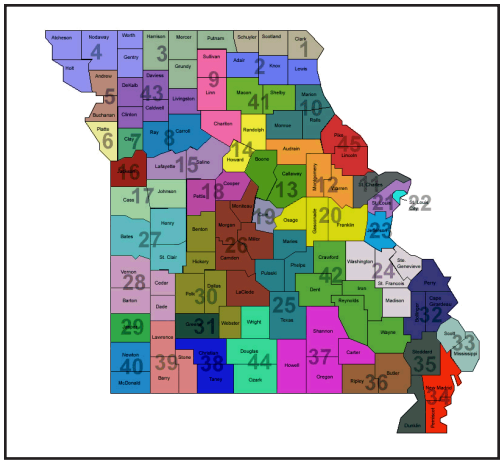
Asynchrony Solutions helps Missouri State Courts implement cutting-edge data integration program

MISSOURI LEADS NATION WITH STATEWIDE GJXDM CONVERSION

Lessons learned in the wake of the terrorist attack of 2001 created additional urgency at both state and federal levels to enable automated data sharing. In 2005 the Departments of Justice and Homeland Security selected the Global Justice XML Data Model (GJXDM) as the first standard for creation of the National Information Exchange Model (NIEM). A project led by the Missouri Office of State Courts Administrator (OSCA) is the largest and most comprehensive state-wide GJXDM-based project to date. The GJXDM approach in Missouri has reduced the time to conversion competition by 50% and potentially saved OSCA $1,600,000 on the remaining conversion.

THE MISSOURI COURT AUTOMATION INITIATIVE

The Missouri Court Automation Initiative was launched in 1994 to give Missouri courts the most advanced information technology available. During that period Missouri's Judicial Circuits, Appellate Courts and the Supreme Court each had their own proprietary data and court automation systems. After extensive research, OSCA selected the ACS Justice Information System (JIS) to supersede the forty-nine unique and disconnected court automation systems then in use. To deploy JIS, data from each participating court required conversion to the new, statewide, JIS database. In 1997 OSCA's Information Technology Division initiated the data conversion project.



CHALLENGE: 49 COURTS TO INTEGRATE

Creating the methods to transfer local court data from forty-nine unique court case management systems to a statewide Oracle database was an extremely complex task. Over the course of many years each Missouri court system had put together its own unique software implementation, data structure and data schema. Some courts deployed homegrown systems. Others used one of a variety of off-the-shelf products with databases such as SQL, Microsoft Access, DB and Clarion. With approximately five hundred data fields per site, the full statewide implementation would eventually require analysis and conversion of over twenty-five thousand data fields

OSCA's initial conversion strategy was to import raw, unformatted, flat data files extracted from each proprietary database, into Oracle. Programmers used Oracle Stored Procedures to move that data into the State's Oracle database. Due to the unique properties of each court's existing system and the best practices for conversions available at the time, almost no reusable code was created within a particular conversion. Developers started almost from scratch with each court. Each conversion required a development team eighteen to twenty-four months to complete. Over the subsequent seven years, forty out of forty-five Circuit courts plus four Appellate courts were converted to the new system.

THE GLOBAL JUSTICE XML DATA MODEL (GJXDM)

Since the conversion project began, Extensible Markup Language (XML) had emerged as the leading vehicle to facilitate data exchange by creating standards of data structure and semantics. In 2002, the Department of Justice's Infrastructure and Standards Working Group chose XML as the open standard for data exchange. Founding the Global Justice Information Sharing Initiative resulted in a Justice-specific implementation. "Global" released the Global Justice XML Data Model (GJXDM) in February 2004. It provided a standard vocabulary and semantic building blocks that could be reused and extended by Justice-related practitioners, integrators, and vendor communities.

> "THE GLOBAL JUSTICE XML DATA MODEL PROVIDED A STANDARD VOCABULARY AND SEMANTIC BUILDING BLOCKS THAT COULD BE REUSED AND EXTENDED BY JUSTICE-RELATED PRACITIONERS, INTEGRATORS, AND VENDOR COMMUNITIES."

After close examination, OSCA determined that GJXDM would be a more efficient method to accomplish their integration requirements. Since GJXDM was such a new standard, no other State had completed an implementation of GJXDM on the scale required by Missouri's conversion project. OSCA had no internal resources experienced in XML and realized it would be best to find a vendor who had proven experience with large-scale XML-based integration projects and programmers who had received specialized GJXDM training. After a public RFP process, OSCA chose Asynchrony Solutions to lead the GJXDM-based project.

An essential part of Asynchrony's approach to the large-scale conversion project was the use of an "agile" programming methodology. Instead of architecting an entire project at the beginning, agile programming uses an iterative approach breaking programming tasks into short, discrete and testable steps. This methodology uses real-world trial and error to progress to a fully vetted system. It allows the programmers to prove that each step in the project works in the course of creating the underlying software code. It also allows the software owner to validate the accuracy of the initial requirement and make changes in scope or structure as the project progresses.

MISSOURI'S GJXDM CONVERSION PROJECT

Missouri's conversion is the most ambitious GJXDM-based data integration project ever successfully attempted. Missouri's project addressed the integration of over five hundred data fields per court.

GJXDM supplies a Data Dictionary providing naming conventions for the purpose of semantic consistency. However it does not provide a schema, which is an XML document that enforces rules related to data structure and format. The project team's initial task was to create a GJXDM-based schema to handle more than five hundred fields of data in the JIS system.

Developers analyzed the JIS database and mapped each field to its corresponding tag. However, GJXDM did not have tags to handle every data field. OSCA created and submitted tags for missing data to "Global" to expand GJXDM standards to include them. Once the mapping between a tag in GJXDM and a field in the JIS system's Oracle database was set, it was added to the schema.

Creating the schema involved investigation and also "trial and error." Since GJXDM is not a schema, but rather, a library of tags, the content and meaning of data had to be discovered and validated by the development team working closely with the OSCA's technical personnel. The project's iterative approach allowed for ongoing fine-tuning of the system and changes were made almost to the end.

"Getting to know the complexity of the data structure was a demanding and somewhat dynamic process," explained Nate McKie, Asynchrony Project Lead. "In a criminal case, for instance, there is only one judgment and only one record if you're guilty. For a civil case, the judgment needs to touch various parties and must be properly linked. As we worked through hundreds of data fields, there were dozens of similar situations that needed to be analyzed and integrated into the overall data schema. I can't imagine how anyone could create a design document before working with the actual data."

Requirements changed quickly when working with real data uncovered new information and data relationships. A needed data item might be discovered, so a place would have to be created for it in the XML document. The question of hierarchy was an ongoing challenge as feedback from OSCA and ongoing investigation required shifts of data organization throughout the project.

> "MISSOURI'S CONVERSION IS THE MOST AMBITIOUS GJXDM-BASED DATA INTEGRATION PROJECT EVER SUCCESSFULLY ATTEMPTED, ADDRESSING THE INTEGRATION OF OVER FIVE HUNDRED DATA FIELDS PER COURT."

Once the schema was created, the transfer of data between XML and the JIS Oracle database was still not a simple process. It was not enough to just create an XML schema. The developers needed to create, manage and enforce business rules to evaluate source data, and place and format it properly based upon its content. Instead of moving data directly from XML to JIS, an intermediate step was necessary to effectively apply business rules. Using an open source component called "Digester," programmers converted the XML document to Java Objects. Business rules could then be applied through an XML document defining each rule. Over 200 unique business rules were eventually created. The rules fell into three general classes:

1. Scrubbing Rules handled moving or formatting data
2. Data Cascading Rules allowed inserting a record's unique ID wherever it appeared
3. Data Association Rules prevented the duplication of data

By creating a rule library, specific combinations of rules could be quickly established to fit the particular requirements. This allowed fine-tuned customization with re-useable Java components. An initial filing, for instance, needs relatively fewer rules since the schema contains most of what the file needs. In that case, pruning unnecessary rules created a shorter rule chain.

The majority of the custom code created for the project was the "rules code". Once rules were in place, it was a relatively straightforward process to move data from the XML and Java representation, format it, convert it, reorganize it into a database object representation and write it to the database. An open source tool called "Hibernate" freed the developers from a lot of the tedious work of writing SQL statements to actually move data to the database.

PROJECT RESULTS

"This new approach has potentially saved OSCA $1,600,000 on the remaining data conversions and reduced the time to conversion completion by 50%. The previous methodology took eighteen to twenty four months per court. Using the new GJXDM approach, conversions are taking only six to nine months. The acceleration of these critical tasks will enable the completion of all court conversions by the end of 2007," said Patrick Brooks, OSCA's Manager of Applications Development and Administration.

The unification of Missouri Court data under a single GJXDM-compatible system provides a foundation for a wide range of related data integration initiatives. For instance, Asynchrony Solutions recently worked with the Missouri Office of Prosecuting Services (MOPS) to extract data from their legacy MS-SQL version of Prosecutor Dialog software for electronic submission of the initial case filing to the court. Asynchrony also created a secure web service to transmit the information to OSCA's secure web service that, in turn, will store the initial filing into the appropriate JIS database utilizing the case file submission interface.

> "THIS NEW APPROACH HAS POTENTIALLY SAVED OSCA $1,600,000 ON THE REMAINING DATA CONVERSIONS AND REDUCED THE TIME TO CONVERSION COMPLETION BY FIFTY PERCENT."
>
> *Patrick Brooks, OSCA Manager of Applications Dev. & Admin.*

By eliminating the time lag from non-electronic case filing and the duplication of entry into legacy systems, the GJXDM solution will reduce errors and speed the process of populating the JIS central database. The new system will dramatically imp rove the timeliness and accuracy of the OSCA database, which is used by all courts in the state.

LOOKING AHEAD

GJXDM has emerged as a standard that extends beyond the Department of Justice. It speeds the process of creating data exchanges and integration while significantly reducing the costs of such projects. The Department of Homeland Security in conjunction with the Department of Justice based the National Information Exchange Model (NIEM) on GJXDM. The Federal Bureau of Investigation will use GJXDM as the foundation for the Law Enforcement Data Exchange (N-DEx.) Through its proactive utilization of GJXDM, Missouri is a leader in supporting future inter-state, intra-state and federal data integration requirements.

"Missouri's Judiciary has been an active contributor to the GJXDM from its beginning. We continue to work on future versions and other national XML initiatives such as electronic court case filing XML standards and the NIEM. It has been exciting to be involved in the GJXDM from its early development and we will continue to support the development of national standards," said Jim Roggero, Director of Missouri Court Automation

ABOUT ASYNCHRONY SOLUTIONS

Asynchrony Solutions is an information technology consulting firm specializing in systems integration, custom application development and secure collaboration.

Asynchrony has taken an active role in helping to create and implement the next generation of government focused data-exchanges. Asynchrony is an active member of the Integrated Justice Information Systems Institute (IJIS). Neil Kurlander, Asynchrony's Vice President of Public Sector Solutions currently is Chairman of IJIS Public Safety Technical Standards Committee (IPSTSC). He also a member of the Communications and Technology Committee, International Association of Chiefs of Police.

In addition to the Missouri court integration program, Asynchrony has provided technical guidance related to GJXDM in conjunction with the creation of the National Sex Offender Registry, Florida's "Finders" data integration project and the Washington DC Metro Court integration project. Asynchrony provides national trainers in support of education related to GJXDM, XML and justice integration and other related topics.

ASYNCHRONY solutions

Asynchrony Solutions, Inc.
1709 washington avenue // suite 200 //saint louis, missouri 63103
PN:314.678.2200 // FX:314.436.2559
www.asolutions.com // www.ahubzone.com

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