



SEARCH

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Workshop Report

Law Enforcement Information Exchange Package Documentation

Constructed from GJXDM 3.0.2

March 15, 2005

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Executive Summary

In FY 2005, the U.S. Department of Justice (DOJ), Office of Justice Programs (OJP) announced that a new special grant condition had been adopted, requiring any OJP grant application with the potential of using Extensible Markup Language (XML) to use the Global Justice XML Data Model (GJXDM) and to publish the schema to the central OJP repository.¹ Since the initial announcement, the same special condition language has also been adopted by DOJ and the Department of Homeland Security (DHS). The underlying requirement of the condition is that data exchange among grant recipients must be constructed to *conform* to the GJXDM.

According to DOJ, “Conformance to Global JXDM ensures that a basic core set of information (the Global JXDM components) is well understood by the community and carries the same meaning. The result is some *level of interoperability* that would be unachievable with the proliferation of custom schemas and dictionaries.”

Most justice practitioners, including law enforcement officers and information technology professionals, clearly understand our nation’s need to share information among justice and public safety agencies at all levels of government. Many embrace the notion of interoperability for both voice and data exchange, and understand the utility of XML as a universal translator. The reality is, however, that building XML schemas (data exchange instructions) that conform to the GJXDM has proven to be a challenge for many of those who have attempted this work.

Reference *Information Exchange Package Documentations* (IEPDs—formerly known as *Reference Exchange Documents*) can significantly help local law enforcement agencies by providing good baseline models for GJXDM conformant information exchange. SEARCH, the National Consortium for Justice Information and Statistics, with support from the U.S. Department of Justice, Office of Community Oriented Policing Services (COPS), has developed a first set of reference IEPDs for law enforcement, including an Incident Report, a Field Interview Report, a Booking Report, and a Charging Document.

The law enforcement IEPDs have been developed collaboratively by public sector subject-matter experts and technical developers, with open-source, non-proprietary tools. What has been critically important is the subject matter expertise that has supported the association of GJXDM components and the use of object inheritance correctly, to provide domain models that represent the business requirements of the exchange before proceeding with the GJXDM mapping and schema creation.

The publication of ubiquitous law enforcement IEPDs provides, for the first time, tangible models and GJXDM content that can be leveraged by local law enforcement agencies, whether large or small, urban or rural, federal, tribal, state, county or local, to begin on the path of data interoperability to support information sharing about crimes and offenders throughout our nation.

¹ The Global Justice XML Data Model Website is located at: http://it.ojp.gov/topic.jsp?topic_id=138

Introduction, Purpose and Scope

Since the release of the Global Justice XML Data Model (GJXDM) Version 3.0 in January 2004, practitioners and developers from various justice “communities of interest” have identified strategies to develop *Information Exchange Package Documentations* (IEPDs, formerly known as *Reference Exchange Documents*), derived from GJXDM components.

SEARCH, with funding from the U.S. Department of Justice, Office of Community Oriented Policing Services (COPS), has recently completed a project to develop GJXDM IEPDs for Law Enforcement. This project has been helped by collaboration with the Organization for the Advancement of Structured Information Standards (OASIS) Integrated Justice Technical Committee, the National Law Enforcement and Corrections Technology Center Southeast (NLECTC-SE), The Los Angeles County Information Systems Advisory Body (ISAB), the Maricopa County AZ ICJIS Project Office, the Law Enforcement Information Technology Standards Council (LEITSC), the IJIS Institute XML Advisory Committee, the Justice Information Sharing Practitioners (JISP), and numerous domain experts from local law enforcement, state law enforcement, transportation and the Federal Bureau of Investigation (FBI).

The business purpose of the Law Enforcement IEPDs is as follows:

- To provide a model (and potentially an aspirational standard) for electronic exchange of justice information initiated by local law enforcement entities;
- To provide a model for the electronic exchange of justice information shared among law enforcement agencies and local, state, tribal and national partners;
- To provide a baseline model, especially with regard to incident data, for use by other first-responder and incident management organizations.

The intent of each IEPD is to provide a *reference model* of consistently structured and reusable pieces of information to be used by the law enforcement community for its internal use and for information exchange with other justice partners.

Participants

Travel to the IEPD workshops and meeting costs were funded by SEARCH through a grant from the COPS office. Additional meeting space was also provided by the Los Angeles County Information Systems Advisory Body (ISAB), the Maricopa County ICJIS Office, and the Integrated Justice Information Systems (IJIS) Institute. Many workgroup participants volunteered their time and covered their own travel expenses to participate in the workgroup activities.

Catherine Plummer, SEARCH Justice Information Systems Specialist, served as the coordinator and advocate for the Law Enforcement IEPD workshops. One of her major tasks was the initial selection of participants for each of the work groups. Individuals from the criminal justice information management and technology professions were selected for the following reasons:

- Law enforcement practitioners/subject-matter experts (SMEs) with a comprehensive understanding of the day-to-day use and management of the specific document type being developed;
- Technology specialists from the vendor community with practical experience in developing and implementing GJXDM tools and instruments, including schema;
- Participation in either the OASIS technical committees, IJIS Institute or JISP sub committees currently working to establish standards for the use of the GJXDM.

WORKGROUP 001: The following individuals participated in Workgroup 001 to develop an IEPD for Incident Report/Incident Data/NDEx.

Participant	Organization	Workgroup Role
Debra Cohen, PhD	Office of Community Oriented Policing Services (COPS) US Department of Justice	Project funding and coordination
Jennifer Hicks Zeunick	LEITSC	Coordination, Education & Outreach
Scott Came	Justice Integration Solutions	Facilitator
Catherine Plummer	SEARCH	Co-facilitator
John Aerts	LA County ISAB	Subject-matter expert (SME)
Scott Edson	LA County Sheriff's Department	SME
Jeff Harmon	Northrup Grumman (formerly Maine State Police)	SME
Jackie Vandercook	Tennessee Bureau of Investigation/NIBRS	SME (NIBRS/UCR)
Paul Herman	Baltimore Police Department	SME
Scott Shaw	Baltimore Police Department	SME
Jeffrey Cooper	Baltimore Police Department	SME
Rick Brown	FBI	SME
Sarah Wilson	FBI	SME (NIBRS/UCR)
Cherie Morgan	FBI contractor	Technical (NDEx coordination)
Scott Smith	FBI contractor	Technical (NDEx coordination)
David Kelley	DOT/IEEE	Technical Transportation/ IEEE 1512 coordination
Eric Lockhart	Marietta PD	SME
Monica North	Albuquerque Police Department	SME
Dennis Frye	ARJIS	SME
Dustin Henson	ARJIS	Technical

WORKGROUP 002: The following individuals participated in Workgroup 002 to develop an IEPD for Field Interview(Investigation) Report.

Participant	Organization	Workgroup Role
Winfield Wagner	Crossflo (formerly ARJIS)	Facilitator
Tim Wilson	Tritech	Co-facilitator
Bona Nasution	MTG	Technical
Tom Kooy	JISP (formerly CriMNet)	SME
Pamela Scanlon	ARJIS	SME
Dustin Henson	ARJIS	SME Technical
Coleman Knight	NLECTC-SE	SME
Karen Cordray	North Charleston PD	SME

WORKGROUP 003: The following individuals participated in Workgroup 003 to develop an IEPD for a Booking/Arrest Report.

Participant	Organization	Workgroup Role
Nancy Rutter	Maricopa County ICJIS	Facilitator
Joe Mierwa	VisionAir	Co-facilitator
Marcus Leon	LA County ISAB	SME
Karen Cordray	North Charleston PD	SME
Gerry Coleman	Wisconsin Crime Information Bureau	SME; Technical
Coleman Knight	NLECTC-SE	SME

WORKGROUP 004: The following individuals participated in Workgroup 004 to develop an IEPD for a Charging Document (Juvenile Petition, Complaint, Information, Grand Jury Indictment).

Participant	Organization	Workgroup Role
John Ruegg	LA County ISAB	Facilitator
Bob Slaski	Advanced Technology Systems	Technical
Jerry Floyd	LA County ISAB	Co-facilitator
David Goodwin	Maricopa County	SME
Lisa Miller	LA County Prosecutor	SME
Renee Cobb	JPS Consulting, Ltd.	SME

Workshop Methodology

In June, 2004, a workshop, co-sponsored by SEARCH and the OASIS Integrated Justice Technical committee, was conducted to establish GJXDM base schemas for court reference exchange documents. During that workshop an initial methodology was established to capture a suite of documentation for developing domain-focused, GJXDM-conforming schemas. The methodology was based on obtaining the data requirements and business requirements for a reference schema based on real world database structures, documents and forms used by justice practitioners. Technical participants turned those requirements into subset, extension, constraint and document schemas based on the GJXDM components. This first cut methodology has been outlined in the OASIS Integrated Justice Technical Committee's *Exchange Document Development Process* document.

This methodology, with some modifications to the steps and deliverables, was used as the basis for the SEARCH Law Enforcement IEPD Workshops, which took place in November 2004 and January 2005. The following is a review of that modified methodology and its steps:

Step 1: Initial Data and Document Collection to Establish the Base Domain Model

One month prior to the scheduled workshop, the facilitators began collecting numerous source documents, database structures and forms used by an assortment of justice agencies:

Development artifacts reviewed by IEPD workgroup teams included:

- Records Management and Case Management system input screens
- Data dictionaries and element lists
- Example incident reports, field interview reports, booking and arrest reports, criminal complaints, informations, grand jury indictments, and juvenile petitions
- Supplemental reports collected to augment initial incident data

If the members were unable to provide their reports, screens and database reference documentation before the start of the workshop, they were instructed to bring those items to the workshop for group discussion. During the workshops, additional reference artifacts were collected and reviewed by team members, including draft FBI Criminal Justice Information Services Division's National Data Exchange Project (N-DEx) data element user guides and schemas.

From the collected source material, each facilitator created initial products to be used during the workshop session, including:

- An object-oriented domain model, described either with UML static structure diagrams or MS PowerPoint Diagram illustrating the base objects (complex types) that could be used by all exchange partners.
- Spreadsheet mapping the domain model to GJXDM structures.

Step 2: Pre-workshop Distribution of Workshop Documentation

One week prior to the workshop, an initial package of documentation was distributed to the invited participants. The facilitators requested additional user documentation, as required. Additions and changes to the documentation packages were distributed to the invited participants prior to the start of each workshop.

Step 3: Workshop Process

During the workshop, each workgroup followed a basic three-step process in developing the Law Enforcement IEPDs:

1. Domain modeling
2. GJXDM mapping
3. Schema building

The domain modeling step was conducted during either one or two face-to-face sessions. The first session was held in Los Angeles County, California, November 15-17, 2004. The second session was held in Ashburn, Virginia, January 25-26, 2005.

During the morning of the first face-to-face session (Los Angeles), the technical facilitators met initially to review and agree upon a coordinated technical process, including: 1) domain modeling; 2) GJXDM mapping; 3) schema creation, and 4) packaging, to ensure that work product from each workgroup would be consistent. Following the facilitator discussion, all workgroup members participated in a collaborative two-hour session on *Level Setting and Overview of the Process*, which provided a background and framework of the GJXDM and IEPD objectives.

Workgroup members agreed to the following principles for the construction of IEPD artifacts:

- Following a principle established by earlier workshops, the base object for the schema would represent a law enforcement reference document represented by IncidentReport, FieldInterviewReport, BookingReport, or ChargingDocument, derived from the GJXDM 3.0.2 *DocumentType*.
- The development of the schema package would utilize objects and tags derived from or extended appropriately from the GJXDM 3.0.2 model.
- Missing elements or objects (complex types), identified by the workshop members, would be noted and provided to the XML Structure Task Force (XSTF) as potential extensions or modifications to the GJXDM.
- The schema created by each group would represent a subset schema of all possible information that might be required for a law enforcement information exchange package.
- The schema created would be a 'reference' schema that would enable the sharing of information across justice agencies and not a representation of any specific agency's system or document/form.

- If a piece of information could be represented in GJXDM 3.0.2 as both a Text Type and Code Type element (i.e. race, sex, hair color, eye color, etc.), the developed schema would include both element type tag names.
- As much as possible, object relationships would follow the hierarchy of GJXDM 3.0.2 inheritance.
- Development of more specific extension or constraint schemas would not be the responsibility of the IEPD Workgroup but that of any individual agency intending to use the reference IEPD as a baseline for its local implementation.

The participants gathered into separate groups for face-to-face sessions focused on the individual reference documents. Each group initially created a domain model (a graphical depiction of the document structure) from existing paper forms and screen shots as well as business experts' knowledge, using GJXDM where appropriate, but without being constrained by GJXDM. The groups used either Unified Modeling Language (UML) notation, or simply associated the business level data structures with PowerPoint or MS Word graphics.

During breaks in the members' discussion, the facilitators completed the following tasks:

- Updated the documentation
- Noted items and ideas that would help future users of the schema in understanding the content of the schema
- Noted items and ideas that may impact future versions of the GJXDM

Workgroups 002, 003 and 004 completed their domain models and initial GJXDM mapping during the first session in Los Angeles. Workgroup 001 required one more face-to-face session to complete its domain model, and met again in Ashburn, Virginia, for two additional days.

The GJXDM mapping step was completed remotely. The mapping spreadsheet "shell" was pre-populated by extracting information from the domain model segments. The facilitators performed the initial mapping and presented the spreadsheet to the workgroup for review. The completed mapping provided the "want list" to be input into the GTRI (Georgia Tech Research Institute) subset schema tool.

The facilitators then created the schemas; the subset schema was created using the online GTRI subset schema generation tool. The constraint schema was created by transforming the subset schema using a StyleSheet built during previous IEPD development projects. The extension and document schemas were authored by hand.

Finally, the facilitators built a sample instance to illustrate each IEPD, as well as to test the integrity of the schemas. The artifacts were packaged into a zip file, and the IEPD documentation drafted to conclude the project.

Workshop Deliverables

It was the responsibility of the facilitators to create a Zip Folder file that provided the necessary documentation to describe and use the base IEPD schemas, as well as the domain model and GJXDM mapping spreadsheet. The following artifacts are included in each IEP:

Artifact File Name	Purpose
<DocumentName>IEPD.doc	Background documentation for each IEPD
*.zargo files	UML class diagrams for segments of the domain model, in ArgoUML format
*.png files	UML class diagrams for segments of the domain model, in PNG format
*.ppt files	PowerPoint diagram of domain model(s)
GJXDM-mapping.xls	Spreadsheet containing mapping of domain model entities to GJXDM
Constraint-schema.xsd	GJXDM-conformant constraint schema
Extension-schema.xsd	GJXDM-conformant extension schema
Document-schema.xsd	GJXDM-conformant document schema
Subset/	Directory containing GJXDM subset package, including "want list" document that can be input into GTRI subset schema generator
Sample-<DocumentName>.xml	A sample instance valid against the document schema
Constraint-schema-transform.xsl	XSLT StyleSheet that creates the constraint schema from the subset schema (there is a minor amount of hand editing necessary in the constraint schema)

Additional Business Rules and Workshop Notes

Some of the workgroups have also identified business rules associated with the Reference GJXDM IEPD. These rules were identified by the IEPD workgroup in the course of developing the domain model and GJXDM mappings.

Additionally, several of the workgroups produced detailed workshop notes, which chronicled the IEPD development process, business and technical issues that arose during the process, and the disposition thereof. These workshop notes could be of great value to law enforcement information technology staff as they use these models for their local implementations.

Post-workshop Process

Following the workshop sessions these steps and tasks were completed:

- The facilitators reviewed the notes and support documentation and finalized the first drafts of the workshop deliverables.
- The draft artifacts were distributed to the other participating members of the workshop for their review, either through email or, in the case of one workgroup, posted on a workgroup Wiki site.

- Comments, corrections or adjustments, identified during the member’s review, were distributed back to the facilitators.
- The facilitators made the appropriate changes or adjustment, provided by the member’s review to the final draft of the documentation.
- The final workshop draft of the documentation was distributed to SEARCH for project review, Web-based publication, education and outreach.

Horizontal Analysis

At the conclusion of the four IEPD workshops, facilitators from each met for two days in Phoenix, Arizona, to perform an initial *horizontal analysis* among the four IEPDs, as well as the Uniform Rap Sheet IEPD developed by the Joint Task Force on Rap Sheet Standardization, for the purpose of:

- Ensuring consistent structures among all law enforcement IEPDs
- Defining core justice data entities to facilitate composition-oriented information sharing using the GJXDM
- Defining high level aggregate data entities to support the National Information Exchange Model (NIEM).

The horizontal analysis meeting was hosted by the Maricopa County, Arizona ICJIS project office in its facility on March 3-4, 2005, and was attended by the following participants:

Participant	Organization	Workgroup Represented
Scott Came	Justice Integration Solutions	001 Incident Report
Catherine Plummer	SEARCH	001 Incident Report
Winfield Wagner	Crossflo (formerly ARJIS)	002 Field Interview Report
Dustin Henson	ARJIS	002 Field Interview Report
Nancy Rutter	Maricopa County ICJIS	003 Booking Report
John Ruegg	LA County ISAB	004 Charging Document
David Goodwin	Maricopa County ICJIS	004 Charging Document
Kate Silhol	NLETS	Uniform Rap Sheet

A report defining this analysis as potential High Level, Basic and Core Justice Entities will be provided, in collaboration with the OASIS Integrated Justice Technical Committee, in April 2005.