SEARCH
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What's New in JIEM 5.0?

Highlighting new features in the Justice Information Exchange Model   November 2010

Introduction

The Justice Information Exchange Model (JIEM®) program began in 1998 as a U.S. Department of Justice Bureau of Justice Assistance (BJA) research project assigned to SEARCH. SEARCH was tasked with evaluating the hypothesis that justice information exchange for criminal justice data is consistent across the nation. The JIEM Tool was used to consistently collect and evaluate information from 20 jurisdictions across the nation. This initial JIEM Tool also was used to produce a reference model, the Adult Felony Reference Model.

Over the past 12 years, JIEM has evolved from its original web-based format to a robust requirements and data modeling tool. The JIEM methodology continues to be a structured approach to capture and document information exchange requirements.[1] Over time, SEARCH and BJA have added capabilities to maintain JIEM's alignment with community best practices, such as leveraging the National Information Exchange Model (NIEM) and Global Justice Reference Architecture (JRA).[2]

This document highlights the enhancements from JIEM 4.1 to JIEM 5.0, and is intended to quickly illustrate features that are unique to the new version. It also explains why most users should find the new features useful and beneficial.

Summary of JIEM 5.0 Enhancements

SEARCH developed JIEM 5.0 to improve the Tool's alignment with several Global Justice Information Sharing Initiative[3] work products and to allow more robust, seamless development of NIEM Information Exchange Package Documentation (IEPD) artifacts. The new JIEM 5.0 features enable users to:

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[1] For more on JIEM and the JIEM Methodology, see http://www.search.org/programs/info/jiem/.

[2] For more on NIEM, see http://www.niem.gov/; and for more on the JRA, see http://www.it.ojp.gov/default.aspx?area=nationalInitiatives&page=1015.

[3] For more on the Global initiative, see http://www.it.ojp.gov/default.aspx?area=globalJustice.

1. **Document Privacy and Access Control Policies.** Users can now document existing information exchange policies and rules in a structured, electronic manner that conforms to the Global Technical Privacy Framework.[4] Users can:

   a. **Define metadata** to create rules and policies, and (via JIEM reference models) reuse metadata that have been defined by national efforts, such as the Global Federated Identity and Privilege Management (GFIPM) initiative.[5]

   b. **Create reusable policies** across exchanges.

   c. **Use metadata to categorize elements** in the JIEM Information dimension, linking data to policy. For example, a user can define a particular element in a NIEM IEPD as "personally identifiable information" (PII) and write the policy constraints for PII, keeping all the policy and data categorization information in the JIEM model.

2. **Generate Global JRA Service Specification Packages**. In the Global JRA, each service must have a set of artifacts that describes its interface; this set of artifacts is called a *Service Specification Package* (SSP). Since users are able to model services in JIEM and link those services to JIEM exchanges, it is easy for JIEM to export the SSP for each service.

3. **Develop NIEM Information Exchange Package Documentation artifacts.**[6] JIEM 5.0 provides new features that assist users with creating NIEM-conformant IEPDs. A few of these features are:

   a. **Full IEPD development**. JIEM 5.0 allows users to build document, extension, constraint, and subset namespaces, and to export those namespaces as an IEPD schema set that conforms to the NIEM Naming and Design Rules (NDR).[7] JIEM 5.0 gives users full control over the sharing of extension and subset/constraint namespaces across documents.

   b. **NIEM wantlist import**. JIEM 5.0 allows IEPD developers to make maximum use of existing IEPDS by supporting the import of NIEM and Global Justice XML Data Model (GJXDM)[8] *wantlists*. (A wantlist file represents user requirements.) Users can import any wantlist that has ever been created by the NIEM Subset Schema Generation Tool (SSGT)[9] into the JIEM Information dimension; users can then modify the resulting namespace contents to address new requirements.

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[4] For more on the Global Security Working Group and Privacy Framework, see http://it.ojp.gov/gswg.

[5] For more on the GFIPM initiative, see http://www.it.ojp.gov/gfipm.

[6] For more on the NIEM IEPD lifecycle, see http://www.niem.gov/iepdLifecycle.php.

[7] Download the NIEM NDR version 1.3 at http://www.niem.gov/TechnicalDocuments.php.

[8] The GJXDM is a data reference model for information exchange within the justice and public safety communities: http://it.ojp.gov/jxdm/.

[9] For more on the NIEM SSGT, see http://www.niem.gov/toolSupport.php.

c. **Conform to emerging NIEM guidelines**. JIEM 5.0 supports the recent IEPD changelog and catalog files developed by the NIEM Technical Architecture Committee (NTAC). The JIEM Tool automatically generates the catalog from artifacts that it creates, reducing user workload.

d. **Create enumerated code lists**. JIEM users can create their own code lists — known as *enumerations* — to meet local or project requirements. As with JIEM 4.1, code lists defined in NIEM or GJXDM are also available.

What do these new features mean to JIEM users? *Users now have a single tool that they can use to capture exchange requirements, information content and semantics, and service information, all in alignment with guidelines from NIEM and Global, and export finished artifacts critical to downstream development and implementation activities.*

Details about the JIEM 5.0 Enhancements

This section describes some of the new features in JIEM 5.0. For other details about this new version of JIEM, see the FAQs page on the JIEM Website (http://www.search.org/programs/info/jiem/tool/faqs.asp). Meanwhile, instruction on how to use these new features, and install JIEM 5.0, is covered in online JIEM training courses; see the end of this document for more details.

Document Privacy and Access Control Policies

JIEM 5.0 provides the ability for users to capture *policies* and *rules* for exchanges. Policies can take many forms and come from any number of sources (agency operations, Federal regulations, etc.). JIEM allows users to deconstruct an existing written policy into specific components, as defined by the Global Technical Privacy Framework. Much as an *exchange* consists of five dimensions (events, agencies, processes, conditions, and information), a policy is comprised of specific rules — simple statements that express "who can do what and when." Rules are created by structuring data elements, called *metadata*.

JIEM 5.0 provides a **Policies** dimension tab that allows users to capture details regarding policies used to control access, protect privacy, and adhere to standards in the exchanges. The Policy Details Page (Figure 1) includes:

- **Name:** The name users provide for the policy (free-form text).

- **Description:** The description of the policy (free-form text).

- **Notes:** Notes about the policy (free-form text).

- **Policy Rules:** Rules are used to describe the plan of action for the policy; multiple rules may be applied to a policy using either "and" or "or". See Figure 2 for help with the Rules Details Page.

- **Exchanges (Actions) to which this policy applies:** List of exchanges to which the policy is applied. This is automatically filled in as users apply the policy on the **Exchanges** dimension tab.
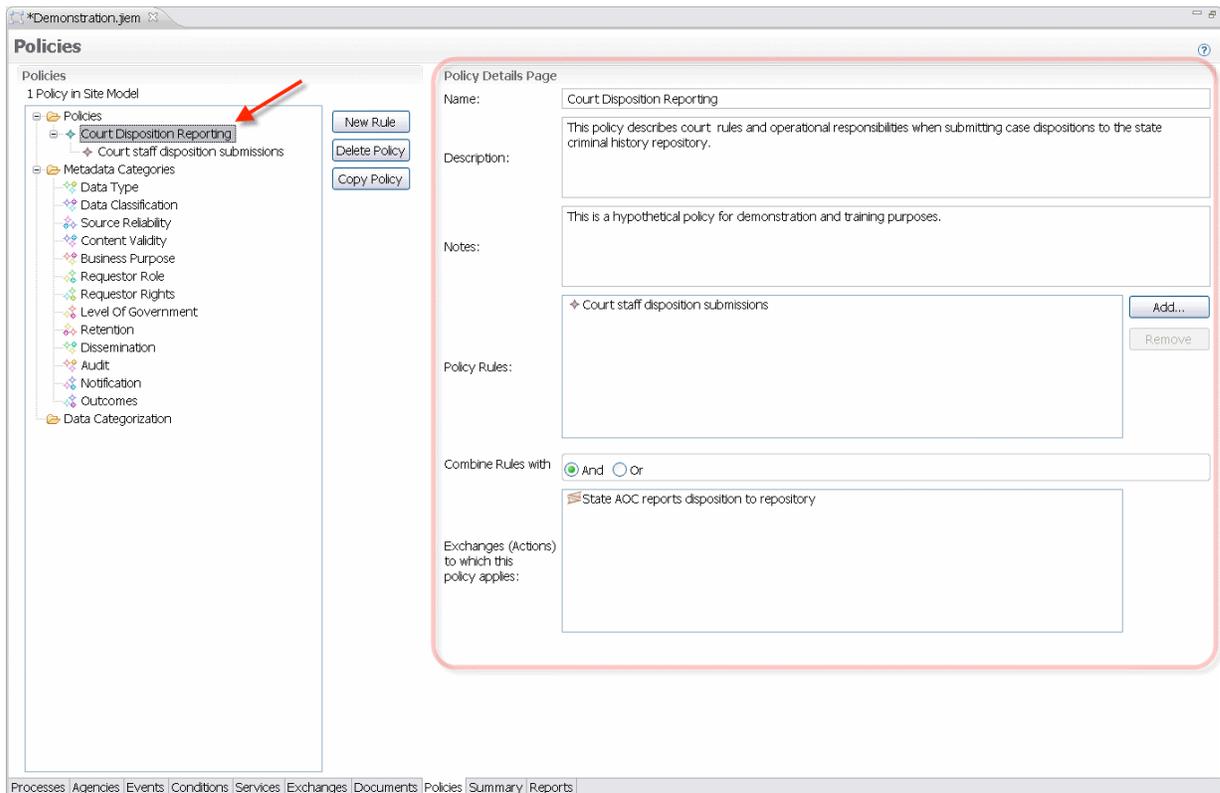
Figure 1. Policy Details Page

In essence, rules describe the "who, what, and when" of a policy. The rules utilize metadata to describe the rule. Rules information captured on the Rules Details Page (Figure 2) are:

- **Name:** The name users provide for the rule (free-form text).

- **Description:** The description of the rule (free-form text).

- **Outcomes:** From the metadata category of Outcomes.

- **User Categories:** From the metadata categories of Level of Government, Requestor Role, and Requestor Rights.

- **Data Categories:** From the metadata categories of Content Validity, Data Classification, Data Type, and Source Reliability.

- **Purpose:** From the metadata category of Business Purpose.

- **Obligations:** From the metadata categories of Audit, Dissemination, Notification, and Retention.

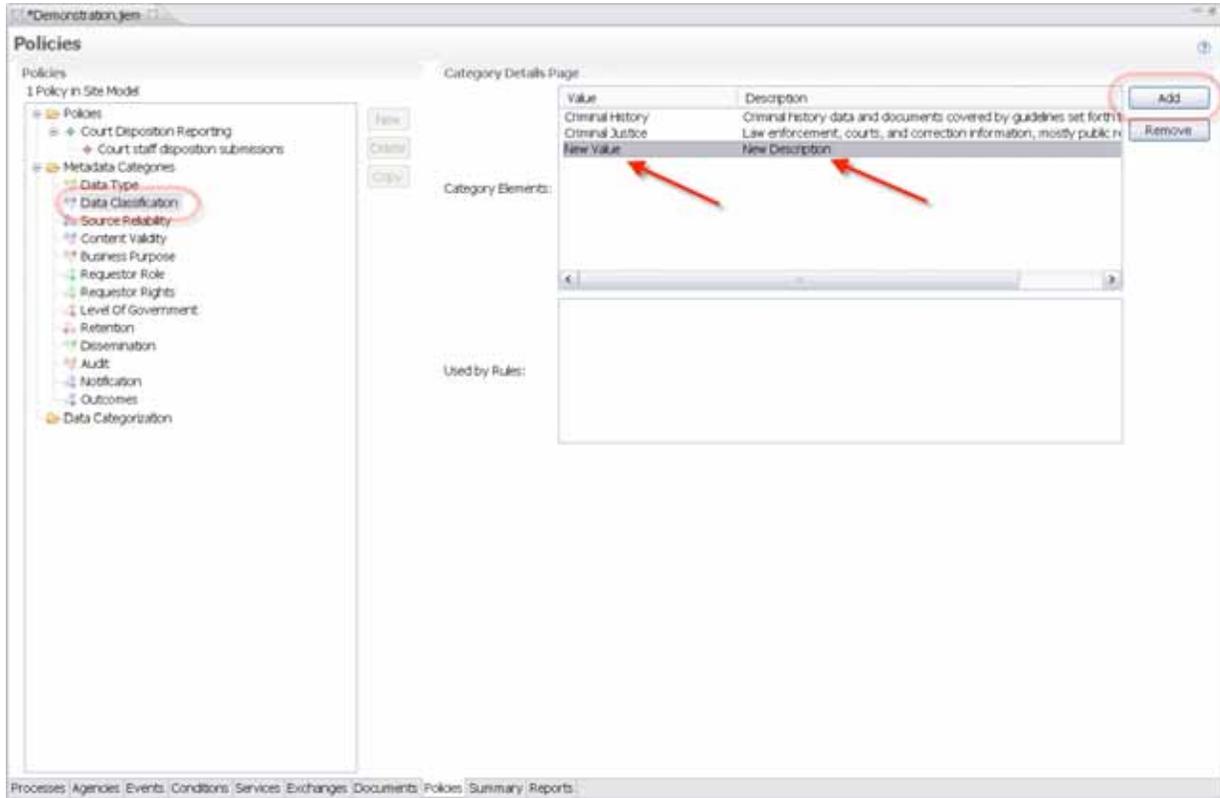- **Conditions:** Added as a free-form text.
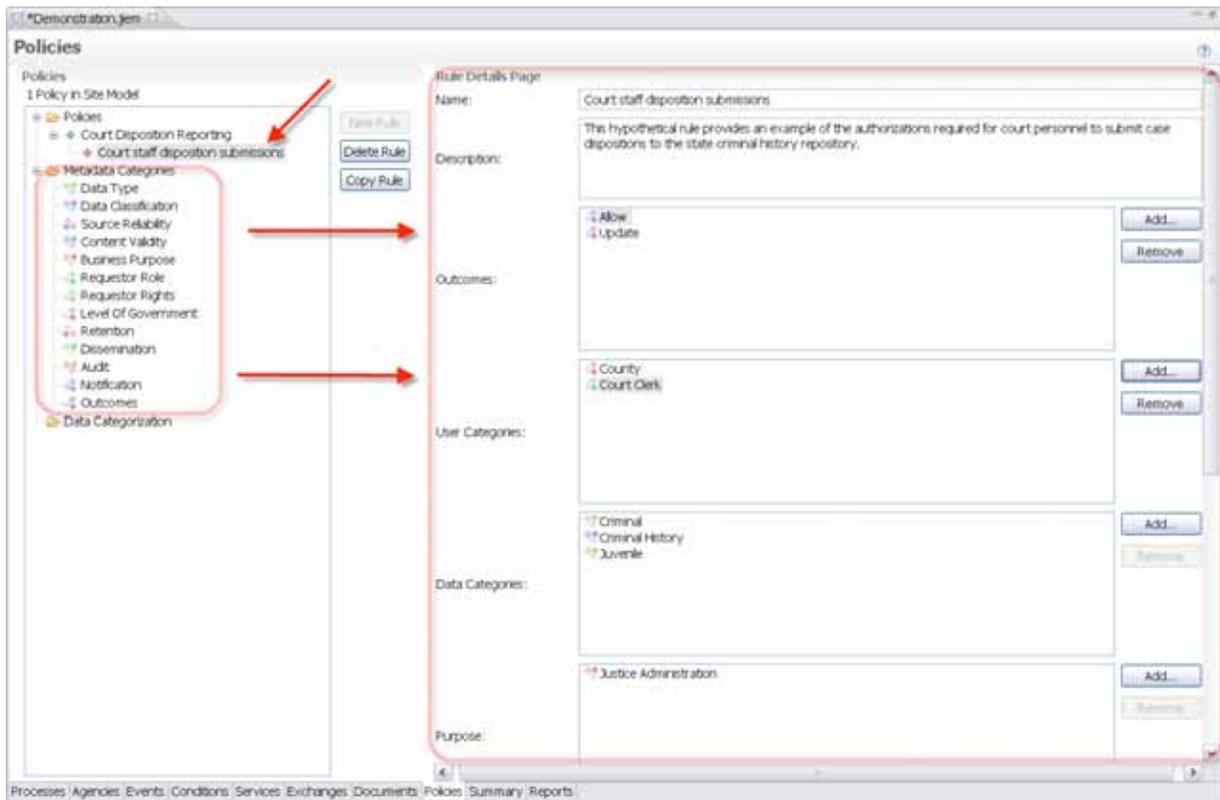

Figure 2. Rule Details Page

Users can create unique metadata values for each of the Rule categories by selecting the desired category and clicking the **Add** button on the Category Details Page (Figure 3). The values and descriptions are free-form text.

Figure 3. Category Details Page

The new Policies dimension offers users the ability to define data elements contained in the Information dimension with the values from the metadata categories of Data Type, Data Classification, Source Reliability, and Content Validity. This powerful feature allows users to apply information sharing policies to specific data elements, which enables subsequent electronic policy enforcement.

When users select the **Data Categorization** folder (Figure 4), a replica of the Information dimension appears. When users right-click on an Information Dimension element, they can chose which metadata value to assign to the element.
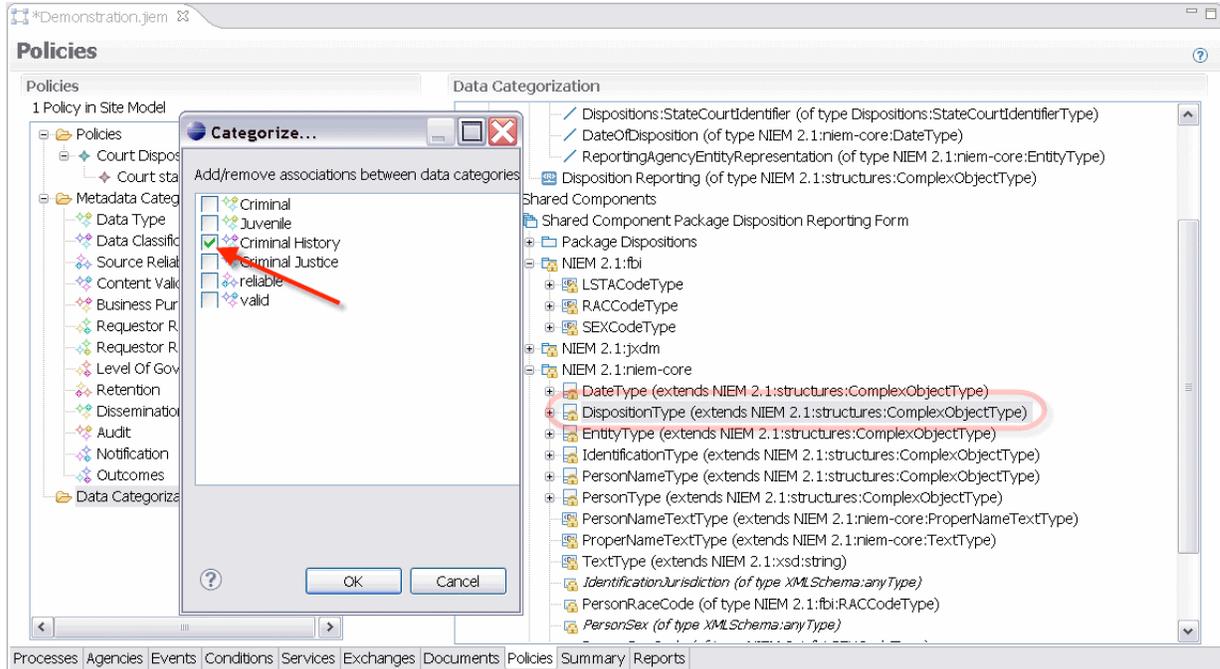
Figure 4. Data Categorization Folder

Service Specification Package Generation

JIEM 5.0 enables users to export Service Specification Packages (SSP) that follow Global Justice Reference Architecture standards (Figure 5).

An SSP is a formal document that describes the capabilities made available through the service. The JIEM SSP includes the mandatory sections of the SSP documented in sufficient detail so that a Service Provider can use the SSP to develop interoperable service implementations and a Service Consumer who is unfamiliar with the service can review, select, and use the service.
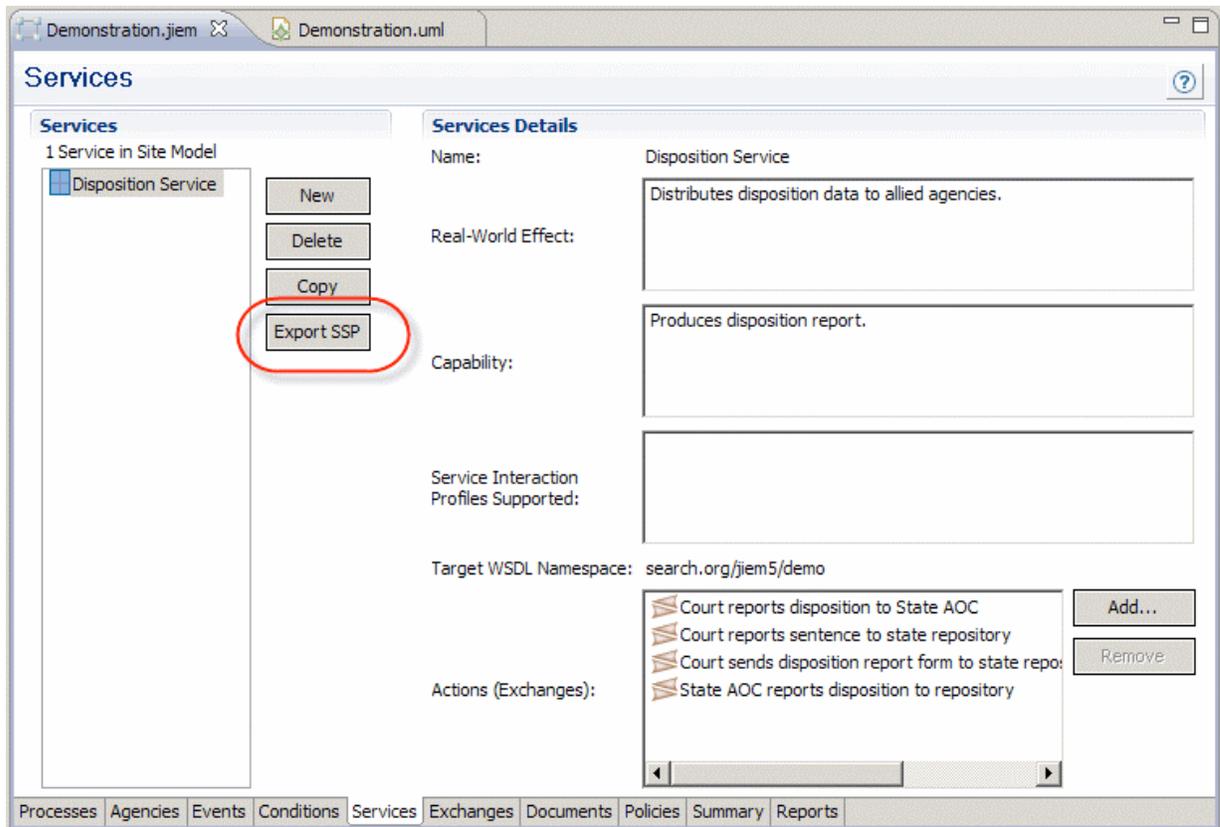
Figure 5. Export SSP Option

Figure 6 illustrates the basic folder structure resulting from an SSP export. For each service, JIEM builds the folder structure and populates it with the required documents. Users need to add the artifacts documents that describe the services and service interfaces. JIEM has populated the **Schema** and **SIP_WS** folders based on information on the Services dimension tab and information contained in the Information dimension.
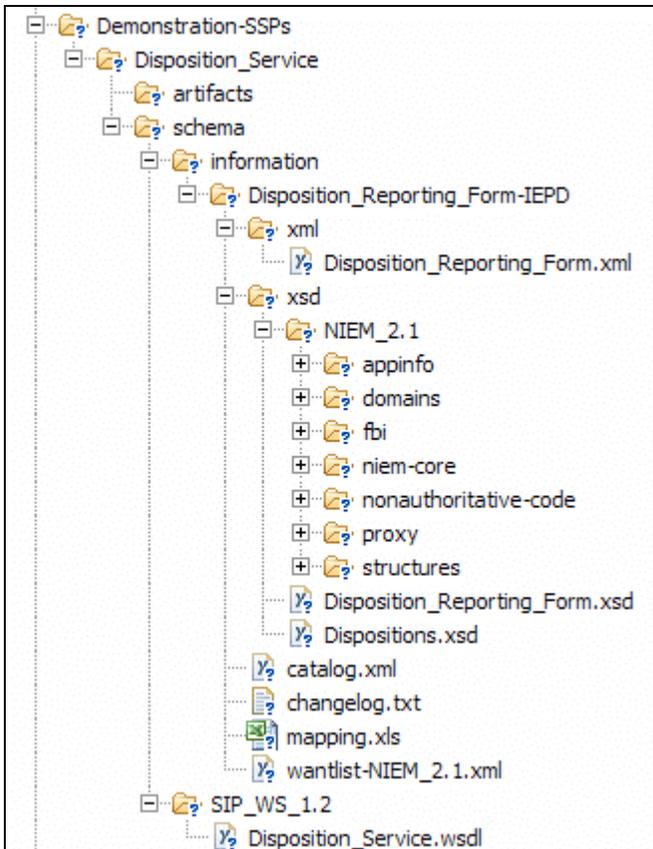
Figure 6. Basic Folder Structure from an SSP Export

The Information Dimension

The Information dimension in JIEM 5.0, as illustrated in Figures 7 and 8, has undergone significant changes. ***The changes to the Information dimension are described throughout the remainder of this document.***

It is important to understand what the Information dimension is and what it allows JIEM users to do. Simply stated,

> *The Information dimension model editor is used to capture the details about information that is being exchanged in specific detail to define a particular data exchange.*

The JIEM 5.0 Information dimension model editor includes many new and significant features to align with Global justice initiatives and the release of NIEM 2.1. Chief among these new features is the ability to create and export a complete Information Exchange Package Document following established practices.
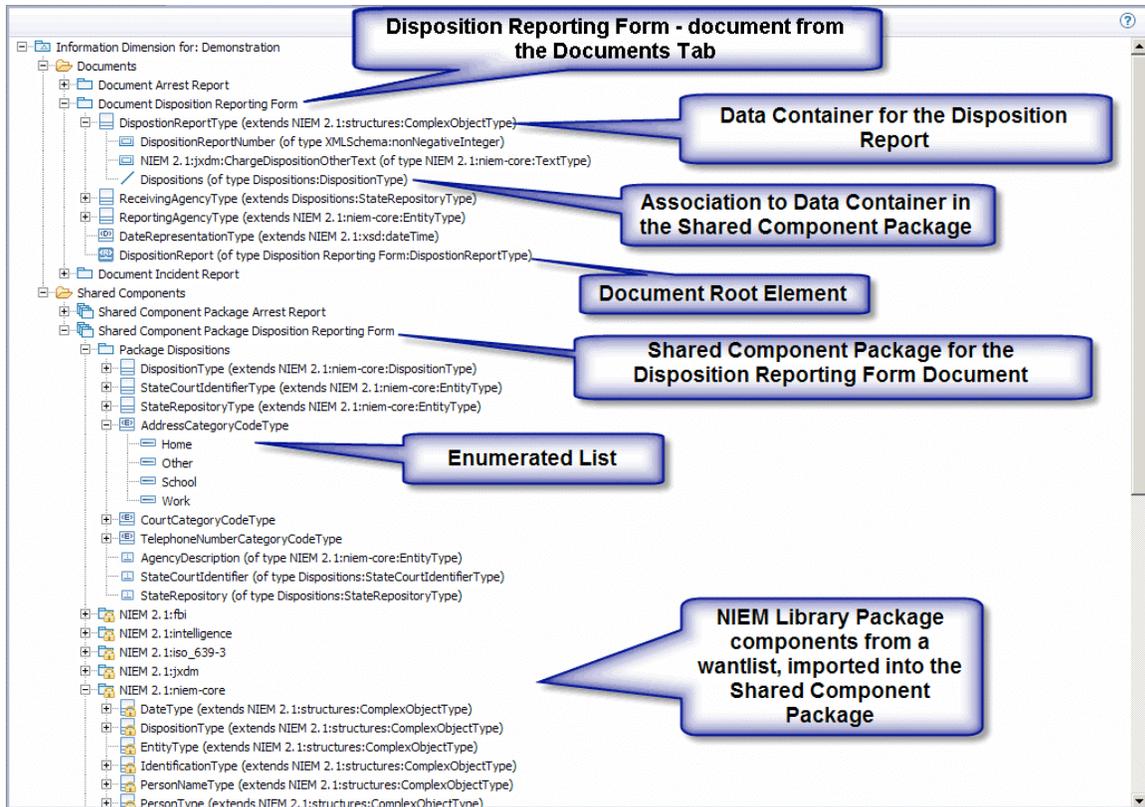
Figure 7. Information Dimension in JIEM 5.0

JIEM 5.0 Reorganized the Information Dimension

With JIEM 5.0, there is a significant change to the Information dimension structure:

- In JIEM 4.1, the Information dimension contained three folders: Documents, Shared Components, and Library Components.

- In JIEM 5.0, the Shared and Library Components are combined into a single file structure and retain the Shared Components name.

Combining the Shared and Library Component folders, as illustrated in Figure 8, supports a greater level of sharing of user-created and national data standard components for seamless integration. It allows users to control and share components across documents within an IEPD. User-created shared components and national data standard shared components, such as those found in NIEM, are now contained within the **Shared Components** folder.
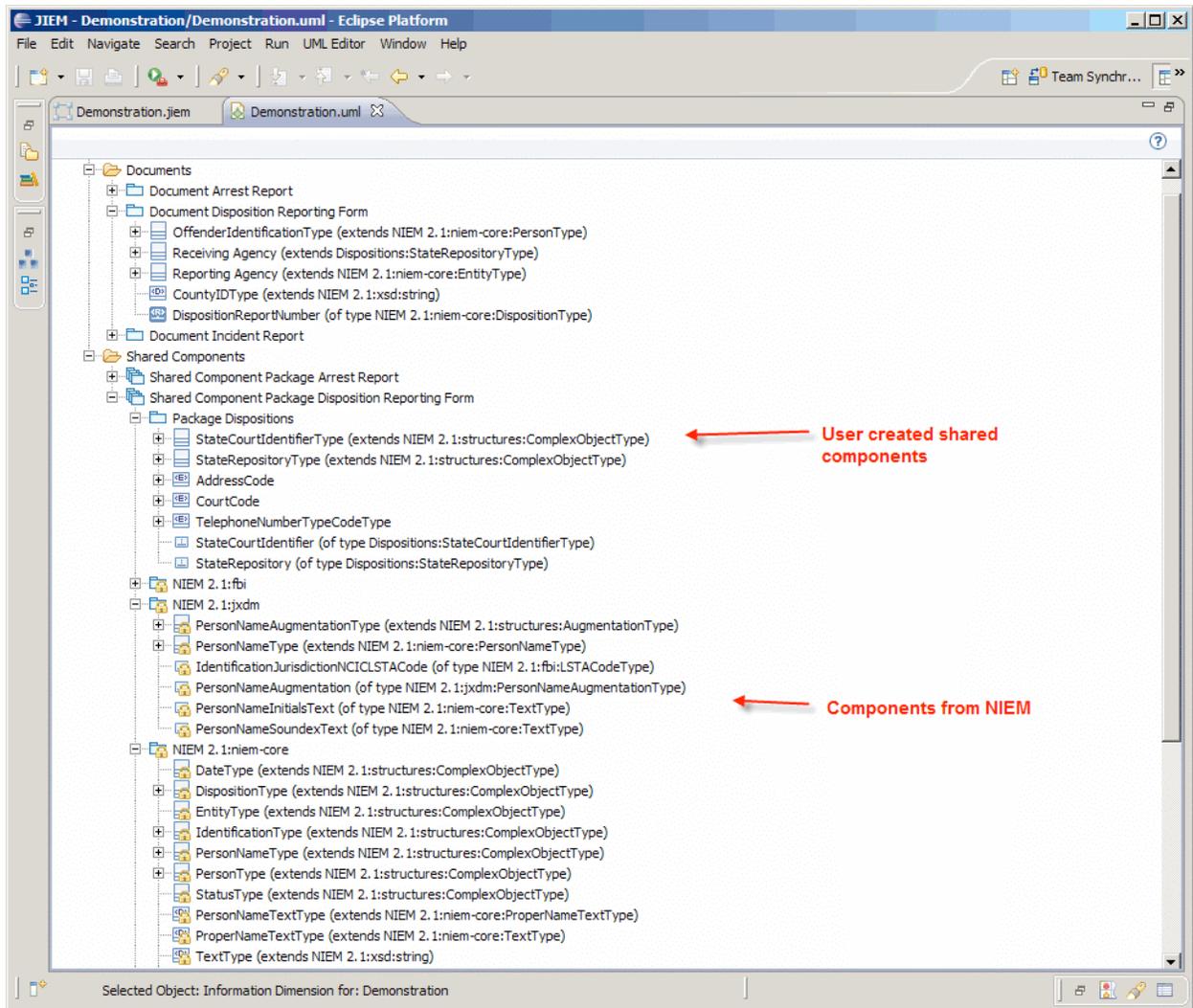
Figure 8. Information Dimension in JIEM 5.0: Shared Components Folder

The Shared Component package is a place where *packages, data containers, data types, enumerations*, and *global data elements* are made available to multiple documents. The Shared Component packages provide a way to reuse global or standard components that apply across exchanges. These "shared" components can come from one of two sources:

- **user-created** shared components, or

- shared component **libraries from national data standard vocabularies** like NIEM.

The first document users create in the Documents dimension also creates a Shared Component package. When creating subsequent documents, users choose whether to use the existing Shared Component package or create a new one.

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NIEM Wantlist Import

JIEM 5.0 includes the capability to import previously created NIEM or GJXDM (v.3.0.3) wantlists into the Information dimension. Importing wantlists populates the Shared Component package in the Information dimension from national data standards. This allows users to leverage other IEPD documents directly into JIEM and significantly reduces the time and effort to create a new Information dimension model.

When a wantlist is imported, it is brought into a Shared Component package. Importing wantlists allows the user to utilize NIEM types, elements, enumerations, and other data standards to create NIEM-conformant IEPDs by referencing global data elements and associations.

Right-click on the Shared Component package that is to contain the imported wantlist, then click on **Import Wantlist…** from the menu (Figure 9).
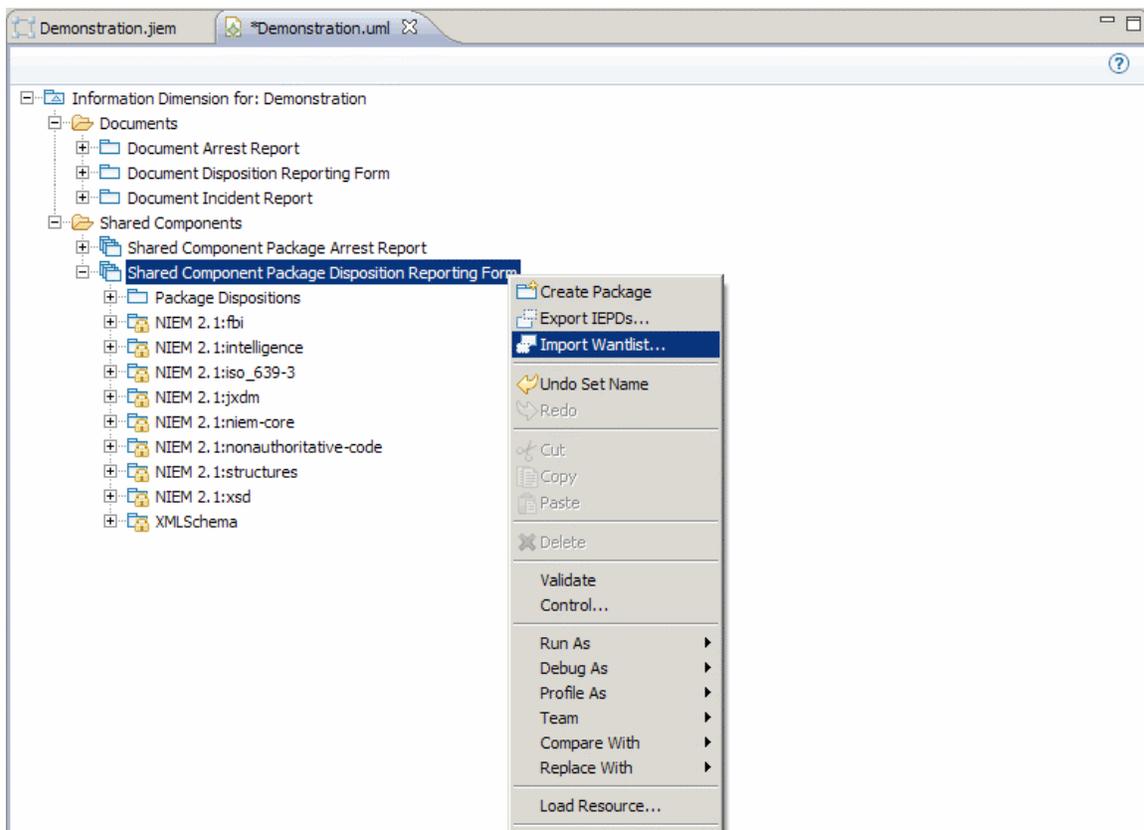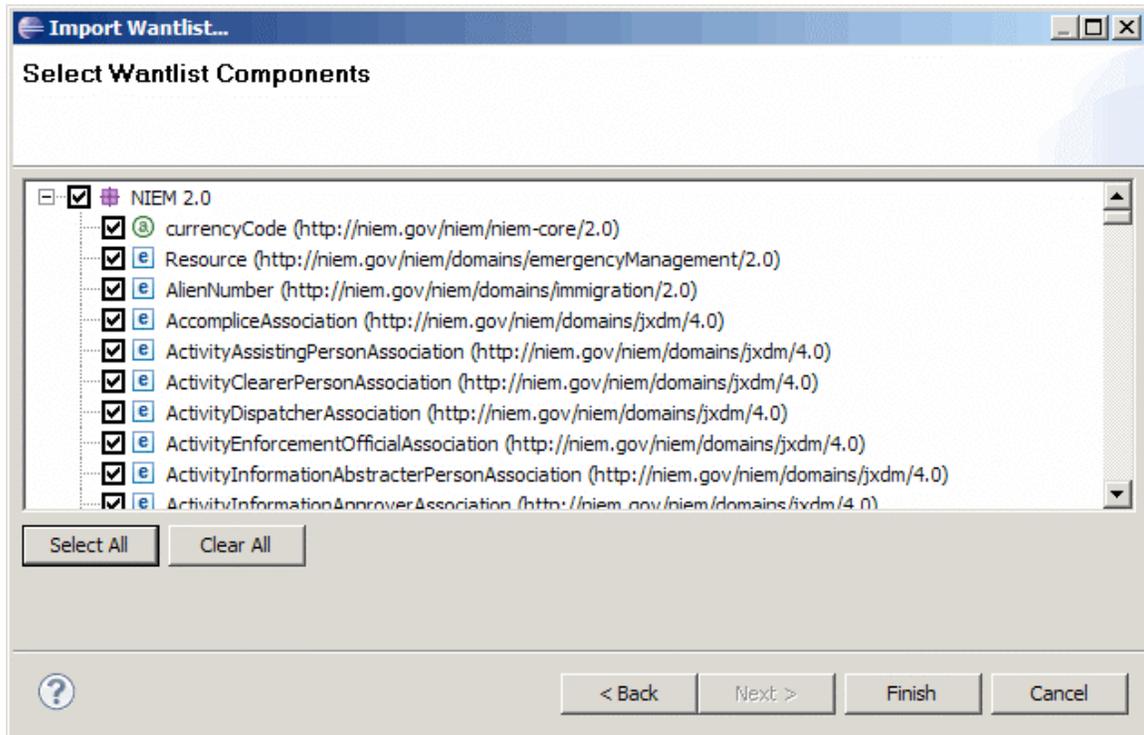

Figure 9. Import Wantlist

Choose the Shared Component package, and select **Next**. Find the wantlist.xml file, and select the wantlist components to bring into the Information dimension (Figure 10).

Figure 10. Select Wantlist Components

The selected items automatically appear in the appropriate package (e.g., NIEM 2.1:niem-core), along with the references to the extensions embedded in NIEM.

New Content for Documents

The Information dimension in JIEM 5.0 retains the options for adding a new data container and data type, and now allows users to create and define enumerations and global data elements (Figure 11).
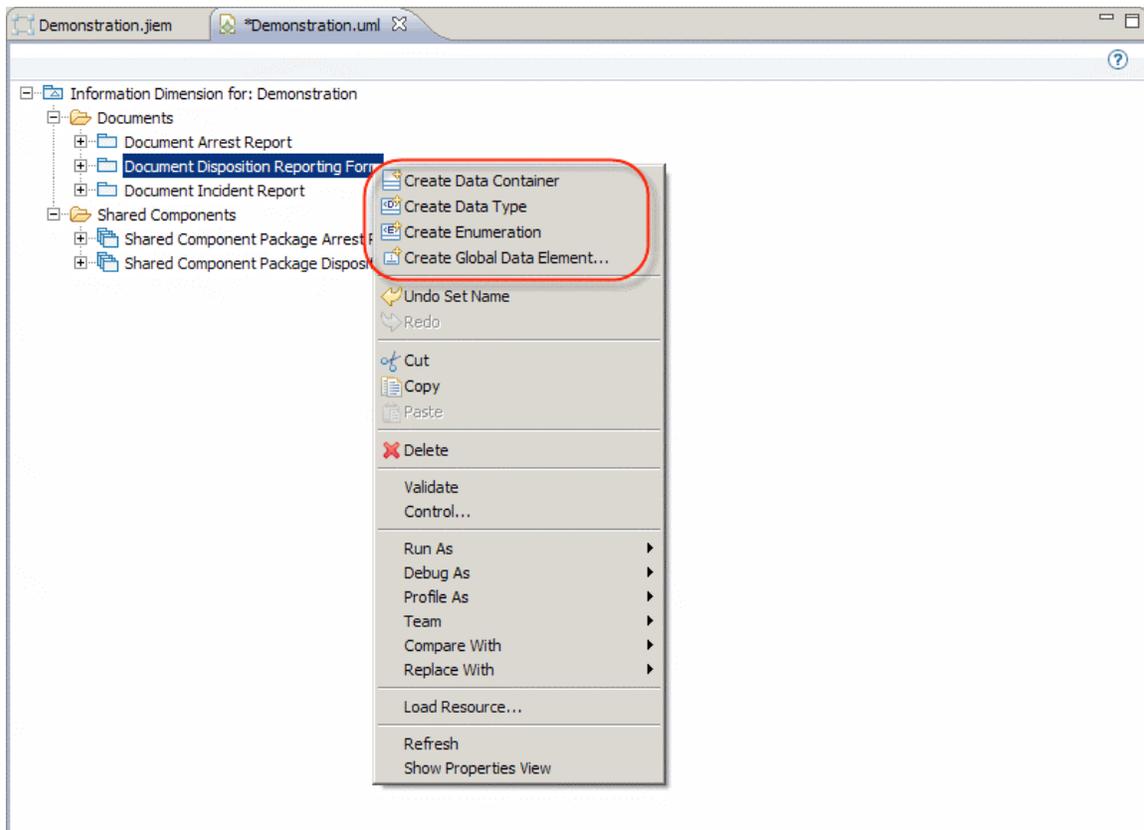

Figure 11. Options for Document Content

Create Enumerated Code List

As discussed above, another feature added to JIEM 5.0 is the ability to create enumerations, or code lists. Enumerations allow users to create lists of data that are contained in that list. For example, a list of counties in a particular state will be a finite list and one that is reused throughout the state. NIEM has fields in the niem-core component library for identifying a county; however, creating an enumerated list of the counties in a state for these fields is unique to that state and can be done in JIEM 5.0.

Creating an enumeration in a document allows users to assign unique codes or values used in documents. These include Court Identification codes, local statutes, terminal identifiers, etc. Users can create an enumeration by right-clicking a document, and selecting **Create Enumeration** in the Context menu. Users can then assign additional details and notes under the Properties tab.
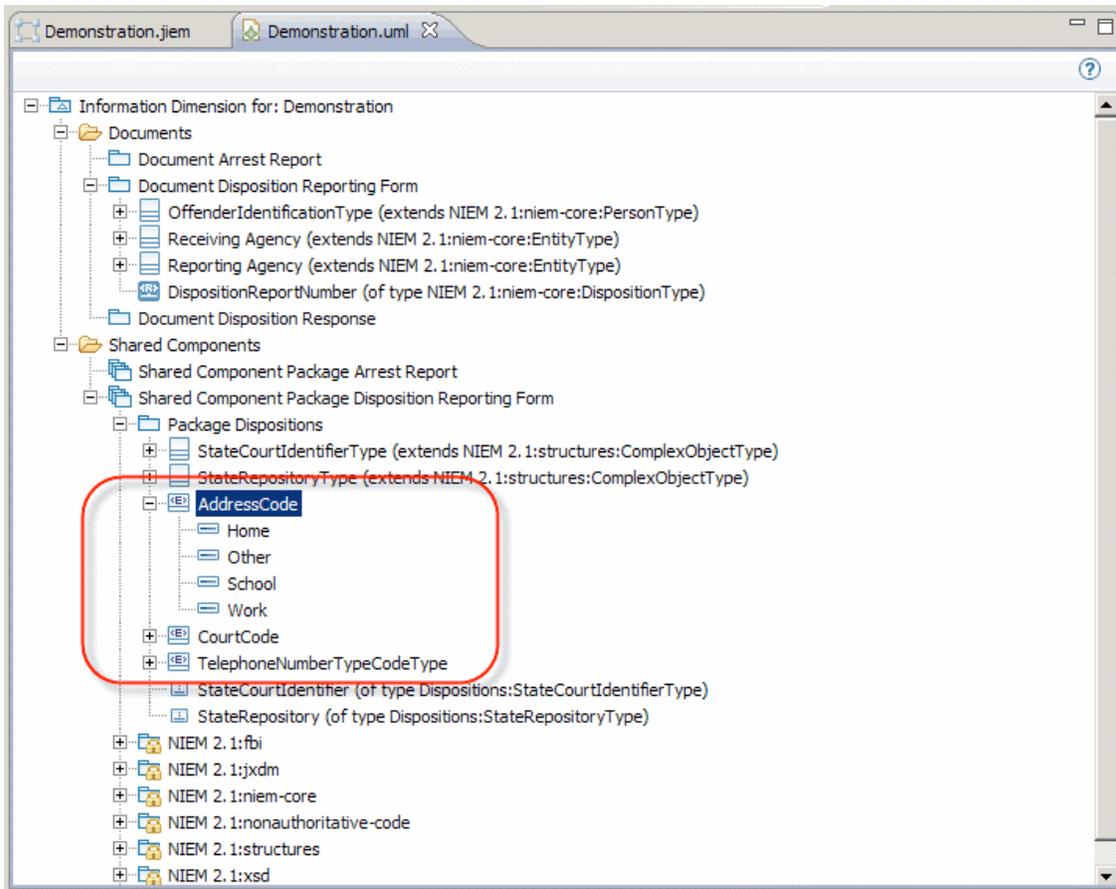
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Figure 12. Create an Enumeration in a Document

Upon creating an enumeration, users can create specific values, called *enumeration literals*. Users can right-click the enumeration and select **Create Enumeration Literal** in the Context menu (Figure 12). Users can then assign the appropriate details and repeat the process for each literal value necessary for the enumeration.

Search for Instances/References

JIEM 5.0 allows users to search for *instances*, which are occurrences of the selected data item throughout the Information dimension. Searching for instances is helpful when users create complex associations. Figure 13 is a result of right-clicking on the StateCourtIdentifier global data element and clicking on **Search for Instances**.
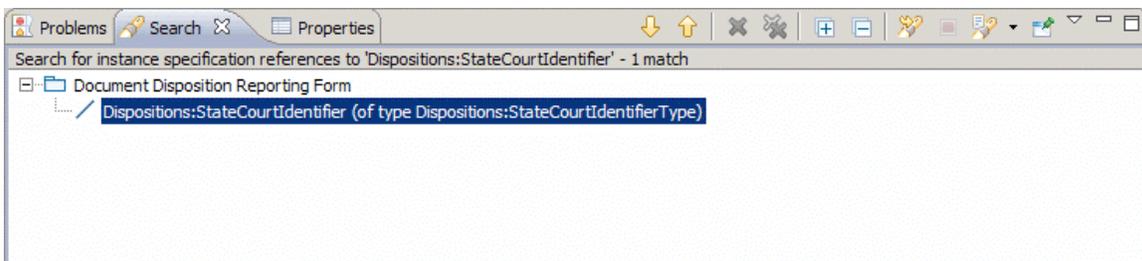

Figure 13. Example of Searching for Instances

Creating Global Data Elements

Users may also create extensions to NIEM when required content is not available. Global data elements will then be available for reference in the scope of the Shared Component package. A *global data element* is an attribute that can be shared across data containers. JIEM 5.0 allows users to use and create global data elements to align with XML schema and support NIEM schemas. Global data elements are good practice because users create the element once and reuse it. However, if a global data element is used in more than one data container, any change to the global data element will affect all data containers that reference it. Many documents and data containers may have the same elements used over and over; NIEM provides for many of these elements, such as various name and location fields. Jurisdictions may also have global data elements that are used in their exchanges to track persons, incidents, and cases or have other fields that are used more than once in an exchange.

As described, global data elements are data elements used throughout the exchange. When a user right-clicks a document, the Context menu allows the user to **Create a Global Data Element**. Once a global data element is created, a dialog box appears and prompts the user to assign a type for the global data element (Figure 14). Users may select any data container, data type, or enumeration.
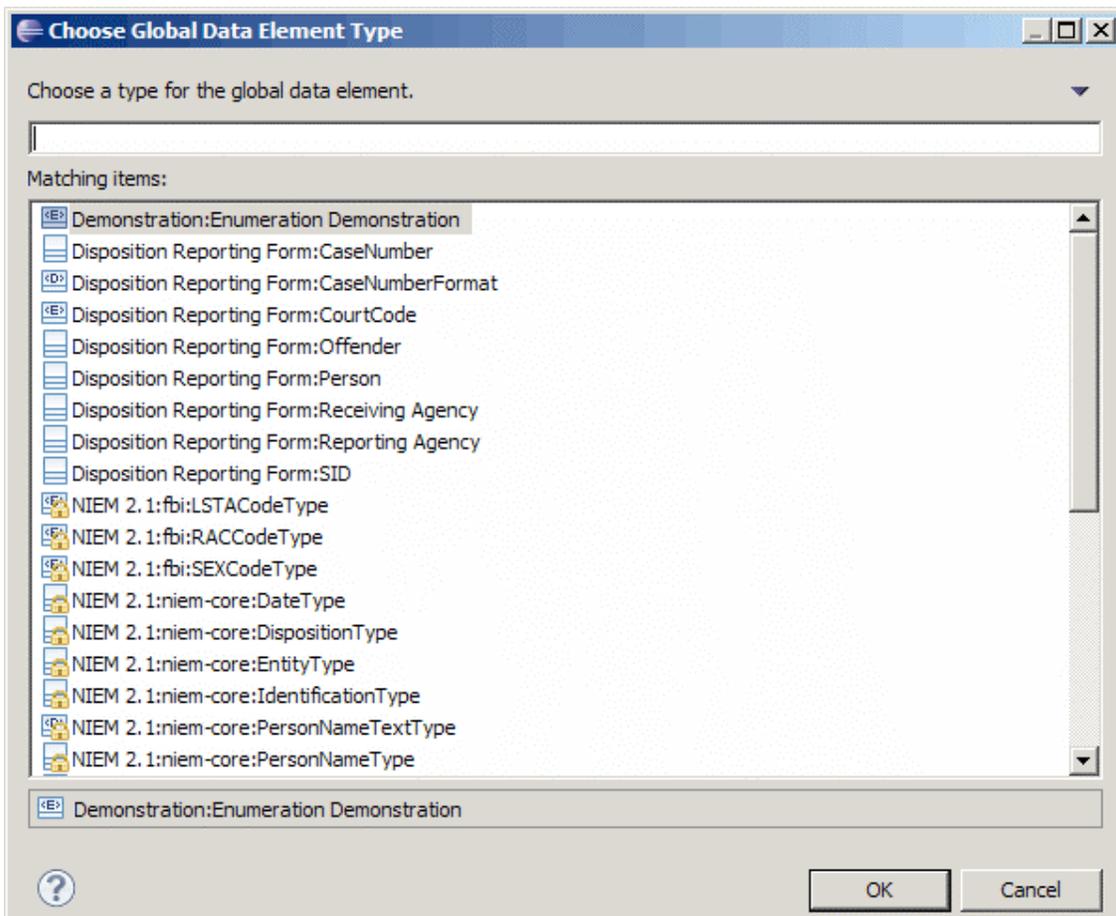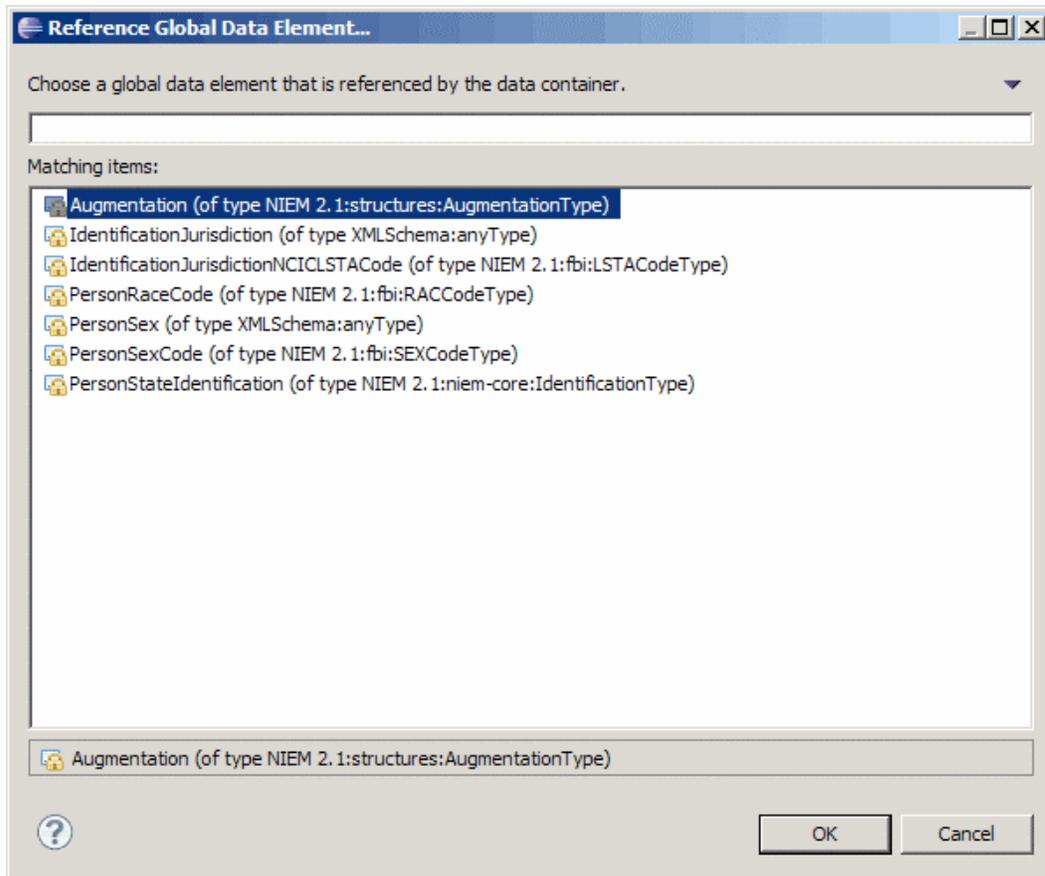

Figure 14. Choose Global Data Element Type

In the user-created data containers in the Document or Shared Component Package folders, users can reference a global data element by right-clicking on the data container and clicking on **Reference Global Data Element…** from the menu (Figure 15).

Figure 15. Reference Global Data Element

Global data elements are useful when a single element needs to appear in the context of multiple data containers. In this case, users would define the global data element once and reference that element from the data container(s) that require the global data element as a property.

IEPD Development

The most significant new feature of JIEM 5.0 is the ability to create a complete IEPD from the Information dimension model editor. This new feature follows best practices and provides users with a single tool to capture unique requirements, build a domain model, search national data standards, import the structures and definitions, map them to users' own definitions, and finally, create required XML schemas.

Once users have imported a wantlist, completed the necessary modifications per requirements, and validated the content with subject matter experts, they are ready to generate the IEPD. To do this, right-click the **.uml** file in the project explorer and select **Export IEPDs** (Figure 16).
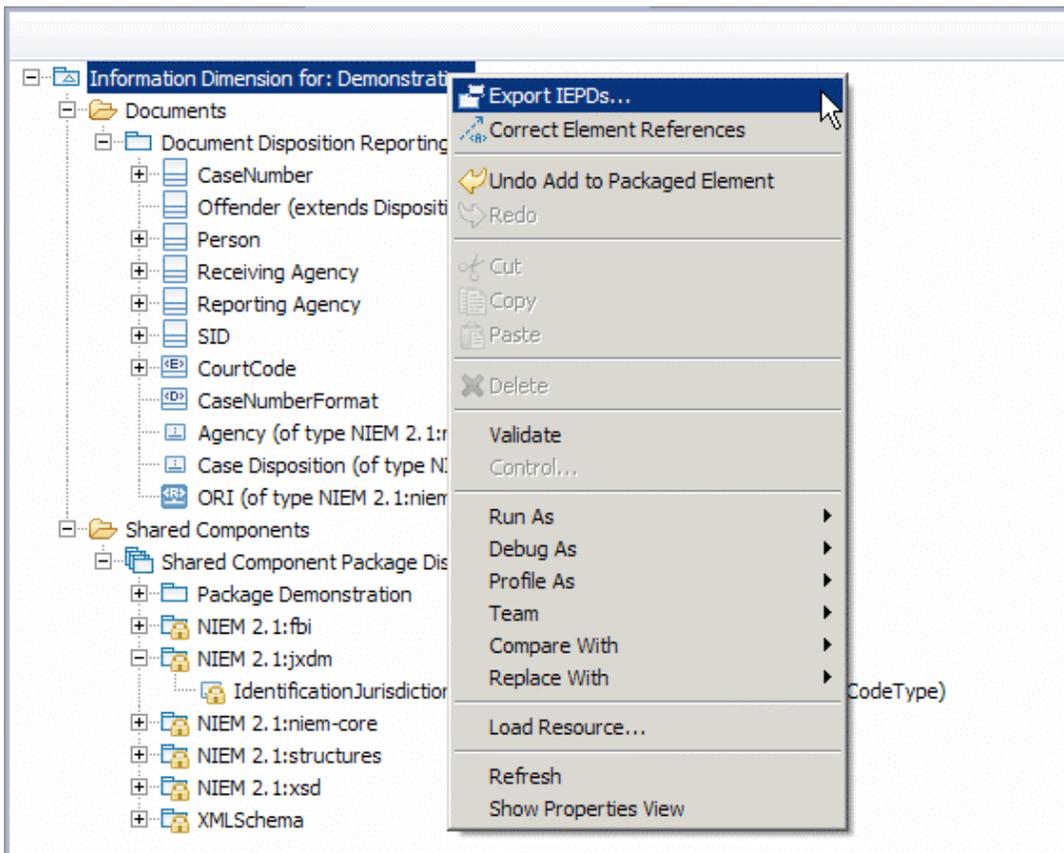

Figure 16. Generate IEPDs

The following are the basic contents of each IEPD, which conform to current and emerging NIEM guidelines (Figure 17):

- The **document XSD file**, which contains the information described in the document package. In essence, this is the **exchange schema** and contains reference to the appropriate NIEM namespace in the header.

- XSD files, which contain the **NIEM subsets from each of the appropriate domains** (niem-core, jxdm, fbi, appinfo, structures, etc.).

- One extension schema for each user-defined package created in the **Shared Components**.

- The **catalog**, a manifest of the IEPD artifacts, in a format specified by the NIEM Technical Architecture Committee (NTAC).

- A **change log** to capture the author, contributors, version history, etc.

- The **mapping spreadsheet**, which lists the complete contents of the Document and Shared Component package, along with element definitions, cardinality, business rule, and notes.

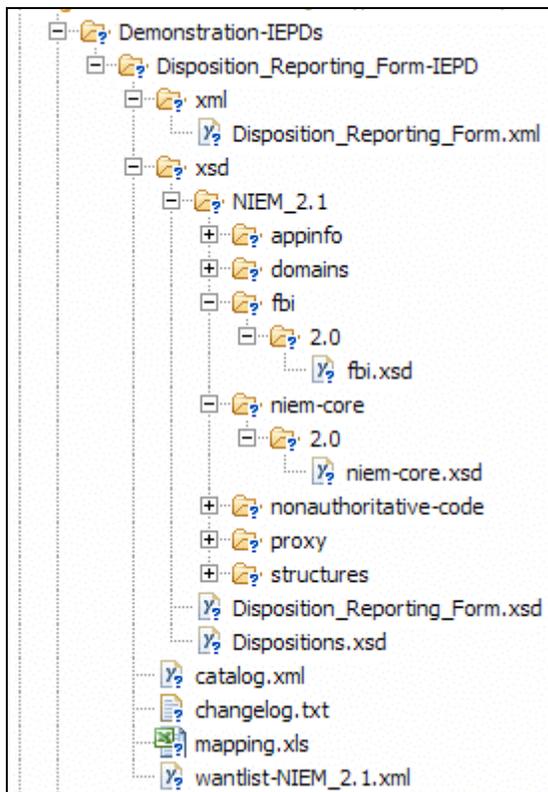- A **wantlist** from the authoritative data source (NIEM 2.1, GJXDM 3.0.3, etc.).

Figure 17. Basic Content of an IEPD

Conclusion

The JIEM 5.0 enhancements help to achieve the goal of improving support for Global work products and support for NIEM and the IEPD Lifecycle. The added functionality presented in the new Policies dimension and the enhancements to the Information Dimension make JIEM 5.0 a robust tool to assist users with documenting information exchanges and creating NIEM-conformant IEPDs. Following Global Justice and NIEM standards for documenting policies, and creating JRA service specification packages and information exchange package documents provides users with a single tool to create the artifacts used to build criminal justice information exchanges.

Details regarding how to utilize these new features, as well as step-by-step instructions for the JIEM 5.0 Tool, are available through the online help feature in the JIEM 5.0 Tool. See http://www.search.org/programs/info/jiem/ for more information.

How do I download JIEM 5.0?

· *New users* must complete the online JIEM certification training and pass the certification exam. During the course, users will receive download and installation instructions for the JIEM 5.0 Tool. New users may register for JIEM training at **http://www.search.org/programs/info/jiem/training**

· *Users who are already certified* in a previous version of JIEM may view the JIEM 5.0 Quick Start Screencast and download the JIEM 5.0 Tool from the JIEM Community website at **http://jiem.search.org/jiem-wiki/Main_Page**