

Report on the Open Space Sessions¹

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Abstract. This report summarizes the eleven contributions by eight presenters from the two open space sessions that took place during the TMRA'05 workshop on 6th and 7th of October 2005. The contributions were informal and non-refereed, since workshop attendants had been given the opportunity to sign up to short talks on a flipchart, and the suggested format for each presentation was: only one slide, five minutes presentation, and five minutes discussion. The 90 minutes, smoothly chaired by Lars Marius Garshol, were filled with an inspiring exchange of ideas and arguments, since in this "playground for visionaries" new proposals were made and current work in progress was reported and lively discussed. For the purpose of this report, the presentations have been regrouped into the five sections: 1. Resources for the topic maps research community, 2. Authoring topic maps, 3. Querying topic maps, 4. A PSI infrastructure for topic maps, and finally, 5. Topic maps applications.

1. Resources for the Topic Maps Research Community

bibMap: The Bibliography of the Topic Maps Technology Literature

Since one of main objectives of the TMRA'05 workshop was "to chart the landscape of topic maps research", *Lutz Maicher*, University of Leipzig, created *bibMap*², an attempt to capture all known research references to the topic maps technology literature, represented in one topic map. This bibliographic topic map contains 95 persons and 194 sources (version 1.0 revision 1.3.3 of 2005-08-22). It is published in LTM³ (and also available in XTM⁴) format and can be freely used. To deploy it (e.g. for literature research), it may be loaded into a freely available topic maps browser such as the

¹ The corresponding slides for all presentations can be retrieved from <http://www.informatik.uni-leipzig.de/~tmra05/prog.html#OSS1> and <http://www.informatik.uni-leipzig.de/~tmra05/prog.html#OSS2>. In the preparation of this report, the following two blog entries about this session, published by the session chair, have been used: <http://www.garshol.priv.no/blog/8.html> and <http://www.garshol.priv.no/blog/9.html>. In addition, comments by the presenters about an earlier draft of this report have been taken into account.

² <http://www.informatik.uni-leipzig.de/~maicher/bibliography.html>

³ http://www.informatik.uni-leipzig.de/~maicher/bib/bibmap_latest.ltm

⁴ http://www.informatik.uni-leipzig.de/~maicher/bib/bibmap_latest.xtm and http://www.topic-maps.org/lib/exe/fetch.php?cache=cache&media=topic_maps%3Abibmap.xtm

TM4J/TMNav or the Omnigator, or be viewed online⁵ with Tmwiki, developed by Hendrik Thomas (see below). You are also free to write your own application using bibMap. To maintain consistency, modification of the original bibMap is not allowed. In order to extend it with your own documented (subjective) view of the topic maps research literature, you may create your own topic map (with categories, annotations, and comments) and merge it with bibMap. Exchanging such extensions with others in the topic maps community and merging further extensions in is highly encouraged. Please contact Lutz Maicher if you want to collaborate with him on improving bib-Map.

2. Authoring Topic Maps

TMEP Disclosure: Disclosing the Process of the Topic Maps Engineering

In order to ease the maintenance of huge topic maps (like his bibMap), *Lutz Maicher* advocates to also disclose the observation principle applied during the topic map generation, i.e. to document the principles by which a topic map is created. A schema is not sufficient for this purpose, as the editorial guidelines need also to be documented. If a schema, for example, defines that a topic of type “person” exists, a maintainer of the topic map would want to know when such a topic has to be created and how a person should be described accurately.

A TMEP disclosure is a topic map which describes the editing process⁶ (the observation of the environment) motivating the topic map modifications. It consists of a set of action items which direct an interactive editing interface. The action items are: action directive, action sequence and action container. A TMEP disclosure defines an operator, an operand and a slot for the result, as well as conditions and the previous action item if the condition holds. Lutz Maicher demonstrated his current TMEP disclosure implementation, using the console, and the corresponding large LTM topic map⁷.

A TMEP disclosure is useful to drive generic topic map editing interfaces (customizing the editing interface with TMEP), to disclose how automatic indexing functions (like e.g. in the Semantic Talk [1] system which creates indices of real-time speech streams) were used to improve later integration of indices, and to describe arbitrary workflows.

Tmwiki – a Topic Map wiki application

Tmwiki⁸, developed and presented by *Hendrik Thomas*, is:

1. a topic map-enhanced wiki system: wiki-like collaborative editing of XTM topic maps and browsing and viewing of topic maps with a generic graphical topic map browser (TMV⁹, the “Topic Map Visualiser”) as a display and navigation interface;

⁵ http://www.topic-maps.org/cgi-bin/tmv_graph.pl?id=b1&path=bibmap.xtm

⁶ The acronym TMEP stands for: Topic Maps Editing Process,

⁷ See <http://www.informatik.uni-leipzig.de/~tmra05/PRES/LMc.ppt>, slide 3

⁸ <http://www.topic-maps.org/projects:tmwiki>

⁹ <http://www.topic-maps.org/projects:tmv>

2. content in this wiki about topic maps (information which someone needs to understand what topic maps are for and how they can be used).

Tmwiki extends the PHP wiki DokuWiki¹⁰ (which stores all data in plain text files) by storing topic maps flattened into the file system, and by displaying them.

As seen above, editing and viewing the bibMap topic map is one example. Another example is viewing the entry for this presentation¹¹ in the TMRA'05 topic map¹², originally created by Robert Cerny.

A clear advantage of Tmwiki is the capability for very easy and fast collaborative development of topic maps, supported by a versioning system and an RSS feed about changes. Current problems are consistency (the topic map may become confusing because additions by many users may lead to an unstructured topic map editing process), and that Tmwiki understands only XTM syntax, since XPath and no topic maps engine is used internally.

AsTMa= 2.0: Authoring Topic Maps

Lars Heuer held a 6-slide tutorial on latest developments towards AsTMa= (version 2.0), created by him and Robert Barta.¹³ The AsTMa*¹⁴ language family [3] is designed to support authoring, updating, constraining and querying topic maps. AsTMa= is the authoring language¹⁵, and “=” stands for facts which authors state. Version 2.0 is almost ready, but some work remains to be done. AsTMa= supports definition of a topic by identifier, by subject locator and by subject identifier. An association can be defined as follows:

General:

```
(assoc-type)
  role-type: role-player
```

Example:

```
(membership)
  member: john
  group: beatles
```

Association templates are one of the most powerful features of AsTMa=, since the template URIs (here: ...#left and ...#right) will be replaced by the respective topics:

```
[ (born-in)
  bio-entity:
  http://astma.it.bond.edu.au/authoring/psi/1.0#left
  place: http://astma.it.bond.edu.au/authoring/psi/1.0#right
]
```

Named association templates look like this:

```
born-in = [(i'http://psi.example.org/born-in )
... ]
```

To apply an association template:

```
JohnLennon is-a person born-in Liverpool
```

¹⁰ <http://wiki.splitbrain.org/wiki:dokuwiki>

¹¹ http://www.topic-maps.org/cgi-bin/tmv_graph.pl?id=t713&path=tmra05.xtm

¹² http://www.topic-maps.org/cgi-bin/tmv_graph.pl?path=tmra05.xtm

¹³ [2] is a tutorial of the *previous* version of AsTMa=

¹⁴ <http://astma.it.bond.edu.au/>

¹⁵ A comparable authoring language is LTM [4]. AsTMa= v2.0 will have directives like LTM for prefixes, include etc.

```
tn: John Lennon
var @sort: lennon, john
ex (website): http://johnlennon.com
in @en (descr): John Lennon was ...
```

Lars Heuer has also written an AsTMa= parser in Java for TMAPI¹⁶, which will be open source. The alpha version is available upon direct request from the author.

3. Querying Topic Maps

AIOBCT - Q/A over Topic Maps

Rani Pinchuk reported on how topic map queries are used in the AIOBCT project to support question answering (Q/A). AIOBCT is an ESA project to create a Q/A system to assist astronauts on board the International Space Station (ISS) by answering questions that arise while performing their tasks. Topic maps are populated with knowledge of two subsystems of the Columbus (Europe's laboratory on the ISS) Operations Manual, namely EPDS – Electrical Power Distribution System and MSM – Mechanical Structure and Mechanisms).¹⁷

The topics and the associations between them provide an excellent structure for extracting answers to questions. The system knows about associations such as:

- host-location (the location of the device)
- function-of (which is the function of the PDU)
- mode-of (the mode of the device)
- part-of (the parts of the device)
- controls (the controller of the PDU)
- provides (the device which provides 28W).

The Q/A system supports a wide range of English natural language queries, since queries are parsed with Context Free Grammar into an internal representation of the question which is later used to generate queries in Toma (Topic Map Query Language) [5]. For example, the natural language query “What is the device which is located in d2?” is transformed to `what_is ([device] host-location ([d2]))`.

Toma is considered as useful input to the development of TMQL, a standard topic map query language¹⁸, since most of the language as described in the specification is already implemented in a prototype topic maps engine running Toma queries.

The system can answer questions like:

- What is ...? (What are the parts of the device which is located in D2?)
the value ...? / its mass? / the location of the PDU? / the electrical interface of the device which is located in D2? / What are the commands available on the PDU?
- Where is ...? / Yes/No question – where
- How many?
- View / Show ...? / Can I see please a diagram of the device which controls the PDU?
- Which telemetry is available? (for the device in D2)?

¹⁶ TMAPI, Common Topic Map Application Programming Interface. <http://www.tmapl.org/>

¹⁷ Question Answering System for Astronauts on board the International Space Station. Poster <http://www.sas.be/projects-so/37AIOBCT.pdf>

¹⁸ <http://www.isotopicmaps.org/tmql/>

- How to execute (How do I activate the PDU?) / How are the parts of the PDU related to the MLU?

4. A PSI Infrastructure for Topic Maps

Towards a P2P (?) PSI registry

Alexander Sigel motivated the urgent need for a PSI(D) registry, provided some use cases where such a registry would be advantageous and tried to convince people to start working together on this neglected subject to offer the services of a PSI registry, calling for contributions of work items towards a project. After vigorous discussion on the subject, there was general agreement that this was needed, but no concrete action plan was devised.

A published subject has a machine-readable published subject identifier (PSID, must be a URI) which must resolve to a human-interpretable published subject indicator (PSI) [6]. Consider the following statement from the Published Subjects Technical Committee on the adoption of PSIs: “Any user that needs a PSI for a particular purpose should first consider adopting one that already exists, and then, if nothing suitable is found, create his or her own.” [6]. How could a user know for sure about an existing PSI without a PSI registry, and how could the “arbitrary proliferation of PSI entries”¹⁹ be avoided without a PSI registry?

He named as main motivations for such a registry:

- PSIs establish identity and lead to better semantic interoperability [8]. A PSI infrastructure supports merging and works towards the aim of SLUO (Subject Location Uniqueness Objective, the collocation objective)²⁰.
- PSIs support reuse and best practice, e.g. in Distributed Knowledge Management (DKM), Federated Seamless Knowledge, or Content Intelligence.
- PSIs are the infrastructure for emerging collaborative distributed lightweight ontology engineering.

Unfortunately, no long-term public registry (“PSIpedia”) and no working group on this exists²¹, therefore, not much progress has been seen since the inception of XTM five years ago.

Architectural and technical issues include:

- Should such a registry evolve to a P2P-like system in which topic map fragments are exchanged with TRMAP [11] between peers?

¹⁹ Cf. “The aim with such registries (and services) is to early on forestall the arbitrary proliferation of unrelated but maybe similar topics.” [7, 398]

²⁰ [9] defines: “2.26 Subject Location Uniqueness Objective (SLUO): The objective of the topic map paradigm, which is to enable everything that is known about a subject to be accessible from one place”, in other words: “having one proxy for each unique subject”. However, in the current version of this document [10], this concept can no longer be found.

²¹ Meanwhile, Michael Chapman informed this author about his “WWW Virtual Library of Published Subject Indicators”, automatically generated from a topic map. <http://psi.mchapman.com/vl/>

- Which topic map engine should be used as backend for the moment? How should a PSI search engine be implemented, and which topic map query language should be used?

There should be cooperation with content owners, and incentives for publishers and content producers should be discussed. Practical questions include: creating roles and responsibilities, deciding for an implementation language, setting up a source-forge project, registering a domain like `psi-regisry.net`, and hosting the application. Advanced research questions include the realization of P2P trust networks such that subjective mappings between two PSIs can be shared between parties trusting each other.

In some later individual discussions²², *Lars Marius Garshol* suggested preparing a much simpler problem statement to gain traction on this. *Gabriel Hopmans* pointed out that one might draw some ideas from the openPSI project proposal²³ and current extensions of this idea²⁴. He also proposed trying to get EC funding within ADNOM²⁵ for such a registry. *Lutz Maicher* asked if one should better start with individual published topic maps as a kind of decentralized registry. *Jack Park* wondered how PSI registries registering a rigid semantics can cope with meaning “in a constant flux” and how PSIs for key-value pair types in TMRM for the specification of subject properties might help. One answer to the latter is that notions are stable to the interpreter at the time of describing the PSI, and that upper categories used to describe the characteristics of concepts are more stable than concepts themselves. Hence, more research should be carried out on using “essential characteristics” from knowledge organization (a concept is the sum of all essential statements one can make about a subject) to refine PSIs, e.g. by modelling such statements as topic map expressions within the PSI. Instead of simply writing text into the PSI documentation, we could attach a topic map, e.g. characterizing a person by its birthday, occupation, works produced, or influence it had on the works of other thinkers.^{26 27}

Use of PSI sets in ADNOM

Gabriel Hopmans asked the audience for best practice on how to define and use PSI sets in the ADNOM project (see also [12]). Questions included:

²² See also the blog entry: <http://asigel.blogspot.com/2005/10/towards-p2p-psi-registry.html>

²³ Open Published Subjects Infrastructure (openPSI). Proposal for the openNet call for seed projects: <http://www.agentcities.org/openNetOld/first.php>

²⁴ <http://mssm.nl/portfolio/openpsi/>

²⁵ The acronym stands for: **A**dministrative **N**omenclature, see also below

²⁶ Bernard Vatant had proposed using properties for establishing identity, instead of restricting to a URI. “... so far both *Topic Maps* and *RDF* (hence *OWL*) use a very restrictive way of establishing subject identity: use of a single identifier (URI string), although subject identity could be established on more general basis by identical values for a specific subset of properties.” Cf. “Subject Identity Discrimination Properties - in *Topic Maps* and in *OWL*”. Posting by Bernard Vatant on 2003-11-05 to the mailinglist `public-webont-comments@w3.org`, archived at <http://lists.w3.org/Archives/Public/public-webont-comments/2003Nov/0001.html> See also his *univers immedia* blog on subject identity at <http://universimmedia.blogspot.com/>

²⁷ See also the blog entry: <http://asigel.blogspot.com/2005/10/topic-properties-phis-and-more-email.html>

1. Why should three-digit numbers be used as ISO country identifiers instead of two-letter abbreviations? (Because a given two-letter ISO country abbreviation is not guaranteed to be stable whereas the number is. In addition, upconversion of legacy data is easier, in which three-digit numbers are often used.)
2. Why should, in faceted classification, the classification code (e.g. <http://psi.adnom.org/code/11ba>) rather than the textual explanation (e.g. <http://psi.adnom.org/politics/>) be used as URI of the PSID? (Again, reasons include stability and ease of administration.)

Systematic documentation of such best practice is needed.

Using PSI in inferencing

Peter-Paul Kruijsen asked about the relationship between inference rules and PSIs in a topic map:

- Is it possible to link a PSI to a predicate in the head of an inference rule? (E.g., in a first topic map, brother is statically defined with a PSI, and in a second topic map, brother is dynamically defined via an inference rule, using parenthood associations with father, mother and child role players. To link the two, the PSI in the first topic map should be attached to the inference rule in the second topic map.)
- And in general: Can inference rules be placed within a topic map?

It is natural that one wants to make explicit what one knows about identities, independently of the fact whether a topic characteristic is static or inferred, but so far tolog [13] does not support this well. Further work will extend tolog and/or fulfill this requirement in TMQL.

Peter-Paul Kruijsen illustrated with several examples (comparing various topic maps/ontologies, dynamic topic typing, and the notion of an interface) how his ideas could lead to ontology mapping, i.e. mapping information between sources that use similar (not equal) ontologies. He is collecting requirements and wants to tackle some hard problems there. The requirements include:

- PSIs in inference rules
- tolog statements and inference rule heads with constants (PSI or strings)
- Use of existing association-types in inference rule heads
- Caching of inferred facts.

5. Topic Maps Applications

Merlino: A Prototype for semi-automated Generation of Occurrences in Topic Maps using Internet Search Engines

Hendrik Thomas demonstrated Merlino²⁸, a system which takes as input a topic map and uses multiple web search engines to automatically identify relevant information resources as occurrences for a given topic. The prototype system, implemented in Perl, combines the ability to express semantic relationships in topic maps with search engine retrieval power. The aim is to accelerate and facilitate the generation process for occurrences.

²⁸ The acronym stands for: **M**ethod for evaluation and **r**etrieval of **l**inks for **o**ccurrences

The system realizes a five-step workflow: After uploading a topic map via a web form, the system (1) analyzes it for certain knowledge, (2) generates appropriate queries for search engines, and (3) queries the engines correspondingly. Occurrence candidates are pre-ranked (4) and (5) presented for intellectual relevance evaluation, and finally added to the topic map. In the analysis step (1), the information stored in the topic map is extracted via XPath queries from base and variant names of the topic, from already existing occurrences, and from associations in which the topic is involved. During query generation (2), processing rules are applied which describe how to transform the information gained from step (1) into the query syntax of the search engines. To rank the occurrence candidates in step (3) according to estimated relevance, Merlino can either use scoring information extracted from the collected search result sets for internal ranking, or use the external web impact factor, calculated by querying Altavista.

An online demo of Merlino is available²⁹. Hendrik Thomas had developed an earlier version of Merlino in his diploma thesis [14], which was further extended together with Patrick Möhn, and demonstrated at the 2nd European Semantic Web Conference [15].

A Software for Personal Knowledge Logging

Robert Cerny has created a personal knowledge logging system.³⁰ Conceptually, it is a tool for people wanting to record what they know and where they know it from. Technically, it is a web application for creating topics, associations and encounters (his occurrences differ slightly from the standard ones), including a journal to trace the development over time. It is based on REST and topic map ideas, is implemented with PHP, JavaScript, MySQL and Ajax. Robert Cerny sees the following areas into which his system might potentially develop:

- CMS for homepages and weblogs
- Knowledge syndication via HTTP
- Methods for topics in JavaScript or PHP
- E-Learning system, and
- Topic map export to XTM.

Semblogging with Topic Maps

Alexander Sigel presented his ongoing research project kPeer on topic map-based semblogging (semantic blogging).³¹ Semblogging is a special case of semantic annotation in line with DKM (Distributed Knowledge Management). To achieve smarter content aggregation, blog entries need more semantics than just tag clouds.³² Therefore, the blog entries are semantically described by associating topics and associations, held in topic maps, with them.

²⁹ http://staudinger.wirtschaft.tu-ilmenau.de:8080/merlinotest-cgi-bin/m_start.pl

³⁰ In <http://www.cerny-online.com/resume/en/>, he describes it as a “Web application for Personal Knowledge Management”, a leisure time project started in January 2005

³¹ See also [16] for early ideas on P2P aspects, and [17] for aspects of content intelligence.

³² For aspects of tagging, see also [18]

Both the seminal semblogging concept and prototype by Steve Cayzer [19] and a first proposal to mine desktop data for semantic blogging [20] uses RDF. However, with topic maps one can do even better³³, therefore the kPeer system builds on topic maps.

In a first diploma thesis, use cases have been described, and a plug-in for the Java blogging framework blojsom has been developed which uses TMAPi and TM4J. A demonstration will be available soon³⁴. A further diploma thesis will look into issues of P2P distribution and semantic web services. The aim is to release an open source prototype via sourceforge in the near future and to test and further develop the system with semblogging user communities. Such communities might including the bibMap or the TMRA'05 community semblogging (or even sem-wiki-blogging?³⁵) on topic maps, the students in a teaching course in information and knowledge management, or a group of people interested in semblogging in cultural heritage³⁶.

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³³ This is visible e.g. from [21] (semlugging as an example for Augmented Storytelling), Dmitry Bogachev informally discussing semblogging with topic maps, and Lars Marius Garshol realizing a simple semblogging application using OKS (personal communication)

³⁴ <http://semlblog.wim.uni-koeln.de/blojsom/blog/>

³⁵ See blog entry: <http://asigel.blogspot.com/2005/10/semantic-wikis-semwikis-topic-map.html>

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