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Centre for Intelligent Systems and their Applications

Concept Mapping Between Compendium and IX

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Concept Mapping between Compendium and I-X

Jessica Chen-Burger, Austin Tate
21st March 2003

This document extends the initial description of issues discussed during the CoAKTinG workshop at Open University, October 10-11, 2002. Its content is based on a follow-up internal Edinburgh meeting and the design of new I-X v3.0. Feedback in telephone conversations with Michelle Bachler from OU has also been factored in.

0. Summary of Updates:

- Compendium will no longer be using tags as a mechanism for mapping to I-X system.
- Compendium will allow argumentation nodes to be mapped to I-X constraint nodes (not Note nodes with tags).
- Nodes to be exported to I-X will be marked with highlights and is exported via Compendium exportation user interface.
- A list of mapping examples between Compendium and I-X is added to the document and placed in Section V.
- Based on the mapping examples described in Section V, a brief discussion is given in Section VI.
- In summary, those above changes are mainly reflected Section I, III, V and VI.

I. Conceptual Mapping Summary:

- Compendium Question nodes are mapped to I-X Issue nodes. As compendium question nodes may contain sub-questions, these sub-questions are mapped to I-X sub-issues.
- Compendium Decision nodes are mapped to I-X Activities. As compendium Decision nodes may contain sub-decisions, those sub-decisions are mapped to I-X sub-activities.
- Compendium Argumentation nodes are mapped to I-X Constraints.
- Compendium Reference and Note nodes are mapped to I-X Annotations.

II. Primitives:

Concept Mapping between Compendium Argumentation and I-X Notation:

A. Model Primitives in Compendium: [1]

- **Main Node**
 - Question Node
 - Answer Node
 - Decision Node
- **View Node**
 - Map Node (opens to a map)
 - List Node (opens to a table)

- **Argumentation Node**
 - Argument Node
 - Pro Node
 - Con Node
- **Documentation Node**
 - Reference Node
 - Note Node
- **Link Connecting Node**
 - Directed (arrowed) link connecting all node types

B. Model Primitives in I-X: [2][3]

- **Issue**
 - Sub-issue (This captures the problems to be solved or issues to be resolved.)
- **Activity:**
 - Sub-activity (This captures activities in a process.)
- **Constraint**
 - Constraint (hard constraint)
 - Preference (soft constraint)
- **Annotation**

III. An Initial Mapping Between Compendium and I-X Process Model:

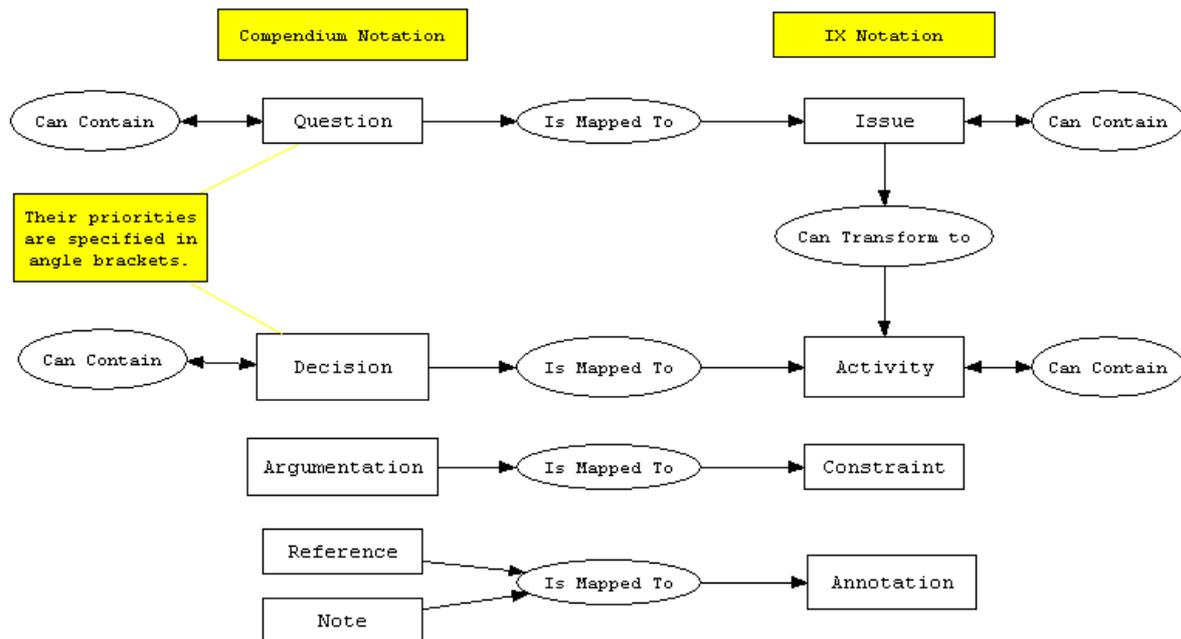


Figure 1: Mapping between Compendium and I-X Primitives

Points about Communication Mechanism:

1. It may be desirable to keep track of Compendium nodes that have been exported to I-X and store feedbacks that may be received from I-X. We propose the export information to be entered using a user interface that may store the information in the

attributes of the corresponding node. This is mainly to provide a communication and tracking mechanism.

IV: Collaboration and Advanced Topics:

A possible division of effort between Compendium and I-X is for Compendium to provide the argumentation for questions and answers including their rationale and justifications, while I-X describes the activities decided upon as well as providing assistance to carry them out. In other words, Compendium may be describing the “Why” and “What” to do in an organisation, where as I-X stores the “What” and “How” to do it information as well as having the execution capabilities of actually doing them.

A few possible collaborations and considerations about them are described here:

- **Issue Tracking:**
 - When I-X finishes its tasks it may feed back to Compendium some indication that a particular task is finished. As the original Compendium node information is recorded on the I-X side, this information can be fed back to Compendium and linked to the original Compendium nodes.
- **Discovery of and Dialogue about Missing Information:**
 - After receiving a particular issue or activity from Compendium, I-X may find (based on its process knowledge) that additional information must be provided in order to carry out the task. Such information may be authorisation needed for tasks or unknown resources used, etc. Such missing information may be resolved by I-X itself, or instigate feedback to Compendium to request more information.
 - After receiving feedback from I-X, Compendium may subsequently provide additional information to I-X. I-X will record this new information and use it to help its operations;
 - Compendium may send new or complimentary information on its own initiatives when it feels necessary. I-X should also be able to deal with such information and decide what to do with it.
- **Annotations:**
 - During a transmission, Compendium may send I-X an “attached” annotation message that is associated with a Question or Decision node, or a “stand-alone” annotation message that is not attached to other Compendium nodes. I-X may treat the former as an annotation to the appropriate issue or activity, and store the latter in a separate annotation node. Compendium may also send an entire sub-tree of argumentations to I-X - as this information may be written in free-style plain text, I-X may treat the entire information as an annotation to the appropriate issue/activity or store it in a separate annotation node.
- **Shared Ontology:**
 - A Meta-Ontology is shared between Compendium and I-X. This Ontology describes the mapping of the two methods as described in Figure 1.
 - A (partially) shared Domain Ontology may be also constructed between Compendium and I-X. This Domain Ontology describes things in the problem domain that both Compendium and I-X work on.
 - I-X will provide a process library based on its process ontology, e.g. the types of activities/meetings/events, the verbs used for processes and their semantics.

- Event and preference: an individual may like to specify interesting events and wish to be alerted when they happen.

V: Conceptual Mapping by Examples

This appendix describes example mappings between Compendium and I-X. In particular, how Compendium nodes may be shown in an I-X I-P2 Panel that consists of the four sub-panels:

1. Issue Panel;
2. Activity Panel;
3. Constraint Panel; and
4. Annotation Panel.

The exportation of Compendium nodes may be of the two types below:

1. exportation of an entire (sub-)tree;
2. exportation of some nodes of a (sub-)tree.

Since in a Compendium map, not all nodes may be selected to be exported to I-X, in this appendix, the selected nodes are highlighted in yellow as they will be shown using Compendium.

Recording semantics of links:

Directed links are widely used in a Compendium map to connect the different types of nodes. We may coarsely divide them in two types:

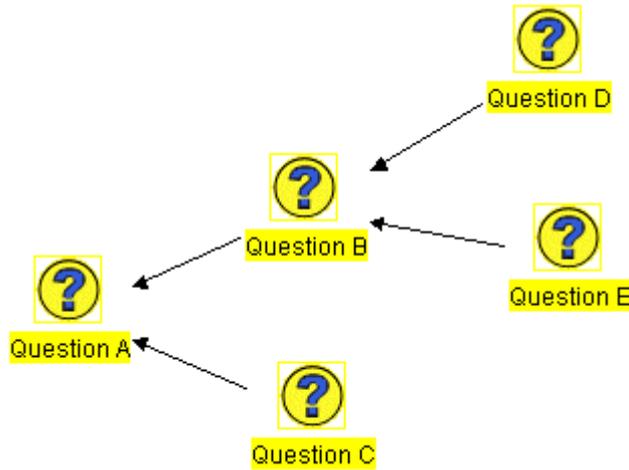
1. “related to” links; and
2. “part of” links.

Related-to links: This is the general relation that may be applicable for any node to node connections. That is to say that if a particular link has not been specified to a certain type then it indicates a “related-to” relation between the connected nodes. In other words, if there is a link pointing from node A to B, it may be read as “node A is related-to node B”.

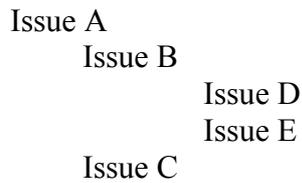
Part-of links: The links between questions and its sub-questions (therefore issues and its sub-issues) and the links between decision and its sub-decisions (therefore activities and its sub-activities) are often of the relationships type 2. As they more naturally preserve the part-of relation. For example, a question of whether/how to do X may lead to several sub-questions that each deals with a sub-part of the problem addressed in the main question. A decision may also lead to may sub-decisions that together form the higher level decision. In I-X when all sub-activities are finished the higher level activity is finished. Where there is not a decomposition relation between two question (or decision) nodes, the general related-to links are used.

In this document, we loosely refer to the node that a link points to as a “parent node” and the node that a link leaving from as a “child node”. This is in particular the case when a hierarchy is observed.

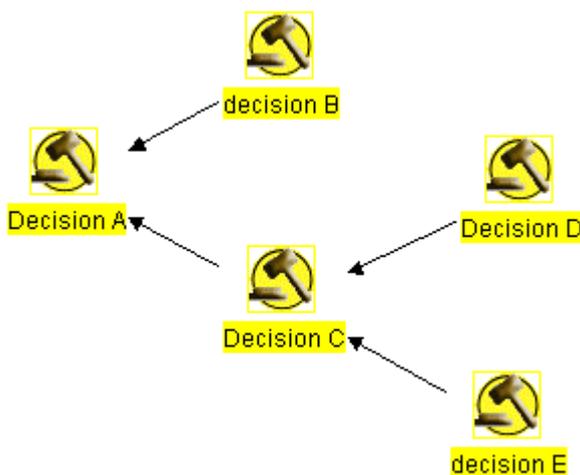
1. Export an entire Questions Structure:



This structure may be shown in an issue hierarchy in the **I-X Issue Panel** to indicate sub-issues of their corresponding parent-issues: (The tree structure in Compendium is therefore naturally preserved in I-X.)



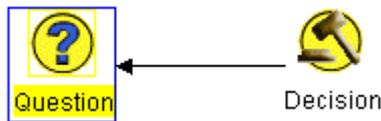
2. Export an entire Decision Structure:



Similarly, a Compendium Decision tree may be mapped to a hierarchy in the **I-X Activity Panel** as below:

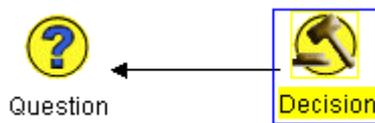
Activity A
 Activity B
 Activity C
 Activity D
 Activity E

3. Export a Question node in a structure:



The question may be presented as an Issue in the I-X Issue Panel without sub-structure and without references to the Decision node that links to it.

4. Export a Decision node in a structure:

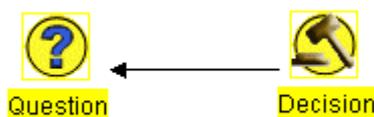


The Decision node may be presented as an Activity in the I-X Activity panel with annotations (e.g. “related to” relation) point to the Question node. The Question node itself, however, is not recorded or presented in the I-X panel, as it has not been exported. This, however, does not prevent the Question node to be exported to I-X at a later stage.

The annotation information that is associated with the Activity entry in the Activity panel may be used to keep track of its position/semantics in a Compendium map that one may decide to refer to (using Compendium). This information may also be used to associate itself with other exported nodes from Compendium. In this case, if the Question node is exported at a later time, the newly created Issue is linked to the activity node.

In the case when the above Question node has a parent node, the link between itself and its parent node is not preserved. The linking information is only preserved for the selected nodes and to its immediate parents.

5. Export a tree of mixed types:



These may be presented in I-X as below:

1. The Question node is presented as an issue in the Issue panel, and

2. The Decision node is presented as an activity in the Activity panel with annotation information linking to the Question node (a related-to relation);
3. Since in this case, the Question node is also exported to I-X. I-X may (or may not) assign an I-XID to it. The newly created activity entry on the Activity panel will be able to point to the corresponding newly created issue within I-X (using Compendium, I-X IDs and/or other means is an implementation issue.)

6. Argumentation Structure:

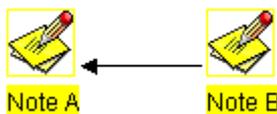


The above graph may be shown as two constraints in the I-X constraint panel as below: (a Compendium argumentation node is mapped to an I-X constraint.)

1. An entry of constraint A in the constraint panel;
2. An entry of constraint B in the constraint panel with additional information that stores the “related-to” relation to constraint A. (Where this relation information will be stored and in which form is an implementation issue.)

As argumentation nodes do not have a hierarchy, i.e. their relation is more of “related-to” other than “part-of” relations as displayed in the Question/Issue and Decision/Activity nodes, the link information is recorded as a “related-to” relation in I-X.

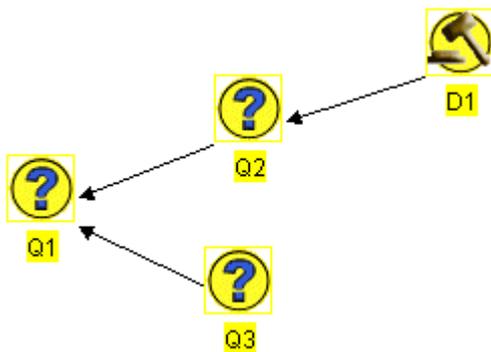
7. Note Structure:



Those two nodes may be represented in I-X as below: (A Compendium Note node is mapped to an I-X Annotation.)

1. An entry of annotation A in the I-X annotation panel;
2. An entry of annotation B in the I-X annotation panel with additional information that stores the “related-to” relation to annotation A. (Where this relation information will be stored and in which form is an implementation issue.)

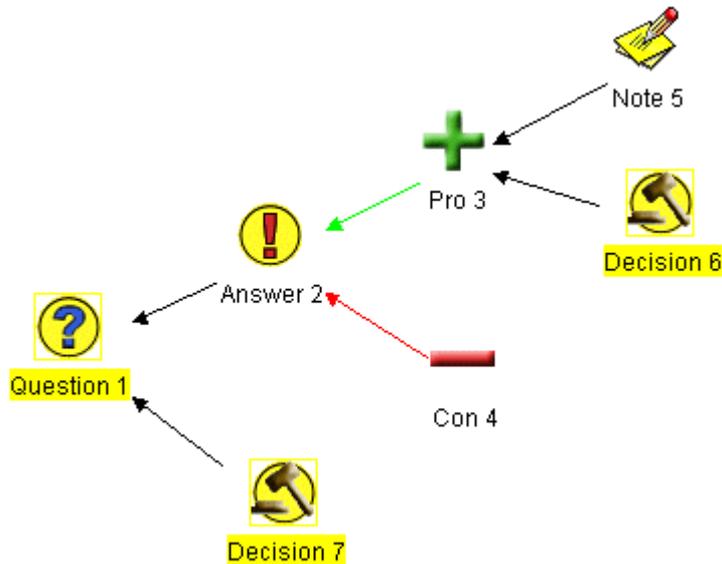
8. More Complex Structure:



This graph may be represented in I-X as below:

1. An issue of Q1 in the issue panel;
2. An issue of Q2 in the issue panel as a sub-issue of Q1 (being part of the Q1 hierarchy);
3. An issue of Q3 in the issue panel as a sub-issue of Q1 (being part of the Q1 hierarchy);
4. An activity of D1 with annotation information, “related-to” relation, linking to issue Q2.

9. Partially selected tree:



As they are highlighted, three nodes are exported, Question 1, Decision 6 and 7 and will be represented in I-X as an Issue and two activities and in the corresponding specialised panels. The two activities are also associated with the appropriate linking information to their immediate “parent nodes”.

VI: Discussion:

Points of Consideration: additional mapping facilities

As not all nodes are exported (or mapped) to I-X, inevitably some information is lost in I-X. This is desirable in some cases. One, however, may also want to consider to enrich the conceptual mapping by also mapping Pro and Con nodes to I-X annotation nodes. Therefore, for instance, in this case, when the Pro 3 node is also selected for exportation, it can be explicitly recorded in I-X. Such additional information will provide decision rationale as why some decisions have been made, but they do not provide operational know-how.

References:

[1] Compendium Web Site <http://www.compendiuminstitute.org/>

[2] <I-N-C-A> Web Site <http://i-x.info/inca/>

[3] I-X Web Site <http://i-x.info>