



## **NATIONAL INFORMATION EXCHANGE MODEL (NIEM) OVERVIEW**

**FINAL**

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## **EXECUTIVE SUMMARY**

DHS and DOJ officials have announced a new partnership to provide leadership for enhanced development of the Global Justice XML Data Model as a base for the deployment of the National Information Exchange Model (NIEM). NIEM will provide enhanced capabilities for organizations to share data across federal, state, local and tribal lines. This paper gives an overview of the National Information Exchange Model (NIEM). It outlines the background, concepts, objectives and the development strategy for implementing NIEM.

## 1.0 INTRODUCTION

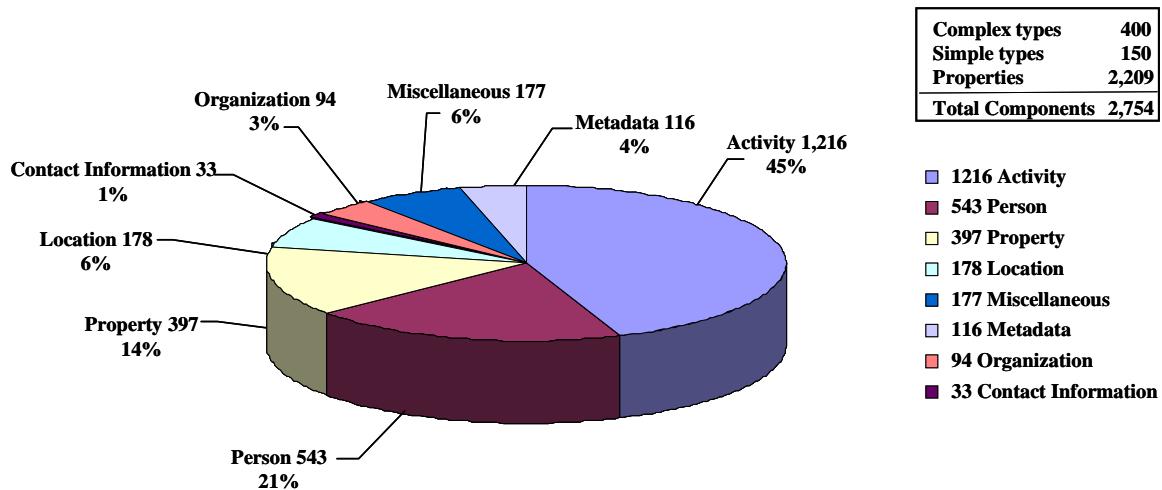
### 1.1 What is NIEM

The National Information Exchange Model (NIEM) is an interagency initiative to provide the foundation and building blocks for national-level interoperable information sharing and data exchange. The NIEM project was formally announced at the Global Justice XML Data Model (GJXDM) Executive Briefing on February 28, 2005. It is initiated as a joint venture between the U.S. Department of Homeland Security (DHS) and the Department of Justice (DOJ) with outreach to other departments and agencies. The base technology for the NIEM is the GJXDM. The NIEM will leverage both the extensive GJXDM reference model and the comprehensive GJXDM XML-based framework and support infrastructure.

### 1.2 Background

Department of Justice started Global Justice XML Data Model by gathering approximately 16,000 data elements from 35 data dictionaries comprised of DOJ agencies as well as various local and state government sources. The developers removed the redundancies and duplications and resolved semantic differences. Currently, GJXDM consists of well-defined and organized vocabulary of 2,754 reusable components out of which there are 400 Complex Types, 150 Simple Types, and 2,209 Properties that facilitate the exchange and reuse of information from multiple sources and multiple applications. The Global model is rich, flexible and extensible, has effective governance mechanism, widespread recognition and is used by state and local agencies (see Exhibit 1).

**Exhibit 1: Distribution of Components in GJXDM**



Even though GJXDM has a robust framework, it is a large, complex, single, monolithic schema with no reusable modular core components. It is a limited exchange model with no reusable exchange packages. GJXDM has limited mechanism for leveraging multiple government and industry resources for development, maintenance, and user support.

## **2.0 NIEM IMPLEMENTATION**

### **2.1 Extending GJXDM to National Level**

The NIEM is intended to provide a major component of the information sharing and data exchange solution needed to protect United States borders and ensure homeland security. It will provide enhanced capabilities for organizations to share data across federal, state, local and tribal lines. NIEM offers the opportunity for a unique partnership and collaboration among communities of interest. It is designed to enable each partner to apply its capabilities and expertise in cooperation with the other communities of interest to provide a consistent, single source of data exchange standards for shareable data of interest to these partners and other agencies necessary to protect the citizens and interests of the United States. Ultimately, NIEM will provide multidisciplinary functionality by developing the methods and actions necessary to define and implement universal data types that provide semantic consistency across multiple business domains.

### **2.2 NIEM Objectives**

The goal of the NIEM is to prevent fragmentation and semantic non-interoperability in XML standards within and across agencies through a proactive collaborative initiative to develop and implement common XML information sharing standards that meet critical homeland security data exchange needs.

The NIEM has following objectives:

- Develop a unified strategy within the Departments of Homeland Security and Justice for an XML-based information sharing capability
- Develop an initial implementation of the NIEM that satisfies Executive Order EO13356 and Homeland Security Presidential Directive HSPD11
- Develop an XML profile implementation of the Federal Enterprise Architecture (FEA) Data Reference Model (DRM)
- Provide technical assistance and training to local, state, tribal and federal organizations seeking to implement revisions to the GJXDM and support the new national standards emerging from joint efforts under this Memorandum of Understanding (MOU)
- Develop and demonstrate an application of the NIEM for the Border and Transportation Security (BTS) operational domain involving customs and border patrol agent data exchange (as a pilot)

### **2.3 NIEM Concept**

The NIEM concept embodies next generation enterprise data management technologies at the conceptual and implementation levels. Key aspects of this concept include modularity aligned with common and stakeholder-specific information needs, stakeholder consensus, and the collaborative development, sustainment and reuse of sets of core data types. “Universal Core data types” have applicability across all information domains. “Core Data Types” have applicability across two or more, but not all information domains. Individual domains can reuse and extend these core data types to meet domain-specific needs (see Exhibit 2).



- Facilitate discovery of reusable data components
- Facilitate assembly of reusable exchange packages
- Adopt a standard for assigning context
- Maintain compatibility with GJXDM for future work
- Demonstrate use of core in Federated Query
- Joint Development and Joint Governance of Core Entities and Exchanges

## 2.5 NIEM Next Steps

The NIEM pilot project will start with GJXDM as a baseline to leverage from Global JXDM. It will use the Global JXDM as the base for a wider vocabulary. Some of the initial steps for NIEM development are:

- Identify candidates for NIEM Pilot projects
  - The DHS projects are:
    - Border and Transportation Security (BTS) pilot
    - Immigration and Customs Enforcement (ICE) pilot
    - Disaster Management/EDXL
    - Information Analysis and Infrastructure Protection (IAIP) pilot
  - The DOJ projects are:
    - DEA Concorde Project
    - U.S. Marshals Services
    - U.S. Drug Enforcement Administration
    - Federal Bureau of Investigation
    - Litigation Case Management
- Perform Gap Analysis. This task will include mapping the entities and the attributes from different data models from different organizational elements (OE) to the GJXDM. This process will help identify the gaps and overlapping of elements and attributes of different models against the GJXDM. This analysis will come in the form of requirements as well as structure. A standard gap analysis template will be developed and will have definitions collected in a format to support the comparison of data. The NIEM PMO will then develop strategies based on the results of the gap analysis
- Create NIEM Concept of Operation
- Create NIEM Project Plan
- Identify partners and stakeholders
- Develop Joint Governance Model
- Start the governance process to add new candidates

- Identify tool support
- Demonstrate pilot project
- Upon success of pilot, expand scope

### **3.0 SUMMARY**

NIEM is a first step in the right direction on data interoperability. This unique collaboration with the leadership of DHS and DOJ will use a base technology, Global Justice XML Data Model (GJXDM), as its underlying foundation. This important initiative will provide a mature and robust framework that will be rich, flexible, and extensible for sharing data across communities of interest by leveraging the existing GJXDM (which was developed by state and local practitioners) and by expanding it to involve new key partners and their stakeholders. As other models are entered into the NIEM infrastructure model, a basic vocabulary will be generated. The implementation strategy will adopt, enhance, and extend the GJXDM so both initiatives- GJXDM and NIEM will be operating on parallel tracks to accommodate existing implementations.

The partnership and collaboration of DHS and DOJ in this important endeavor will provide consistent guidance and a clear path for government in the area of information sharing, eliminate redundancy, reduce cost and help provide needed tools in the fight against terrorism.