# Role of XML in Transportation

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The advent and acceptance of the Internet as a 24x7x365 business medium has opened the door to deliver the system-to-system connectivity needed to introduce a new era of cross-enterprise trade. A close look at the current state of the transportation industry suggests that XML will play a major role in integrating various small, medium and large players in communicating with different systems with ease.

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# Introduction

Electronic commerce is significantly changing the way data is communicated across all the players in the transportation industry. The potential is very large: rapid growth in B2B e-commerce will create new demand on how information is exchanged across all the transport players in the services chain. The ease of data communication will make transport faster as well as lower its administrative costs. Several old as well as new e-commerce solutions for the transport industry have met with little or no financial successes.

But this would not undermine the potential offerings of ecommerce to the transport industry. Rather than measuring the success, its impact to the industry has to be measured. The potential offerings of ecommerce have started to emerge and perhaps only few of the today's products and applications will be recognizable five years from now.

EDI was initiated in the late 1960s within the transportation industry for seamless transmission of data between the carrier and the shippers. By the late 1970's it had expanded to the point that the American National Standards Institute adopted it as a national standard. The 1980's saw exponential growth in commercial EDI implementations. **EDI has been less successful in penetrating to small and medium enterprises** for a variety of reasons including a complex set-up process and high initial investment on the infrastructure. EDI expansion continued in the industry, but at a very slower pace. With the advent of XML, the EDI is slowly loosing its ground as a de-facto mode of robust communication medium between computer-to-computer communication. The comparison table (figure1) presents a look at benefits, drawbacks and future. The analysis does suggest that XML may become de-facto mode of computer-to-computer interface for exchange of data in future.

Figure 1

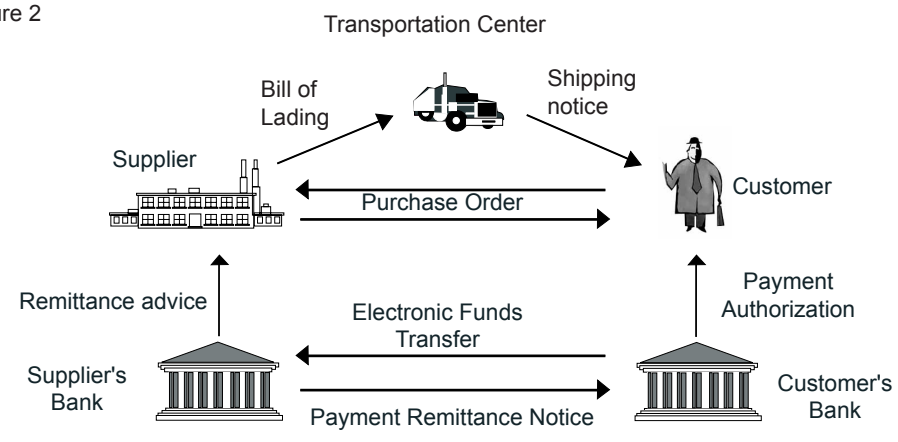
| | EDI | Flat Files | XML | Web/Email |
|---|---|---|---|---|
| **Benefits** | • Well established<br>• High level of standards<br>• Track & Trace<br>• Resends<br>• Recognized by ANSI as a national standard | • None | • Rules exist<br>• Human and Machine readable<br>• Needs no external software<br>• Support by almost all databases<br>• Ease of implementation | • 80% of small and medium trading partners<br>• Low cost to trading partners<br>• No additional software needed<br>• Low or nil implementation on costs |
| **Draw backs** | • Initial software is costly<br>• Very complex<br>• Only machine readable<br>• Needs external software | • Lack of standardization<br>• Not as robust as EDI for track & trace and resends<br>• High maintenance costs<br>• Constant human interaction needed | • Lack of standardization for transport industry | • Lack of standardized user friendly GUI<br>• Need high human interaction<br>• Lacks in correctness of data due to human intervention |

| | EDI | Flat Files | XML | Web/Email |
|---|---|---|---|---|
| **Future** | • Will remain the preferred method among large trading partners for standard documents | • Not preferred<br>• Utilized due to demands from other partner and for other security reasons | • Will be close to EDI for now and may eventually replace or be equally preferred to EDI | • Viable only to very small trading partners |

# Information flow among Trading Partners

As the number of trading partner increases in the complete supply chain cycle, the amount of information flow grows exponentially. Figure 2, depicts a typical flow of information among the trading partners. Rather than managing the business, managing accurate and timely information flow becomes the highest order of importance for every trading partner. This creates an utmost need for a robust mechanism among the trading partners for flow of information by integrating their systems with others. XML can play a vital role in integrating the heterogeneous systems among all the trading partners.

Figure 2




# Current Information Capture modes

Most of the small to medium carriers and shippers depend on manual entry of data into their systems. The data typically will arrive either through fax, email or even through telephone. A close look at the existing modes suggests vulnerability on the correctness of the captured data during the creation stages.

## Manual data input

Most medium to smaller carriers and shipping companies use manual keyboard data entry techniques to process incoming shipping documentation. Human operators provide the only viable solution because of lack of standard documents that flows across the complete cycle and across the globe. A skilled data entry operator quickly scans a document and finds the necessary information that's required to be captured. In this event the operator will capture only those pieces of information that is found to be vital for his needs thereby losing the vast amount of data needed during the complete shipping cycle. Outsourcing keyboard operation does not solve the fundamental inefficiencies in the keyboard process. It only

shifts the responsibility from the owner to the contractor. It has been observed in the industry that a skilled data entry operator can process approximately 1,000 incoming bills of lading during one shift of operation. Medium sized and larger carriers and shippers typically employ 100 or more key entry personnel for the sole purpose of inputting these documents.

## Keyboard staffs spend about 10% of their time correcting errors

Having enough skilled data entry operators still leads to approximately 10% of wastage of time in correcting the errors. Studies have revealed that skilled data entry operators make approximately one keystroke error out of every 300 characters entered. The errors come from a variety of sources: incorrect and illegible forms, passage of incorrect information during the transmission over mail or telephone etc. Even after applying very high skilled and efficient data correction techniques, errors persist in the entered data. These errors quickly become operational inefficiencies leading to misdirected shipments, misplaced items, and ultimately upset customers that incurs heavy losses both to shippers and carriers.

## Electronic Data Interchange (E D I)

EDI techniques allow reliable transmission of information directly from the shipper's computer to the carrier's. Fully functional EDI relationships like ***EDI-856 Advance Ship Notice/ Manifest*** virtually eliminate paper logistics documents. EDI completely solves the manual processing problems arising out of bad data entries. Smaller staffs can easily support a fully functional EDI program than those required to manually input the data. EDI also virtually eliminates errors introduced during the transmission of information between trading partners. The high level of standards ensures elimination of ambiguity, and automatic error correcting techniques prevent communication channel errors. EDI has the capability to track and trace the information sent among its trading partners along with resending the information in case of any errors occurred during the transmission among the trading partners.

## EDI is perceived as being expensive for shippers

While EDI is a technically elegant solution, EDI programs face significant commercial hurdles. Implementing EDI relationships requires a high level of initial commitment between the personnel of trading partners. It is also needs high capital resources that some trading partners cannot spare. Also, the primary economic benefit of an EDI relationship between shipper and carrier at first appears to accrue to the carrier, while the expense seems disproportionately borne by the shipper. Due to this perception, the adoption of shipper-carrier EDI programs is slow.

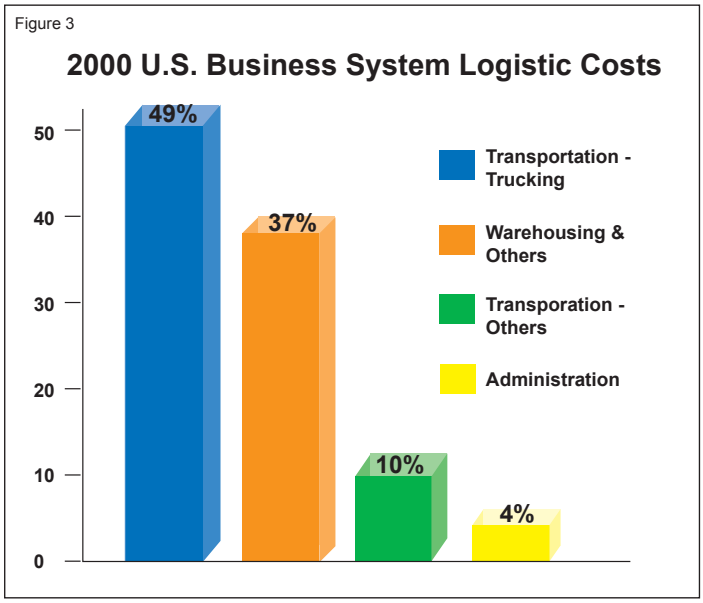
# XML solution for the Transportation Industry

The XML throws the doors wide open for a simple and robust means of data communication between shipper and carrier. Due to ever changing and increasing needs of information exchange among the trading partners EDI and manual entry systems are finding it difficult to meet the needs. Transport sector is increasingly adopting XML as the means of standard data communication, but the flip side is it lacks standardization. Transport industry is currently in the process of creating necessary and required standards. Once these standards are in place EDI may slowly lose its ground.

## Need for XML

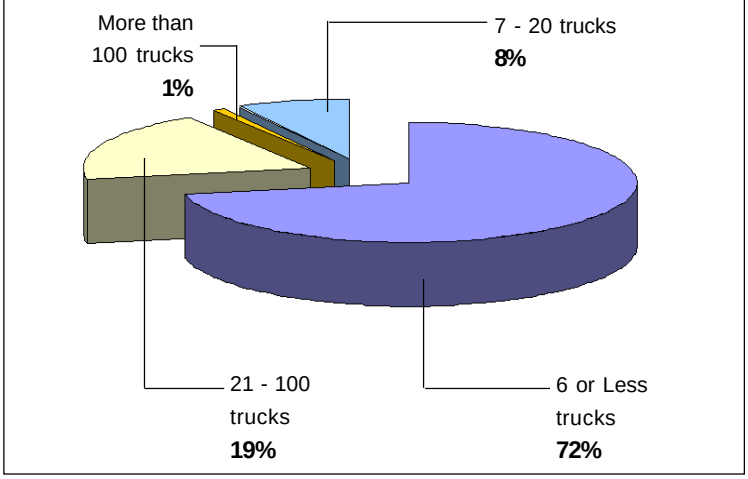
If we look at the industry logistics costs, we find that the trucking industry constitutes about 49% of the total logistics costs (ref. Figure 3).

Figure 3




The major share of this costs is pre-dominantly dominated by small carriers who operate less than 6 trucks (ref. Figure 4). These small carriers constitute around 72% of the total trucking fleet. Most of these carriers do not have a large IT infrastructure to implement the information needs of the shipper using expensive EDI methodology and tools.

Figure 4




These smaller players are always on a lookout for a cost effective and a manageable solution for the information needs as demanded by the shipper without hampering their revenues and costs.

## Leveraging XML

XML is a boon for these smaller and medium trading partners involved in the complete transportation cycle.
XML brings several attractive features.

First, it is “firewall friendly.” This is critical, since most corporate firewalls accept XML in standard ports namely on port 80 for standard XML and on port 443 for encrypted XML. This greatly reduces the cost and expense of firewall configuration for a medium trading partner without compromising on the security.

Second, XML can be sent real-time over the Internet via HTTP technology. A server can perform an HTTP or HTTPS posting to deliver an XML document from a spoke to a hub. During a study it was found that a spoke **anywhere in North America** can deliver an XML document (EDI-856 an advanced shipping notice, for example) to a hub located within USA **in less than 30 seconds**. With XML, the real-time objectives were realized without the need of pooling through expensive EDI software.

Third, XML can be made very secure with inexpensive encryption and authentication techniques called digital certificates. These digital signatures are commonly called as SSL security (secure sockets layer). Digital certificates provide encryption of XML documents so that while they travel over the public Internet they are virtually undecipherable. Digital certificates also provide authentication; a digital signature is applied to a transaction, and the hub will only receive it if the signature identifies as an authentic source. These security components are absolutely essential to give companies the confidence that their critical corporate data (such as the customer orders) is safe while traveling over the public Internet.

Finally, XML is self-defining and easily extensible. Trading partners specific data can be added to the standard XML data formats without any major customization. This helps in ease of information exchange across different countries and continents which has different rules and regulations.

## XML Is Preferred Over EDI

EDI is used as a powerful tool in the transportation industry and is in place since long. Yet it is not as extensively used in transportation and logistics as professionals might think. In fact a recent study suggests that, only about 2 % of the world's businesses use EDI. A poll in Europe revealed that 99% of small to medium enterprises are reluctant to incur the costs involved in using EDI. Even large retailers have 20% of their suppliers using EDI. On the other hand, XML is considered to be less costly. and may result in communicating as a standard mode of information exchange between the trading partners.

## Advantages of using XML

There are several important advantages that transportation managers will realize when using XML for information exchange across the trading partners.

First, using the internet to transmit the messages will allow reduction in the use of Value Added Networks (VAN) which is expensive in comparison with internet. In a recent study it was found that traditional EDI systems are seven to ten times more expensive than Internet-based options. This will be a primary concern to the carrier and shipper in adopting EDI. The trading partners will value XML because the programming effort for this kind of document is much lower, thereby incurring less costs in developmental efforts for the information exchange. XML is a key technology for integrating various corporate systems like ERP and accounting systems without affecting the existing systems both in terms of security and integrity of the data. Current ERP systems from Oracle and SAP have programmed interfaces to accept XML inputs.

Secondly, today many companies group the delivery of outbound and inbound EDI messages periodically during a day. As the supply chain flexibility and integration grows, these delays measured in hours will be unsatisfactory over a longer run. More flexible timing and more immediate response will be available via the use of XML. Current efforts in establishing E-commerce private transportation exchanges will be facilitated by the XML technology, thereby every subscriber to the exchange will be able to send and receive messages instantaneously.

Another useful advantage that will appeal to many transportation managers is that the generation and modification of these documents is less complex. They can be managed not only by the in-experienced IT staff but directly by transportation staff also. As an example, Imagine a scenario of sending the XML documentation for an international shipment to a trading partner. If the Bill of Lading is not complete, he or she could add the necessary missing details like proper carrier, cite the proper international documents etc. He saves the file, email a copy to the recipient, and then forward the document to the Warehouse Management System for addition to a picking list. Because of its immense potential as a human readable format the correct XML document can be sent as an email-like document with a flexibility for smaller carriers and customers who do not possess the necessary EDI software to interpret the document.

## What needs to be done to implement XML across trading partners?

The fundamental question that arises is "*What should the transportation professional do about XML?".*

First, the trading partners need to discuss the necessary information that needs to be exchanged among them. The trading partners should agree upon a standard format for exchange of information.

Second, trading partners either need to find a common e-commerce exchange to exchange the data, or need to provide access to each others in accessing the XML data.

Third, minor changes may require to be made to the existing application at both the ends of the trading partners to read the information and to upload for processing. Since both shippers and carriers realize savings from using this technology, there will be opportunities to share the savings via discounts.

Lastly, think about the flexibility that a document-based version of EDI could allow you to revise and streamline the business processes among the various trading partners.

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