Lutz Maicher
Alexander Sigel
Lars Marius Garshol (Eds.)

Leveraging the Semantics of Topic Maps

LNAI 4438

Second International Conference
on Topic Maps Research and Applications, TMRA 2006
Leipzig, Germany, October 2006, Revised Selected Papers

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Preface

The papers in this volume were presented at TMRA 2006, the International Conference on Topic Maps Research and Applications, held October 11–12, 2006, in Leipzig, Germany. TMRA 2006 was the second conference of an annual series of international conferences dedicated to Topic Maps in research and industry.

Topic maps are continuously gaining more and more attention in science and industry; they are "crossing the chasm." The TMRA series provides a platform for researchers in the topic maps community to meet for exciting exchanges in a stimulating setting. The uniqueness of TMRA is its focus on both sides of the same coin: scientific research on topic maps and upcoming applications in industry.

In the autumn of 2005 the first TMRA conference took place in Leipzig. The proceedings have been published in this LNAI series as volume 3873. It was amazing to see how ideas and solutions from TMRA 2005 matured within the last year to full products or projects. The overall success of TMRA 2005 encouraged us to improve this conference series for the topic maps community: More people were attracted, and the scientific quality was enhanced.

The TMRA 2006 program attracted a very international crowd of about 80 attendees, hosted in the completely new media campus of the Leipzig Media Foundation. The scientific quality of the conference was ensured by significantly enlarging and diversifying the international Program Committee to 34 members. From 52 submissions, 34 were accepted for presentation at the conference. Every submission was carefully reviewed by three members of the Program Committee. In this proceedings volume, 15 full papers, 6 short papers, the invited keynote, and one invited report from both the poster and open space sessions are published.

Parallel sessions focussing on different areas were introduced to better address the different needs of science and industry. The papers were grouped into nine paper sessions.

Smoothly moderated by Steven R. Newcomb, a poster session with six posters took place for the first time. In parallel, there were three system demonstrations. Even the success story from last year was kept in the conference program: The open space sessions, once more moderated by Lars Marius Garshol, have proven to be an exciting playground for visionaries and early ideas. These kinds of sessions will also be part of the TMRA 2007 conference.

For the first time, the TMRA conference was preceded by a full day of in-depth tutorials, called tutorials@TMRA, which were held in parallel. Due to the vital interest, the tutorials will remain an important part of upcoming conferences. TMRA 2006 was succeeded by a 3-day ISO standardization meeting which emphasized the importance of TMRA.

We would like to thank all those who contributed to this book for their excellent work and great cooperation. Furthermore, we want to thank all members of the Program Committee, and Gerhard Heyer and Miriam Sühnel for their tireless commitment to

making TMRA 2006 a true success. TMRA was organized by the Zentrum für Informations-, Wissens- und Dienstleistungsmanagement. We acknowledge the generous support by all sponsors.

We hope all participants enjoyed a successful conference, made many new contacts, gained from fruitful discussions helping to solve current research problems, and had a pleasant stay in Leipzig. Last but not least we hope to see you again at TMRA 2007, which will be held October, 10-12, 2007 in Leipzig.

February 2007

Lutz Maicher
Alexander Sigel
Lars Marius Garshol

Organization

TMRA 2006 was organized by the Zentrum für Informations-, Wissens- und Dienstleistungsmanagement (ZIWD) in Leipzig, Germany.

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Flat Topic Mapping for a Flat World*

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Abstract. Every topic map has something in common with all other topic maps: a commitment to the goal of "one topic per subject", a state in which everything known about each distinct subject will be (apparently) co-located at its unique topic. A side effect of this commitment is that all topic maps, regardless of the diversity of the universes of discourse in which they are expressed, inherently facilitate their combination with other topic maps.

Thus, all topic maps, in all universes of discourse, can be accurately regarded as contributions to the ability of diverse human communities to understand each other. Even though they may use diverse – and even logically incompatible – universes of discourse, all topic mappers are themselves members of a community whose unifying conviction is that subjects exist apart from, and are more important than, any particular ways of identifying them and co-locating information about them.

1 What Unites the Community of Topic Mappers?

One may observe many characteristics that tend to be shared by people who make topic maps. Among these are characteristics common to all scientists and scholars, such as a belief that knowing things – whatsoever they may be – is better than not knowing them, and a certain impatience with the process of finding things out, especially when somebody else has already discovered and expressed them.

Despite the priority of such basic impulses, when topic mappers are asked to articulate why they are so enthusiastic about topic mapping, they tend to focus on the details of some specific way of modeling or processing information, or of interchanging it. This is understandable and, in fact, it's a characteristic of a vibrant community of alert and engaged individuals, but to outsiders (i.e., to all potential *new* members) it can make participation in the topic mapping community appear unattractive by virtue of the community's contentiousness, incoherence and unstability.

The question naturally arises: What should be the "marketing message" of the topic mapping community? How can we know when we're "off-message", and get ourselves back on track? What's the right "elevator speech" (the speech

* This paper is not an ordinary conference paper, but a paper reflecting the content of the invited opening keynote.

L. Maicher, A. Sigel, and L.M. Garshol (Eds.): TMRA 2006, LNAI 4438, pp. 1–7, 2007.

that can be given entirely during a brief elevator ride, and that has a generally *positive* effect on its hearers)? This question has obsessed and often bedeviled the pioneers of the community since the very beginning.

The message that has created the most "traction", by far, was developed by Steve Pepper: the so-called *TAO of Topic Maps* [Pepper02]. The TAO message has all the features of an effective marketing message: it's simple, intuitive, mnemonic, and "catchy." The TAO is the easy on-ramp to topic mapping, and it's easy to explain, too. It gives the potential convert something to think about, at every turn. Each of the thoughts it inspires is beautiful, and each portends yet more elegance and beauty. It comfortingly hides many complexities. It is anchored to notions that are themselves some of the primary pillars of civilization and the Humanities. It is worthy of the highest compliment that can be paid to any meme: *It works!* It has moved the whole idea of topic mapping into the mainstream, and for this the entire community owes Pepper its gratitude, admiration, and, at least arguably, even its existence.

Nobody wants to abandon the TAO, and yet it looks as though it's not, at least by itself, a big enough tent for all the communities that remain to be persuaded that topic mapping:

- does not (directly) threaten them or their existing practices, investments, identities, or members,
- is more than a marketing message,
- is more than just a new vocabulary of catchphrases for talking about existing well-understood concepts,
- is more than just a data model or database schema,
- is not technically, philosophically, or politically naive,
- does not impose prior constraints on the universes of discourse of the communities that choose to use it, and
- is not obvious (at least not to most information technology practitioners, and at least not until they can see that it's not what their habits of thinking generally lead them to think that it is).

All of the above statements about topic mapping are true. However, the rhetoric of the TAO and of those who use the term "topic mapping" exclusively as an invocation of the Topic Maps Data Model [ISO13250-2], have led people who influence technology adoption decisions to believe that one or more of the above statements about topic mapping is untrue.

Thus, the topic mapping community faces a crisis. Will it seize its opportunity to develop and adopt a marketing message that will identify topic mapping with every community's portion of humanity's *entire* noösphere, and that will also honor and protect the inroads into the public consciousness that the TAO and other efforts have already made? Or will topic mappers be content to say, "If the TAO (or the Topic Map Data Model) doesn't work for you, then seek shelter in another tent. Topic mapping is the TAO (or the Topic Map Data Model), no more and no less." The remainder of this paper argues that the former option is preferable.

The most effective marketing messages direct the attention of potential buyers in ways that persuade them to buy; this truism is demonstrated by the TAO message, for example. It seems reasonable for the community to inventory the things toward which the attention of potential adopters might be directed. To create such an inventory, it seems appropriate to ask, "What unites the topic mapping community? What holds it together? Why do its members insist that topic mapping is a good thing?"

As a step toward such an inventory, here is a list of notions that are central to topic mapping, and that seem unlikely to provoke disagreement within the community. These are things that most if not all topic mappers believe to be virtuous and valuable about topic mapping:

1. **Information interchange requires disclosures of syntaxes, data models, etc.** A recipient of an interchangeable topic map should be able to parse it.
2. **Other ontological commitments must be disclosed.** A recipient of a topic map should be able to understand what it is saying.
3. **One subject per topic.** Topics represent subjects (as in "*subjects* of conversation"). (*Topics* are also called *subject proxies* in the draft Topic Maps Reference Model [ISO13250-5] [Durusau06].) Every topic represents exactly one subject.
4. **One topic per subject.** Topic mapping does not (and, as a practical matter, cannot) *forbid* the existence of multiple topics that all represent the same subject. However, it is the *goal* of all topic mapping activities to produce topic maps in which a certain state has been achieved – a state in which everything known about each subject is available at a *single* virtual "place" (i.e., a single topic), that, at least within the topic map, is the *only* such "place" where information about the subject has been comprehensively co-located.
5. **Subject-sameness must be disclosed.** This is a corollary of the "one topic per subject" principle. Topic mapping does not (and, as a practical matter, cannot) require that the identity of the subject of every topic be disclosed in a fashion that everyone will be forced to admit is well-grounded in any particular sense. Nevertheless, by means of the disclosures of applicable rules and by means of each topic's disclosure of the identity of the subject that it represents, topic mappers generally make it possible for the users of their topic maps to determine whether, under the applicable disclosures, any two topics should be regarded as representing the same subject.

2 What Differentiates the Topic Mapping Community from Other Communities with Avowedly Similar Goals?

Decades ago, a milk truck in New England reportedly bore the following sign: "Brown's Milk. Good as any. Better than some." Such a weak and nebulous

claim may have sold dairy commodities in the 20th century, but it will not sell the idea of topic mapping to future adopters in industry and government. Regardless of whether it is true or not, there is a perception, at least in the North American marketplace, that there is an alternative to topic mapping: RDF. Some proponents of RDF feel threatened by topic mapping, and at least one of them misses no opportunity to compare RDF and topic mapping in ways that are very unfavorable to topic mapping, and that sow significant amounts of fear, uncertainty, and doubt in the minds of potential adopters.

For its part, the topic mapping community has no incentive to deprecate, or to promote disinformation about, any other approaches. On the contrary, *all* approaches that meet the needs of the communities that use them are in every way honorable. When properly disclosed, the information resources that they govern can *all* offer opportunities and benefits to their communities of origin, and to other communities, in topic map land, where achievement of the one-topic-per-subject state is always facilitated.

Moreover, topic mapping is simply inevitable, in the long run. Those who need to communicate efficiently, including such diverse entities as aerospace manufacturers, financial services providers, healthcare providers and government agencies, are eventually going to adopt the practices of topic mapping, regardless of whether they do so under the explicit rubric of "Topic Maps". (The same cannot be said of RDF, which demands of its adopters that all their subject identifiers shall always be URIs. There is nothing wrong with URIs; they are ideal subject identifiers for the information spigots that can be addressed on the Web. However, it is hard to see a significant benefit for society at large in the constraint that all other things, such as gender, Hamlet, middle C, and the class-instance relationship class, must also be identified just as if they were such spigots. Subject identification is necessarily an unboundedly subtle thing.)

Anyway, for the sake of potential adopters, and for the sake of the existing and future members of the topic mapping community, it is vital that the features of topic mapping that make it "better than some" be articulated clearly and compellingly. With that goal in mind, let us return to our list of things that presumably all topic mappers believe to be virtuous and valuable. Are there any of them that are not also believed to be virtuous and valuable by, for example, the RDF community?

1. **Standard syntaxes and data models.** Every community that is serious about digital information interchange has some of these. There is nothing unique about the fact that the topic mapping community has its own. True, these syntaxes and models are unique to the community, but the same can be truthfully said about every comparable community. If the syntaxes and data models of topic mapping are better than RDF's, *how* are they better? And, even if it's true that they are better, why does it matter? This is a losing argument for topic maps, if for no other reason than the fact that RDF already has more adopters, and RDF emanates from an alliance of major IT industry players whose combined economic clout cannot be overmatched. Few people really care very much if there is a better syntax, or a better data model.

Moreover, topic mapping is a grassroots phenomenon. It is a response by information managers to their problems, and, at least at its roots, it is not part of anyone's strategy to dominate some IT or media arena. Among other things, this means that no market leaders are saying to potential adopters of topic mapping, "We will stand behind your commitment to topic mapping, and we will not let your project fail." (Few if any companies are saying that about RDF, either, but the name of the Microsoft, IBM, and Sun alliance – "The World Wide Web Consortium" – is frequently mentioned by those who wish to promote uncertainty about topic mapping by implying that Microsoft, IBM, Sun, and all the other WWW members are standing behind RDF, so topic mapping should therefore be regarded as an technological orphan to be avoided by the risk-averse.)

2. **Ontological commitments must be disclosed.** All information interchange communities at least pay lip-service to the idea that people should say what they mean, and mean what they say. There is nothing special here about topic maps, and, worse, some of the disclosure and grounding of even the flagship Topic Maps Data Model is explained as a raw procedure, rather than in terms that emphasize the semantics that are being preserved and supported by the procedure. Thus the TMDM is still vulnerable to unfavorable comparison to the (at least arguably) more declarative apparatus already widely available in the RDF world. Topic mappers would be well-advised to avoid making broad claims of superiority for disclosures of the ontological commitments of topic maps, at least until the TMDM's semantics have been disclosed more declaratively.

   The best that can be said about this (non-)differentiator is that the disclosure intentions of the topic mapping community are good, as evidenced by the fact that the Topic Maps Reference Model explicitly demands that such disclosures be made.

3. **One subject per topic.** Again, there's nothing here that compellingly differentiates topic mapping from RDF. It can be justifiably argued that every RDF "node" represents *something*, and much of the literature on RDF can be read in such a way that every "resource" is, in fact, the same thing that is called a "subject" in the parlance of topic mapping. While there are significant "impedance mismatches" between RDF and the radical subject-centricism of topic mapping, it would be hard to argue that the principle of "one subject per topic" is not, in fact, just as fundamental to RDF as it is to topic mapping.

4. **One topic per subject and subject-sameness must be disclosed.** Topic mapping appears to be genuinely different from anything else in that it is all about the goal of co-location. Topic mapping does not require conformance to much of anything, really, other than that there must be sufficient disclosure to allow subject sameness to be detected. Topic mapping neither requires nor interferes with any of the features of any particular universe of discourse, and therefore it is compatible with all of them. RDF's syntaxes, semantics, and logics are not excluded, but in order to regard RDF resources as topic maps, commitments as to what they are talking about