

# Representing (CDA Section and Entry Level) Templates in DECOR



Dr. Kai U. Heitmann  
HL7 Templates Working Group  
April 2012

# Pre-requisites

- Wel-written implementation guides (or is it the other way round??? :-)
- Value Sets



ELGA\_Confidentiality 2011-12-19

Value Set Name	Value Set Id	Version / Eingangsdatum
ELGA_Confidentiality	1.2.40.0.34.10.7	2011-12-19

Quell-Kodesystem:

- 2.16.840.1.113883.5.25

Level/ Typ	Kode	Kodesystem	Anzeigename	Beschreibung
0-L	<b>L</b>	2.16.840.1.113883.5.25	low	
0-L	<b>N</b>	2.16.840.1.113883.5.25	normal	
0-L	<b>R</b>	2.16.840.1.113883.5.25	restricted	
0-L	<b>V</b>	2.16.840.1.113883.5.25	very restricted	

Legende: Typ L=leaf, S=specializable, A=abstract, D=deprecated. NullFlavors werden im @nullFlavor Attribut statt in @code angegeben.

# Pre-requisites

- Value Sets

```
<valueSet name="ELGA_Confidentiality" displayName="ELGA_Confidentiality"
  effectiveDate="2011-10-01" id="1.2.40.0.34.10.7" statusCode="final">
  <conceptList>
    <concept code="L" codeSystem="2.16.840.1.113883.5.25" displayName="low" level="0" type="L"/>
    <concept code="N" codeSystem="2.16.840.1.113883.5.25" displayName="normal" level="0" type="L"/>
    <concept code="R" codeSystem="2.16.840.1.113883.5.25" displayName="restricted" level="0" type="L"/>
    <concept code="V" codeSystem="2.16.840.1.113883.5.25" displayName="very restricted" level="0" type="L"/>
  </conceptList>
</valueSet>
```

# First Template

- Building block for (internal) re-use

  <b>PersonElements [1.2.40.0.34.11.90001] - 2011-12-19</b>				
Template (intern)		PersonElements		
Id		1.2.40.0.34.11.90001		
Version		gültig von 2011-12-19 Status active		
Item	DT	Card	Conf	Desc
hl7:name	PN	1..1	M	

- Namespace + Element names
- Datatype PN (person name), also flavors
- Card 1..1 und Conf (mandatory as a shorthand)

# First Template

- Building block for (internal) re-use

```
<template id="1.2.40.0.34.11.90001"
  name="PersonElements"
  displayName="Person Elements (CDA Header)"
  effectiveDate="2011-10-01T12:34:12"
  statusCode="final">

  <element name="hl7:name"
    minimumMultiplicity="1" maximumMultiplicity="1"
    isMandatory="true" datatype="PN">
  </element>

</template>
```

# Table View of Templates

- The data type or a data type flavor
- The cardinality
- The conformance, e.g. if data may be absent (nullFlavor)
- Vocabulary bindings and coding strengths
- Possible fixed values
- Additional properties such as units (measurements), ranges, fraction digits

# Table View of Templates

## Examples

Examples of class attributes in table format, with different attribute names, data types (DT), cardinality (Card), conformance (Conf) and description.

**Table: Class Attributes with data type, cardinality, conformance and a description**

Attribute	DT	Card	Conf	Description
repeatNumber	INT	0..1	O	Number of repetitions
value	PQ	1..1	R	The measurement as a physical quantity
code	CE CNE	1..1	M	The code of the observation

# Co-Occurrences

- Example: Amnionicty und Chorionicity with multiple pregnancies

## Example: Amnionicty and Chorionicity

Assume, that if the number of fetuses of a pregnant woman is more than 1 (multiple gestation), than an Amnionicty observation – number of fluid filled / (amniotic) sacs – and a Chorionicity observation– type of placentation – need to be reported.

Attribute	DT	Card	Conf	Description/Fixed value
component			C	Conditionally contains <i>AmnionictyObservation</i> template id 2.16.840.1.113883.2.4.6.10.90.1054
		Card	Conf	Predicate
		1..1	M	If number of fetuses > 1
			NP	otherwise
@typeCode	CS	1..1	F	COMP
component			C	Conditionally contains <i>ChorionicityObservation</i> template id 2.16.840.1.113883.2.4.6.10.90.1055
		Card	Conf	Predicate
		1..1	M	If number of fetuses > 1
			NP	otherwise
@typeCode	CS	1..1	F	COMP





# Status of a Templates

statusCode	Description
draft	Template under development (nascent). Metadata and template may be incomplete. Entered primarily to encourage other users to be aware of ongoing process.
active	Template has been published by the custodian organization and deemed fit for use. May have associated adoption and annotation metadata
retired	Template retired: No longer fit for use. Information available for historical reference.
inactive	Template never recommended for use. For example, rejected, withdrawn or found another template fit for use of the one under development. Will not have associated adoption metadata.
rejected	Template is rejected
cancelled	Template is withdrawn
update	Template under Update (adoption metadata): adopter adds adoption metadata and/or grouping metadata: these are the only actions an adopter organization can perform. The template(s) in the "under update (adoption metadata)" status are unavailable for any other status or metadata changes until the "under update/adoption metadata" action has been completed.
pending	Template is in pre-publication review: the template is complete, pending appropriate review. Entered primarily to encourage other users to be aware of and/or participate in the review process. The custodian organization has not given it an "Active" status (i.e. it has not been published); and it may still be rejected (transitioned to an inactive status). E.g. the template may be under ballot by an SDO.
review	Template is in Review: a post-publication state; may result in a new version or a retirement or no change at all. A new version is one that adds clarity but not new intent; the version number is incremented by one, but the identifier is unchanged. A retirement is a template that is no longer fit for purpose, and which may be replaced by a different a template with a different identifier, which is linked to the retired template.

# Second Template

- Building block for (internal) re-use

  <b>OrganizationElements [1.2.40.0.34.11.90002] - 2011-12-19</b>				
Template (intern)	OrganizationElements			
Id	1.2.40.0.34.11.90002			
Version	gültig von 2011-12-19 Status active			
Item	DT	Card	Conf	Desc
hl7:id	II	0..*	O	
hl7:name	ON	1..1	M	
hl7:telecom	TEL	0..*	O	
hl7:addr	AD	0..1	O	

# Second Template

- Building block for (internal) re-use

```
<template id="1.2.40.0.34.11.90002" name="OrganizationElements"
  effectiveDate="2011-12-19T00:00:00" statusCode="active">

  <element name="hl7:id" minimumMultiplicity="0" maximumMultiplicity="*" datatype="II"/>
  <element name="hl7:name" minimumMultiplicity="1" maximumMultiplicity="1"
    isMandatory="true" datatype="ON"/>
  <element name="hl7:telecom" minimumMultiplicity="0" maximumMultiplicity="*"
    datatype="TEL"/>
  <element name="hl7:addr" minimumMultiplicity="0" maximumMultiplicity="1"
    datatype="AD"/>

</template>
```

# Third Template (section level)

 <b>Risiken [1.2.40.0.34.11.1.2.8] - 2011-12-19</b>				
Wird ausschließlich als Untersektion zu einer fachlichen Sektion angewandt. Enthält die Risiken zum Thema der übergeordneten Sektion als narrative Beschreibung oder Auflistung.				
Template	Risiken			
Id	1.2.40.0.34.11.1.2.8			
Kontext	Elternknoten des Template-Element mit Id 1.2.40.0.34.11.1.2.8			
Version	gültig von 2011-12-19 Status active			
Beschreibung	Wird ausschließlich als Untersektion zu einer fachlichen Sektion angewandt. Enthält die Risiken zum Thema der übergeordneten Sektion als narrative Beschreibung oder Auflistung.			
Item	DT	Card	Conf	Desc
h17:section				
└ h17:templateId	II	1..1		
└ @root		1..1	F	1.2.40.0.34.11.1.2.8
└ h17:code	CE	1..1	M	
	CONF	@code muss "51898-5" sein @codeSystem muss "2.16.840.1.113883.6.1" sein		
	Beispiel	<code>&lt;code code="51898-5" displayName="Risk factors" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"/&gt;</code>		
└ h17:title	ST	1..1		
	CONF	Elementinhalt muss "Risiken" sein		
└ h17:text		1..1		

# Third Template

```
<template id="1.2.40.0.34.11.1.2.8" name="Risiks" displayName="Risiks"
  effectiveDate="2011-12-19T00:00:00" statusCode="active">
```

```
  <desc language="de-DE">Wird ausschließlich als Untersektion zu einer fachlichen Sektion
    angewandt. Enthält die Risiken zum Thema der übergeordneten Sektion als narrative
    Beschreibung oder Auflistung.</desc>
```

```
  <desc language="en-US">Is used in.....</desc>
```

```
  <context id="**"/>
```

```
  <element name="hl7:section">
```

```
    <!-- Element templateId -->
```

```
    <element name="hl7:templateId" minimumMultiplicity="1" maximumMultiplicity="1"
      datatype="II">
```

```
      <attribute root="1.2.40.0.34.11.1.2.8"/>
```

```
    </element>
```

```
  ...
```

# Third Template

```
...
<!-- Element code -->
<element name="hl7:code" minimumMultiplicity="1" maximumMultiplicity="1"
    isMandatory="true" datatype="CE">
    <example>
        <code code="51898-5" displayName="Risk factors"
            codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"/>
    </example>
    <b><vocabulary code="51898-5" codeSystem="2.16.840.1.113883.6.1"/></b>
</element>
<!-- Element title -->
<element name="hl7:title" minimumMultiplicity="1" maximumMultiplicity="1"
    datatype="ST">
    <text>Risiks</text>
</element>
<!-- Element text -->
<element name="hl7:text" minimumMultiplicity="1" maximumMultiplicity="1"/>
</element>

</template>
```

# Fourth Template (entry level)

## ● Template LaboratorySpecimenEntry - 1.2.40.0.34.11.4.3.1 Laboratory Specimen Entry

2012-01-07

Template	LaboratorySpecimenEntry - 1.2.40.0.34.11.4.3.1			
Id	1.2.40.0.34.11.4.3.1			
Kontext	Elternknoten des Template-Element mit Id 1.2.40.0.34.11.4.3.1			
Version	gültig von 2012-01-07 Status active			
Item	DT	Card	Conf	
<b>h17:entry</b>				
└ h17:templateId	II	1..1		
└ @root		1..1	F	1.2.40.0.34.11.4.3.1
<b>h17:act</b>				
└ @classCode		1..1	F	ACT
└ @moodCode		1..1	F	EVN
└ h17:code	CD	1..1	M	
	CONF	@code muss "10" sein @codeSystem muss "1.2.40.0.34.5.47" sein @displayName muss "Probeninformation" sein		
└ h17:entryRelationship wo [h17:procedure[h17:code[@code='33882-2' and @codeSystem='2.16.840.1.113883.6.1']]]		1..1	M	
2012-04-05	Beinhaltet	gererbtes Regelset <a href="#">SpecimenCollection</a> mit überschriebener Kardinalität 1 .. 1 mandatory		

15

# DECOR builder's recipes

- Divide et impera!
- Make re-usable parts, separate, and internally “include” or “inherit” them in your “big” template
  - *PersonElements* (used often)
  - *HeaderRecordTarget* (used once, but nice block)
  - *HeaderElements* (collection of a part of the CDA header elements)
- containment



# DECOR builder's recipes

- Follow the thought: how to *build* an instance
  - Not only constraint oriented
  - Validation mechanisms are automagically derived from that
- Context!!! Of Templates
  - “internal”, no context („embeddable“)
  - “external” with multiple ☹ possible contexts
    - *templateld* element sibling or parent nodes
    - An absolute or relative path

# DECOR builder's recipes

- Template
  - id="1.2.40.0.34.11.1"
  - name="ELGACDAAlleDokumente"
  - displayName="Allgemeiner Implementierungsleitfaden ELGA CDA Dokumente"
  - effectiveDate="2011-10-01T12:34:55"
  - statusCode="draft" or "active", "deprecated"...
- Version management!
- <context id="\*" /> ... oder "\*" oder path="..."

# Typical Context of a Template

```
<entryRelationship typeCode="COMP">
  <observation classCode="OBS" moodCode="EVN">
    <templateId root="2.16.840.1.113883.2.4.6.10.81.29"/>
    <code code="27113001" codeSystem="2.16.840.1.113883.6.96"
      displayName="body weight (observable entity)"/>
    <effectiveTime value="20080924"/>
    <value xsi:type="PQ" value="91" unit="kg"/>
    <referenceRange typeCode="REFV">
      <observationRange classCode="OBS" moodCode="EVN.CRT">
        <value xsi:type="IVL_PQ">
          <low value="60"/>
          <high value="80"/>
        </value>
      </observationRange>
    </referenceRange>
  </observation>
</entryRelationship>
```

# DECOR builder's recipes

- Elements
  - name="hl7:id"
  - minimumMultiplicity="1"  
maximumMultiplicity="1"
  - isMandatory="true"
  - datatype="PN" (z. B. CE, CV, TS, IVL\_TS, ...)
- Examples, examples, examples: so one or more <example> !!!

# DECOR builder's recipes

- Attributes
  - Datatypes (CE, CV, TS, IVL\_TS, ...)
  - Also with flavors, e.g. II.NL.BSN, II.US.SSN
  - Value Sets <vocabulary>
    - `<attribute datatype="CE">`  
    `<vocabulary valueSet="ELGA_AdministrativeGender"/>`  
    `</attribute>`
    - `<vocabulary code="GEPLENTLDAT" codeSystem="1.2.40.0.34.5.28"`  
    `displayName="Geplantes Entlassungsdatum"/>`
  - Properties <property>
    - `<property minInclude="1"/>`
    - `maxInclude, maxLength, unit, fractionDigits`
  - Element content <text>

# DECOR builder's recipes

- Attributes
  - HL7 V3 XML Attribute (shorthands)
    - @classCode, @moodCode, @typeCode
  - Examples

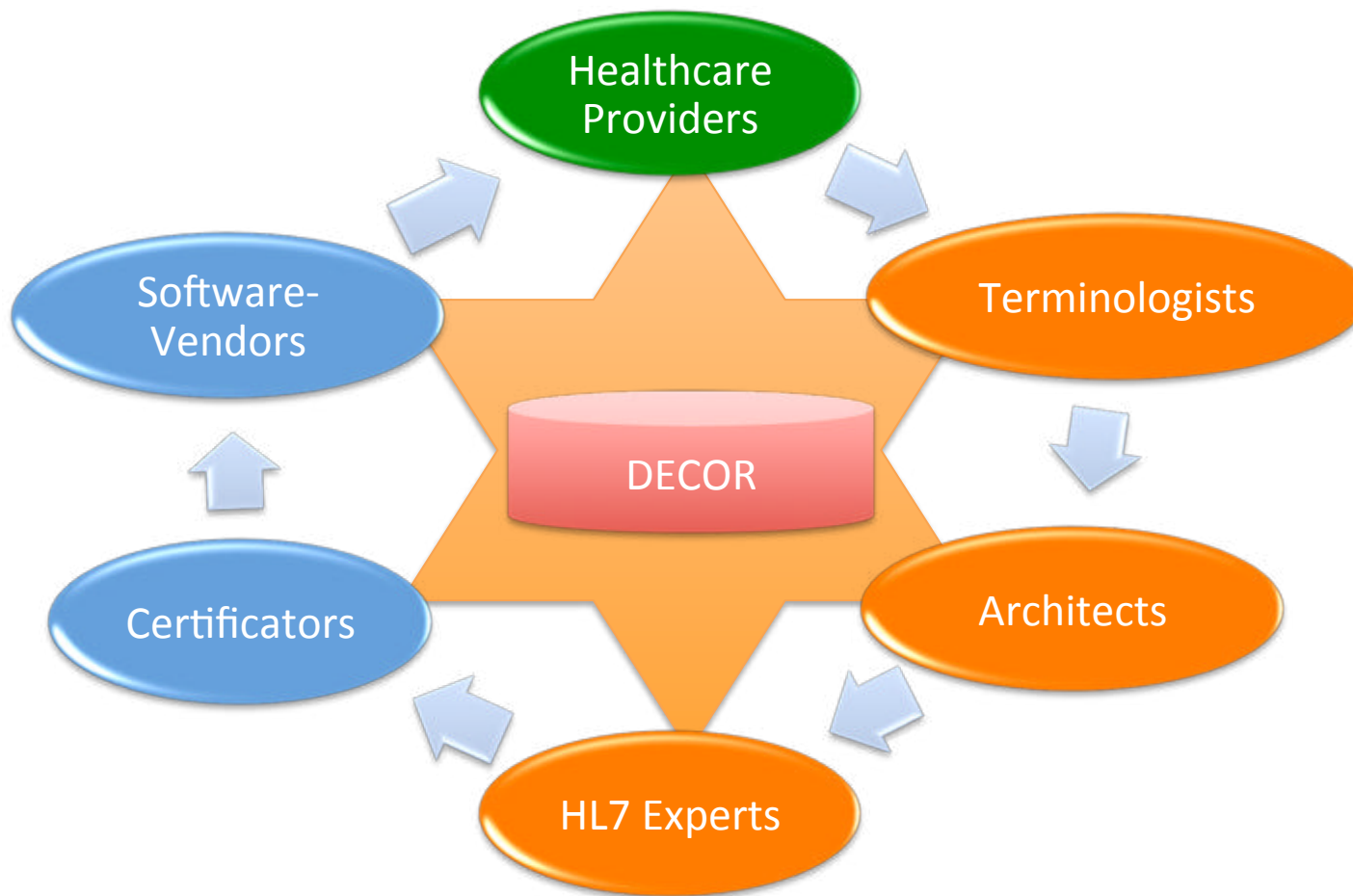
```
<attribute typeCode="REF" />
```

```
<attribute classCode="PSN" determinerCode="INSTANCE"  
            isOptional="true" />
```

```
<attribute root="1.2.40.0.34.11.1.2.3" />
```

# DECOR (and ART)

# Skills and development cycle

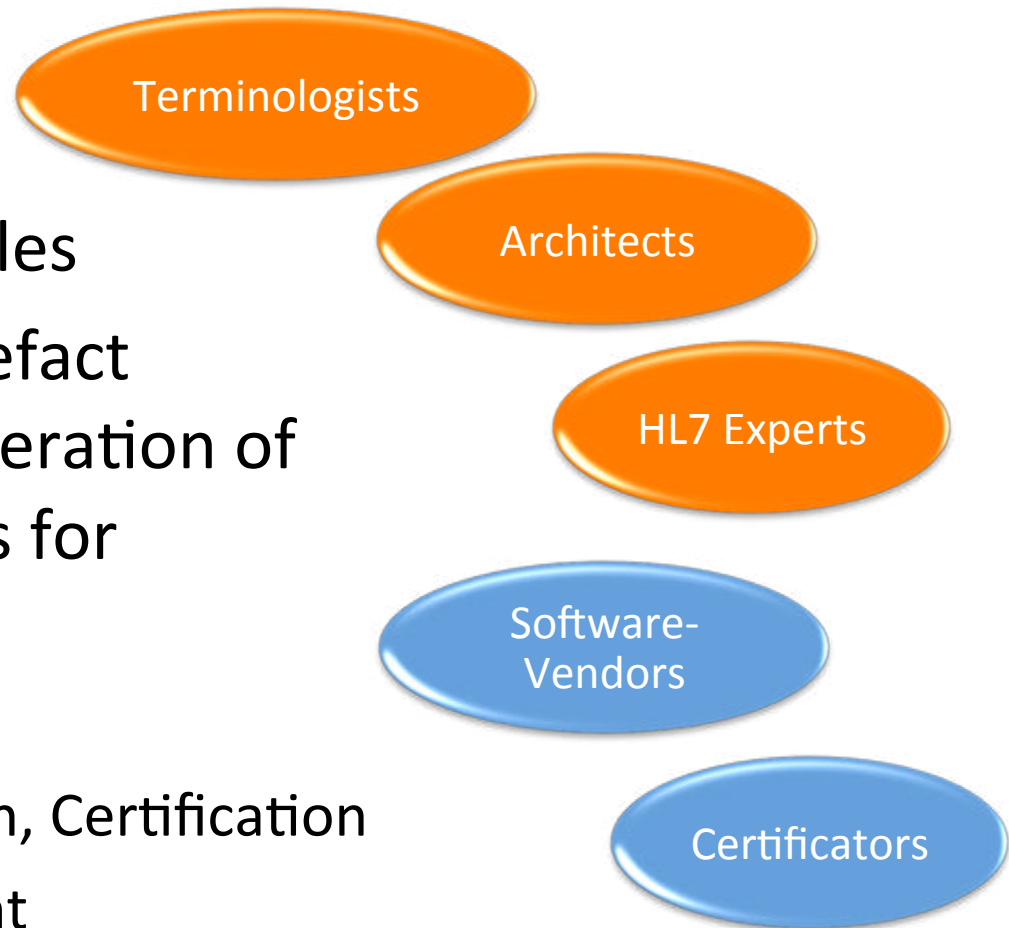




# DECOR (“separation of concerns”)

- DECOR

- => Data-Elements, Codes, OID’s and Rules
- Goal: consistent artefact documentation, generation of supporting materials for
  - Implementation
  - Validation
  - Testing, Qualification, Certification
  - Change Management



# DECOR

- COR 2009
  - Shorthand for the generation of Schematrons
  - No dataset description/ -link
- DECOR 2011
  - dataset description/ -link to other artefacts
  - Multiple projects (Nictiz NL, ELGA AT, Germany)
  - Group of experts
  - Open Source, web site art-decor in preparation

# DECOR

- Objectives
  - Requirement analysis from the practice for the practice
  - Practical
  - Understandable
  - Expandable, multi-language support
  - Visit, use, „refine“ standards (ISO, IHE, HL7)

# DECOR and standards

- visited, embraced, perceived, adopted
  - ISO/IEC 11179 Information technology — Metadata registries (MDR)
  - ISO 21090 Health Informatics – Healthcare Datatypes
  - ISO 13582 Health Informatics – Communication model and XML-interface specification for OID Registries
  - IHE IT Infrastructure (ITI) Technical Framework Supplement – Sharing Value Sets 10 (SVS)
  - HL7 Common Terminology Services 2 Service Functional Model (SFM)
  - HL7 Implementation Guide for CDA Release 2.0 Consolidated CDA Templates
  - HL7 Templates Business Process Requirements Analysis
  - ISO/IEC 19757-3 Schematron
- Viewed also at
  - Archetypes / openEHR development
  - Software for Issue Management

# DECOR for Humans

- ... DECOR + ART = ART-DECOR
  - ART: User-Interface for DECOR



## Perinatologie

Project Informatie			
<b>Gegevens</b>   Scenario's   Templates   Waardelijsten			
Dataset	Spirit data set 1a ▼		
Naam	Spirit data set 1a	Id	2.999.999.999.77.1.1
Omschrijving	Spirit data set 1a	Datum	2009-10-01
<b>Concepten</b> + X			
Zorgaanbieder/Zorgverlener			
Vrouw			
Burgerservicenummer			
Lokale persoonsidentificatie			
Naam vrouw			
Geboortedatum			
Postcode			
Etniciteit			
Lijst ziekten en bijzonderheden vrouw in d algemene anamnese			
Lijst bijzonderheden obstetrische anamnese			
Bijzonderheden obstetrische anamnese			
Soort bijzonderheden obstetrische anamnese			
Zwangerschap			
Zorgverlening			
<b>Naam vrouw</b>			
Id	2.999.999.999.77.2.10035		
Soort	Item ▼		
Status	Definitief ▼		
Naam	Naam vrouw		
Omschrijving	Namen van de vrouw, zoals de vrouw die opgeeft		
Commentaar			
<b>Gebruik</b>			
Scenario	Cardinaliteit	Vereist	
Template	Cardinaliteit	Element	