

FHIM MDA Implementation Modeling Process Guide

Developing Standard-specific
Implementation Guide for Health IT



**Office of the National Coordinator for
Health IT**

**Federal Health Architecture
Program Management Office**

**FHA Federal Health Information Model
(FHIM)
Model-Driven Architecture (MDA)
Implementation Modeling Process Guide**

<https://www.projects.openhealthtools.org/sf/projects/fhims/>

Version 0.2

Draft, as of August 8, 2013



FHIM Implementation

- Model-driven approach
 - The model is the basis for generating
 - Ballot documentation
 - Software libraries for creating/parsing, validating constraints
 - Reference implementation (i.e.
- Modeling implementation guides based on interoperability use cases
 - One IG model may be used to create multiple Platform-specific IG artifacts
 - NIEM-based IEPD
 - CDA R2 IG

Implementation Guide Models based on FHIM

Implementation Guide Model: containing the use cases for interoperability and a profile model:

1. Use Case Package

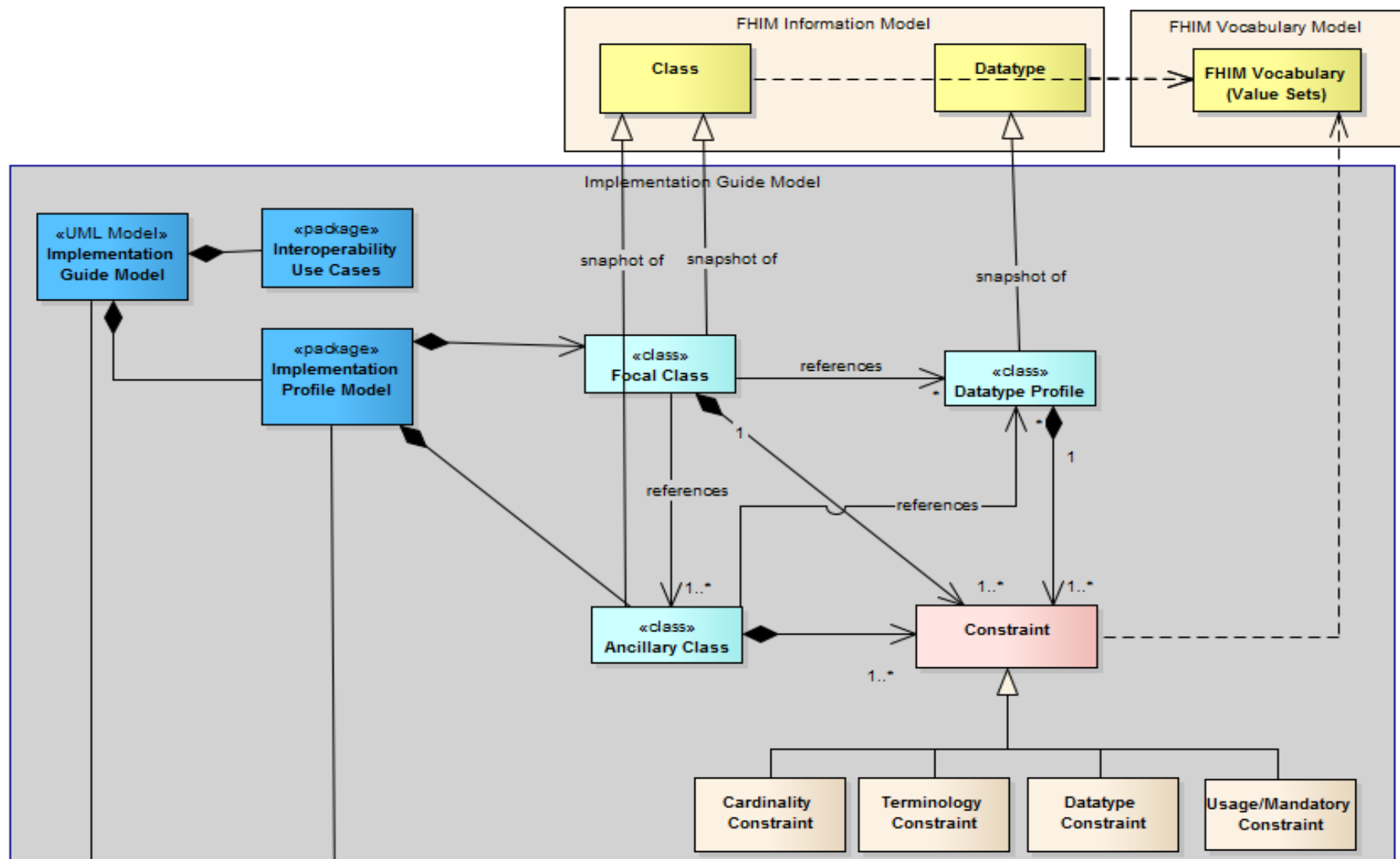
- Interoperability Use case descriptions including pre- and post-conditions for information exchanges.
 - The use case may identify a specific type of business objects that are involved in the exchange (e.g. Patient, Encounter, Sample, Order, and Observation Result).
- Identified human and system actors involved in information exchanges. The systems actors may represent specific types of system. An EHR system may play one or more roles in an interoperability use case

Implementation Guide Models based on FHIM - continued

Implementation Guide Model: containing the use cases for interoperability and a profile model:

2. Implementation Profile Model Package

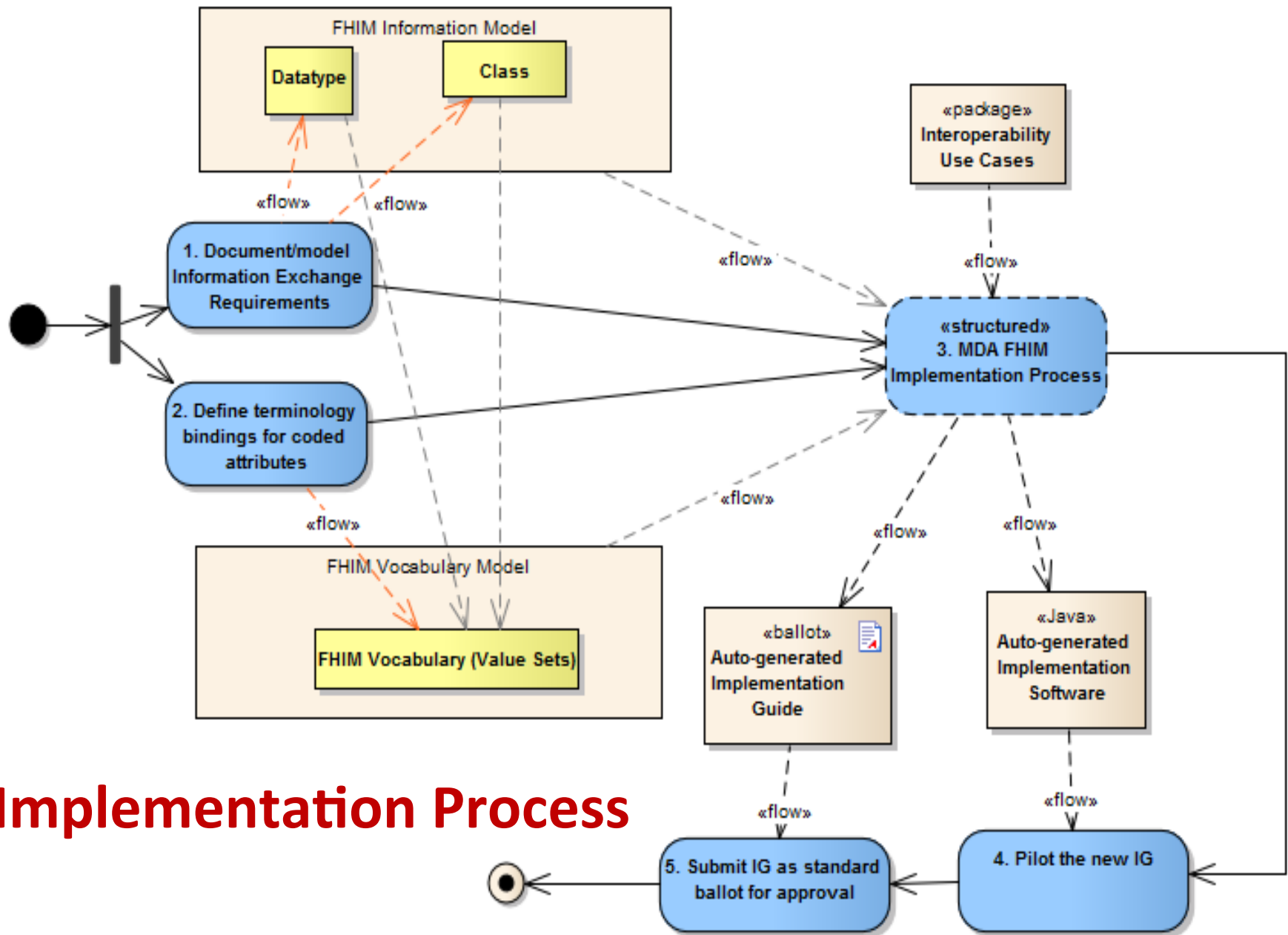
- Snapshots/copies of FHIM classes including:
 - Focal class(es) corresponding to the focal objects that are the subject of interoperability (e.g. Patient, Encounter, Sample, Order, Observation Result). Related classes that supply context to the focal objects (e.g. target records, author, custodian, ordering provider, etc.)
 - Including PSM-specific annotations for code generation. This tooling guidance should be added to the original FHIM classes and reused
- Constraints applied to the classes, associations and attributes in the model including:
 - Semantic clarifications
 - Cardinality constraints for associations and attributes
 - Usage/mandatory constraints for associations and attributes
 - Terminology and fixed value constraints (these constraints apply to attributes only)



Implementation Guide Modeling Artifacts

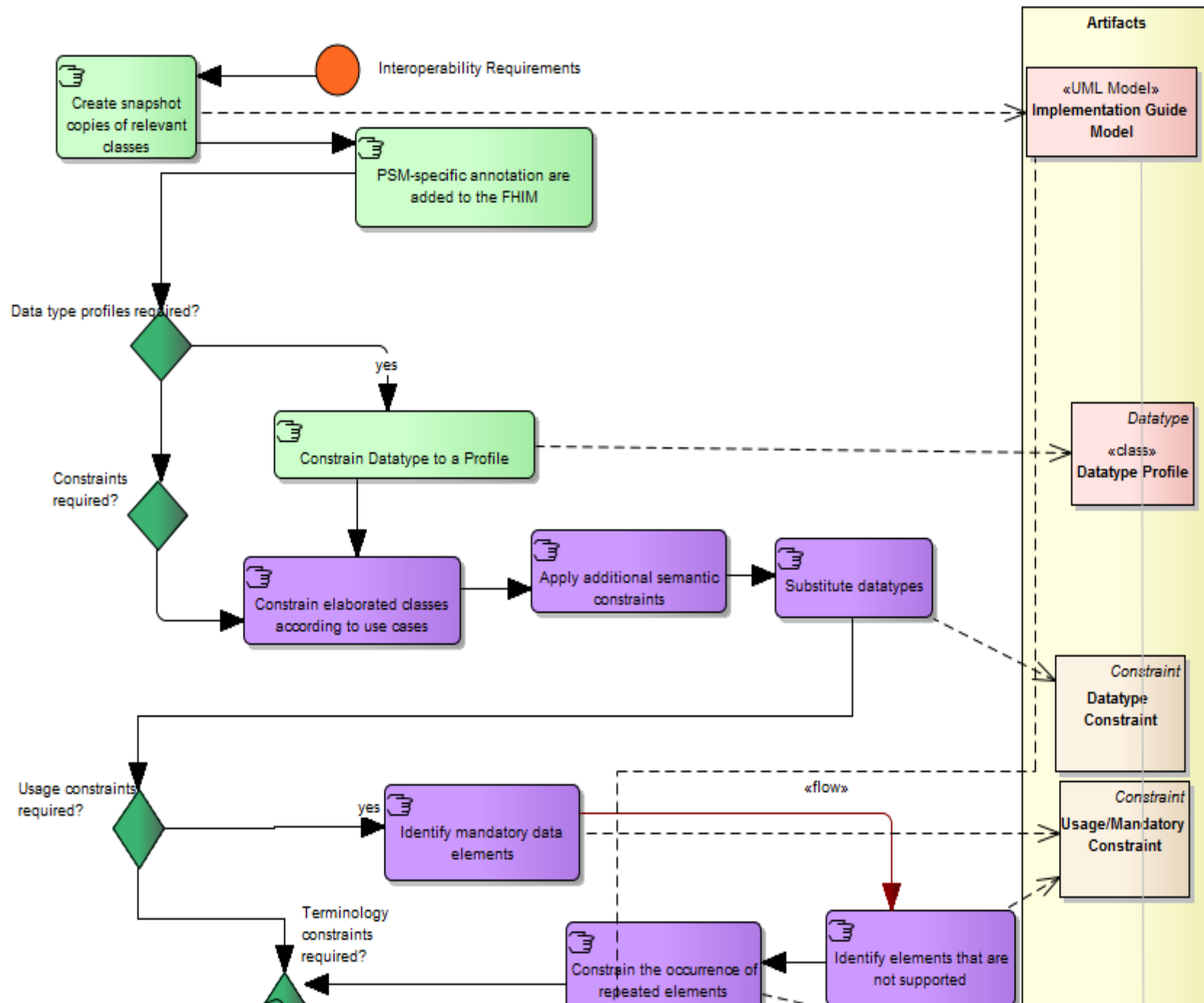
IG models

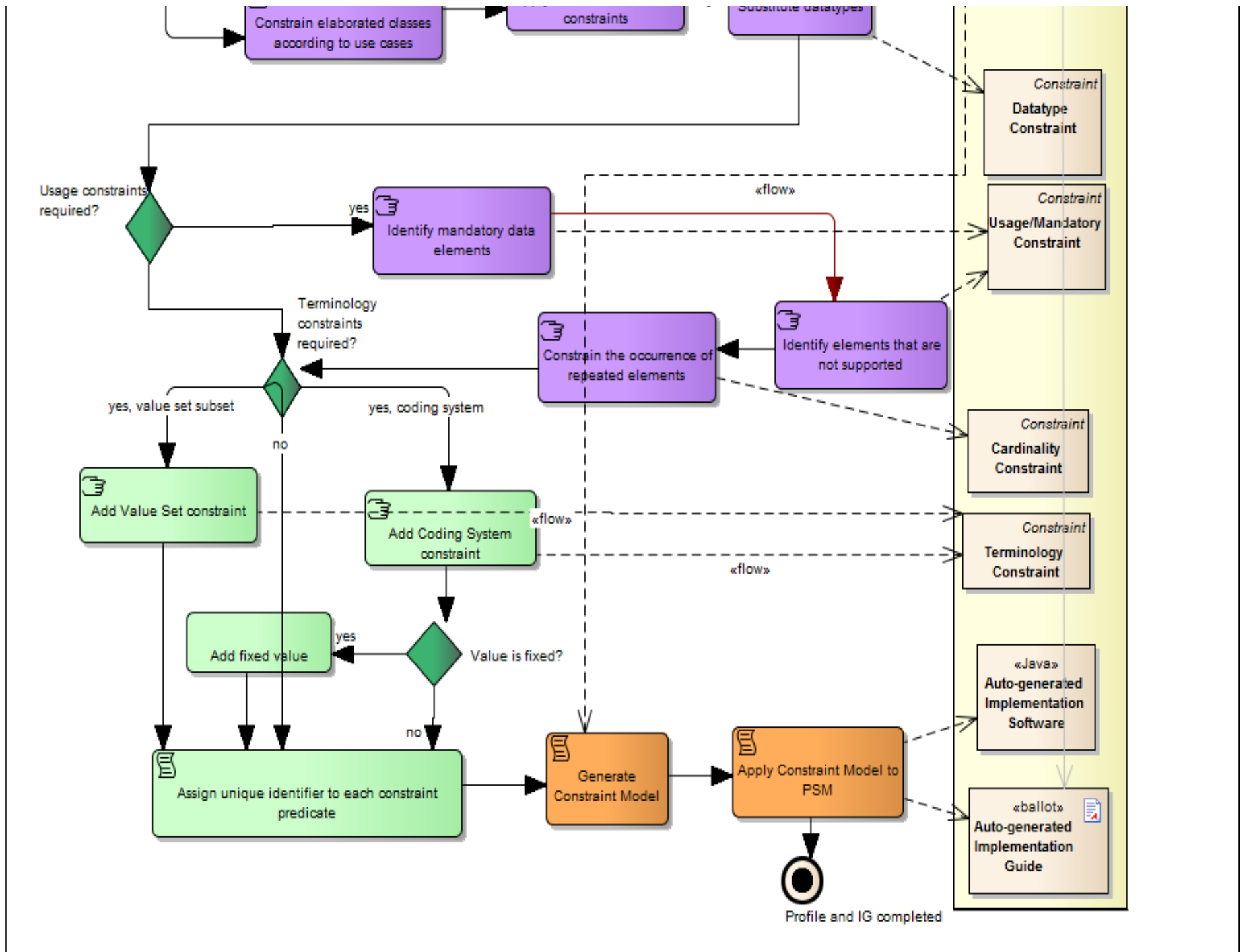
- Isolate the data required to implement one or more specific interoperability use cases
- Identify the constraints applied to FHIM
- Refers to the FHIM vocabulary
 - Value sets
 - Identified coding system



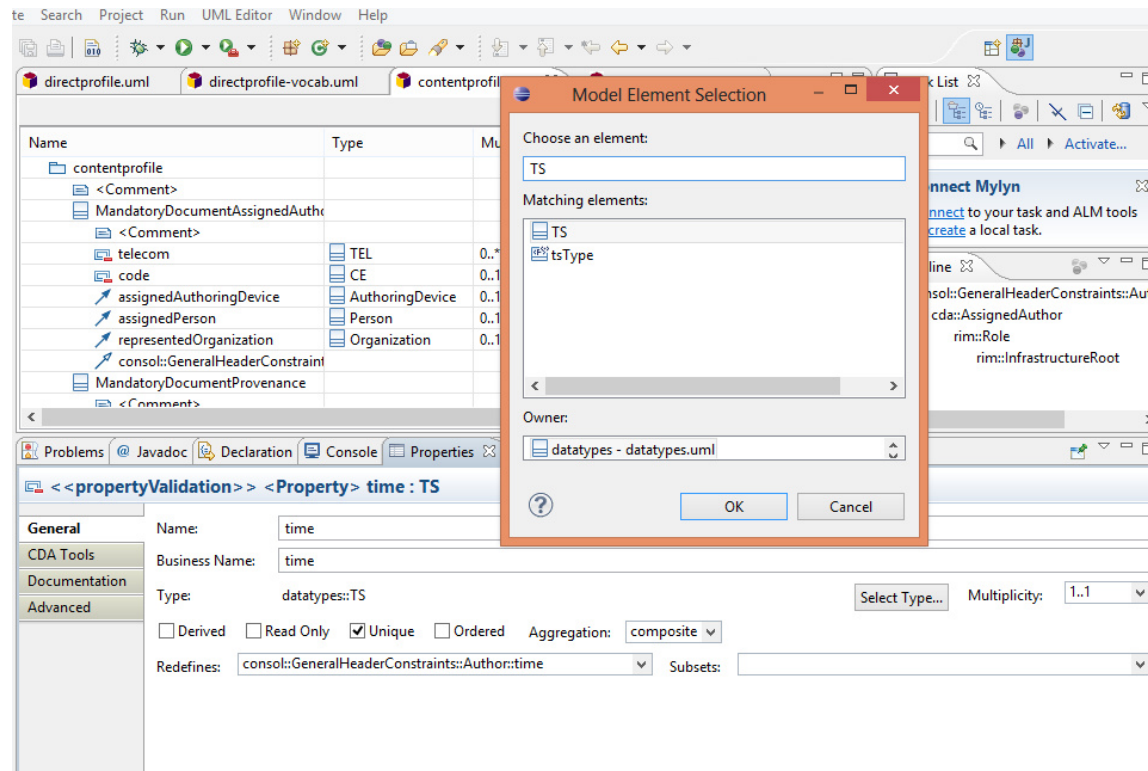
Implementation Process

Business Process Implementation Process

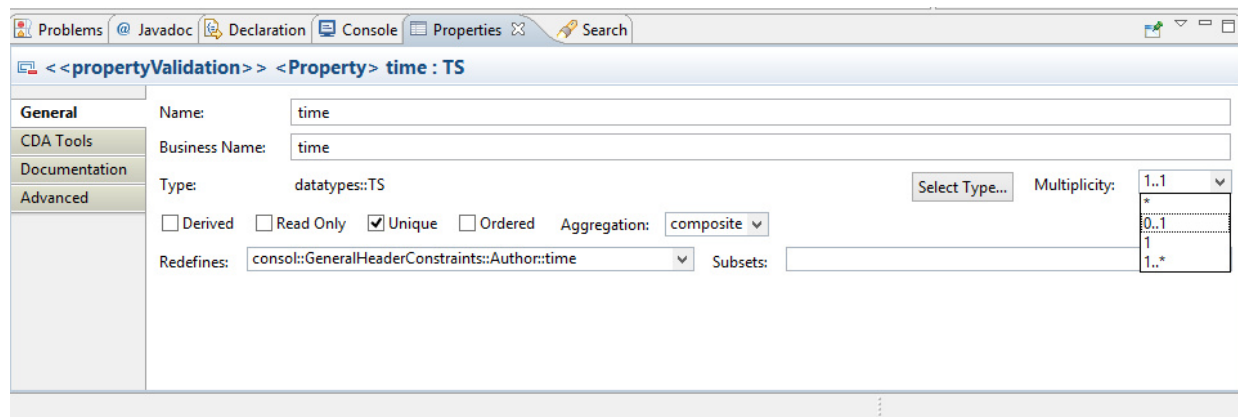




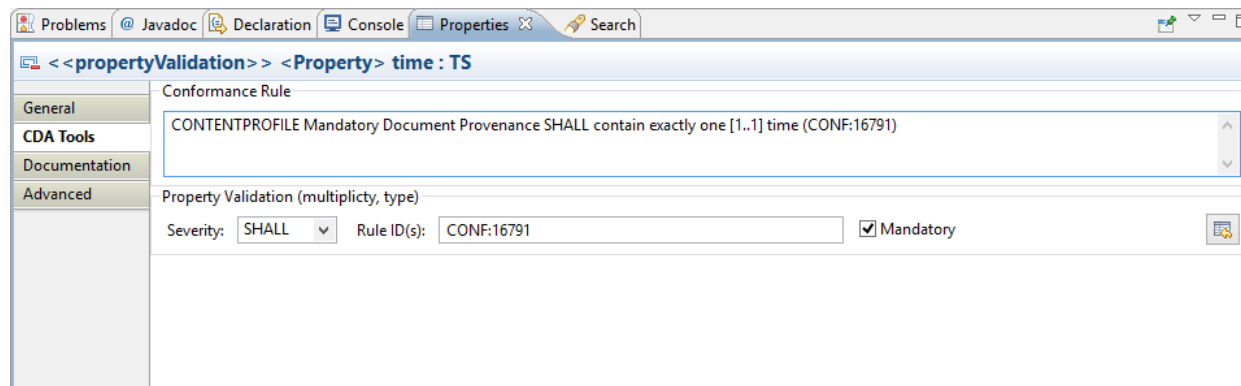
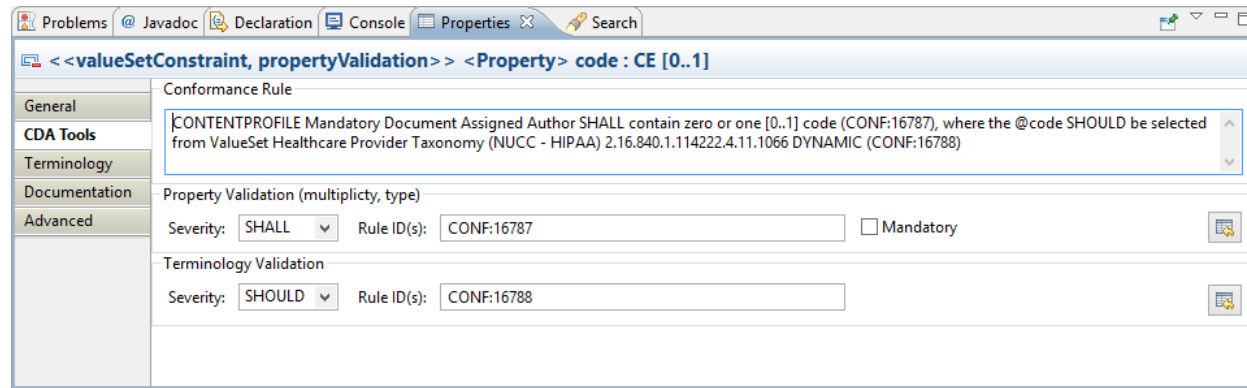
Data type constraint



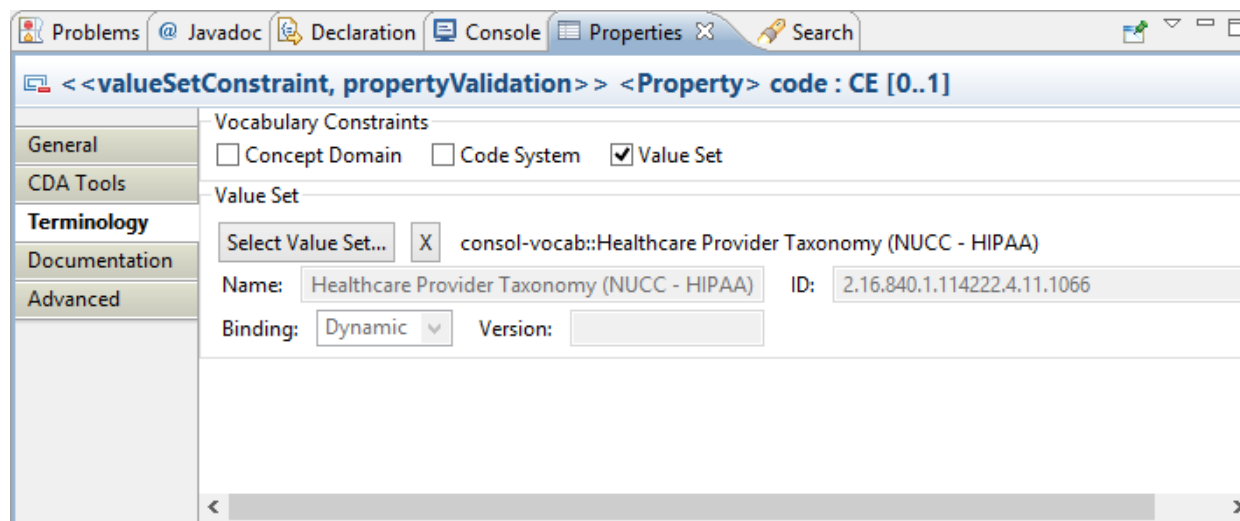
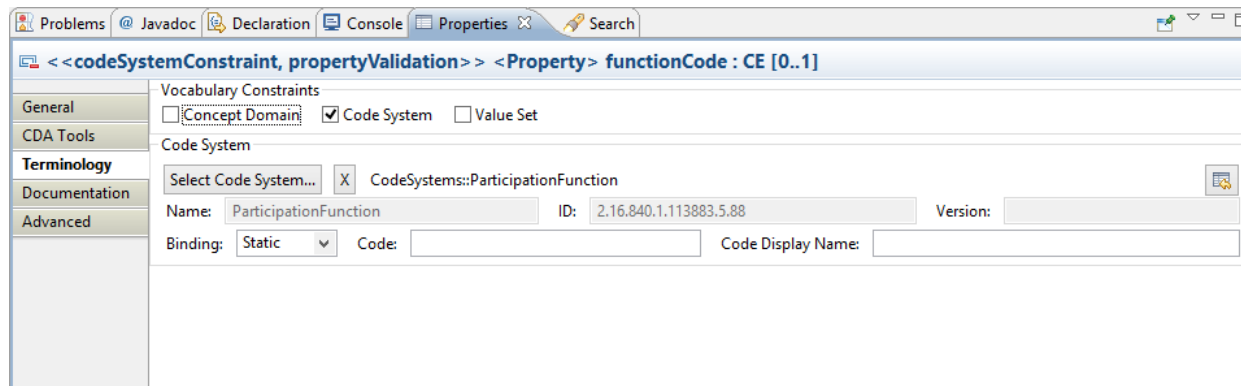
Cardinality constraints



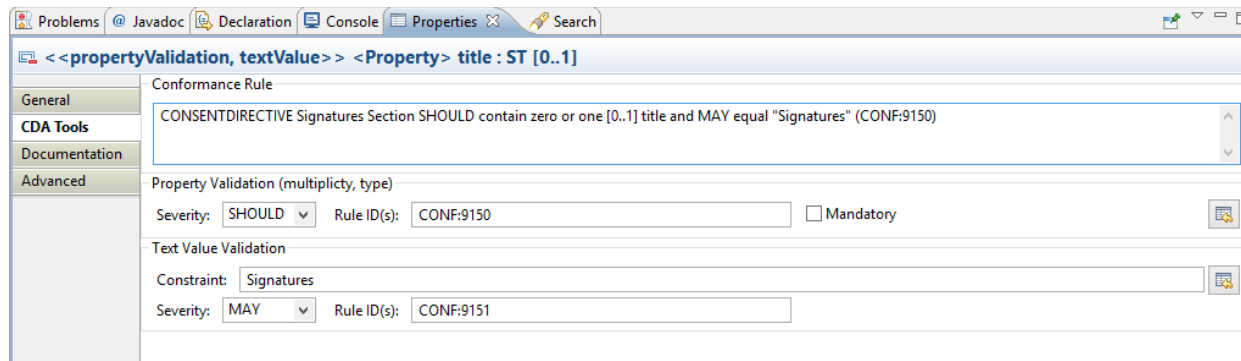
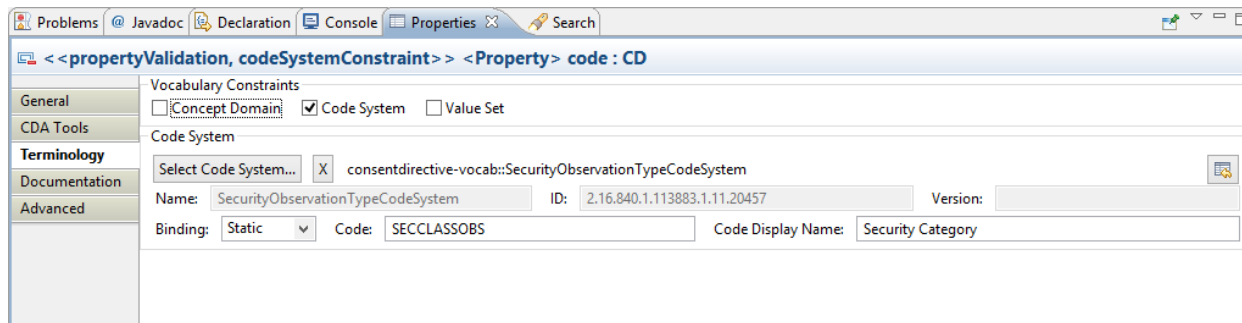
Data element usage and terminology constraints



Code system vs. Value Set constraints



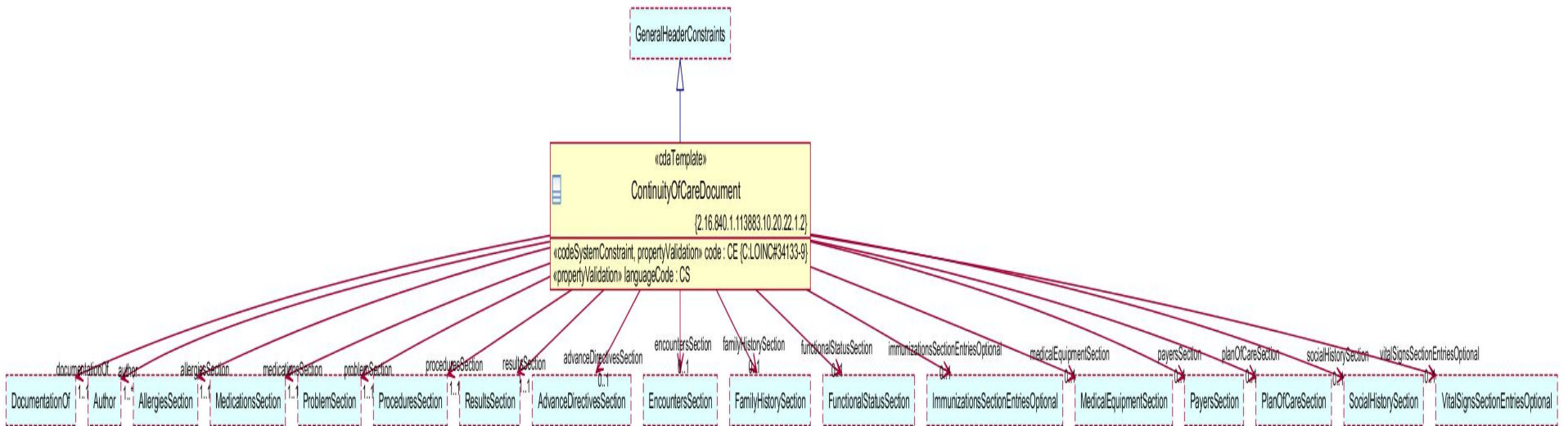
Fixed value constraints



Unique Identifiers

Name	Type	Multiplicity	Annotation	Value
consentdirect				
< Comme				
Computa			✗ 2.16.840.1.113883.3.445.16	
Confiden			✗ 2.16.840.1.113883.3.445.12	
ConsentA			✗ 2.16.840.1.113883.3.445.8	
ConsentD			✗ 2.16.840.1.113883.3.445.4	
ConsentD			✗ 2.16.840.1.113883.3.445.5	
Criterion			✗ 2.16.840.1.113883.3.445.10	
Criterion			✗ 2.16.840.1.113883.3.445.11	
IIHIRectiv			✗ 2.16.840.1.113883.3.445.7	
Informati			✗ 2.16.840.1.113883.3.445.9	
Obligatio			✗ 2.16.840.1.113883.3.445.14	
PrivacyCo			✗ 2.16.840.1.113883.3.445.17	
PrivacyCo			✗ 2.16.840.1.113883.3.445.1.1	
PrivacyConsentHeaderAuthor			✗ 2.16.840.1.113883.3.445.2	
PrivacyConsentHeaderDocume			⚠ 2.16.840.1.113883.3.445.26	

CDA PSM Overview



CDA R2 Metamodel

- CDA templates
 - Header
 - Section
 - Clinical templates
 - Observation
 - Problems
- Immunization example in Appendix A

Appendix A: C-CDA Specifics

The HL7 Clinical Document Architecture ([HL7 CDA](#)) PSM consists of a Clinical Document Structure, a Section and one or more Clinical Statement Template(s) for each use case. The PIM to PSM transformation supports the following annotations to generate the CDA PSM and ultimately the CDA IG. The PSM structure is based on the MDHT implementation of CDA (see [MDHT](#))

Name	Purpose	Example	Use	UML Element
cdadocumenttype	This tells the transformation what clinical document definition to start with	GeneralHeaderConstraints	Required	Use Case
cdadocumentname	The name of the clinical document within the IG	ImmunizationExchangeDocument	Required	Use Case
cdadocumenttemplate	A template ID for the document	1111-2222-3333-4444	Optional	Use Case
cdasectiontype	This tells the transformation what section type to use within the document	ImmunizationsSection	Required	Use Case
cdasectionname	The name of the section within the IG	ImmunizationsExchangeSection	Required	Use Case
cdasectiontemplate	A template ID for the section	1111-2222-3333-4444	Optional	Use Case
cda	This tells the transformation	ImmunizationActivity	Required	Class

NIEM PSM Exar

Appendix B

- Exchange module
- Constraint module
- Extension module

