Neurosurgery: Radiculopathy (Cervical) Harmonize and Integrate Member KNARTs White Paper

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Knowledge Based Systems (KBS)
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Clinical Decision Support (CDS)

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by Knowledge Based Systems (KBS), Office of Informatics and Information Governance (OIIG), and Clinical Decision Support (CDS)

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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 standalone 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 knowledge artifacts only communicate with the composite container.

In the creation of the individual knowledge artifacts 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.

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 the includes both literal inclusion and references to other knowledge artifact. 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 1.0 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 out the concept of a knowledge document and create two potential root references which could be used depending on if the KNART was a singleton or a composite. The version 2 schema superset of the prior schema - Which is to say that singletons follow the older schema (reorganized structurally) and the new composite document type supports the composite structures, references, and direct inclusion of multiple knowledge documents. All the elements of the original document type are still supported without breaking anything.

Overview of Integration Scenario

This composite uses a simple integration scenario whereby the documentation template is first projected and the order set is then 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 Health Level 7 (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

- Detailed review of composite components
- Map components to 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_B39CervRadi.xml. The second of these entities is the order set named CDSK_KRprt_OS_B15CervRadi.xml. For the purposes of orchestration the composite initially triggers an event causing the documentation template to be activated. Upon the completion of the documentation template the completion triggers the order set knowledge artifact to be activated via an ECA rule.

Data

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	None
FireOrderSet	Named event	None

Redundant Data Elements

None.

Near-Duplicates Within KNARTs

None,.

Redundant References, Supporting Evidence, and Expressions

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

Data Elements That Are to be Hidden From the User

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

None.

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 is conducted prior to proceeding to an implementation phase.

Assets

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

Asset filename	**Description**
CDSK_KRprt_CRCK_B60CervRadi.xml	The main composite controller
CDSK_KRprt_CRDT_B39CervRadi.xml	The documentation template
CDSK_KRprt_OS_B15CervRadi.xml	The order set