Cardiology: Pre-Op Risk Assessment Harmonize and Integrate Member KNARTs White Paper

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Chapter 1. General Process

In integrating and harmonizing the individual components of a composite knowledge artifact (KNART), the general process has been to rely on the inherent encapsulation properties envisioned in the new composite structure. Each individual knowledge artifact is presumed to be able to run in a stand-alone and independent manner. The composite artifact acts as a central orchestration agent, activating individual knowledge artifacts using an event-driven model. Intercommunication between artifacts is handled solely through global shared state external to the composite and through the process of event payloads. Individual KNARTs only communicate with the composite container.

During the creation of the individual KNARTs used in the formation of the composite, their design and implementation explicitly envisioned their further integration into a composite structure. As such, minimal harmonization or communication is generally required. All composite KNARTs use references to the individual component knowledge artifacts rather than direct inclusion. The general design principles used should ensure that the overall composite does not alter the essential information contained in the components.

The emerging composite KNART standard envisions that the parent composite will not restate the metadata included in its component parts unless there is a clinical or technical need to override or supplement the information contained in the components. This includes elements such as supporting evidence, intended use, etc. Analysis of the components of this KNART did not find the need to make any overrides or supplements to the essential metadata.

In developing the Version 2.0 KNART standard, the work group has updated the essential file structure to support composites. The design approach of the workgroup was to define the composite mechanism to support composition that includes both literal inclusion and references to other KNARTs. The emerging standard explicitly envisions that composites may be of a heterogeneous nature and supports artifacts authoring in other forms. The creation of the Version 2 schema explicitly maintains backward compatibility. The Version 1 knowledge document schema was structured such that the introduction of composite feature could not be made without breaking backward compatibility. As a result, internal organization of the schema was refactored to isolate the concept of a knowledge document and create two potential root references, which could be used depending on whether the KNART was a singleton or a composite. The Version 2 schema supports the composite structures, references, and direct inclusion of multiple knowledge documents. All the elements of the original document type are still supported.

Overview of Integration Scenario

This composite uses a simple integration scenario whereby the documentation template is first projected and, based upon applicability information captured in that template, the order set is selectively activated. All orchestration is accomplished through embedded Event-Condition-Action (ECA) rules in the composite.

General Limitations

The composite KNART is a machine-readable artifact comprised of independently validated components. The goal of the composition is not to add additional content but rather to orchestrate the individual components. The composite is not expected to be machine executable. The schema and functional environment in which the composite is created is based on an emerging standard and is not guaranteed to be compatible with the final balloted standard.

Format Limitation

The proposed Health Level Seven International (HL7) KNART format for composites is based on the original Knowledge Artifact Specification (KAS) schema. The composite extension is specifically developed to allow the composition of these singleton KAS artifacts into an organizing structure to provide greater meaning. The composite KNART format is an emerging standard at HL7 that allows heterogeneous artifacts to be grouped into one common organizing document. In creating the composite knowledge artifacts, the individual components of the composite have been limited to the existing KAS-derived artifact types. As such, the abstraction of more advanced orchestration behavior has been limited to the capabilities of that model.

Chapter 2. Process of Harmonization

General Process

- Conduct a detailed review of composite components

- Map components to a conceptual white paper

Organization

At an organizational level, this composite is comprised of two major entities. The first of these entities is the documentation template named CDSK_KRprt_CRDT_B37CardPreOp.xml. The second of these entities is the order set named CDSK_KRprt_OS_B13CardPreOp.xml. For the purposes of orchestration, the composite initially triggers an event causing the documentation template to be activated. Upon completion of the documentation template, the completion event is analyzed to validate that the exclusion criteria was not met. Specifically, acknowledgment that the documentation template is not applicable to emergency surgery patients or patients with an acute coronary syndrome will result in the activation of the order set KNART.

Data

Special Bindings

The documentation template did not specify a specific response binding for the reason for documentation template applicability. For the purposes of making the composite, it is assumed that a default binding scenario is used. The standard binding is to use the explicitly defined binding if present; if such a binding is not present, then a default scheme is assumed. In the default scheme, if a DocumentationConcept.identifier ID is present, then it will become the binding symbol. Should there be no DocumentationConcept.identifier, then the binding is based on the prompt used. The Name used for the binding is the prompt stripped of all punctuation and white space. For example, if the documentation template were to use the prompt "Acknowledge:" the result would be a symbolic name on "Acknowledge." If in creating a default symbolic name there is a conflict in generated names, then that name will contain a zero-based array of the responses in the order they appear in the template. It should be noted that the scheme is not expected to make it in to the standard, but rather the response binding is expected to become a required element of a collect information action. In the case of this composite, the first occurrence of "Acknowledge" is used.

Orchestration Data Elements

All orchestration for this composite is handled by the examination and assertion of named events. The following table lists the events are used to drive the key behavior in this composite.

Event Name	Event Type	Relevant Payload
FireDocTemplate	Named event	none
DocumentationCompleteEvent	Named event	Responses.Acknowledge[0]
FireOrderSet	Named event	none

Redundant Data Elements Within KNARTs

Not applicable.

Near-Duplicates Within KNARTs

Not applicable.

Redundant References, Supporting Evidence, and Expressions Within KNARTs

None due to execution and encapsulation model of the contained artifact.

Data Elements That Are to be Hidden From the User Within KNARTs

Not applicable.

Questions Being Asked of the Documenter

General

All questions being asked of the documenter are delegated to the specific component parts. Readers are asked to refer to the details of the composite parts. No additional questions are asked by the composite itself.

Specific to the Composite

Not applicable.
Organization of Order Sets

Only one order set is present in this composite.

Chapter 3. Integration

Process

The general process integration is based upon the detailed reading of the composite clinical white paper and the individual constituent components. Functional analysis of the expected data flow and event flow between the created entities was used to construct this composite.

Concerns

In reviewing the structure and questions asked of the documentation template, it is not clear that all the elements required to fully create a referral are being asked. It is suggested that either a standardized referral documentation template be created and used for composites or that a detailed review of the documentation template for the additional required information be conducted prior to proceeding to an implementation phase. Analysis of the documentation template shows that it does not selectively engage its questions based on the applicability question.

Assets

The following table lists the assets that make up this composite.

Asset Filename	Description	Analysis Normal Form (ANF) Version
CDSK_KRprt_CR-CK_B58CardPreOp.xml	The main composite controller	1.0
CDSK_KR-prt_CRDT_B37CardPreOp.xml	The documentation template	1.0
CDSK_KRprt_OS_B13Card-PreOp.xml	The order set	1.0