# HL7 Specification: Domain Analysis Model Specifications and Requirements - Canonical Definition, Release 1

**May 2014**

**HL7 Comment Ballot**

**Sponsored by:**
**Architecture Review Board**
**HL7 Technical Steering Committee**

10

11

| Chair | Anthony Julian<br>Mayo Clinic<br>ajulian@mayo.edu |
|---|---|
| Vice-Chair | Lorraine Constable<br>Constable Consulting Inc.<br>lorraine@constable.ca |

12

13  Acknowledgements:

14  This definition was produced as a combined effort by the Architecture Review Board(ARB) and

15  the Technical Steering Committee.  This group gratefully acknowledges input from numerous

16  HL7 community members, including the following ARB members:.

| Bond,Andy | **National eHealth Transition Authority (NEHTA)**<br>Andy.bond@nehta.gov.au |
|---|---|
| Curry, Jane | Health Information Strategies<br>Janecurry@healthinfostrategies.com |
| Dagnall, Bo | Hewlett -Packard Enterprise Services<br>Bo.dagnall@hp.com |
| Grieve, Grahame | Health Intersections Pty Ltd<br>grahame@healthintersections.com.au |
| Hufnagel, Steve | U.S. Department of Defense, Military Health System |
| Kreisler, Austin | Leidos, Inc.<br>Austin.j.kreisler@leidos.com |
| Loyd, Patrick | ICode Solutions<br>Patrick.e.loyd@gmail.com |
| Lynch, Cecil | Accenture<br>Cecil.o.lynch@accenture.com |
| Milosevic, Zoran | Deontik Pty Ltd<br>Zoran@deontik.com |
| Parker, Ron | CA Infoway<br>rparker@infoway-inforoute.ca |
| Quinn, John | Health Level Seven, Inc.<br>jquinn@hl7.org |
| Shakir, Abdul Malik | Hi3 Solutions<br>abdulmalki@shakirConsulting.com |
| Stechishin,Andy | CANA Software and Service Ltd.<br>Andy.stechishin@gmail.com |

17
18

| Revision History<br>Rev | Date | By Whom | Changes |
|---|---|---|---|
| 0 | May 22, 2008 | G. Grieve | Initial document creation |
| 1 | December 4, 2013 | R. Parker | Expanded description and added conformance |
| 2 | February 17, 2014 | A. Julian | Prepared for publication |

19
20

# Contents

## NOTE TO BALLOTERS:

When commenting on this document, please refer to line numbers to assist the ARB in properly
evaluating the ballot comment.

# Domain Analysis Model (DAM)

## Purpose:

This document provides the canonical definition of a Domain Analysis Model.  This work was commissioned by the HL7 Technical Steering Committee.

## Audience

The canonical DAM definition is provided for the use by architects, designers, and developers of HL7 conformant DAMs

## Definition

In its most complete expression, a Domain Analysis Model is a **collection** of artifacts at the **conceptual** level that represents a well-defined **subject-area-of-interest**. The semantics – both static/informational and dynamic/behavioral – that are expressed in the various artifacts that collectively define a DAM must – first and foremost – be of use to domain experts and non-technical stakeholders who have a interest is seeing the DAM's semantics explicitly and unambiguously expressed using standardized, understandable representations (e.g. UML diagrams, concept maps, etc.).

In its most complete form, however, the semantics of a DAM must also be of sufficient robustness to enable the development by architects, designers, and developers of "down-stream" **logical** artifacts/models which are **traceable** from the original DAM (conceptual-level) artifacts. As such, the overarching purpose of a DAM can be summarized as: *"A representation of the static and/or dynamic semantics of a subject-area-of-interest (i.e. a "domain") in a manner that enables harmonization of the various perspectives of the stakeholders in the domain while also providing the foundations required to build logical and implementable representations of the domain."* (NOTE: a clarification of the phrase *"...representation of the static and/or dynamic semantics..."* is given in the following paragraphs.)

A DAM is a collection of artifacts including – but not necessarily limited to – the following:

1. Static/Informational
    1. Class diagrams
        1. attributes
            1. exemplar data types
            2. exemplar vocabulary domains, value sets, etc.
        2. relationships
        3. cardinalities
    2. Roles
2. Dynamic/Behavioral

1. Activity Diagrams
   1. Process Patterns
      1. Process Flows are discouraged as being too organization-specific
   2. Capabilities
   3. Associated static structures
2. Interaction/Collaboration/Sequence diagrams
3. State diagrams
   1. NOTE: There is no "standard" representation required for any of the above artifacts: although UML is often used as the lingua franca to express these semantics, other representations for specific semantics (e.g. RDF graphs, concept maps, etc.) are equally viable assuming the expressiveness of the two different representations is equivalent from a traceability perspective.

## DAM Perspectives

For a given collection of artifacts claiming to be a DAM, there are two perspectives that must be considered relative to the type of HL7 ballot to which those artifacts may be submitted:

### Relevance:

Relevance is a subjective metric that reflects the collective judgment of the domain experts for whom the DAM was built. A given DAM may be considered by these stakeholders to be "complete and relevant" if it serves the purpose for which it was intended by the stakeholders, e.g. "document the static (informational) semantics of the domain". A DAM may be deemed to be "relevant" by its stakeholders without being fully "conformant" according to the conformance definition.

### Conformance:

Conformance is an objective metric used to evaluate the collective semantics of all of the artifacts labeled as a DAM for a given domain. Specifically, the metric refers to degree to which the artifacts have documented both the static (informational) and the dynamic (behavior) semantics of the defined domain.

For example, a given DAM may include "just" an informational or behavioral model and be considered "complete" by the domain experts for whom it is intended. However, without the additional inclusion of the accompanying, inter-related behavioral (or informational) model, the DAM cannot be considered to be "fully conformant" to the formal definition/specification of a DAM.

## Ballot Requirements:

1. DAMs that are deemed "relevant but not fully conformant" **MAY** be submitted for **INFORMATIVE** balloting.

106    2. DAMs that are deemed both "relevant" and "fully conformant" **MAY** be
107       submitted for **NORMATIVE** balloting.

108       DAMs submitted for NORMATIVE ballot should – in all but markedly
109       exceptional cases – have passed through Draft Standard for Trial Use (DSTU)
110       status. In order for a DAM to be balloted as a DSTU, it **SHALL** have **at least two**
111       traceable logical models that have been derived from it.

112    3. A DAM that is submitted for either DSTU or NORMATIVE balloting **SHALL**
113       also contain specific conformance statements that enable traceable logical models
114       to be evaluated for the "derivational correctness," i.e. their COMPLIANCE to the
115       semantics of the source DAM.

## Requirements of a DAM

117 Following are the requirements for a fully conformant DAM that, as such, qualifies for
118 submission to either DSTU or NORMATIVE ballot (noting the above additional requirement for
119 DSTU submission). It is assumed that such a DAM would also be viewed by its stakeholders as
120 relevant and therefore qualified for submission for INFORMATIVE ballot

121 A fully conformant DAM:
122    1. **SHALL** declare the rationale for creating or extending the DAM, including reference to
123       uses cases or capabilities intended to be achieved using the DAM.
124    2. **SHALL** be understandable by the reader without requiring access to other content
125       protected by intellectual property rules.
126    3. **SHALL** have a definition of the shared purpose scoping the domain including the
127       rationale for creation or extension, including reference to use cases or capabilities
128       intended to be achieved using the DAM.
129    4. **SHALL** explicitly define its stakeholders.
130       1. Suggested categories include:
131          • Primary users of the DAM
132          • Domain experts
133          • Developers
134          • Quality Assurance
135          • Maintainers
136          • Secondary users of the DAM
137          • Initiators (strategic)/motivators for DAM's development
138          • Payers for the DAM
139          • Regulators affecting DAM's content
140    5. **SHALL** focus on the conceptual-level semantics
141    6. **SHALL** contain references to other material used to create it.
142    7. **SHALL** have a traceable path to each domain requirement statement.
143       NOTE: There is no criteria for how many requirements "sufficiently define" a given
144       domain-of-interest. Rather, if a given requirement (which can be expressed in a
145       number of ways including storyboards, use cases, or specific requirements statements

146 )exists, a DAM shall have a traceable path from a static and/or dynamic DAM
147 element (or elements) to the requirement.
148 8. **SHALL** contain specific conformance statements that provide implementers of the DAM
149 (i.e. groups that use a given DAM to develop a specific DAM-derived logical model) a
150 testable, verifiable metric for determining whether the DAM-derived logical model is, in
151 fact, conformant with the source (conceptual level) DAM.
152 9. **SHALL** be understandable by subject matter experts that were not present during the
153 development.
154 10. **MAY s**pecify data type bindings either specifically or as exemplar bindings.  If so, the
155 definitions must be contained in the model or referenced from a publically available
156 source.
157 11. **MAY** indicate logical constraints useful in generating traceable logical artifacts as
158 needed.
159 12.  **SHOULD NOT** focus on implementation issues but rather aim to be implementation-
160 independent.
161 13. **SHOULD NOT** include logical and/or implementable artifacts that distract from the
162 clarity e.g. foreign-key constraints.


## Evolution of a DAM

164 The ARB recognizes several types of evolution of a DAM including:

165 1. Change in scope/boundaries
166 2. Change in existing semantics
167 3. Addition of new semantics (within original scope/boundary definition)
168 4. Change in representation of existing semantics

169 Only changes of types 1 and 2 should affect the "compatibility" of a given DAM and therefore
170 require a new ballot cycle.