Case Study: Using XML for Alaska Criminal Justice Data Exchange

by Steve Horneman and Nancy LaPlaca

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XAware, Inc. is a worldwide leader in XML enablement, data integration, and information exchange. From a single point of access, users can query, view, and update information from dozens of data sources. XAware's drag-and-drop environment reduces the need to write complex custom code to retrieve, translate, manipulate, and exchange information. XAware utilizes web services and can implement Justice XML. XML "views" of data from different systems can be created, updated, and then decomposed and sent back to the original data source.

The State of Alaska used SEARCH's JIEM (Justice Information Exchange Model) tool to map out thirty-six exchanges. Rather than continue mapping hundreds of exchanges, Alaska hired XAware to help implement an XML-based exchange between the Court and Public Defender for Notice of Appointment of Counsel. Implementing this exchange took XAware and Alaska three days.

Every justice agency in the U.S. is acutely aware of the lack of electronic data sharing. Over the past two decades, approaches to sharing justice information have changed dramatically. Integration efforts have included point-to-point, proprietary interfaces, centralized repositories and, most recently, a network-based approach. Traditionally, interfaces were brittle, meaning custom code was required, and re-writing was required if any agency changed applications or database. Some jurisdictions find data repositories a

necessary part of their IT infrastructure. Statistical analysis may require that persistent data be available. However, data repositories have ongoing maintenance costs, technologies can become out-of-date, and system performance issues are common problems. Bulk porting of data sets is often necessary.

Most recently, agencies have begun considering network-based integration. Users access information on-demand, and stakeholder agencies maintain ownership of data. Network-based integration using XML can include a data warehouse, but data persistence is not required. XML-based integration uses standardized protocols like SOAP (Simple Object Access Protocol) and WSDL (Web Services Description Language) to exchange information over the web.

Justice XML

Justice XML is the common articulated language that drives a network-based approach. The standards created by Justice XML allow agencies to exchange information in a platform-, application- and vendor-neutral environment.

Justice XML was created by the U.S. Department of Justice (DOJ) and Georgia Tech Research Institute. IJIS, the Institute for Justice Information Systems, is a non-profit organization dedicated to helping justice agencies make the best use of technology to share information. The Global Justice XML Data Dictionary Schema (GJXDDS) was first released in June 2002. Both DOJ and IJIS have embraced XML as the best technology to quickly achieve interagency exchanges.

Justice XML is standardizing data elements and documents and developing schema for rap sheets, court filing records, driver records, arrest warrants, charging documents, and potentially hundreds of other documents. For more information, see: http://it.ojp.gov/initiatives/files/JusticeXMLStructureTaskForceReport.doc.

Global Justice XML Data Dictionary (GJXDD) work groups are developing common, well-defined data elements. The GJXDD group recognizes that the full schema is very large and over-inclusive, and that many agencies will only use a small percentage of the elements. They are working on a tool that will allow agencies to pick and choose parts of the schema. Some customization of schemas will also be allowed. For example, an agency could restrict the field length for a name to 30 characters, or filter out codes like

the National Crime Information Center's (NCIC's) long list of vehicle codes. Unique, local components could also be added as long as they fit GJXDD guidelines. GJXDD can be found at: www.it.ojp.gov/jxdd/prerelease/3.0.0.1/JusticeXML DataDictionary.pdf.

The DOJ's goals for Justice XML are to maximize data sharing, object reusability, and extensibility, easy mainte-nance, and employ current technologies and best practices–for free! Although adoption of Justice XML is voluntary, it will eventually be the standard for all justice agencies.

What Are Web Services and Service-Oriented Architecture?
Web Services Overview

Web services are loosely coupled software components delivered over Internet standard technologies. They enable enterprises to create interlinked, interactive systems that can communicate in a common dialect with each other. Web services are defined by three XML-based components: Universal Description, Discovery, and Integration (UDDI) for registering and discovering web services, Web Service Description Language (WSDL) for contacting/specifying the details of the service to be provided and describing the communication between the provider and the user, and the SOAP protocol for actually carrying the message and carrying out the procedure call aspects on all interactions.

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SOAP defines a uniform way of passing XML-encoded data. It allows remote procedure calls using HTTP (Hyper Text Transfer Protocol), allowing communication via the internet between remote systems. The internet is the physical network infrastructure, and SOAP is used to communicate XML messages via HTTP.

Service-oriented architecture has been around for some time, but until common standards like XML, SOAP, and WSDL existed, there was no practical way to use it. XML, SOAP, UDDI, and WSDL are inter-operable and platform-neutral.

Web services run over HTTP and TCP/IP networks, just like web pages. Integration using XML and web services can be implemented one exchange at a time. XML's revolutionary premise is that data can reside anywhere: in a database, web pages, flat files, spreadsheet, etc. An XML message is converted to a request that the data source being queried can understand, and the results are converted back to XML. The programming and processing are transparent and take place in a web server.

What's so Great About Web Services?

The real value of web services is that its benefits are both immediate and long-term. Immediate benefits include rapidly implemented data exchanges, a one-exchange-at-a-

XAware's secure network-based information sharing approach

Key Features of XML-Based Integration	Key Features of MXL-Based Integration
- COTS and industry standards-based approach to justice information sharing	- Simpler and more cost-effective than point-to-point and data warehouses
- Information Exchange from any application or database, on any platform, to any client	- Flexible and scaleable - as standards evolve and project scopes change
- Full bi-directional access with query, push, pull, publish, and subscribe	- Original and target data can be updated or returned in initial state
- Synchronous or asynchronous transfer protocols based on events or triggers	- Authentication, authorization, and encryption
- Full support for XML, Justice XML, and Web services	- Complete consulting, customization, and implementa-tion services available

time approach, and reuse data of XML objects. Once an object is created, it can be added to a library of "create-once, use-many" XML objects, and served to any data source that can process XML. Object reuse means that as each successive exchanges use objects already in the library, the cost to build each exchange goes down.

"Law Enforcement and Corrections (LE&C) officers in Alaska and other remote areas of the United States face unique challenges to crime prevention, investigation, and rehabilitation efforts."

Objects are called "loosely-coupled" because the object is independent of the source. This allows agencies to easily change vendors or technologies by re-mapping the data objects to the new source. Since program logic calls the object—and not the source—there's no need to change the object if the source changes. If an agency changes its application or database, a simple re-mapping to the new data source is all that's needed.

Using Web services for data source access rather than hard-coded logic adds flexibility. The client data source(s) can know less about the system accessing it, and must

Prosecutor's Office, Public Defender Agency, University of Alaska Justice Statistical Analysis Center and the National Law Enforcement and Corrections Technology Center–Northwest (NLECT-NW), to look at how to best achieve interagency information exchanges. The team submitted a charter to the Criminal Justice Information Advisory Board (CJIAB) for MAJIC (Mapping Alaska's Justice InterChanges). Alaska Statute 12.62.100 requires that the CJIAB advise DPS and other justice agencies on developing and operating criminal justice information systems. The project obtained approval by the CJIAB Chair and MAJIC began.

The National Law Enforcement and Corrections Technology Center— Northwest

Law Enforcement and Corrections (LE&C) officers in Alaska and other remote areas of the United States face unique challenges to crime prevention, investigation, and rehabilitation efforts. NLECT-NW was established to provide assistance in defining LE&C's requirements for inf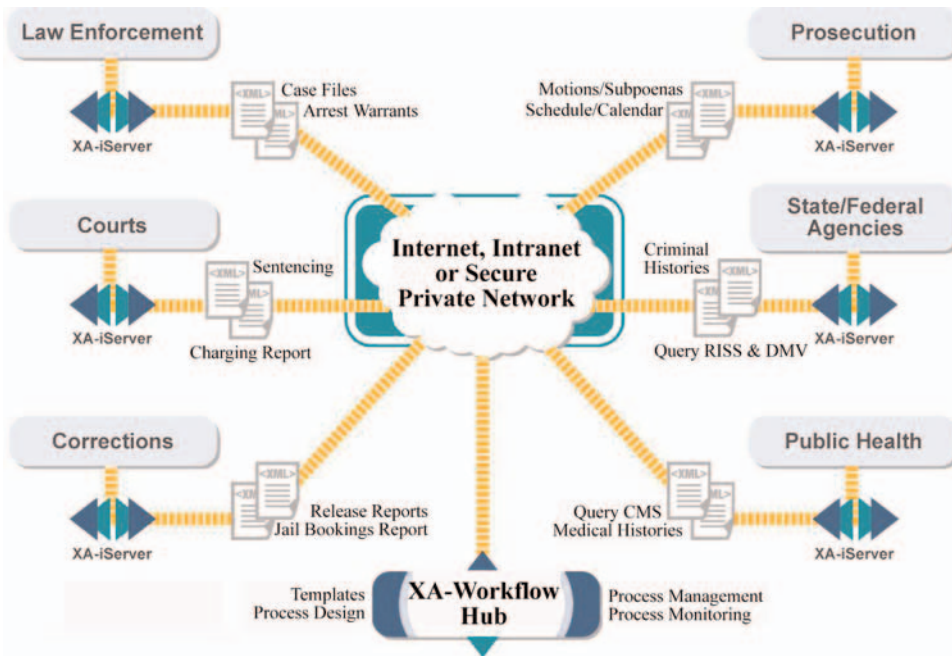ormation and operational technology, with specific attention toward technologies that support law enforcement and corrections under the extreme weather conditions and vast distances of rural Alaska and other parts of the United States.

A program of the National Institute of Justice, NLECTC-NW was founded in 2001 in partnership with Chenega Technology Services Corporation and identifies, evaluates, demonstrates, and assesses technology applications for state and local law enforcement and corrections agencies.

Staff at the NLECTC-NW partnered with MAJIC team members to assist in the location of technologies, training, and tools to assist in the mission of achieving criminal justice data integration across the state. Because of the far-reaching impact of this mission, NLECTC-NW has made support of this group a priority since its inception, both in funding and in providing staff.

only be able to decode the XML stream and use SOAP messages. Modifications are much easier than developing application-specific interfaces.

Alaska Creates MAJIC

In July 2002, the State of Alaska organized a team of criminal justice personnel from the Alaska Court System, Department of Public Safety (DPS), Anchorage Municipal

After a two-day training session, the team began modeling exchanges—identifying the agencies, documents, events, and conditions involved in each exchange. The

team initially thought that the entire universe of exchanges should be mapped before implementation, but later decided that more value would be achieved by demonstrating the effectiveness of JIEM by implementing a proof of concept exchange using XML. Thirty-six exchanges were documented for the proof of concept.

The Alaska team decided to use an XML and Web services-based architecture, which allows bi-directional exchanges–the ability to select and extract data from one agency's database and insert it into another agency's database.

The Institute for Justice Information Systems Recommends XML

IJIS, the Institute for Justice Information Systems, is a non-profit organization dedicated to helping justice agencies make the best use of technology to share information. IJIS is part of a project sponsored by the Global Justice Information Sharing Advisory Committee (GAC), under the U.S. Department of Justice (DOJ). GAC is charged with facilitating standards-based electronic information sharing within justice and law enforcement. The broad scope is essential, since eventually information will be shared by a large number of agencies, from police to prosecutors to motor vehicles agencies. In June 2002, the group produced the Global Justice XML Data Dictionary Schema (GJXDDS). The Global Justice XML Data Dictionary (GJXDD) specification includes a Data Dictionary, XML Schema and Data Model. This means that each justice agency–whether law enforcement, courts, prosecution, defense, corrections, probation, motor vehicles or any other interacting agency–will utilize a common description of data elements.

MAJIC's Exchange between the Courts and Public Defender

For the proof of concept, the MAJIC team chose an exchange between the Alaska CourtView application and the Public Defender Agency, requiring bi-directional exchange between an NT and Novell network and SQLServer 2000 database to Access97. The proof of concept was for a single location handling over 2,500 exchanges. When fully implemented, more than 15,000 paper and manual appointment of counsel exchanges that occur each year between these agencies will be automated.

The MAJIC team had expected to spend hundreds of thousands of dollars just mapping exchanges. However, JIEM allowed the project team to efficiently accomplish mapping and Alaska hired XAware to implement exchanges for a fraction of the estimated project budget.

MAJIC's future goals include implementing a second, more complex project, perhaps mapping exchanges involving Conditions of Release (bail conditions). Currently, this process is entirely manual, leaving law enforcement and other agencies without online access to critical information about release conditions. The Alaska Court system is poised to automate distribution of this data as part of its court application implementation. Once the proof of concept project is implemented in the initial court location, the Public Defender Agency and courts intend to refine and expand the exchange to other court locations.

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XML Exchanges: How Do They Work?

XML drag-and-drop tools create on-demand views of many different agency data sources, including bi-directional exchanges–essentially allowing one to extract from one data source and insert into another. An XML integration server can process data from internal systems to any outgoing XML schema and process inbound XML schemas to any number of internal systems without the need to write code. Information from many different sources can be aggregated into a single XML view.

Connectivity to other agencies, such as Motor Vehicle records can be added as needed. XML-enabling legacy systems using traditional custom code can be expensive and risky.

Security

The exchange XAware implemented includes XAware authentication, authorization and encryption by utilizing the existing capabilities within typical customer application server environments. End-user authentication is provided by use of an ID and password on the presentation layer. Authentication is provided by passing the appropriate credentials in the Web services request. HTTPS (Hypertext Transfer Protocol over Secure Socket Layer) provides 128-bit encryption, essential for passing justice information over the Internet.

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