

# Rules and Policy based handling of XML in Government Contexts including NIEM

David Webber, James Cabral  
and Dana Florescu

# Background

- Managing information privacy and access policies is a critical need and technical challenge for government
- Desired solutions should be both ubiquitous and syntax neutral, yet at the same time incorporate a simple and lightweight approach that meets legal policy requirements through the application of clear, consistent, and obvious assertions
- Support use with National Information Exchange Model (NIEM) approach

# DoD NIEM Adoption

DoD Chief Information Officer Teri Takai :



DEPARTMENT OF DEFENSE  
6000 DEFENSE PENTAGON  
WASHINGTON, D.C. 20301-6000

MAR 28 2013

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS  
CHAIRMAN OF THE JOINT CHIEFS OF STAFF  
UNDER SECRETARIES OF DEFENSE  
DEPUTY CHIEF MANAGEMENT OFFICER  
COMMANDERS OF THE COMBATANT COMMANDS  
DIRECTOR, COST ASSESSMENT AND PROGRAM EVALUATION  
DIRECTOR, OPERATIONAL TEST AND EVALUATION  
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE  
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE  
ASSISTANT SECRETARIES OF DEFENSE  
ASSISTANTS TO THE SECRETARY OF DEFENSE  
DIRECTOR, ADMINISTRATION AND MANAGEMENT  
DIRECTOR, NET ASSESSMENT  
DIRECTORS OF THE DEFENSE AGENCIES  
DIRECTORS OF THE DOD FIELD ACTIVITIES

Subject: Adoption of the National Information Exchange Model within the Department of Defense

In order to comply with White House guidance on the adoption of reference information exchanges, DoD will adopt the National Information Exchange Model (NIEM) as the best suited option for standards-based data exchanges. This adoption will involve a series of phased implementations by Components/Programs using NIEM content, guidance, and tools in an integrated effort to transition current DoD data exchange standards, specifications, and policies to a NIEM-based approach. In addition, the DoD will work with the NIEM Program Management Office to create a Military Operations (MilOps) Domain as part of NIEM.

Given the Clinger-Cohen Act mandates and today's fiscal pressures, DoD must adopt a DoD-wide sustainable business model for information sharing that supports the DoD data strategy, the Joint Information Environment, the DoD Information Enterprise Architecture, and emerging government data sharing guidance. Adoption of NIEM offers potential efficiencies, long-term development cost savings, streamlined governance, and most importantly, improved information sharing across the DoD and with our mission partners.

To facilitate the transition to NIEM, the Office of the DoD Chief Information Officer will lead the development of a DoD Data Framework to include targeted guidance on governance and technical direction regarding NIEM adoption. Specifically, the DoD Data Framework will build upon the existing DoD data strategy and will provide principles, rules and additional guidance for managing data artifacts to improve information sharing. This framework will provide a foundation for how DoD views, manages, and shares its data. As part of the framework effort and to assist in shaping the DoD involvement in NIEM, Combatant Commands, Services and Agencies are encouraged to identify and conduct pilots and demonstrations.

NIEM military domain "will support development of information exchange specifications across the full range of military operations."

NIEM will be used unless component can show compelling reasons

Lt. Gen. Mark Bowman, Joint Chiefs of Staff CIO/J6



THE JOINT STAFF  
WASHINGTON, D.C.

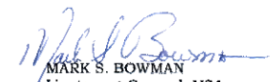
Reply ZIP code:  
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12 April 2013

MEMORANDUM FOR SEE DISTRIBUTION

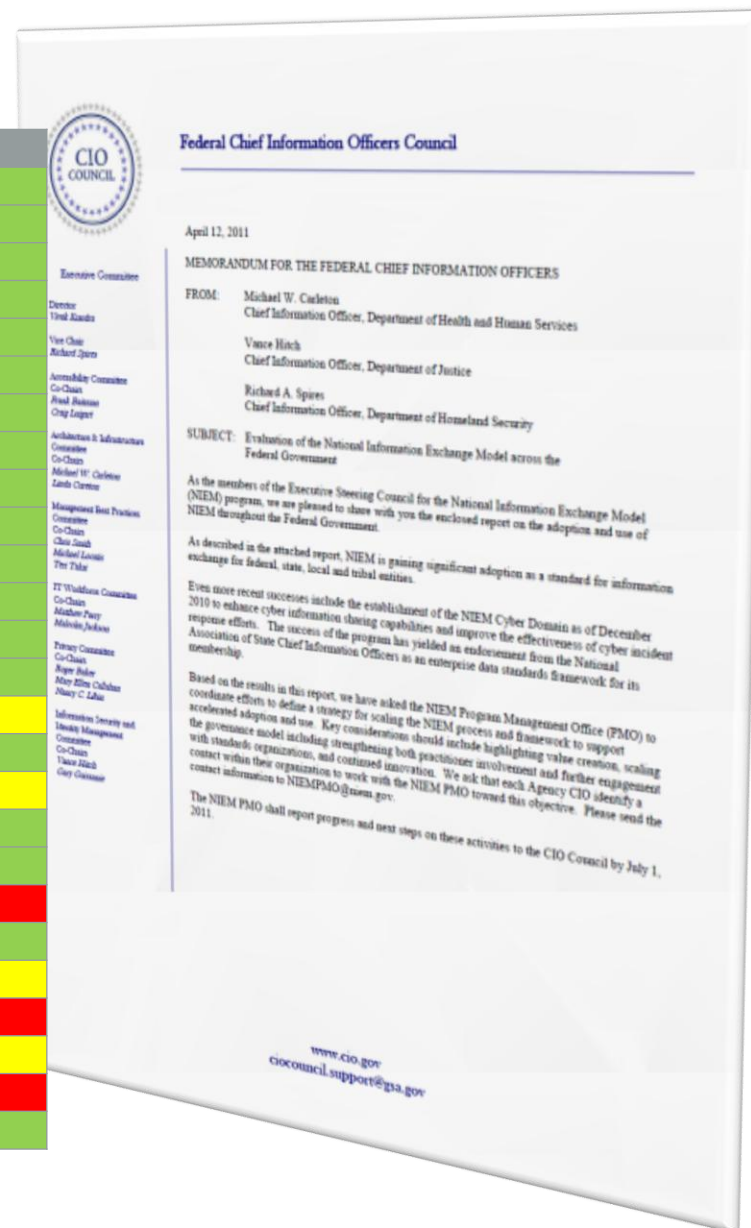
Subject: DoD Adoption of the National Information Exchange Model (NIEM) and establishment of the NIEM Military Operations Domain

1. The 28 Mar 2013 DoD CIO memorandum, "Adoption of the National Information Exchange Model within the Department of Defense", states that the DoD will adopt the NIEM as the best suited option for standards-based data exchanges. This is a critical decision that will ultimately improve our information sharing capabilities within the Warfighting Mission Area, the Joint Information Environment, and the Mission Partner Environment.
2. In support of this decision and in coordination with the DoD CIO, the JS J6 is taking initial steps to establish a new Military Operations (MilOps) Domain within the NIEM construct. In combination with the existing NIEM Core and domains, the NIEM MilOps domain will support development of information exchange specifications across the full range of military operations.
3. Request all Combatant Commands, Services, Agencies and Joint Staff Directors with an interest in this activity provide an organizational point of contact, preferably O-6/GS-15, by 30 April 2013. The DoD CIO and the JS J6 will use these points of contact to share information and coordinate DoD participation in NIEM MilOps Domain establishment, management, and piloting activities.
4. JS J6 OPR for the NIEM MilOps Domain is the Data and Services Division within the Deputy Directorate for C2 Integration (DDC2I). Primary point of contact is Mr. Ryan Schultz, [ryan.r.schultz.civ@mail.mil](mailto:ryan.r.schultz.civ@mail.mil), (757) 203-5785.

  
MARK S. BOWMAN  
Lieutenant General, USA  
Director for Command, Control,  
Communications, and  
Computers/Cyber;  
Chief Information Officer

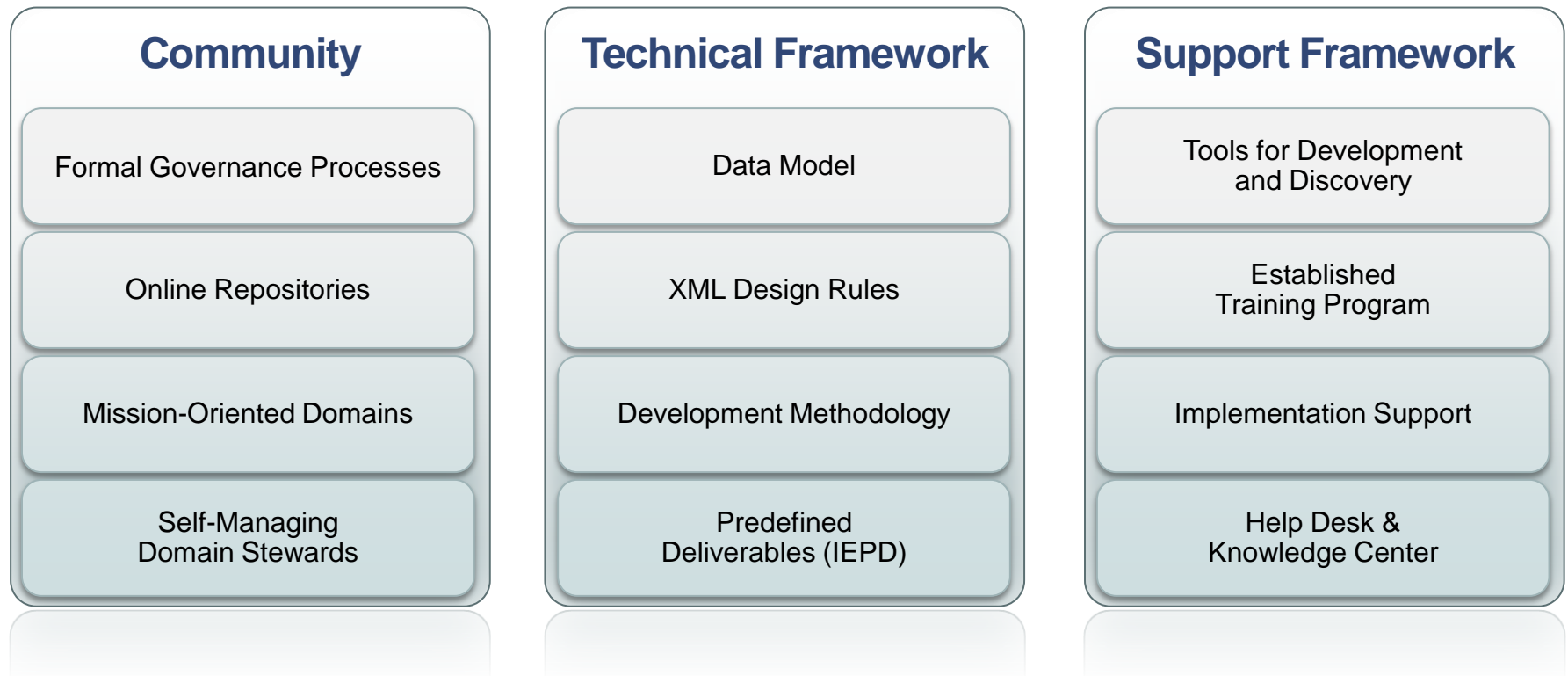
# FEDERAL AGENCY COMMITMENTS

AGENCY	USE OF NIEM	
Department of Agriculture	Committed to Use	
Department of Defense	Committed to Use	
Department of Education	Committed to Use	
Department of Energy	Committed to Use	
Department of Health and Human Services	Committed to Use	
Department of Homeland Security	Committed to Use	
Department of Housing and Urban Development	Committed to Use	
Department of Justice	Committed to Use	
Department of Labor	Committed to Use	
Department of State	Committed to Use	
Department of the Interior	Committed to Use	
Department of the Treasury	Committed to Use	
Department of Transportation	Committed to Use	
Department of Veterans Affairs	Committed to Use	
Environmental Protection Agency	Further Evaluation Required	
General Services Administration	Committed to Use	
National Aeronautics and Space Administration	Further Evaluation Required	
National Archives and Records Administration	Committed to Use	
National Science Foundation	Committed to Use	
Nuclear Regulatory Commission	Will Not Use	
Office of the Director of National Intelligence	Committed to Use	
Social Security Administration	Further Evaluation Required	
Geospatial Line of Business	Will Not Use	
Grants Management Line of Business	Further Evaluation Required	
Financial Management Line of Business	Committed to Use	
Human Resources Line of Business	Committed to Use	



# The NIEM Framework

NIEM connects communities of people who share a common need to exchange information in order to advance their missions, and provides a foundation for seamless information exchange between federal, state, local, and tribal agencies. Much more than a data model, NIEM offers an active user community as well as a technical and support framework.



# Agenda

- Approach Overview
- Use Case Example
- XML and NIEM\*
- Grappling with Complexity
- Simple Solution
- Option - Semantic Data Querying
- Summary
- Q & A

\* National Information Exchange Model – <http://www.niem.gov>

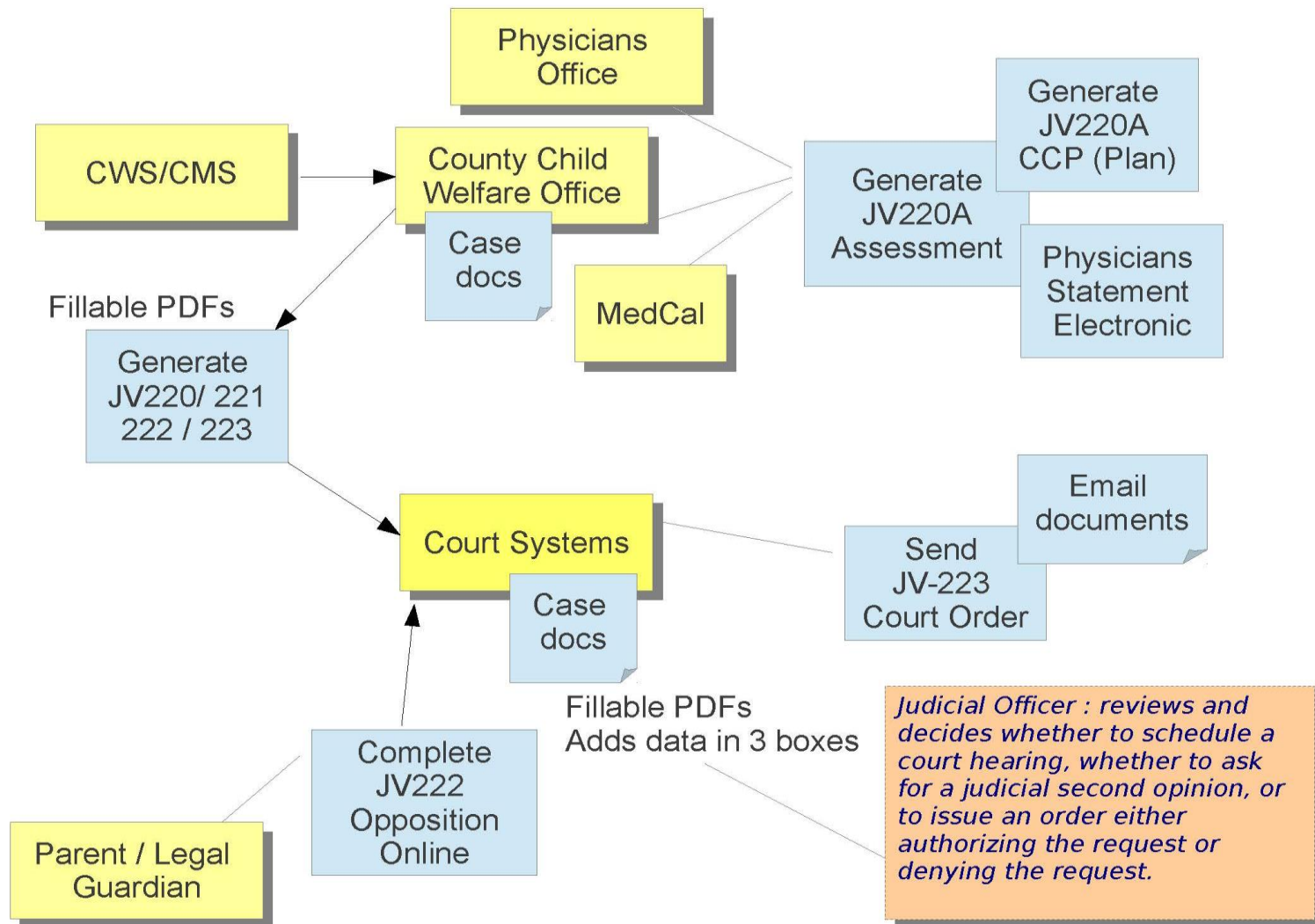
# Approach Overview

- Enable business information analysts to apply and manage policy profiles;
- Provide a clear separation between content and policy artifacts;
- Allow reuse of policies across content instances;
- Provide a clear declarative-assertions-based method, founded on policy approaches developed by the business rules technologies community;
- Leverage open software standards and tools.

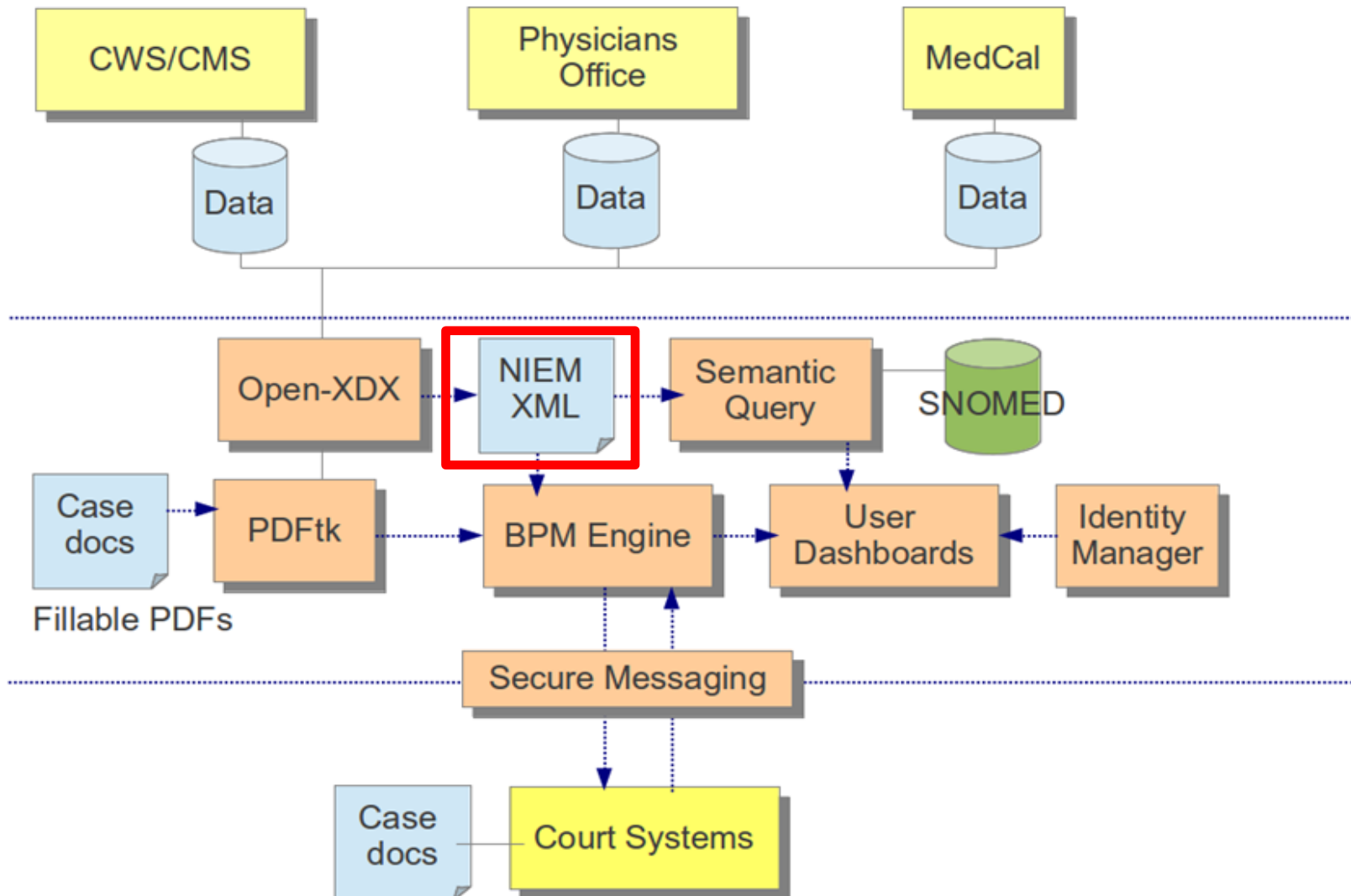
# Use Case Example

- California Child Welfare Services
  - Case Management and Case Court Submission
- Levels of information
  - HIPAA
  - Case Workers
  - Judge
  - Doctors
  - Parents / Guardians





# “To Be” Business Process Architecture



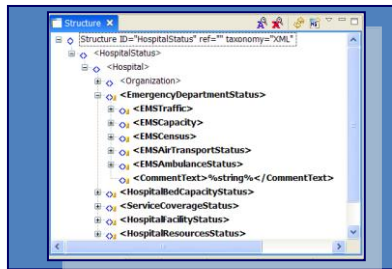
# XML and NIEM

- Court Report NIEM IEPD
- Existing XML Schema (XSD) of court report exchange structure
- Handles general court case reporting
- Need to tailor structure to California needs and medical child welfare case handling
- Map from existing California and physicians case management databases to NIEM XML

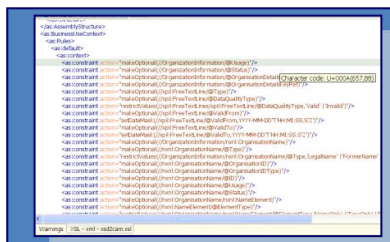
# Load Schema into Template

## OASIS CAM Template

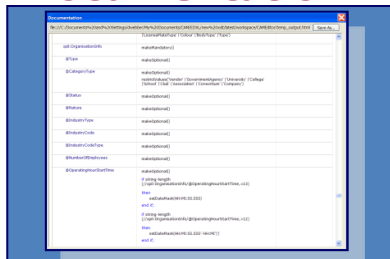
### Structure



### Rules



### Documentation

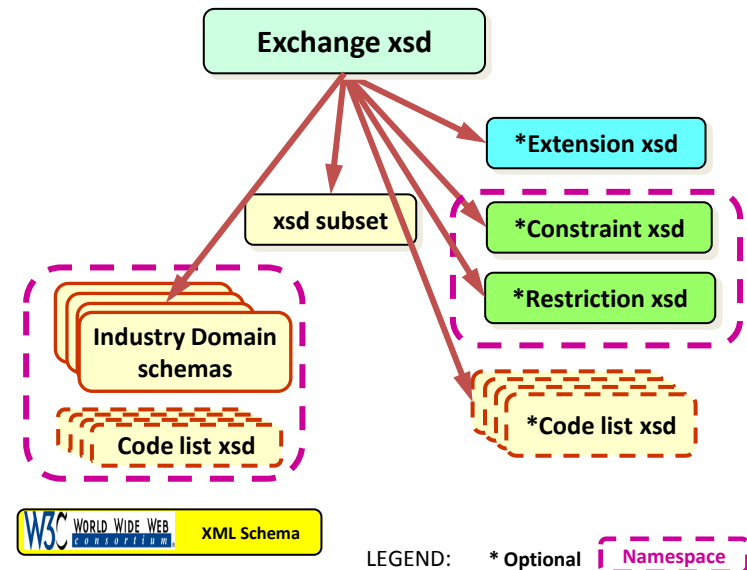


XSLT tools  
process  
entire XSD  
collection

INGEST

## NIEM Exchange Schema

### XSD Collection



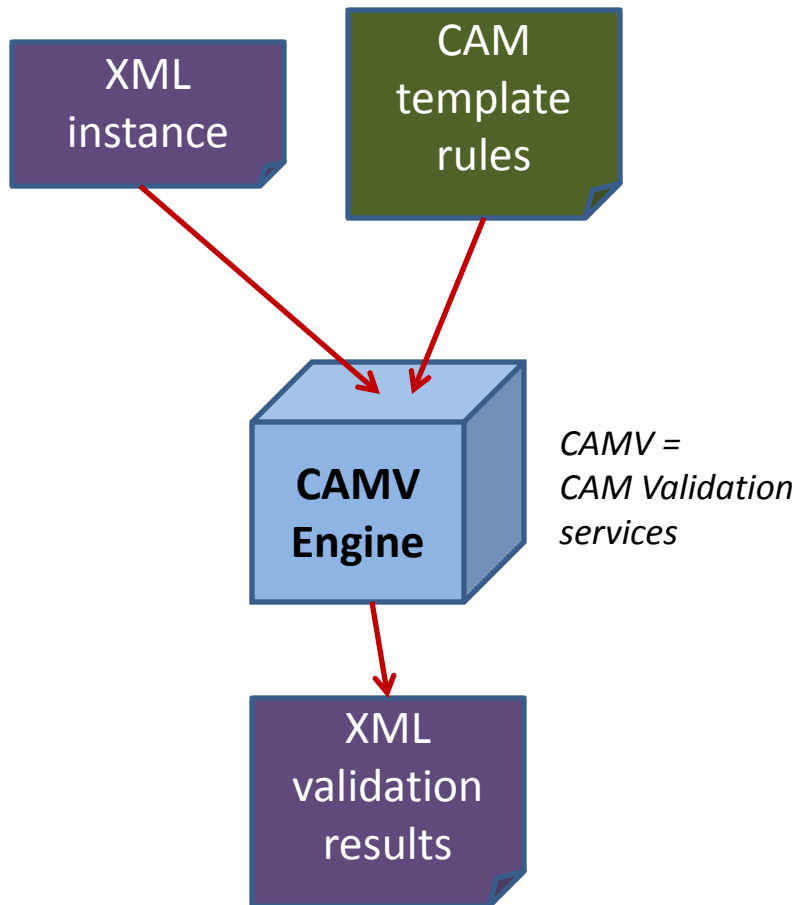
\*CAM – Content Assembly Mechanism – <http://www.cameditor.org>

# CAM Template Capabilities

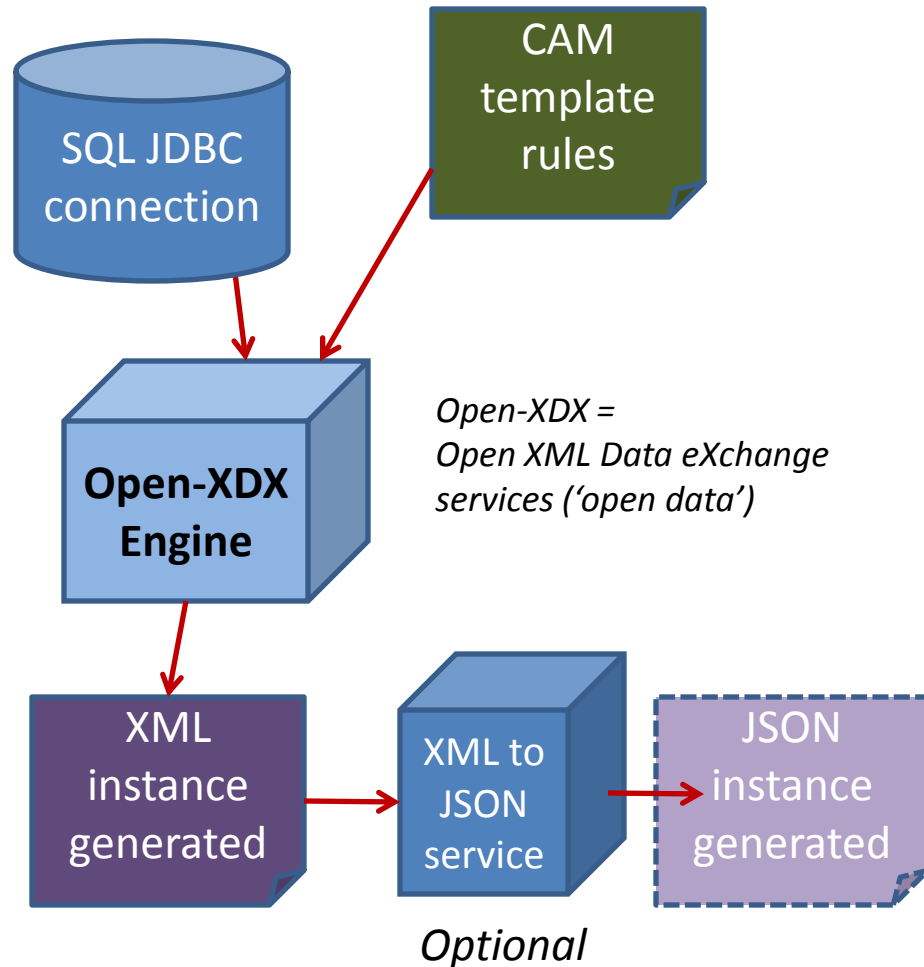
- Fine grained dynamic rule –based control of XML structure components and validation
- Template has separate sections for structure, rules and annotations allowing easy programmatic handling
- Mature full featured visual editor tool
- Supports rendering to models and visual maps
- Ability to generate XML instances and map to/from SQL data stores

# CAM Runtime Tools

## Validation Services



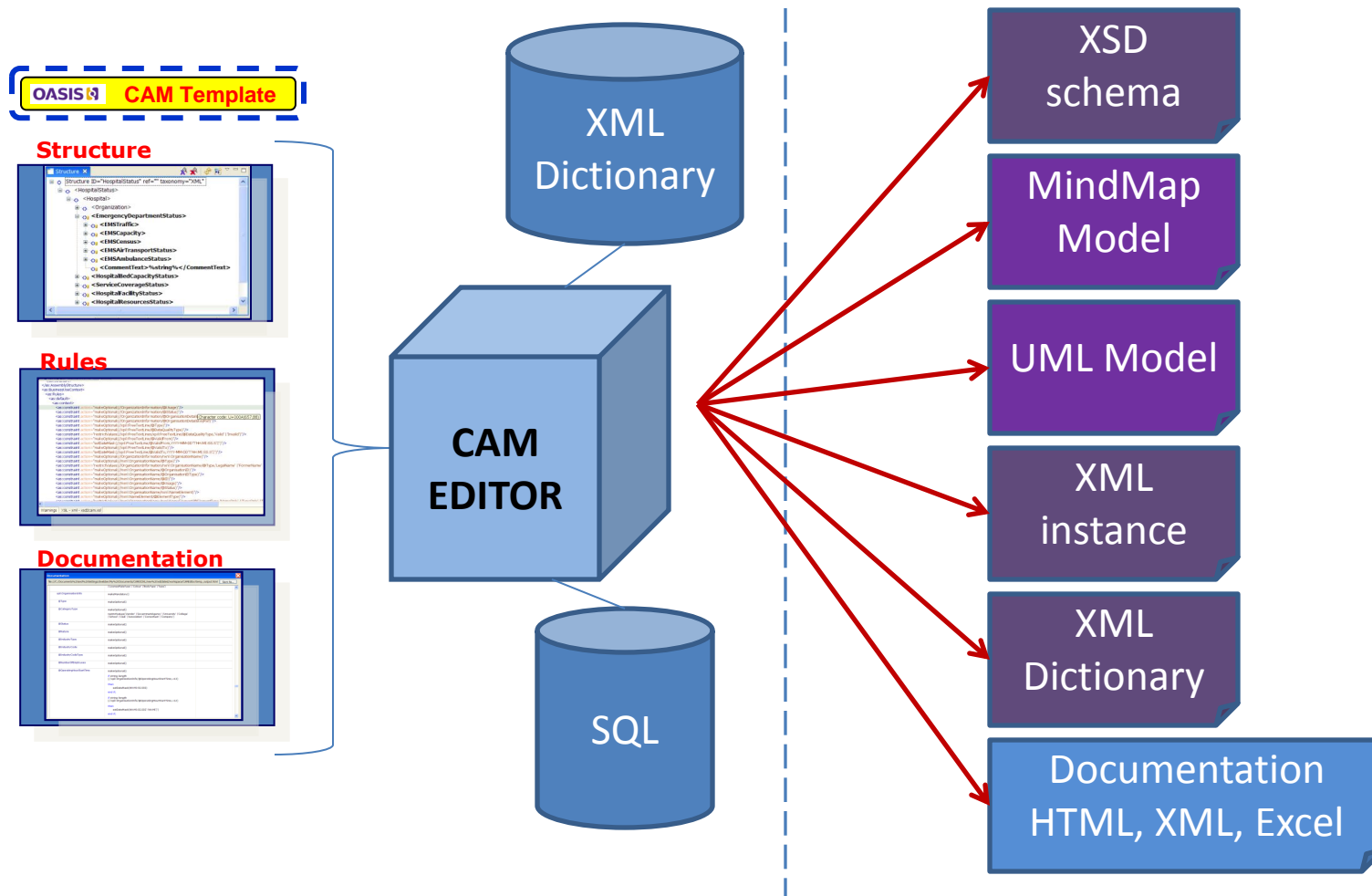
## Mapping Services / XML / JSON



# CAM Editor Tools

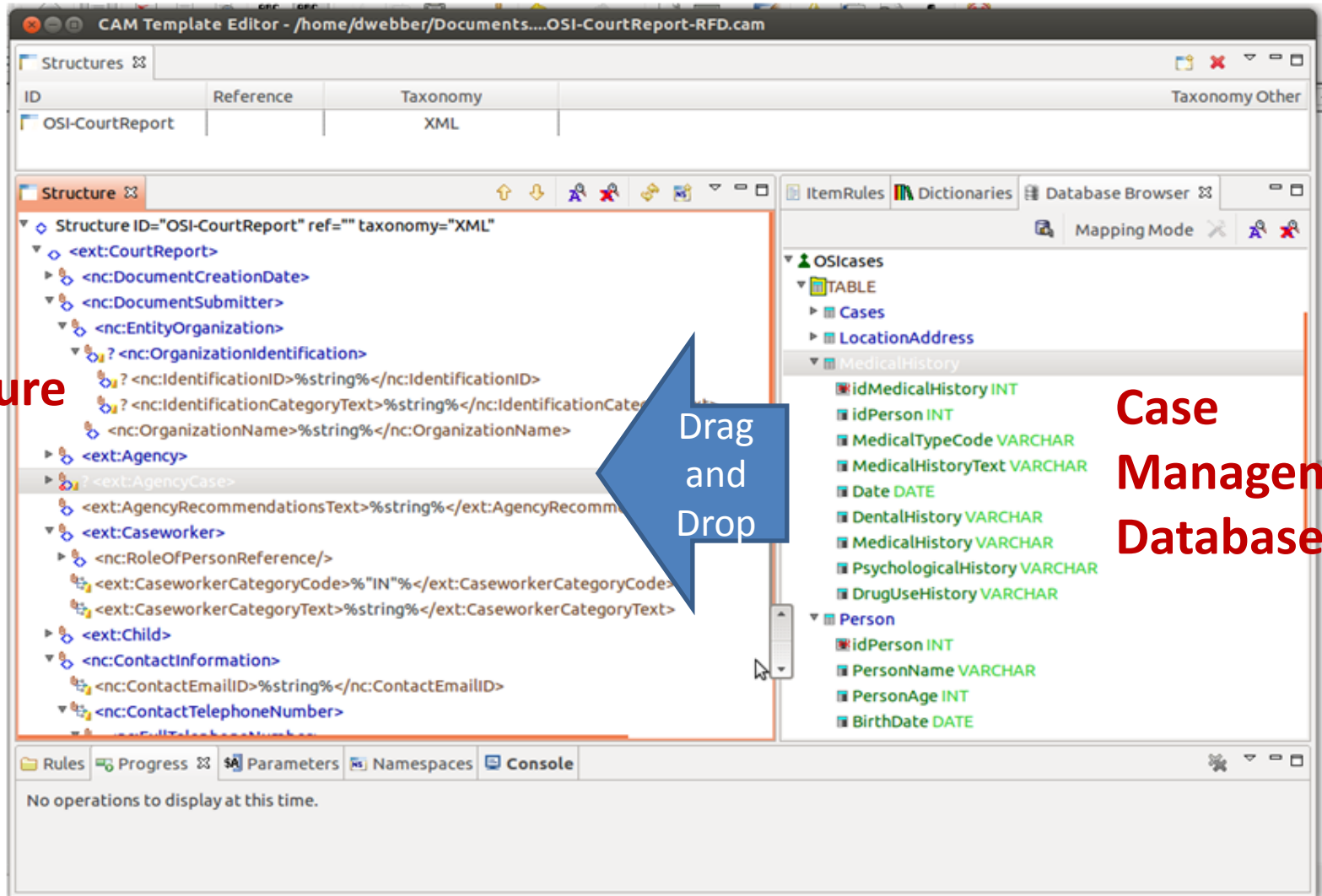
Editing / Dictionary / Mapping

Target Renderings (via XSLT transforms)



# Data Mapping Editor

NIEM  
XML  
Structure



The screenshot shows the CAM Template Editor interface. The top bar displays the file path: `/home/dwebber/Documents....OSI-CourtReport-RFD.cam`. The main workspace is divided into two panes. The left pane, titled "Structure", shows an XML structure for "OSI-CourtReport" with taxonomy "XML". It includes elements like `<ext:AgencyCase>`, `<ext:AgencyRecommendationsText>`, `<ext:Caseworker>`, `<nc:ContactInformation>`, and `<nc:ContactTelephoneNumber>`. The right pane, titled "Mapping Mode", shows a database schema with tables like `OSCases`, `Cases`, `LocationAddress`, `MedicalHistory`, and `Person`. A blue arrow points from the XML structure to the database schema, labeled "Drag and Drop".

Structure ID="OSI-CourtReport" ref="" taxonomy="XML"

Structure

- <ext:AgencyCase>
- <ext:AgencyRecommendationsText>%string%/</ext:AgencyRecommendationsText>
- <ext:Caseworker>
- <nc:ContactInformation>
- <nc:ContactTelephoneNumber>

Mapping Mode

OSCases

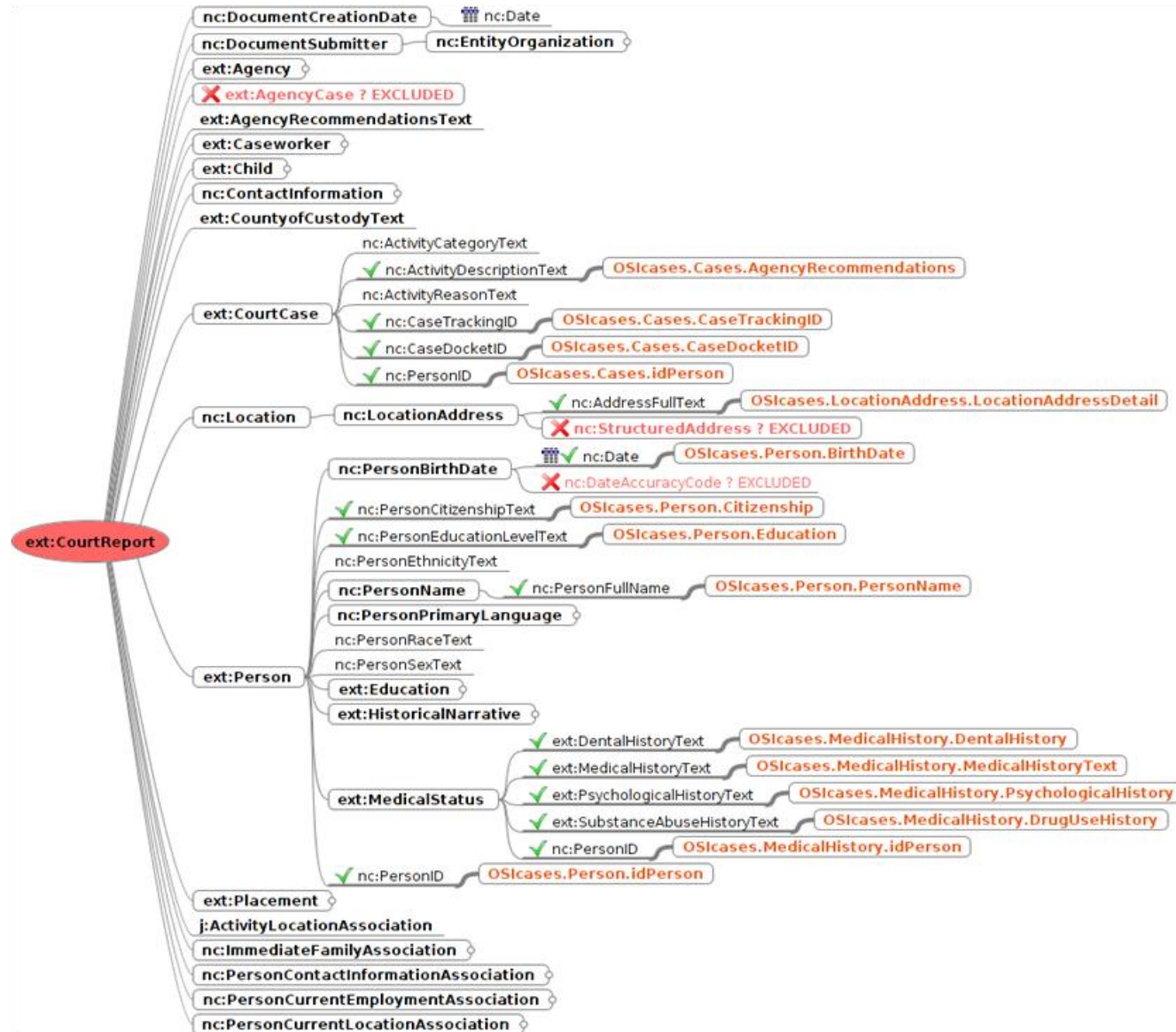
- Cases
- LocationAddress
- MedicalHistory
  - idMedicalHistory INT
  - idPerson INT
  - MedicalTypeCode VARCHAR
  - MedicalHistoryText VARCHAR
  - Date DATE
  - DentalHistory VARCHAR
  - MedicalHistory VARCHAR
  - PsychologicalHistory VARCHAR
  - DrugUseHistory VARCHAR
- Person
  - idPerson INT
  - PersonName VARCHAR
  - PersonAge INT
  - BirthDate DATE

Drag and Drop

Case  
Management  
Database



# Example Data Mapping



# Example NIEM XML

OSI-CourtReport-RFD-xdx.xml (~/.Documents/Oracle/OSI-RFD) - gedit

```
--><ext: CourtReport xmlns:ext="http://ncsc-childwelfare/CourtReport/1.0"
  xmlns:intel="http://niem.gov/niem/domains/intelligence/2.0"
  xmlns:j="http://niem.gov/niem/domains/jxdm/4.0"
  xmlns:nc="http://niem.gov/niem/niem-core/2.0"
  xmlns:s="http://niem.gov/niem/structures/2.0">
  <nc: DocumentCreationDate>
    <nc: Date>2013-06-13-04:00</nc: Date>
  </nc: DocumentCreationDate>
  <nc: DocumentSubmitter>
    <nc: EntityOrganization>
      <nc: OrganizationIdentification>
        <nc: IdentificationID>Medical</nc: IdentificationID>
      </nc: OrganizationIdentification>
      <nc: OrganizationName>OSI California Child Welfare Department</nc: OrganizationName>
    </nc: EntityOrganization>
  </nc: DocumentSubmitter>
  <ext: Agency>
    <nc: OrganizationIdentification>
      <nc: IdentificationID>Medical</nc: IdentificationID>
      <nc: IdentificationCategoryText>Child Welfare</nc: IdentificationCategoryText>
    </nc: OrganizationIdentification>
    <nc: OrganizationName>OSI California</nc: OrganizationName>
  </ext: Agency>
  <ext: AgencyRecommendationsText>This is a case that should be rapidly resolved by the court.</ext: AgencyRecommendationsText>
  <ext: Caseworker>
    <nc: RoleOfPersonReference/>
    <ext: CaseworkerCategoryCode>PE</ext: CaseworkerCategoryCode>
  </ext: Caseworker>
  <ext: Child>
    <nc: RoleOfPersonReference s:ref="CW24-890-1"/>
  </ext: Child>
  <nc: ContactInformation>
    <nc: ContactEmailID>casemanager@osi.ca.gov</nc: ContactEmailID>
  </nc: ContactInformation>
  <ext: CountyofCustodyText>St Annes County</ext: CountyofCustodyText>
  <ext: CourtCase>
    <nc: ActivityCategoryText>Emergency Court Petition</nc: ActivityCategoryText>
    <nc: ActivityDescriptionText>This case be referred to State from County</nc: ActivityDescriptionText>
    <nc: ActivityReasonText>Statutory Requirement</nc: ActivityReasonText>
    <nc: CaseTrackingID>1</nc: CaseTrackingID>
    <nc: CaseDocketID>20130620</nc: CaseDocketID>
    <nc: PersonID>1</nc: PersonID>
  </ext: CourtCase>
</ext: CourtReport>
```

Inserted text values

XML • Tab

# Grappling with Complexity

- Court Report Data Model
  - XSD structure is generalized “catch all” open content structure
- Issues and Resolutions
  - **Every** element is repeatable, optional, nillable !
  - **Replace** with actual real content usage rules:
    - Required, excluded, optional
    - Remove ALL nillable clauses
    - Use Repeatable only when applicable multiple data
  - **Map** to actual SQL database sources
  - **Ensure** consistent and simple information exchange

# Simple Solution

- Uses OASIS CAM Template
- Template Rules expressed using XPath assertions
  - **Layer 1** – actual content control rules
  - **Layer 2** – access policy rules
- Template policy role based XML filtering
  - HIPAA only content
  - Parent / Guardian content
  - Physician content

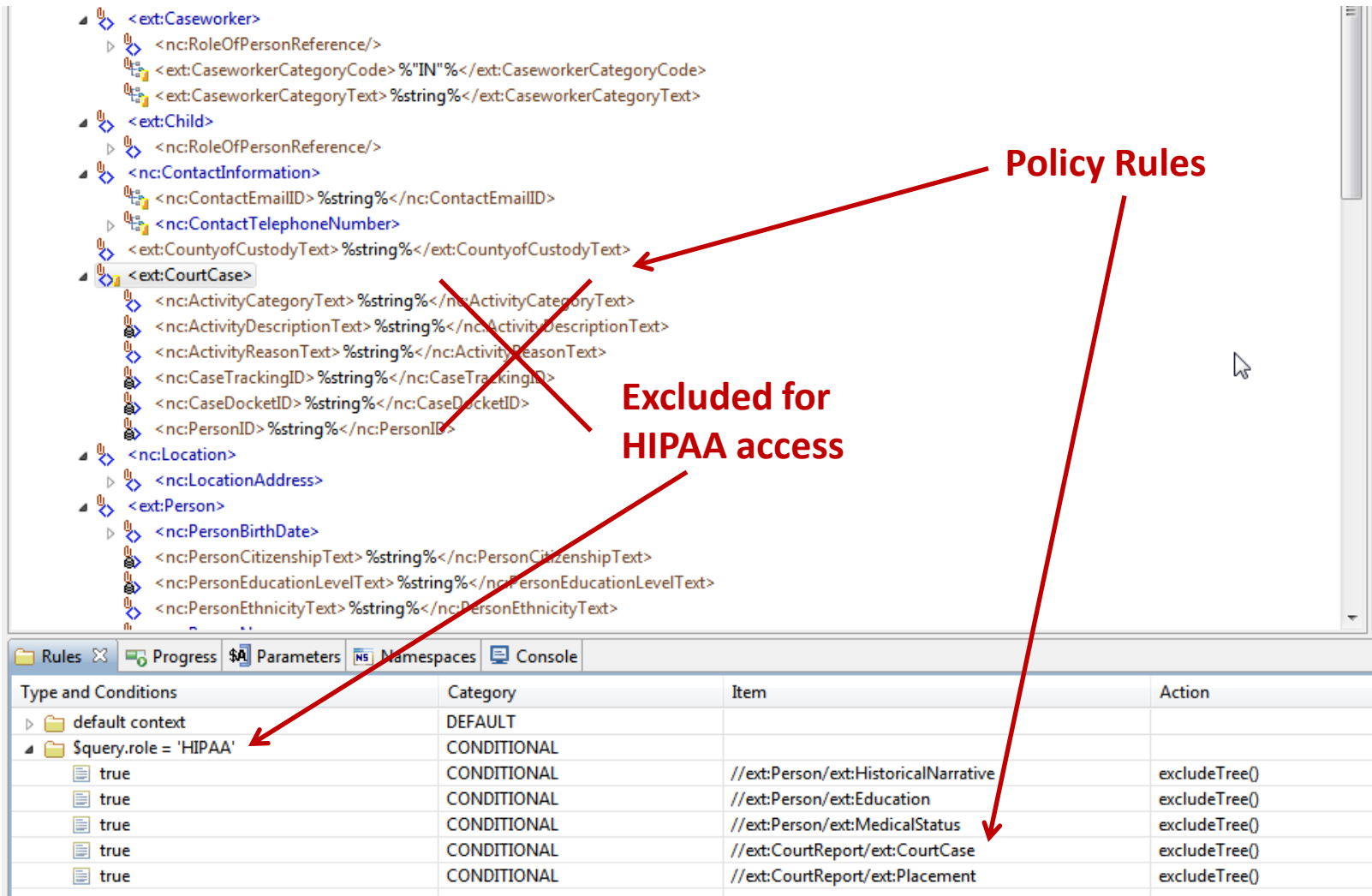
The screenshot shows the CAM Template Editor interface. The main window displays XML code for a template. Three red arrows point to specific parts of the code, each with a label:

- Content Rules:** Points to the `<as:documentation type="Definition">IN - Investigator |` line.
- Exclude item Rules:** Points to the `<as:constraint action="excludeTree"...` line.
- Make Optional Rules:** Points to the `<as:constraint action="makeOptional"...` line.

The XML code is as follows:

```
</as:AssemblyStructure>
<as:BusinessUseContext>
  <as:Rules>
    <as:default>
      <as:context>
        <as:constraint
          action="makeOptional" (//ext:AgencyCase/nc:ActivityCategoryText) "/>
        <as:constraint
          action="restrictValues" (//ext:Caseworker/ext:CaseworkerCategoryCode, 'IN' | 'AD' | 'PE' | 'ON' | 'SU') ">
        <as:annotation>
          <as:documentation
            type="Definition">IN - Investigator |
            AD - Adoption |
            PE - Permanency |
            ON - Ongoing |
            SU - Supervisor |
          </as:documentation>
        </as:annotation>
      </as:constraint>
      <as:constraint
        action="excludeTree" (//ext:CourtReport/ext:AgencyCase) "/>
      <as:constraint
        action="makeOptional" (//ext:CourtReport/ext:AgencyCase) "/>
      <as:constraint
        condition="string-length(.) <11"
        action="setDateMask" (//nc:DocumentCreationDate/nc:Date, YYYY-MM-DD) "/>
      <as:constraint
        condition="string-length(.) >10"
        action="setDateMask" (//nc:DocumentCreationDate/nc:Date, YYYY-MM-DDZ) "/>
      <as:constraint
        action="datatype" (//nc:EmployeeReference/@s:ref, IDREF) "/>
      <as:constraint
        action="makeOptional" (//nc:EmployeeReference/@s:ref) "/>
      <as:constraint
        action="makeOptional" (//nc:EntityOrganization/nc:OrganizationIdentification) "/>
      <as:constraint
        action="makeOptional" (//nc:FullTelephoneNumber/nc:TelephoneNumberFullID) "/>
      <as:constraint
        action="makeOptional" (//nc:FullTelephoneNumber/nc:TelephoneNumberSuffixID) "/>
      <as:constraint
        action="makeOptional" (//nc:ImmediateFamilyAssociation/nc:FamilyKinshipCode) "/>
      <as:constraint
        action="makeOptional" (//nc:ImmediateFamilyAssociation/nc:FamilyKinshipText) "/>
      <as:constraint
        action="makeOptional" (//nc:ImmediateFamilyAssociation/nc:PersonChildReference) "/>
      <as:constraint
        action="makeOptional" (//nc:ImmediateFamilyAssociation/nc:PersonParentReference) "/>
      <as:constraint
        action="excludeTree" (//nc:LocationAddress/nc:StructuredAddress) "/>
      <as:constraint
        action="makeOptional" (//nc:LocationAddress/nc:StructuredAddress) "/>
      <as:constraint
        action="datatype" (//nc:LocationReference/@s:ref, IDREF) "/>
    </as:default>
  </as:Rules>
</as:BusinessUseContext>
</as:AssemblyStructure>
```

# Layer 2 - Policy / Role Rules



**Policy Rules**

**Excluded for HIPAA access**

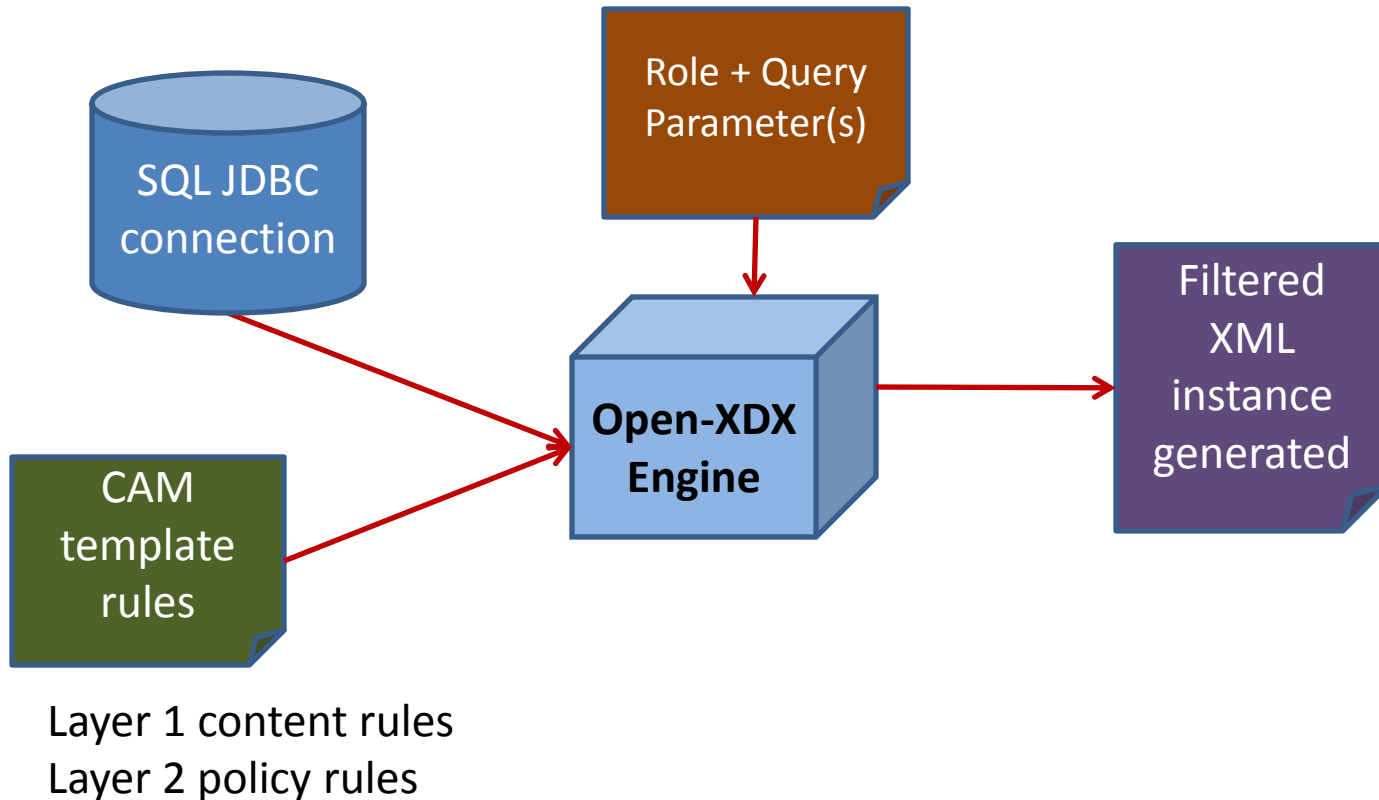
```

<ext:Caseworker>
  <nc:RoleOfPersonReference/>
  <ext:CaseworkerCategoryCode> %"IN"% </ext:CaseworkerCategoryCode>
  <ext:CaseworkerCategoryText> %string% </ext:CaseworkerCategoryText>
</ext:Caseworker>
<ext:Child>
  <nc:RoleOfPersonReference/>
</ext:Child>
<nc:ContactInformation>
  <nc:ContactEmailID> %string% </nc:ContactEmailID>
  <nc:ContactTelephoneNumber>
    <ext:CountyofCustodyText> %string% </ext:CountyofCustodyText>
  </nc:ContactTelephoneNumber>
</nc:ContactInformation>
<ext:CourtCase>
  <nc:ActivityCategoryText> %string% </nc:ActivityCategoryText>
  <nc:ActivityDescriptionText> %string% </nc:ActivityDescriptionText>
  <nc:ActivityReasonText> %string% </nc:ActivityReasonText>
  <nc:CaseTrackingID> %string% </nc:CaseTrackingID>
  <nc:CaseDocketID> %string% </nc:CaseDocketID>
  <nc:PersonID> %string% </nc:PersonID>
</ext:CourtCase>
<nc:Location>
  <nc:LocationAddress>
    <ext:Person>
      <nc:PersonBirthDate>
        <nc:PersonCitizenshipText> %string% </nc:PersonCitizenshipText>
        <nc:PersonEducationLevelText> %string% </nc:PersonEducationLevelText>
        <nc:PersonEthnicityText> %string% </nc:PersonEthnicityText>
      </nc:PersonBirthDate>
    </ext:Person>
  </nc:LocationAddress>
</nc:Location>
  
```

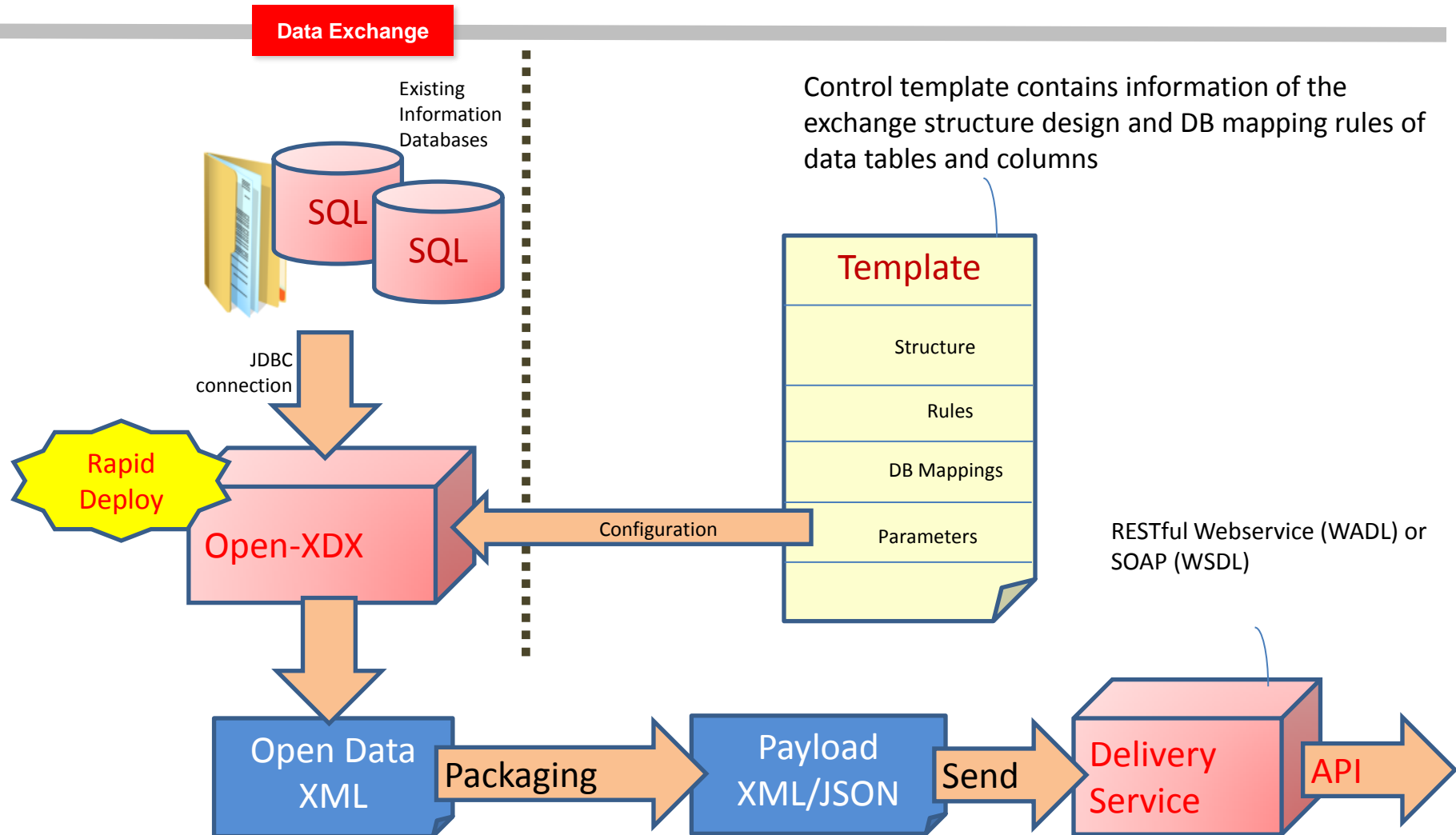
Type and Conditions	Category	Item	Action
default context	DEFAULT		
\$query.role = 'HIPAA'	CONDITIONAL		
true	CONDITIONAL	//ext:Person/ext:HistoricalNarrative	excludeTree()
true	CONDITIONAL	//ext:Person/ext:Education	excludeTree()
true	CONDITIONAL	//ext:Person/ext:MedicalStatus	excludeTree()
true	CONDITIONAL	//ext:CourtReport/ext:CourtCase	excludeTree()
true	CONDITIONAL	//ext:CourtReport/ext:Placement	excludeTree()



# Open-XDX Runtime

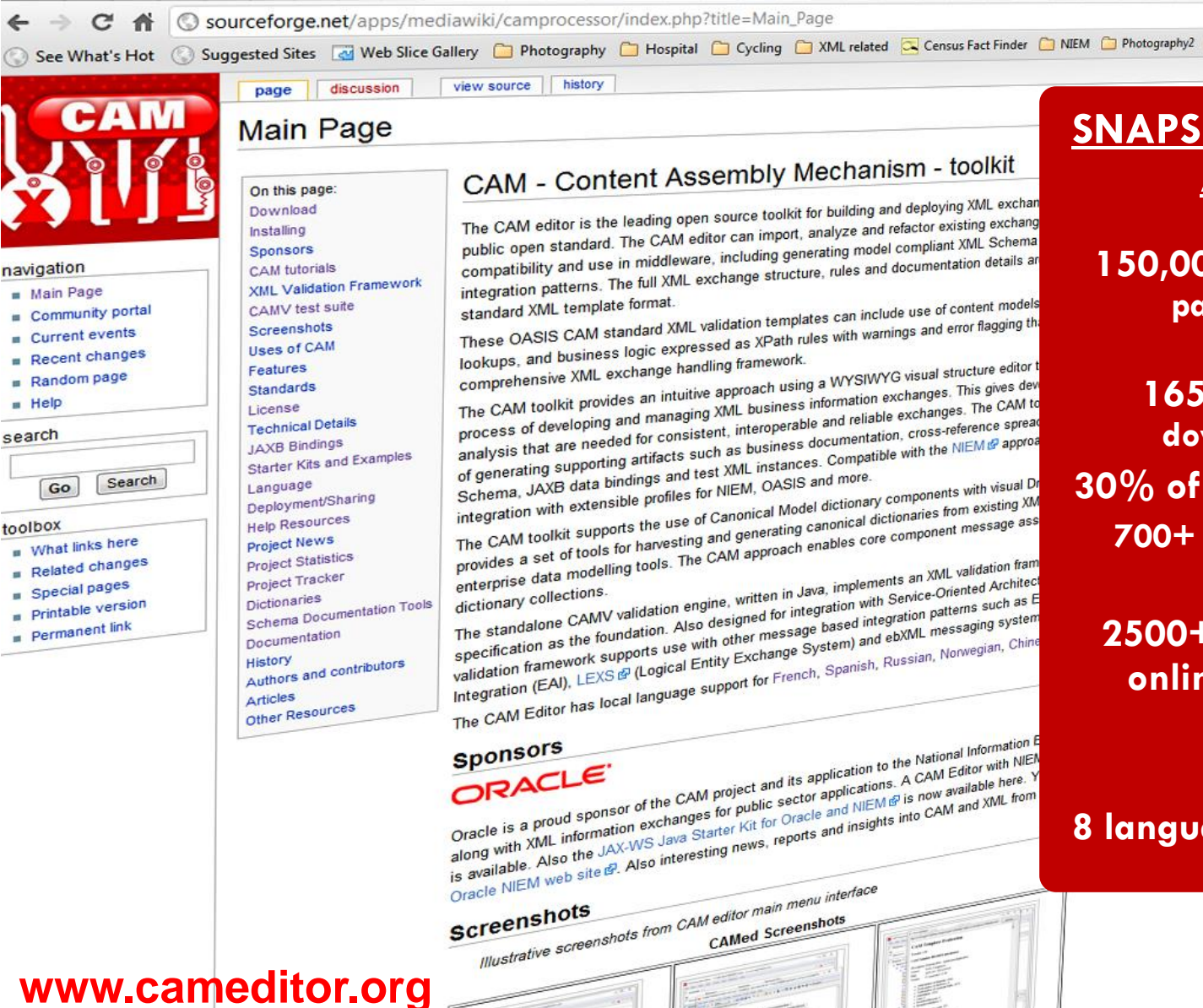


# Open XDX - Conceptual Architecture





# CAMeditor.org Project



The screenshot shows the CAMeditor.org website. The browser address bar displays [sourceforge.net/apps/mediawiki/camprocessor/index.php?title=Main\\_Page](http://sourceforge.net/apps/mediawiki/camprocessor/index.php?title=Main_Page). The page title is "Main Page". The left sidebar contains a "CAM" logo, a "navigation" menu with links like "Main Page", "Community portal", "Current events", "Recent changes", "Random page", and "Help", a "search" box, and a "toolbox" with links like "What links here", "Related changes", "Special pages", "Printable version", and "Permanent link". The main content area has tabs for "page", "discussion", "view source", and "history". The "Main Page" content includes a section "On this page:" with links like "Download", "Installing", "Sponsors", "CAM tutorials", "XML Validation Framework", "CAMV test suite", "Screenshots", "Uses of CAM", "Features", "Standards", "License", "Technical Details", "JAXB Bindings", "Starter Kits and Examples", "Language", "Deployment/Sharing", "Help Resources", "Project News", "Project Statistics", "Project Tracker", "Dictionaries", "Schema Documentation Tools", "Documentation", "History", "Authors and contributors", "Articles", and "Other Resources". Below this is a section "CAM - Content Assembly Mechanism - toolkit" with text describing the CAM editor as a leading open source toolkit for building and deploying XML exchange public open standard. It mentions that the CAM editor can import, analyze and refactor existing exchange compatibility and use in middleware, including generating model compliant XML Schema integration patterns. The full XML exchange structure, rules and documentation details are in standard XML template format. It also mentions that these OASIS CAM standard XML validation templates can include use of content models lookups, and business logic expressed as XPath rules with warnings and error flagging the comprehensive XML exchange handling framework. The CAM toolkit provides an intuitive approach using a WYSIWYG visual structure editor to process of developing and managing XML business information exchanges. This gives developers analysis that are needed for consistent, interoperable and reliable exchanges. The CAM tool of generating supporting artifacts such as business documentation, cross-reference spread Schema, JAXB data bindings and test XML instances. Compatible with the NIEM approach integration with extensible profiles for NIEM, OASIS and more. The CAM toolkit supports the use of Canonical Model dictionary components with visual Dr provides a set of tools for harvesting and generating canonical dictionaries from existing XM enterprise data modelling tools. The CAM approach enables core component message ass dictionary collections. The standalone CAMV validation engine, written in Java, implements an XML validation fram specification as the foundation. Also designed for integration with Service-Oriented Architect validation framework supports use with other message based integration patterns such as E Integration (EAI), LEXS (Logical Entity Exchange System) and ebXML messaging system. The CAM Editor has local language support for French, Spanish, Russian, Norwegian, Chinese. Below this is a "Sponsors" section with the ORACLE logo and text stating that Oracle is a proud sponsor of the CAM project and its application to the National Information Exchange along with XML information exchanges for public sector applications. A CAM Editor with NIEM is available. Also the JAX-WS Java Starter Kit for Oracle and NIEM is now available here. Y Oracle NIEM web site. Also interesting news, reports and insights into CAM and XML from. At the bottom, there is a "Screenshots" section with the text "Illustrative screenshots from CAM editor main menu interface" and "CAMed Screenshots" followed by several small thumbnail images of the CAM editor interface.

## SNAPSHOT OF PROJECT ACTIVITIES

**150,000+ CAMeditor.org page visits to site**

**165+ countries have downloaded tools;**

**30% of visitors are from U.S.;  
700+ downloads weekly**

**2500+ student views of online video training resources**

**8 languages now available**

[www.cameditor.org](http://www.cameditor.org)

[www.niemtrainingvideos.org](http://www.niemtrainingvideos.org)

# Option – Semantic Querying

- Need to know what precisely a medication does that is referenced in patient records
- Obtain classification codes from NIH Master Drug database of generic and named  
<http://www.nlm.nih.gov/research/umls/sourcereleasedocs/current/MDDDB/>
- SNOMED semantic clinical terms repository (RDF)  
<http://www.nlm.nih.gov/research/umls/licensedcontent/snomedctfiles.html>
- Instantiate RDF/OWL store in Oracle database with SPARQL lookup of drug classification details
- Lookup drug name, obtain master code, then reference SNOMED, return set of medical details; notice many drugs have multiple purposes.

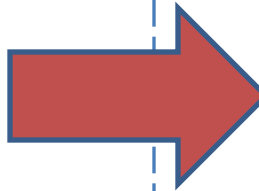
# Implementation Strategy

- Step 1 - Load SNOMED ontology into Oracle Semantic RDF Graph
- Step 2 - Perform OWL logical inference in Oracle database
- Step 3 – Semantically Analyze the XML input (Java)
  - Take the input XML, parse the XML and locate the **PatientDrugInfo** content in the XML
  - Perform Text search to find matching URIs for the given patient drug information (NIH master drug catalogue)
  - Perform Semantic search using SPARQL queries to find relevant concepts (following class hierarchy) in the SNOMED ontology (asserted + inferred)
  - Enrich the PatientDrugInfo text field with all the additional information found
- Step 4 - Return the XML back

# Semantic Enhancement

## Input XML Instance

```
<pmix:PMPRequest xmlns:nc="http://niem.gov/niem/niem-core/2.0"
  xmlns:pmix="http://xml.ijs.org/niem/2.0/"
  xmlns:pmp="http://xml.ijs.org/niem/2.0/extension">
  <pmp:RequestPrescriptionDateRange>
    <pmp:RequestPrescriptionDateRangeBegin>2001-11-26-
05:00</pmp:RequestPrescriptionDateRangeBegin>
    <pmp:RequestPrescriptionDateRangeEnd>2012-11-26-
05:00</pmp:RequestPrescriptionDateRangeEnd>
  </pmp:RequestPrescriptionDateRange>
  <pmp:RequestPatient>
    <nc:PersonBirthDate>
      <nc:Date>1993-10-11</nc:Date>
    </nc:PersonBirthDate>
    <nc:PersonName>
      <nc:PersonGivenName>WILLIAM</nc:PersonGivenName>
      <nc:PersonMiddleName>T</nc:PersonMiddleName>
      <nc:PersonSurName>JONES</nc:PersonSurName>
    </nc:PersonName>
    <nc:PersonSexCode>M</nc:PersonSexCode>
    <nc:PersonSSNIdentification>
      <nc:IdentificationID>234-55-4419</nc:IdentificationID>
      <nc:IdentificationJurisdictionText>SSN</nc:IdentificationJurisdictionText>
    </nc:PersonSSNIdentification>
    <nc:PatientDrugInfo>Desloratadine tablet 3mg</nc:PatientDrugInfo>
  </pmp:RequestPatient>
</pmix:PMPRequest>
```



## Output XML Results

```
<pmix:PMPRequest xmlns:pmix="http://xml.ijs.org/niem/2.0/"
  xmlns:nc="http://niem.gov/niem/niem-core/2.0"
  xmlns:pmp="http://xml.ijs.org/niem/2.0/extension">
  <pmp:RequestPrescriptionDateRange>
    <pmp:RequestPrescriptionDateRangeBegin>2001-11-26-
05:00</pmp:RequestPrescriptionDateRangeBegin> ...
  <nc:PatientDrugInfo>
    Desloratadine tablet 3mg
    match[0] sn:SCTID_134508009
    Desloratadine 5mg tablet (product) score= 65.0 general concepts {
      sn:SCTID_134506008 (Desloratadine (product))
      sn:SCTID_6425004 (Antihistamine (product))
      sn:SCTID_373873005 (Pharmaceutical / biologic product (product))
      sn:SCTID_440131009 (Oral dosage form product (product))
      sn:SCTID_349956006 (Non-sedating antihistamine (product))
      sn:SCTID_135394005 (Antiallergenic drugs (product))
      sn:SCTID_138875005 (SNOMED CT Concept (SNOMED RT+CTV3))
    }
    match[1] sn:SCTID_321591001
    Risperidone 3mg tablet (product) score= 65.0 general concepts {
      sn:SCTID_407748006 (Oral form risperidone (product))
      sn:SCTID_373873005 (Pharmaceutical / biologic product (product))
      sn:SCTID_10784006 (Anti-psychotic agent (product))
      sn:SCTID_46063005 (Psychotherapeutic agent (product))
      sn:SCTID_108385001 (Benzisoxazole derivative antipsychotic agent
(product))
      sn:SCTID_138875005 (SNOMED CT Concept (SNOMED RT+CTV3))
      sn:SCTID_440131009 (Oral dosage form product (product))
      sn:SCTID_321087001 (CNS drug (product))
      sn:SCTID_358927005 (Mood stabilizing drug (product))
      sn:SCTID_108386000 (Risperidone (product))
    }
  </nc:PatientDrugInfo>
  </pmp:RequestPatient>
</pmix:PMPRequest>
```

# Summary

- Shown how to build a simple approach
- Rules and Policy are independent of content
- Leverage open software standards and tools
- Providing resources and tools
- Deliver dynamic policy driven open data exchange with XML or JSON
- Option to include semantic enhancement

# Q & A

- Questions?
- Resources:
  - <http://www.cameditor.org>
  - <http://www.VerifyXML.org>
  - <http://www.niem.gov>
  - <http://www.niemtrainingvideos.org>