

X-Forms: Workflow Solutions Paving the Way to a Paperless Society

From hospitals to manufacturers to governments, everyone uses forms. The sheer mass of paper created from excess printing and mistakes associated with paper and other eforms makes them unusable and costly. Paper forms create disorder, filing mistakes and complications. Users need to guess where the form will line up with the printer and then hope that there are no mistakes on it. Despite all these disadvantages, paper forms are the lifeblood to an organization's knowledge base.

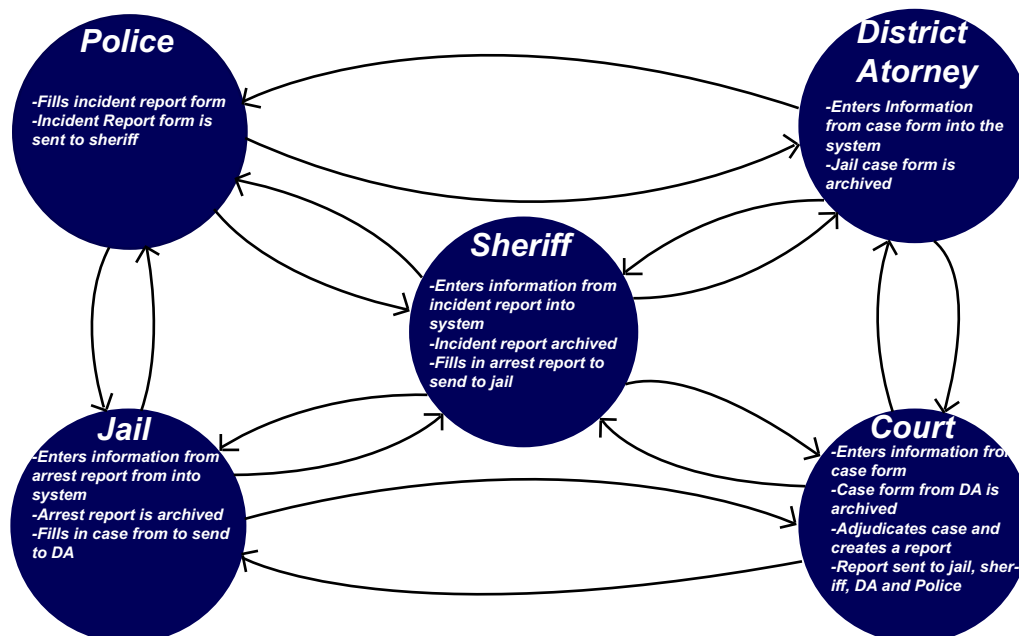
The most valuable asset an organization has is its information or knowledge base. As an organization grows, the sharing of and access to information and knowledge becomes ever more critical, at the same time an organization's growth makes management of this knowledge and information more complicated. Facilitating the exchange of information and knowledge between and within departments is an essential first step to integrating an organization's knowledge assets.

An organization's knowledge is important for the short term and the long term. In the short term information is critical to the operations of an enterprise and in the long term information is crucial for younger generations to learn and work from. Organizations with numerous departments have difficulty managing their information because the departments that comprise the enterprise act independently, difficulty in exchanging data. As a consequence each department over time accumulates and stores data in stylos, thus creating major inefficiencies.

Islands of Information

As an enterprise comes into existence, it becomes segmented into different departments or islands to facilitate management of the enterprise. While these organizational separations allow specialized and expert knowledge to thrive, they create significant barriers between departments which prevent the access of the vary expertise that is needed. In many instances the need to communicate or access information throughout all levels of the organization creates a mind-bending over complicated workflow. Often these barriers are a difference in the networking platform, mainframe system or particular organization structure used. In Figure A below, the everyday interaction between the police, sheriff, jail, district attorney and court is outlined.

Figure A: Workflow scenario for a non-integrated law enforcement enterprise



The inability to access critical information is affording opportunities to terrorists and other multiple offenders.

The need to share information from diverse sources has created inefficient and costly work flows at multiple levels within Justice and Public Safety agencies. Typically, a department obtains information from a form, and then manually inputs that information or data into a new and unique system, creating a new entry, yet containing information that, all to frequently, already exists. These redundancies create productivity, time and cost inefficiencies at multiple levels within multiple agencies, and set-up islands of information. The “islands” exist when time is lost due to restrictive search capabilities, printing, sending and redundant data entry, which fosters the risk of missing a real threat in our community, as well as propagating the obvious monetary and productivity losses. The real-time acquisition of critical, comprehensive data, across the islands of information, will enhance our ability to address potential threats in our communities.

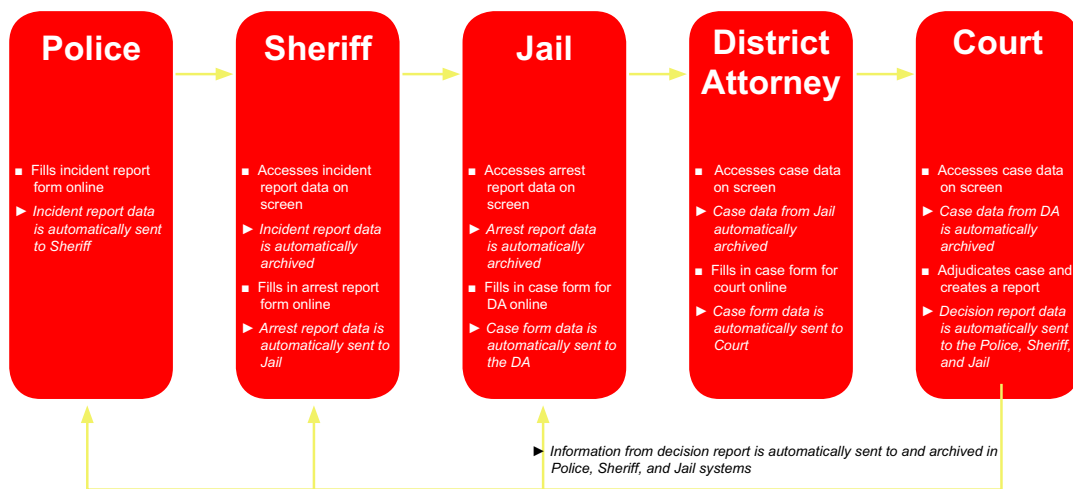
Like human communication, interaction between computers is only possible when all systems understand the same language. Much like a Mandarin speaker and a German-speaker need a translator to communicate and understand the bits of information passing between them, a computer running PeopleSoft and a computer running Sybase also need a translator to facilitate communication. eXtensible Markup Language or XML is that translator.

Again look at Figure A. If the police put a suspect’s booking information on a floppy disk and then gives it to the sheriff, jail, DA or court in an attempt to integrate the systems, it wouldn’t work. While, the police system knows and understands that John Doe is a the suspect’s name and that 1450 was the code for his offense, the others systems are ignorant to these qualifiers. In fact, the sheriff, jail, DA and the court systems see John Doe not as a name but as little 1’s and 0’s with no specific destination or meaning. XML provides a way to give John Doe a interpretable meaning to all systems. But while XML is a standard way of interpreting data, there is no standard authoring tool or way to assemble the data in the first place.

The communication between departments and entities has to be carefully documented and all transactions have to be noted in order for a organization to succeed in today’s info-run society. Forms that departments create are meticulously designed so that they meet the needs of all parties involved. Forms provide departments with all the necessary data, however, forms are very expensive to manage and they do not facilitate a quick transfer of information.

As outlined in Figure B, the justice system can integrate and streamline their processes by converting their current paper forms to an XML format. Post integration data can be interpreted and used by any type of system. The cost of conversion is minimal and the electronic forms generated have the same look and feel as they a do in paper format requiring no retraining or gap between implementation and realization of productivity gains. Using XML technology forms can be enhanced to bridge islands of information and integrate departments across an enterprise. Hence departments can communicate and share information efficiently without the delays of a non-integrated system.

Figure B: Workflow scenario for an XML integrated law enforcement enterprise



Proposed Solution:

One way to manage data across a number of organizations is to use a paper solution, where each party enters the necessary 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 user 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, eliminating the "middle person" or the person that enters the paper information into the computer. The system allows a person to document their transactions from anywhere granted they have internet access. The data is security available to a variety of different people.

The proposed solution will enable business 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. Hence eliminating paper storage costs and allowing for easier access to the report or document.

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 customer, the corporation and all the entities that consist of the in-between transactions. To get a better understanding please consult the raw numbers below:

Police Cost Analysis		
Case Costs	Non-Integrated	XML Integrated
Data Entry	\$1.50	-
Form Filling	\$1.50	\$1.50
Copying/Printing	\$0.20	-
Scanning/Archiving	\$2.00	-
Sending	\$0.50	-
Subtotal	\$5.70	\$1.50
X 1,000 Cases Per Month	\$5,700.00	\$1,500.00
X 12 Months Per Year	\$68,400.00	\$18,000.00
Yearly Savings	\$50,400.00	

Sheriff Cost Analysis		
Case Costs	Non-Integrated	XML Integrated
Data Entry	\$3.00	-
Form Filling	\$1.50	\$1.50
Copying/Printing	\$0.20	-
Scanning/Archiving	\$2.00	-
Sending	\$0.50	-
Subtotal	\$7.20	\$1.50
X 1,000 Cases Per Month	\$7,200.00	\$1,500.00
X 12 Months Per Year	\$86,400.00	\$18,000.00
Yearly Savings	\$68,400.00	

Jail Cost Analysis		
Case Costs	Non-Integrated	XML Integrated
Data Entry	\$3.00	-
Form Filling	\$1.50	\$1.50
Copying/Printing	\$0.20	-
Scanning/Archiving	\$2.00	-
Sending	\$0.50	-
Subtotal	\$7.20	\$1.50
X 1,000 Cases Per Month	\$7,200.00	\$1,500.00
X 12 Months Per Year	\$86,400.00	\$18,000.00
Yearly Savings	\$68,400.00	

District Attorney Cost Analysis		
Case Costs	Non-Integrated	XML Integrated
Data Entry	\$1.50	-
Form Filling	\$1.50	\$1.50
Copying/Printing	\$0.20	-
Scanning/Archiving	\$1.00	-
Sending	\$0.50	-
Subtotal	\$4.70	\$1.50
X 1,000 Cases Per Month	\$4,700.00	\$1,500.00
X 12 Months Per Year	\$56,400.00	\$18,000.00
Yearly Savings	\$38,400.00	

Court Cost Analysis		
Case Costs	Non-Integrated	XML Integrated
Data Entry	\$1.50	-
Form Filling	\$1.50	\$1.50
Copying/Printing	\$0.60	-
Scanning/Archiving	\$1.00	-
Sending	\$1.50	-
Subtotal	\$6.10	\$1.50
X 1,000 Cases Per Month	\$6,100.00	\$1,500.00
X 12 Months Per Year	\$73,200.00	\$18,000.00
Yearly Savings	\$55,200.00	

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	

Assumptions:

- 1) Cost of data entry is \$1.50 per entry, this is a labor cost.
- 2) Cost to fill forms is \$1.50 per form, this is a labor cost.
- 3) Cost is \$.20 per form or case copied, this includes labor and material costs.
- 4) The cost to scan and/or archive each form is \$1.00, this includes labor and material costs.
- 5) Sending costs are \$.50 per each form sent, this includes handling and actual shipping costs.