

Homeland Security: Bridging the Islands of Information

An Image-X Whitepaper

Every year, more than 500 million travellers are allowed into the continental United States. Over 11 million trucks and 2 million rail cars are admitted by land, and at sea an estimated 7,500 ships pass through U.S. ports.

Securing our borders has become more important than ever before. The September 11, 2001 attacks, and the threat of further terrorist action in the future, have prompted us to re-evaluate our procedures for monitoring traffic into and out of the country. The Department of National Homeland Security has recently been formed to address these concerns and to find an appropriate solution.

Managing border traffic requires the efficient collection of data and the rapid distribution of that data to the appropriate agencies. To this end, XML-based interactive forms enable the efficient and reliable collection, entry, and storage of data to allow cost-efficient means for agencies to manage their information online. Once data is XML-formatted and online, a computer Business Intelligence (BI) application allows different agencies to apply their sorting criteria to identify key information.

Using current methods, redundancies add up that result in cost, productivity, and time inefficiencies on multiple levels within multiple agencies, creating “islands” of information. These islands are formed when time is lost due to restrictive search capabilities, printing, sending and redundant data entry, all of which foster the risk of overlooking a real threat as it enters the country. The real-time acquisition of critical, comprehensive data across these islands of information is needed in order to address potential threats in border traffic.

Figure A: Workflow scenario for non-integrated border traffic control



The need to share information from diverse sources has created inefficient and costly workflows within and among all parties, from the merchant to the Department of Homeland Security. Typically, the merchant provides the delivery service with a declaration to describe the contents of the shipment. The delivery service files its own copy and gives the declaration to the shipping company. The ship's captain places these documents, called manifests, into boxes that are checked by Customs officials when the ship arrives at the receiving U.S. port. This process requires that the ship's box of manifests be physically handed over to Customs, where officials then manually input the information into their own unique system.

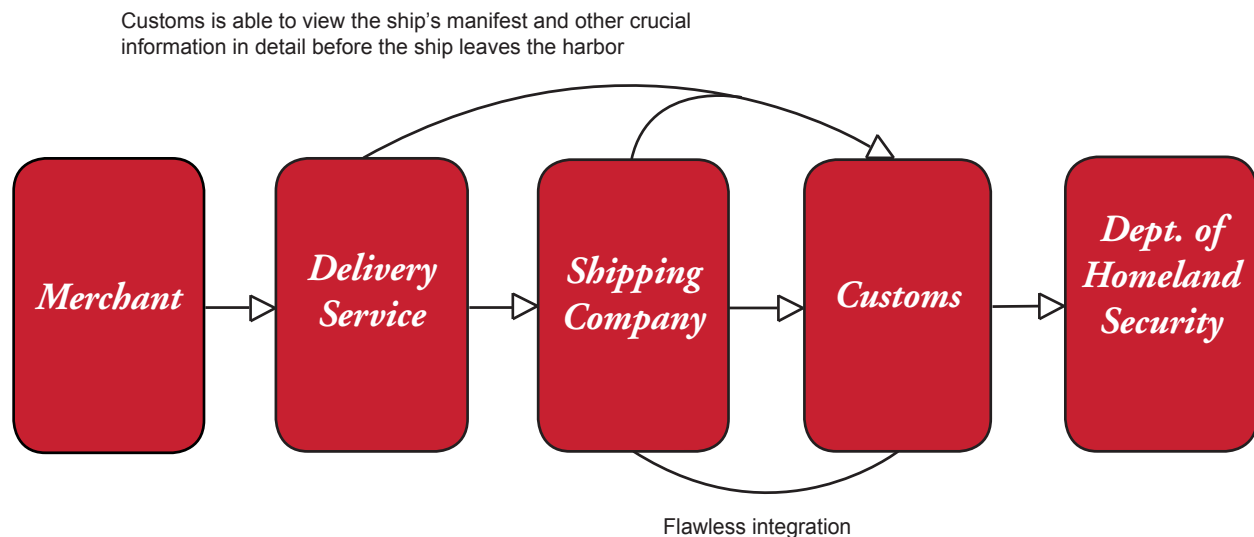
Because there are too many manifest documents and individual items in cargo for Customs officials to check them all, various manifest documents and their matching cargo are selected at random for spot checks. But in today's world, random checks are no longer enough. A new process is needed to ensure that all shipments entering the U.S. are checked thoroughly, yet efficiently, and that information on all shipment statistics is shared by all parties involved in the conduct of international trade.

Like human communication, interaction between computers is only possible when all parties know the same language. In the same way that a Mandarin speaker and a German speaker need a translator to communicate and understand the information passing between them, a computer running PeopleSoft and a computer running Sybase also need a translator to facilitate communication. eXtensible Markup Language (XML) is that translator.

Again look at Figure A. If the merchant saves a package's contents on a floppy disk and gives the disk to the delivery service in an attempt to integrate the systems, it wouldn't work. While the merchant knows and understands that 300 pounds of apples are being shipped, the other systems are ignorant of these statistics. They will see them not as pounds of apples but as '1's and '0's with no specific destination or meaning. XML provides a way to give "apples" meaning to all systems. But while XML provides a standard way to interpret data, there is no standard authoring tool or way to assemble the data in the first place.

As outlined in Figure B, an efficient Homeland Security system should be able to integrate and streamline its processes and give all parties access to critical information, in real-time, and can do this by converting its current paper forms to an XML format. This allows post-integration data to be interpreted and used by any system. The cost of conversion is minimal and the electronic forms generated have the same look and feel that they have in paper format, requiring no retraining or gap between implementation and realization of productivity gains. Using XML technology, combined with business integration tools, forms can be enhanced to bridge islands of information and integrate agencies around the world. In this way, departments can communicate and share information efficiently without the delays of a non-integrated system.

Figure B: Workflow scenario for an integrated security agency



The ability to access critical information denies opportunities to do harm.

Proposed Solution:

One way to manage data across a number of organizations is to use a paper solution, where each party enters the shipping details into a form. This information is then manually entered into a mainframe computer, where it is indexed for future reference, and hard copies are sent to other organizations along the process line for verification, administration, and record-keeping purposes.

Paper forms can provide organizations with all of the necessary data; however, they do not facilitate a quick transfer of information and are expensive to manage. Forms involve heavy amounts of data entry; high paper, filing, and storage costs; and valuable time. There have been attempts by some organizations to put forms into an electronic format, but these forms are expensive to develop and to implement, and are limited to the systems for which they are built, so that they cannot be interpreted correctly by other systems. The information being transferred in these electronic forms is “dumb” data, which prevents it from being universally interpreted.

Another solution available involves Electronic Data Interchange (EDI), which provides standard message formats and an element dictionary in a simple way for businesses to exchange data via any electronic messaging service. This is a complicated and expensive process because it requires creating software that standardizes the data being transferred between two entities: special software must be developed specifically for each line-of-business application.

The most advantageous solution would allow the Department of Homeland Security to maintain its current system of collecting and authoring data while adding the qualities of XML, speeding the exchange of secure data among all parties. Since all data is in an electronic and interpretable format, all agencies with access to the proposed solution can securely exchange data in real time.

X-Forms technology gives all parties the ability to fill out all of the necessary documents online, so that Customs officials in the United States are able to check every box as it is being entered into the shipper’s computer files. The system “red flags” unusual data sets that alert officials to suspicious cargo; for example, 300 pounds of apples in a 1-foot-by-1-foot box, or two boxes of pens that weigh 100 pounds. Based on these inspections, the ship won’t even leave its home port if any potentially harmful packages are discovered.

The proposed solution will enable Homeland Security professionals to search multiple secure databases linking thousands of data points using business integration tools, data warehousing technology, and XML-based forms technology by Image-X. When a query has been completed across these diverse sources, the system will generate interactive XML forms using XSLT (XML Style sheet Language Transformation). Interactive XML forms are customized reports that are created dynamically, based on the user’s need-to-know status, i.e. the user’s log-in i.d. and password. These smart XML forms can be customized for content and form according to the organization and user requirements.

Once the report is done, the data goes into the Data Warehouse. The Data Warehouse allows drill-down searching of data at a later time by authorized users to bring about information assimilation by members of the organization.

The Benefits

XML document exchange allows trade, transport and security organizations to work together smoothly and effectively. In order to protect U.S. borders, all agencies involved must have the same access to the same data. The gap between islands of information can be dramatically reduced with XML-based document exchange, resulting in significant increases to productivity and collaboration. Through the life cycle of the system, these types of returns can be measured by decreased retraining time, a reduction in turnover costs, and productivity gains.

XML document exchange through X-Forms technology eliminates temporary islands of information created when time is lost to printing, sending, and data entry. Since all data is in an electronic and interpretable format, authorized personnel within and across organizations can access and exchange data dynamically. Bridging these islands of information is crucial to the short- and near-term future of security in trade.

In the long run, XML document exchange is inexpensive to develop, implement, change, and manage. Printing and data entry costs are virtually eliminated because XML document exchange allows otherwise highly divergent systems to work as integrated systems. There are no development costs for forms, since the forms already exist and are easily converted to an electronic format. Hardware costs are eliminated because XML document exchange integrates all existing systems without introducing new hardware.

Return on Investment

When making a decision about secure knowledge management, an organization must look at five things: cost, longevity, effectiveness, security and ROI. XML document exchange allows existing forms to be enhanced and used in the most efficient and effective way due to its incorporation of X-Forms technology and warehousing through interactive forms.

X-Forms saves the merchant, the delivery service, the shipping company, Customs and the Department of Homeland Security added time, cost, and confusion, for example, when security questions arise: items are queried on the spot, and either approved, if closer inspection proves them to be legitimate cargo, or else denied entry - not only into America, but even onto the ship.

In this way, security is vastly improved, as well, because inspections are performed long before a ship approaches U.S. waters, and random checks are replaced with complete logs of precise shipment details. Paper costs are eliminated as transportation and security personnel switch to electronic forms. These include the cost of the paper, itself, as well as the additional expenses of the filing system that supports it, the time devoted to administration (form filling, xeroxing, mailing, loss and destruction, etc.), and storage. Figure C, below, details the costs associated with a paper form solution that are eliminated using interactive forms.

Figure C: Comparative Enterprise Cost Analysis

Total Enterprise Cost Analysis		
Case Costs	Non-Integrated	XML-Integrated
Data Entry	\$10.50	-
Form Filling	\$7.50	\$7.50
Copying/Printing	\$1.40	-
Scanning/Archiving	\$8.00	-
Sending	\$3.50	-
Subtotal	\$30.90	\$7.50
X 1,000 Cases Per Month	\$30,900.00	\$7,500.00
X 12 Months Per Year	\$370,800.00	\$90,000.00
Yearly Savings	\$280,800.00	

It quickly becomes clear that dramatically improving security in trade does not have to mean increasing expenses. In fact, interactive forms provide an immediate and significant return on investment, on multiple levels, from all stages of the process of moving goods from their home countries into U.S. markets while providing better security measures to protect our borders.

Conclusion

The efficient exchange of data is of paramount importance in securing our borders. The proposed system will enable all authorized parties to exchange data faster and more efficiently, requiring no extraneous data entry and eliminating paper slow-down and waste caused by exchanging hardcopy forms.

To enable the quick, efficient, and secure movement of goods into the country, importers, shippers, and national security organizations need to work together to manage their knowledge effectively in both the short term and the long term. XML document exchange through X-Forms technology is the most simplified and cost effective knowledge management solution that can be used across trade, transport, and security organizations to bridge their islands of information.