

Mark-up based analysis of narrative guidelines with the Stepper tool

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Structure of the presentation

- Step-by-step mark-up based formalisation of narrative guidelines
- Stepper tool UI & formalisation example
- Transformation process diagram
- Comparison of existing GL mark-up tools
- Future work

Step-by-step mark-up based formalisation of narrative guidelines (1)

- **Bottom-up**, document-centric approach to formalisation
vs. top-down methods relying on a flowchart-like model
- Advantages of bottom-up approaches
 - lower risk of information loss
 - lower risk of implicate subjectivisation
- Disadvantages of bottom-up approaches
 - might be tedious
 - large syntactical and semantic gap between marked-up text and operational model

Step-by-step mark-up based formalisation of narrative guidelines (2)

- Central ideas of the Stepper tool:
 - An ‘intelligent’ **mark-up** editor and **transformation** processor might make the formalisation easier
 - Explicit separation of formalisation **levels** might help to bridge the mentioned gap

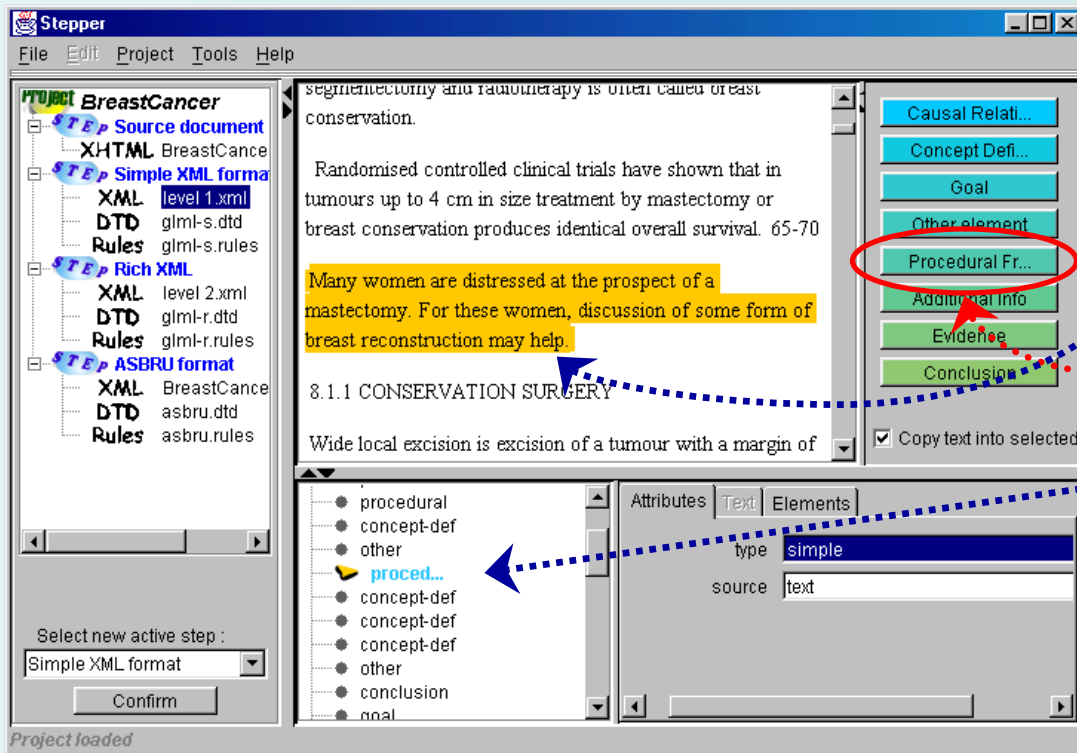
Step-by-step mark-up based formalisation of narrative guidelines (3)

- Stepper offers
 - initial text mark-up
 - rule-based transformation between different levels of formalisation or different models
 - retrieval of corresponding knowledge elements (and text) across formalisation levels
- Used technology
 - standards: XML, XLink, XSLT
 - original XKBT (‘...knowledge base transformation’) language defining interactive parts of transformation

Step-by-step mark-up based formalisation of narrative guidelines (4)

- Experiments
 - WHO 1999 Hypertension Guidelines
 - tentative formalisation of **selected parts**
 - through **all levels** of formalisation
 - result: **automatically generated demo-application**
 - Czech Unstable Angina Guidelines
 - Testing formalisation of the **whole document**
 - Breast Cancer Guidelines (at VU Amsterdam)
 - preparation of **ASBRU** language implementation

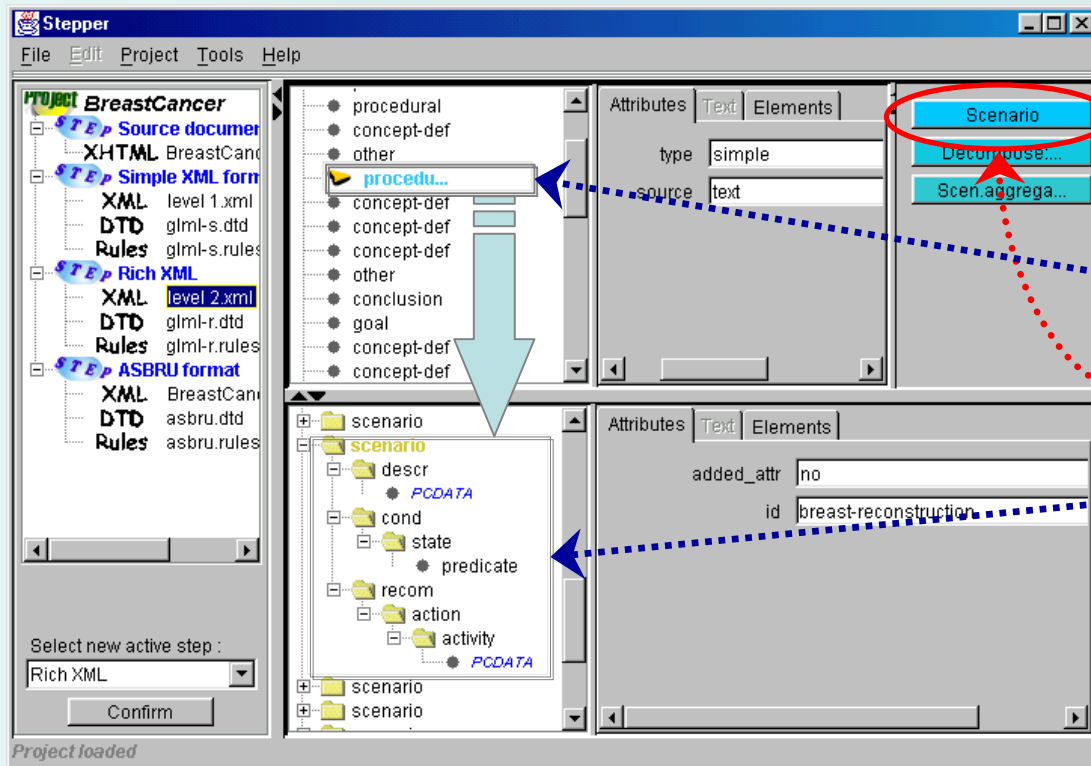
Stepper tool UI (1)



- Initial mark-up of source document

1. Selecting text in source level
2. Picking one of offered rules
3. Creation of new successor in destination level (in automatic way)

Stepper tool UI (2)

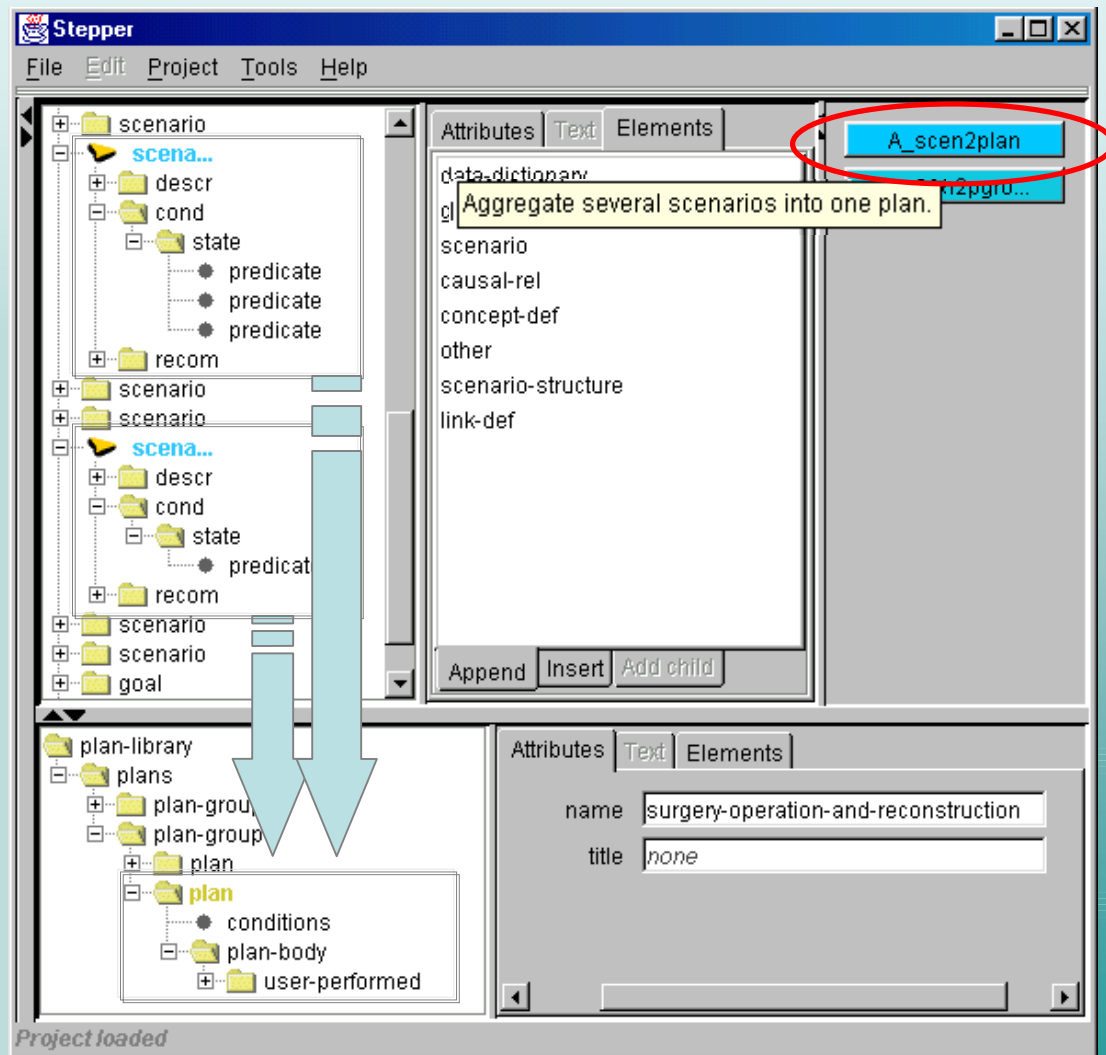


Typical work with Stepper : **XML-to-XML** transformation

1. Selecting fragment(s) in source level
2. Picking one of offered rules
3. Creation of new successor in destination level
4. Editing successors sub-structure

Stepper tool UI (3)

- Example of creation of asbru plan from several parts in previous level
- Transformation rule types:
 - Aggregation
 - Decomposition
 - One-to-one relation
- All transformation rules are prepared in included editor



Transformation process diagram (1)

- Multiple step approach disadvantages
 - With increasing number of levels whole process is getting unbearably complicated
 - UI for only two levels at the same time is insufficient
- Possible solution
 - Each new successor is enriched with links to all its ancestors (using Xlink technology)
 - Links allows finding all text fragments in source document for any part of any level

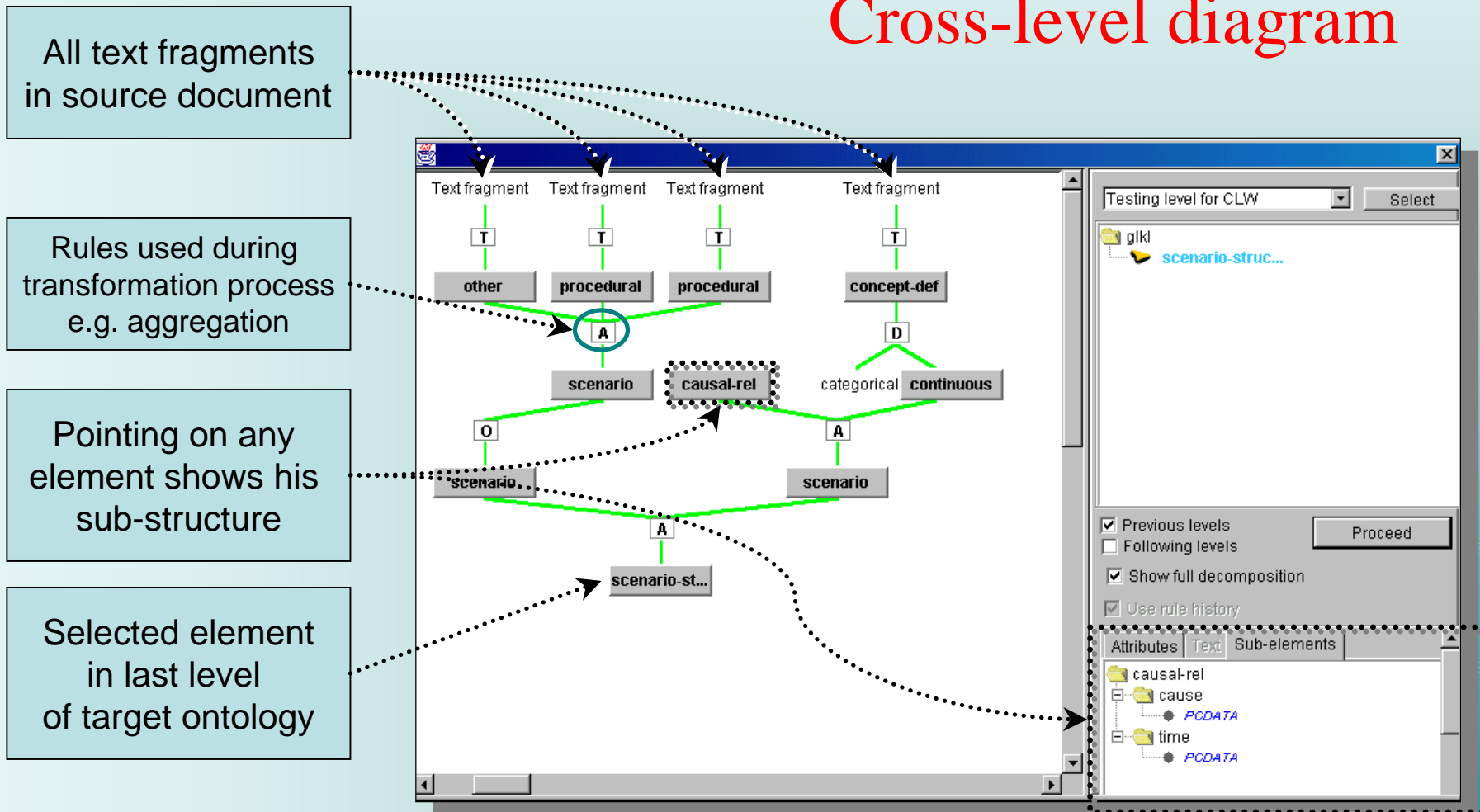
Visualization tool for
links



Cross-level diagram

Transformation process diagram (2)

Cross-level diagram



Comparison of existing GL mark-up tools (1)

- Existing tools:
 - GEM-Cutter
 - Developed at YCMI
 - Supports only GEM format
 - Graphic Mark-Up Tool (GMT)
 - Developed at VUT
 - Supports Asbru language
 - Uruz
 - Part of DeGeL project
 - Supports both GEM and Asbru (possible extension to other ontologies)

Comparison of existing GL mark-up tools (2)

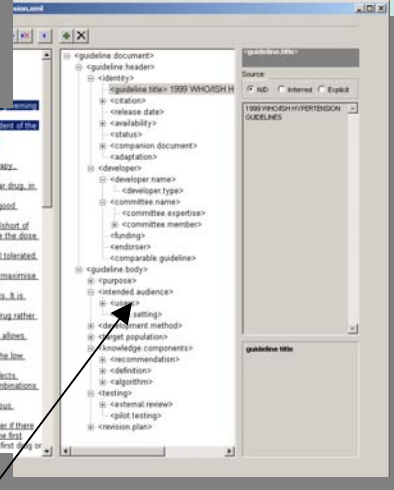
GEM-Cutter

Source document

*.txt
*.rtf

Gem-Cutter
mark-up

Output – GEM format
no links



Stepper

Source document

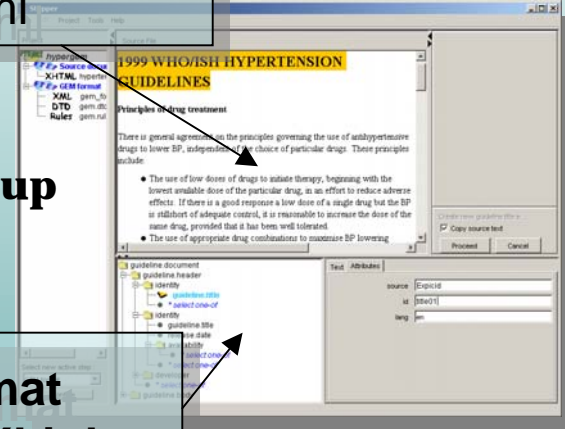
*.xhtml

Stepper
one-step mark-up

GEM format
including XLink

XSLT

Pure GEM format



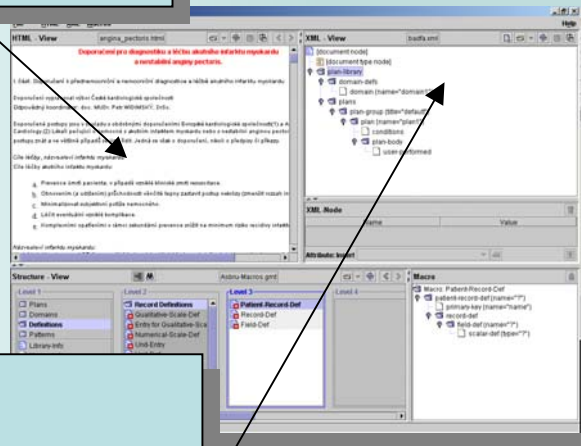
Comparison of existing GL mark-up tools (3)

GMT

Source document
*.html

GMT
one-step
mark-up

Output :
Asbru XML format
including links to source
text via special attributes



Stepper

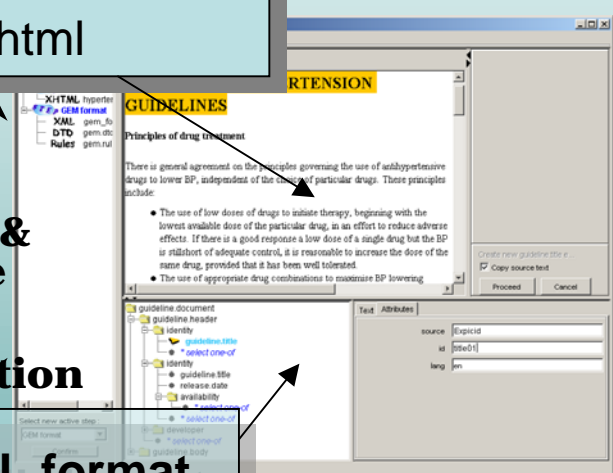
Source document
*.xhtml

Stepper
mark-up &
multiple
level
transformation

Asbru XML format
including XLink

XSLT

Pure Asbru format



Future Work

- Co-operation with the database group at the EuroMISE:
 - resources such as ICD-10 or ATC already part of their **EHR** application MUDR
 - stand-alone and web-service-based provision of terminology for Stepper envisaged
- Including other ontologies, e.g.:
 - **GLIF** (version 3 is already based on XML and has execution engine *GLEE*)
 - **Arden syntax** (many documents encoded in MLM)

More information at euromise.vse.cz/Stepper