GTM Level 1 Proposal

July 2, 2007
GTM Level 1 Proposal

• This is a first GTM level 1 proposal
  – intended as a strawman to kick-start discussion
  – will be properly formalized once feedback indicates that the basic form of the proposal is accepted by the committee

• Feedback wanted!
  – is this headed in the right direction?
  – what is good?
  – what is bad?
  – what is missing?
  – what is too much?
  – what is not clear?
  – ...

http://www.isotopicmaps.org
Mapping to TMCL

- GTM level 1 will have a defined mapping to TMCL
  - this mapping is not fully defined in this proposal yet
- Note: TMCL schemas are expressed as topic maps
Topic types

- Topic types are always boxes
- A QName (or id) giving the subject (or item) identifier must be present
- Prefixes are declared with floating text in CTM syntax

foo:person

%prefix foo http://psi.example.org/

http://www.isotopicmaps.org
Properties

- A division for names may or may not be present
- A division for occurrences may or may not be present
  - must always be the second division
  - first can be empty
- Cardinality is omissible
- Datatypes are omissible
- `@ oasis:language` means `foo:biography` can be scoped with topics of this type

```
<table>
<thead>
<tr>
<th>Property</th>
<th>Cardinality</th>
</tr>
</thead>
<tbody>
<tr>
<td>tm:name</td>
<td>1..1</td>
</tr>
<tr>
<td>foo:given-name</td>
<td>1..1</td>
</tr>
<tr>
<td>foo:family-name</td>
<td>1..1</td>
</tr>
<tr>
<td>foo:email : string</td>
<td>1..1</td>
</tr>
<tr>
<td>foo:biography : uri</td>
<td>0..*</td>
</tr>
<tr>
<td>@ oasis:language</td>
<td></td>
</tr>
</tbody>
</table>
```
Abstract topic types

- As in UML
  - write the topic type identifier in italics

<table>
<thead>
<tr>
<th>foo:person</th>
</tr>
</thead>
<tbody>
<tr>
<td>tm:name</td>
</tr>
<tr>
<td>foo:given-name</td>
</tr>
<tr>
<td>foo:family-name</td>
</tr>
<tr>
<td>foo:email : string</td>
</tr>
<tr>
<td>foo:biography : uri</td>
</tr>
<tr>
<td>@ oasis:biography</td>
</tr>
</tbody>
</table>
Binary associations

• Binary associations are lines
  – association type given in middle
  – role types given near player
  – cardinality from player side given near player
N-ary associations

- N-ary associations use a circle to represent the association type
  - behaviour is otherwise as for binaries
Unary associations

- Unary associations follow the same pattern
- There must be restrictions on the possible cardinalities here
Symmetric associations

- Binary associations where the same role type appears on both sides
- Issue: cardinality on both sides must be consistent
Repeatable roles

- For n-ary associations the cardinalities of roles in instance associations can be given.
- For binary associations they are fixed at 1..1 (except if repeated, as in symmetrics).
- Disclaimer: this is not an example of good modelling.

```
foo:person
  foo:coach 0..1
  foo:player 0..1
  foo:soccer-team 11..* 1..1
```
Roles with many player types

- It’s possible for a role type to be played by more than one topic type
- This is represented by branching the line
  - works for both n-ary and binary
- Role type given at branching point
- Cardinalities given at player
Subclassing

- Effectively UML notation
Text notes

- Text notes documenting the diagrams are allowed
- They are given as simple rectangles containing the text note

foo:person

foo:employee

We realize that employee is strictly speaking a role type, but...
Identity constraints

- A separate division for these
  - divisions have a fixed order
  - names, occurrences, identities

- **Predefined names**
  - locator (subject locator)
  - identifier (subject identifier)
  - itemid (item identifier)

- **Datatypes fixed to “uri”**

<table>
<thead>
<tr>
<th>foo:organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>tm:name</td>
</tr>
<tr>
<td>foo:homepage : uri</td>
</tr>
<tr>
<td>identifier</td>
</tr>
</tbody>
</table>
Issue: What about names?

- **This proposal does not put names for typing topics in the diagram**
  - the rationale is that space savings are crucial for readability in large diagrams

- **So where are the names specified?**

- **In this proposal that is considered out of scope**
  - editing tools can allow the names to be edited manually
  - and/or they can generate default names from the PSIs
  - or they can ignore them entirely
Issue: scope support

• The support for scope needs more work
• Open questions:
  – interaction of cardinality with scope
  – multiple types of scoping topics
  – ...

http://www.isotopicmaps.org
Issue: reification support

• Should there be any?
• What should it look like?
Issue: assertion constraints

• Should query constraints be supported?
• Should regular expression constraints be supported?
Issue: omitted information

• GTM must indicate which information can be omitted
• **How should omitted information be interpreted?**
  – should there be default cardinalities, for example?
  – is it possible to generate TMCL without specifying these?
  – is it better to just leave the issue of defaults to tools?
• **What about visual shorthands for omitted information?**
  – these would serve as indicators that something is present but not shown
  – is that useful? is it clutter? is it too much complexity?
Issue: overlapping types

- It is possible for topic types to overlap
  - for example: in the Italian Opera topic map the librettist and composer types overlap, in the sense that topics can be instances of both
- In TMCL overlap must be explicitly stated to be allowed
- Should GTM support this?
  - if so, how?
Issue: codependent role player types

- Given an association type contained-in that joins
  - cities, provinces, and countries, where
  - cities must be in a province, and provinces must be in a country
  - it’s not allowed to connect cities directly with countries

- This constraint is expressible in TMCL

- Should it be expressible in GTM?

- If so, how?
Issue: support for multiple schemas?

- TMCL allows multiple schemas to be mixed in a single topic map
- Should GTM allow diagrams to indicate which schema they “belong to”?
- The current proposal stays well clear of this
Issue: interchange format for graphical info

- We propose that we not support this
Issue: documentation of non-topic types

• Should it be possible to make a GTM diagram that says
  – dc:description is an occurrence type with datatype string?
• That is, without assigning the occurrence type to any topic type...
• This would make it possible to create diagrams for ontology fragments
  – on the other hand: is that useful?
• Is the thing on the right the solution?

<table>
<thead>
<tr>
<th>dc:description : string</th>
</tr>
</thead>
</table>
Issue: navigable roles

- **UML allows navigable roles to be specified**
  - that is, to say that an association is only traversable in one direction

- **Should GTM and TMCL support this?**
  - it would not be a hard constraint, but more in the nature of a semantic hint