CORBAmed RFI 3 Response - Clinical Decision Support

General Information

Responding Organization:
American Society for Testing and Materials (ASTM) Subcommitee E31.15 Heatlh Knowledge Representation ("Arden Syntax")

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ASTM E31.15 is a subcommittee of the American Society of Testing and Materials, a Standards Development Organization. The charter for the subcommittee is to develop and maintain standards for Health Knowledge Representation. The present standard owned by this subcommittee is E1460-92, Standard Specification for Defining and Sharing Modular Health Knowledge Bases, better known as Arden Syntax.

The Arden Syntax came forth out of a number of existing clinical decision support systems, particularly the HELP system at LDS Hospital in Salt Lake City, and the CARE system at the Regenstrief Institute for Healthcare in Indianapolis. The objective of the Arden Syntax is to enable sharing of medical knowledge by providing a standard language for clinical decision rules. A rule in the Arden Syntax is called a "Medical Logic Module" (MLM). MLMs are modular, and contain sufficient knowledge to make a single clinical decision. MLMs are commonly used to implement alerts and reminder systems. Using the Arden Syntax, healthcare institutions can share MLMs between and among each other, independent of the clinical information system they may use.

Full information on the Arden Syntax may be obtained from the website hosted by Columbia Presbyterian Medical Center, one of the early Arden Syntax users, and co-creators of the standard: http://www.cpmc.columbia.edu/arden

To order a copy of the standard specification, please contact the ASTM:
ASTM
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
phone: (610)832-9500
fax: (610)832-9666
email: service@astm.org

You can also obtain more information and order a specification from the ASTM web site:
http://www.astm.org

Implementation Status

A number of vendors of clinical information systems have implemented clinical decision support systems based on the Arden Syntax:

3M
Eclipsys
HealthVision
IBM
SMS

Several of these vendors have generally available Arden Syntax based products and live implementations in customer healthcare institutions. This list may not be complete. In additions to the companies listed, a number of other vendors have Arden Syntax projects in a planning phase or under development (Cerner, HBOC).

Besides these commercial applications, there are a number of academic institutions in the U.S. and abroad using Arden Syntax based clinical decision support systems.

Industry Trends

Current trends in healthcare information technology strongly favor the development of alert- and reminder systems. Numerous recent studies demonstrate the effectiveness of rule-based alert- and reminder-systems in the reduction of Adverse Drug Events, and the delivery of more cost effective care. The industry recognizes that clinical information systems with intergrated clinical decision support engines can play a major role in the optimization of healthcare delivery. Many of these systems are based on an Arden Syntax approach. Healthcare information system RFPs without exception include inquiries about rule-based clinical decision support systems.

The bottleneck in the widespread use of such systems will be the development of knowledge that is easily installable in a large number of institutions. Arden Syntax enables us to leverage the knowledge from as many different sources as possible: from academic institutions, through the WWW, through informal sharing between institutions, and through commercial knowledge vendors. A number of knowledge vendors are realizing the market opportunity that the Arden Syntax creates, as a vehicle to implement knowledge in disparate systems. I expect commercial knowledge vendors to start making Arden Syntax based knowledge available in 97-98.

Arden Syntax standards development in progress

Two major projects are in progress in the Arden Syntax subcommittee.

Development of the next version of Arden
We are developing a new version of Arden, based on and backward compatible with the first version. This new version adds features and functions based on feedback from current users and implementors of the standard.

"Curly Braces" {} Project
The current standard uses curly braces {} to indicate portions of an MLM that are not standardized. Within the {}, implementors can use any institution specific syntax to link the MLM to the surrounding environment.

For example, if I want to use a creatinine level in an MLM, the MLM contains a read statement to retrieve that creatinine level from a clinical repository:

last_creatinine := read last {do anything in here that gets you to the desired creatinine value};

The {} provide a mechanism to allow implementors to use standard language where appropriate, and use non-standardized syntax where necessary. It is the buffer between the non-standardized clinical information system, and the standardized clinical decision support logic. Curly braces are used to define the data to be retrieved from a clinical repository (query), to define the trigger events, and possibly to define response transactions from the DSS back to the clinical information system.

Goal of the {} project is to make MLMs more portable and shareable by removing the need for curly braces. This is a large, ambitious and long-term project. It involves three major components:
- select a standard data model
- select a standard query language that builds on this model
- select standard clinical vocabularies for all clinical data

These are not projects that the Arden Syntax groups will attempt to execute. Rather, the {} project aims to expose the need for such standards, to encourage other standards organizations to develop such standards, and to provide a proving ground for such standards. Examples of outside standards to be referenced and used by the {} project include: the HL7 Reference Information Model as the data model, and vocabularies such as SNOMED, LOINC, etc.

Exploring relationships between CORBAmed and Arden

The CORBAmed RFI focuses on the interfaces between the DSS and its environment: trigger interfaces, data retrieval interfaces, etc. The Arden Syntax focuses primarily on the knowledge representation, at the inside of the DSS. Although technically one can separate the inside (knowledge representation) from the outside interfaces of a DSS, they are tightly coupled. The knowledge representation drives the requirements for the interfaces, and the interfaces determine the capabilities allowed inside the DSS. We need to explore to which extent the two efforts can take advantage of each other's momentum. In particular, we need to explore the extent to which CORBAmed objects can serve as the standard data model for Arden database queries. The HL7
Reference Information Model can serve this purpose for many MLMs, but our work will benefit from comparison with other models.

Specifically, the {} project is the area where the two meet, and I encourage and welcome communication and coordination between the CORBAmed effort and the Arden Syntax group. Together we can ensure that our standards enforce and supplement each other and have the optimal impact on the healthcare information systems industry be being widely available, easily installable, and effective in helping healthcare providers deliver high quality, cost-effective care.