supply chains

XML & supply chains

General Motors, Ford, and DaimlerChrysler are cooperating to build the world's largest supply chain. They are integrating suppliers, customers and partners over a high-speed private Internet, in just one example of industry partnerships making major strategic investments in supply chains. XML is emerging as a key enabling technology for this purpose.

In this paper, I will explain the business case for a supply chains, why XML is an ideal enabling technology, and some key issues in using XML.

Although the supply chain concept impacts many industries, examples will be given from the automotive industry, which has been an early adopter of XML.

Historical background of supply chains

Supply chains have a long history, but let's focus on the factors which have recently caused them to gain particular importance.

In the last decade, many companies found it benefited them to outsource non-core functions, and delegate responsibility to suppliers. Outsourcing meant that brands could push inventory and costs off their balance sheets, as well as deal with cost issues more flexibly. The increased fiscal responsibility this approach enforced all along the line made this very popular.

Increasingly, companies are moving away from one organization building the entire product.

These efforts were originally driven by top of the pyramid, by the company which originally made the complete product.

What has driven the development of supply chains?

However, outsourcing will have negative results if a company can't coordinate production of materials it needs to create its product. Most industries are partially dependent on suppliers to produce their products. If there are demand swings, the chain may not be able to respond, resulting in inability to match market demand as quickly as competitors can.

Implementation of supply chains have been driven by the realization that businesses don't win, supply chains do: if the agility and efficiencies of a value chain are less than its competition, the company will lose in the marketplace.

The concept of automated supply chains is a response to restore some benefits of pre-supply chain functioning to an outsourced relationship, and permit globalized, distributed systems to take economic advantage of world markets.

What is a supply chain?

So what is a supply chain? It's a loose agglomeration of independent, interdependent companies, cooperating to build product(s).

Setting up a supply chain means automating many aspects of the supplier relationship, including functions such as Engineering, Production, Inventory, and of course, Procurement.

The idea is the best of both worlds: you just do your own business, but you have reliable partners who do their part.

The advantage is that you can work with any supplier, and if a particular supplier does not add value, you can remove it from the chain.

This approach lets market forces work to "rightsize" suppliers in a way that was not possible in an environment where a company was trying to, for example, make its parts division more cost-effective.

Business factors increasing demands on supply chains

This comes at a time when markets demand ever closer synchronization of business processes. Many companies have gained benefits from reducing inventory costs through a Just in Time approach to manufacturing. This requires coordinating production and inventory levels so that products can be built "just in time", from minimal inventory. Obviously, this is more complex to maintain between companies.

A further driver is Internet based sales. In an Internet purchase, the customer, not a salesperson, drives the decision process, and this leads to differences in how Internet sales transpire.

To purchase a car, we used to have to physically travel to a car lot and deal with a car salesman. Today it's possible to purchase cars online, with a number of advantages. Now that we have much more information about car prices, it's easy to shop around, since the competitor is a mouseclick away. We will likely make our decisions based on objective criteria such as price and the exact features we want.

Without a salesman to push the customer into a decision, the customer will tend to keep shopping around until he really gets what he wants.

For the car company to drive sales, they have to be competitive on price, provide better service, or provide exactly what the customer wants— the exact configuration and quick delivery. This means more complex

configuration options for production, better logistics, and further increases the need for integration of suppliers.

Disintermediation

Mentioning car salesmen brings up a key issue in supply chains – disintermediation – since that’s where the cost savings are realized. This fancy word just means taking out the middleman, if he doesn’t add value.

The value of car salesmen as intermediaries has been reduced, and it’s possible to remove their costs from the product. Many existing industries have similar processes which were necessary evils. Technology is making it possible to remove some of these processes. If they can be removed, they will be.

Are supply chains just a fad?

Because of the potential for realizing cost savings, supply chains are becoming increasingly attractive in major industries. In the 80’s, auto manufacturers bought 20-30% of their components. Today, they buy close to 90%.

Technical issues

So why hasn’t everyone been using supply chains?

So if supply chains make so much business sense, why hasn’t everyone been building them?

The key inhibitor has been technology. There is substantial difficulty in integrating processes and systems and difficulties in providing rich information over distance

We’ve already observed that the requirements of Just in Time pretty much demand automated systems. Setting up such capabilities has previously meant dealing with the complexities of using EDI (Electronic Data Interchange), which has been prohibitive for all but the largest companies.

How have supply chains been implemented?

Up to now, the key technology for implementing supply chains has been EDI (Electronic Data Interchange). This is however a highly expensive technology to set up and maintain.

Another technology for creating loosely coupled systems is CORBA, which despite its many advantages, is almost synonymous with costly systems development.

And, of course, up until recently, these systems needed to run over private networks, expensive to set up and maintain.

Naturally, all these technologies required experts, which meant that integration was expensive.

Requirements supply chains need to solve

Let’s sum up the issues of a supply chain. In a world where global competition is increasingly feasible, the choice of partners becomes more open, and so supply chains are characterized by dynamic relationships. Companies also need to contend with communicating rapidly changing demand. A successful supply chain must coordinate forecast, production, and delivery information among members of the chain.

Since costs still flow to the consumer unless the supply chain is optimized, we need to be able to easily swap out or remove processes from the supply chain which don't add value.

Now let's take a look at the technical options to build a system which can help us solve these problems.

System requirements to support supply chain process

When we consider the requirements from the supply chain process, it is clear that the systems that support this process must be flexible in terms of the information we need to exchange.

Since we want to work with smaller suppliers, the required integration must have a low cost of entry.

We don't want to be tied in to the relationship, so ideally we would use an open standard that would let us seamlessly switch to another trading partner when necessary.

Since we are trying to meet market demand, the systems must also be relatively simple and quick to set up.

Enter XML

XML is a technology ideally suited to these requirements. I will just touch on a few of the benefits. It is a rich data format with a structure which can be validated. The semantics can be defined to meet the requirements of a particular industry.

It is an open standard, which brings many free extras. Through Unicode, it has built-in support for world languages. It is cross platform, not just in the format itself, but also in terms of tools support.

It is rich enough to transmit complex database information, and can convey information to keep in synch multiple databases even with very different schemata. For all that, it is easy for machines to process.

A not insignificant advantage is that it is human readable, so that if we haven't set up a system yet, we can still interact with the information on an ad-hoc basis, even if we're communicating with an automated system on the other end.

Where does XML fit in?

We often talk about system glue. Simply put, XML can be viewed as a kind of Velcro between different computer systems.

Since XML's roots are as a document format, it can of course be used to automate business documents, but it can also serve as a rich messaging format, even for interprocess communication and can even be a low cost substitute for complex EDI, CORBA technologies.

How else can it be done than with XML?

XML isn't the only technical option. As we have observed, EDI, at least for the moment, is already entrenched in supply chain integration. Efforts are underway to provide EDI over Internet technology.

For systems that are more permanent, and must have better performance requirements, CORBA, COM or EJB are potential next steps.

And of course there are commercial products with non-XML means of communication, designed specifically for supply chain integration.

XML in comparison with other potential technology choices may be less "machine efficient", but faster and cheaper to implement, and more flexible in the long run.

Can't I use ERP software to do this?

A natural question is, can't ERP (Enterprise Resource Planning) software be used for this, since it is designed, after all, to coordinate business processes. However, a key difference is that ERP software built to automate businesses processes within a company.

Because supply chains are made up of separate companies, integration work will likely mean getting different ERP software to communicate.

Even if you are lucky enough to have trading partners who made the same technological choices that you did, because supply chains are dynamic interactions between different businesses, who may or may not be trading partners in the future, you may have to repeat the exercise if your choice of partners changes.

And, of course, ERP resources are notoriously expensive and difficult to find.

Who's using XML in supply chains?

Industries which are involved in adopting XML in their supply chains include not just the Automotive, but also the Aerospace (Boeing, Raytheon, Lockheed Martin) and Computer industry (Hewlett-Packard, Hitachi, IBM, Intel, Lucent, Motorola, Philips, Rockford).

Even existing efforts based on EDI technology are considering XML.

How are supply chains being formed?

In some markets, such as automotive and aerospace, supply chain efforts are being driven by market leaders seeking to gain competitive advantage. In industries with stronger suppliers, such as computer hardware, consortia are driving the effort.

E-Commerce vendors are taking on existing supply chain vendors, existing ERP vendors are positioning themselves for this market, and businesses are taking advantage of new niches, such as to provide solutions for mediating bidding.

What XML schemata are being used?

In all industries, there is a trend to try to define (and of course, own) schemata, usually industry schemata, although there are some all-purpose efforts as well.

Although XML is emerging as the standard for expressing schemata, there is not a clear standard for the schemata themselves. Many are spreading out from emerging E-Commerce de-facto standards. There are vertical market schemata such as HL7 Kona, RosettaNet, ECM Data, ACORD, OTA for industries as diverse as healthcare, computers, insurance, travel.

There are also proposals for generic industry schemata such as ebXML and BizTalk, efforts to provide XML equivalents for ANSI X12 EDI features, and standards for expressing interfaces.

As always, companies are seeking to own the standards as much as possible. There may eventually be a clearinghouse for such tagging schemes. That will of course open the question of who will want to own that.

Key technical issues

There are certainly many technical issues, but here are a few of the most important ones.

Even if you are using a commercial product, be aware that no product will do all that you need.

Keep in mind too that this is a dynamic market. Your vendor may not be around in a few years.

Use open standards such as XML whenever possible.

Even if the tool says it uses XML, or is based on it, beware of ties to parallel proprietary methods.

Abstract any proprietary interfaces to commercial tools.

All of this emphasis on XML is ultimately good for the customer, who wants to avoid getting tied to tools, but it may not be so easy to avoid getting tied to particular schemata. In some cases, organizations may have to choose among competing schemata. Be aware that the schema (DTD or namespace) you need to support may change, and that you may need to support more than one.

Don't shortcut the design. Technical concepts like authentication, authorization, transactional integrity or scalability will become much more than buzzwords to you if you don't take them into account.

Summary

Supply chains are in your future..

Supply chains are indeed in your future ...and these days, the future is closer than you think. Supply chains make global competition much more possible than it has ever been, so it is important to understand the market implications.

Existing trading partnerships will be less secure. After all, the whole point of a supply chain is to be able to remove links in the chain, or replace them with those which add more value. If you don't maximize the value that can be added, expect to be disintermediated.

The transition to XML-based supply chains offer a temporary competitive advantage for the nimble, which may effectively lock out competitors who move too slowly, and may also temporarily open up markets that were previously locked down tight. The window will not stay open long, though, since if their needs are met, most companies will usually tend to work with a relative few known suppliers.

Understand the implications of a supply chain infrastructure in your business, and move quickly to take advantage of the potential. Establish your company early on as a player in this environment. The ability to quickly support an industry schema, or to help drive it, may make the difference in your company's perception as a viable trading partner. Build the groundwork for standards-based systems which will let you flexibly interface your systems to supply chain partners.

XML and supply chains are a powerful combination that will ultimately give you – or cost you – a competitive advantage.

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