



School of Informatics, University of Edinburgh

Centre for Intelligent Systems and their Applications

Mapping Principles Between IX and Compendium

by

Jessica Chen-Burger

Informatics Research Report EDI-INF-RR-0167

School of Informatics
<http://www.informatics.ed.ac.uk/>

May 2003

Mapping Principles Between IX and Compendium

Jessica Chen-Burger

Informatics Research Report EDI-INF-RR-0167

SCHOOL *of* INFORMATICS

Centre for Intelligent Systems and their Applications

May 2003

not published

Abstract :

Keywords :

Copyright © 2003 by The University of Edinburgh. All Rights Reserved

The authors and the University of Edinburgh retain the right to reproduce and publish this paper for non-commercial purposes.

Permission is granted for this report to be reproduced by others for non-commercial purposes as long as this copyright notice is reprinted in full in any reproduction. Applications to make other use of the material should be addressed in the first instance to Copyright Permissions, School of Informatics, The University of Edinburgh, 2 Buccleuch Place, Edinburgh EH8 9LW, Scotland.

Mapping Principles between IX and Compendium

Jessica Chen-Burger
April 25th, 2003

This document describes initial attempts to provide mapping principles that may be carried out for translating concepts between Compendium and IX Process Panels. This document is based on previous mapping results [1] and provides a more detailed illustration of it.

Its purpose is to promote discussion and provide a foundation for forming mapping consensus between Compendium and IX. This document first describes mapping principles. These principles are used in and demonstrated by a concrete example that is based on a larger Compendium map provided by Simon Buckingham-Shum, KMI OU.

As understood, a new version of IX Process Panel will be produced. In addition to the existing *Issue*, *Activity* and *Constraint* sub-panels, the new IX Process Panel will also have an *Annotation* sub-panel. Although these changes will largely not affect its conceptual mapping to Compendium, the presentation of the mapping results will be reflected in an IX Panel. This document is constructed based on this new IX Process Panel.

Mapping Principles and Proposals:

The proposed high level mapping principles are given below:

- A one-layered parent-tracking translation.
- The use of two types of links in a Compendium map
- Mapping compendium “Reference” and “Note” nodes to IX.

A one-layered parent-tracking translation:

The one-layered parent tracking mechanism proposes that the mapping and tracking of relations between Compendium nodes is only recorded at one-layer, the immediate parent level. The grandparent and sibling nodes may be derived via those links. This tracking mechanism is directional. The relation is recorded at the child node, but not at the parent node. We loosely define a “child node” (with respect of the link in concern) as the node that a link leaves from, and a “parent node” (with respect of the link in concern) as a node that a link points to in a Compendium map.¹

The use of two types of links in a Compendium map:

¹ Although a one-directional mapping for links has been proposed, reverse-links may also be consistently recorded in IX, if desired.

We propose two types of links to be used in a Compendium map, the **related-to** and **part-of** links, where originally one type of links has been used (the related-to link).² As previously indicated in [1], a related-to link generally indicates a connection between two nodes, where a part-of link indicates a decomposition (sub-node) relation between the connected nodes.³

The proposal for Compendium to use two different types of links makes it possible to represent the fact that a (decomposable) node may be “related-to” some nodes while has “part-of” relations with the others. For instance, a Question node *X* may be related-to another Question node *Y*, while having a (different) sub-Question node *X.I* (a part-of relation).

It is possible that this approach is not adopted. If this approach is not adopted, then a decision will have to be made during translation about the semantics of a link between two decomposable nodes, e.g. whether it is a related-to or part-of relation. In the example of this document, due to the absence of two different types of links in the current Compendium map, we assume that all links between two Questions nodes are part-of relations, and all links between two Decision nodes are also part-of relations. Any other links are related-to relations.

Mapping principles of Compendium “Reference” and “Note” nodes to IX:

Reference” and “Note” nodes are mapped to the IX annotation concept. As the new IX process panel will have an annotation sub-panel, those nodes will be shown through there.

Case Study: A Mapping Example:

Based on those mapping principles, we attempt to map out an example Compendium Map given in Figure 1 that has been provided by Simon. We firstly illustrate mapping details and rationale followed by how it may be presented in an IX Process Panel. The highlighted parts of the map are selected for exportation to IX (an convention agreed with OU).

As currently, there is no indication about whether a link is a related-to or part-of relation in a compendium map. In this example, we assume that a link from a question node to another question node is a part-of link, and that a link from a decision node to another decision node is also a part-of link, whereas all other links are interpreted as related-to links.

In this example, the names of the nodes are often a combination of the following:

Node-type + Node-ID.

² This does not include Pro and Con specialised links, as they are not mapped and translated to IX.

³ Although a part-of link may imply either a specialisation or an alternation relation. One may only want to consider this to be incorporated in Compendium if it is proved to be necessary.

For instance, the node “Question 1” indicates its node type is “Question” and that it has an ID “1” that is used to distinguish it from other Question nodes.

These node names are not altered after translated and imported to I-X.

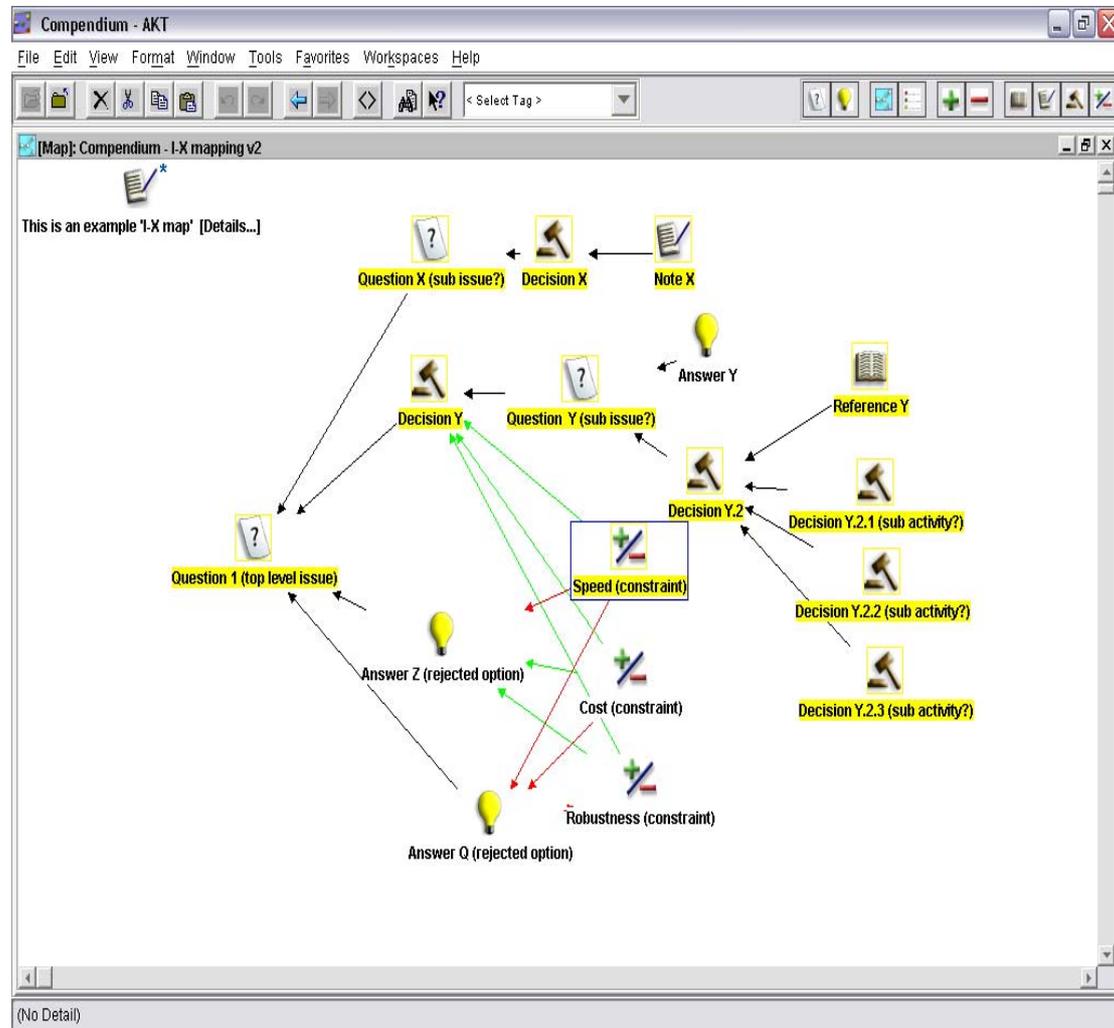


Figure 1: An Example Compendium Map

The below illustrates translation details:

1. As *Questions 1* is a top-level question, it is represented as a top-level issue (named *Question 1*) in the IX Issue sub-panel.
2. As *Question X* is interpreted as a sub-question of *Question 1* (a part-of relation), it is also represented as a sub-issue (also named *Question X*) of issue *Question 1*. The part-of link is recorded in the annotation field, and also shown in the hierarchical relation between *Question 1* and *Question X* in the Issue panel (an IX convention).
3. As *Decision X* is related to *Question X* in the Compendium map and not a sub-decision of any other nodes, it is presented as an activity in the IX activity sub-panel annotated with a related-to relation with issue *Question X*.

4. As a Note node in Compendium is mapped to an Annotation node in IX. *Note X* is presented as an annotation item in the Annotation sub-panel. As *Note X* is related to *Decision X*, we store this relation in the “Reference” field. There are also other ways that may be used to preserve the link; this document only gives an example of those.

With those above Compendium nodes translated, a (simulated) IX panel is given in Figure 1. As so far there are no individual constraint item, the constraint sub-panels is empty.

Note that as the real version of IX panel that consists of the above mentioned four sub-panels has not been produced, Figure 2 offers a speculative look of IX. The final IX may or may not look similar to this setting.

Issues

<i>Description</i>	<i>Annotations</i>	<i>Priority</i>	<i>Action</i>
Question 1			
Question X	(link part-of “Question 1”)**		

Activities

<i>Description</i>	<i>Annotations</i>	<i>Priority</i>	<i>Action</i>
Decision X	(link related-to “Question X”)		

Constraints

<i>Description</i>	<i>Annotations</i>		

Annotations

<i>Description</i>	<i>Reference</i>		
Note X	(link related-to “Decision X”)		

Figure 2: First Stage Mapping Result*

* As the new IX has not been implemented, the above panels and presentation are speculative. Its purpose is only to help illustrate how Compendium nodes may be translated to and presented in an IX process panel. The final version of IX may or may not look similar to the above. The mapping of fields “priority” and “action” are not shown as they are not included in the initial map. Those fields, however, can be included in this approach when an agreed interface is in place.

** For simplicity, we have used the entire node name as the unique ID for the node in a link reference. In reality, when IX is fully implemented, this is likely to be replaced by IX’s internal identification system.

Applying the same principles, the rest of the nodes can be mapped below:

5. *Decision Y* is presented in the activity sub-panel, with the necessary link, related-to, maintained to *Question 1*.
6. *Question Y* is presented as a top-level issue item in the issue panel, with relation to *Decision Y*. Its two-levels away relation with *Question 1* is not expressively presented in IX, but is derivable via *Decision Y*. As *Question Y* is not linked directly to *Question 1*, it is not been interpreted as a direct sub-issue of *Question 1*. To become a sub-issue of *Question 1*, an additional (part-of) link may be drawn from *Question 1* to itself.⁴

Issue sub-panel

<i>Description</i>	<i>Annotations</i>	<i>Priority</i>	<i>Action</i>
Question 1			
Question X	(link part-of "Question 1")		
Question Y	(link related-to "Decision Y")		
Question Y.2	(link related-to "Question Y")		

Activities sub-panel

<i>Description</i>	<i>Annotations</i>	<i>Priority</i>	<i>Action</i>
Decision X	(link related-to "Question X")		
Decision Y	(link related-to "Question 1")		
Decision Y.2	(link related-to "Question Y")		
Decision Y.2.1	(link part-of "Decision Y.2")		
Decision Y.2.2	(link part-of "Decision Y.2")		
Decision Y.2.3	(link part-of "Decision Y.2")		

Constraint sub-panel

<i>Description</i>	<i>Annotations</i>		
Speed	(link related-to "Decision Y")		

Annotation sub-panel

<i>Description</i>	<i>Reference</i>		
Note X	(link related-to "Decision X")		
Reference Y	(link related-to "Decision Y.2")		

⁴ Again, if one does not wish to use only a direct (part-of) link to indicate a sub-structure, another mapping mechanism should be used.

Figure 3: Completed Mapping Result

7. *Decision Y.2* is linked to *Question Y*, it is therefore interpreted as a top-level issue in the IX activity panel with a related-to link to *Question Y*.
8. “Reference Y” is presented as an annotation node in IX, with a reference to “Decision Y.2”.
9. *Decision Y.2.1*, *Decision Y.2.2*, and *Decision Y.2.3* are sub-decisions of *Decision Y.2* and are interpreted as sub-activities of “Decision Y.2” in IX.
10. As an argumentation node is mapped to an IX Constraint node, “Speed” is presented as a constraint in the constraint sub-panel, with reference to *Decision Y*. As the node type “Answer” is not mapped to IX, the links with *Answer Z* and *Answer Q* have not been exported to and recorded IX.⁵

This completes the mapping example.

Discussion:

The decision and tracking of whether a question/issue has been resolved requires various knowledge and considerations that can be a very complex problem. Some considerations are given below:

- From a static point of view: since not all parts of a compendium map are exported to IX, not all tasks are exported to IX. Therefore, upon completion of all tasks relevant to an issue on one IX panel does not guarantee the issue has been resolved.
- From a distributed point of view: relevant tasks of an issue may be assigned to different IX process panels (that are controlled by different users). This may raise synchronisation problems if no proper control/tracking mechanism is put in place.
- From a semantic point of view: a compendium map can be very large that involves several diagrams and with relatively deep structure. Whether it carries the same weight for the necessity of completion of certain tasks that is close to an issue or far away from an issue (in the hierarchy or graph) is not clear. It is also unclear when alternative tasks are included in the map that not all of them need to be carried out/finished.
- From a dynamic point of view: this involves the practice of exporting information in a Compendium map to IX. When is an appropriate time for doing so? Can a fixed part of a map be exported to IX when the rest of the map is still developing, as long as the fixed part of the map is no longer subject to changes? If the answer is yes, then will it be possible that more tasks are discovered and therefore generated for an already exported issue?

In order to avoid all of the above difficulties, a weak semantics may be applied. It is to suggest that the completion of a certain task may “*contribute to*” resolving the corresponding related issues. Perhaps only the Compendium user that has the full

⁵ It is interesting to consider, if the node *Speed* is linked to another node, say *Decision U*, that can be mapped to an IX concept but has not been selected for exportation, whether the link with Decision U should be preserved.

information can decide whether an issue has truly been fully resolved, unless other control mechanism is in place that addresses the above points.

Nevertheless, from an IX process panel's point of view, upon finishing all the assigned tasks, its work is done.

References:

[1] Jessica Chen-Burger, Austin Tate, Concept Mapping between Compendium and I-X, 21st March 2003.