

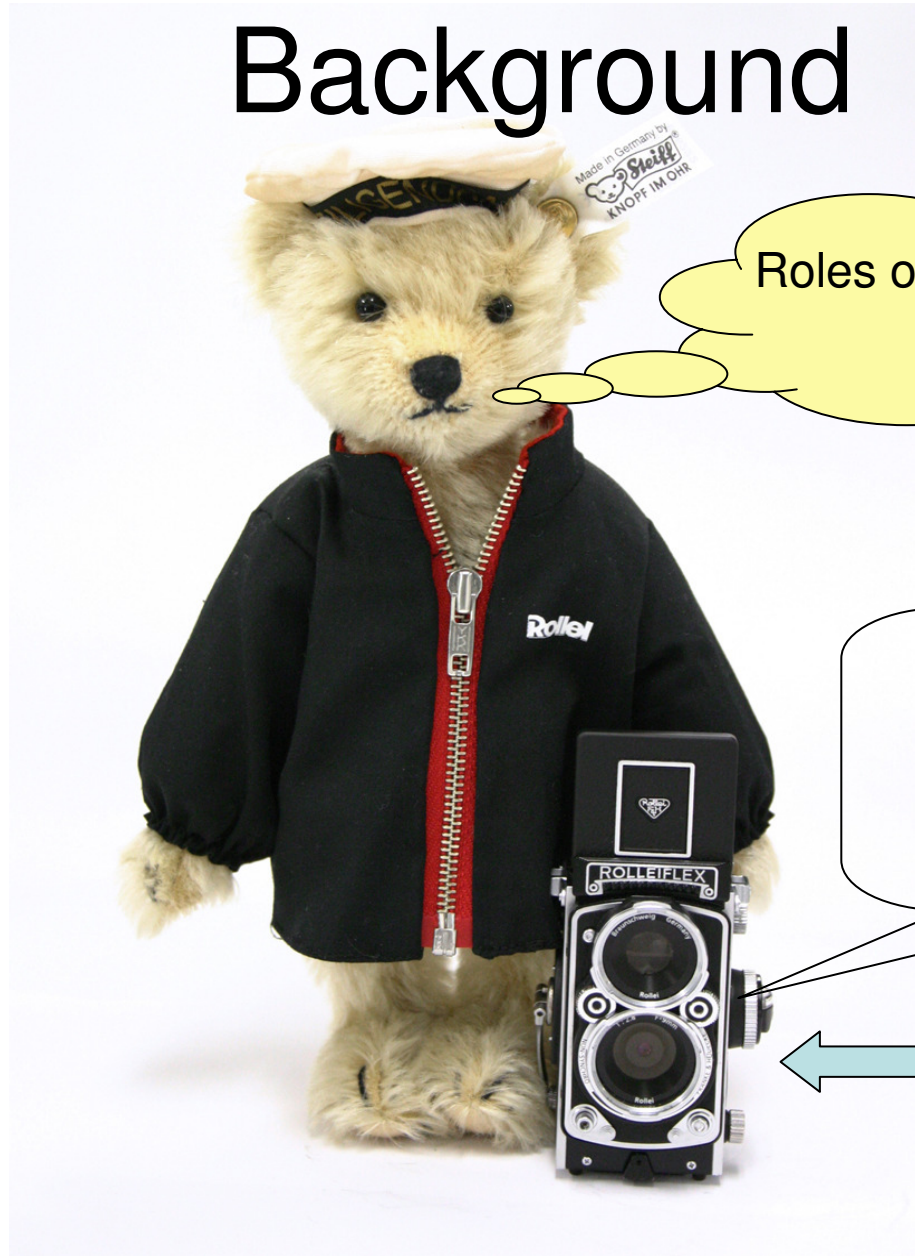


Services Sciences, Management, Engineering (SSME):
Roles of Topic Maps in semantic representation
techniques regarding services innovation

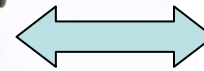
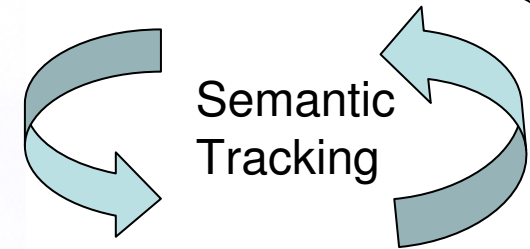
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Background



Roles of Topic Maps for SSME ?



Topic Maps



Outlines

- What is SSME ?
- SSME & Topic Maps Ecosystem
- Architecture
- Data Model
- Examples
- Conclusion

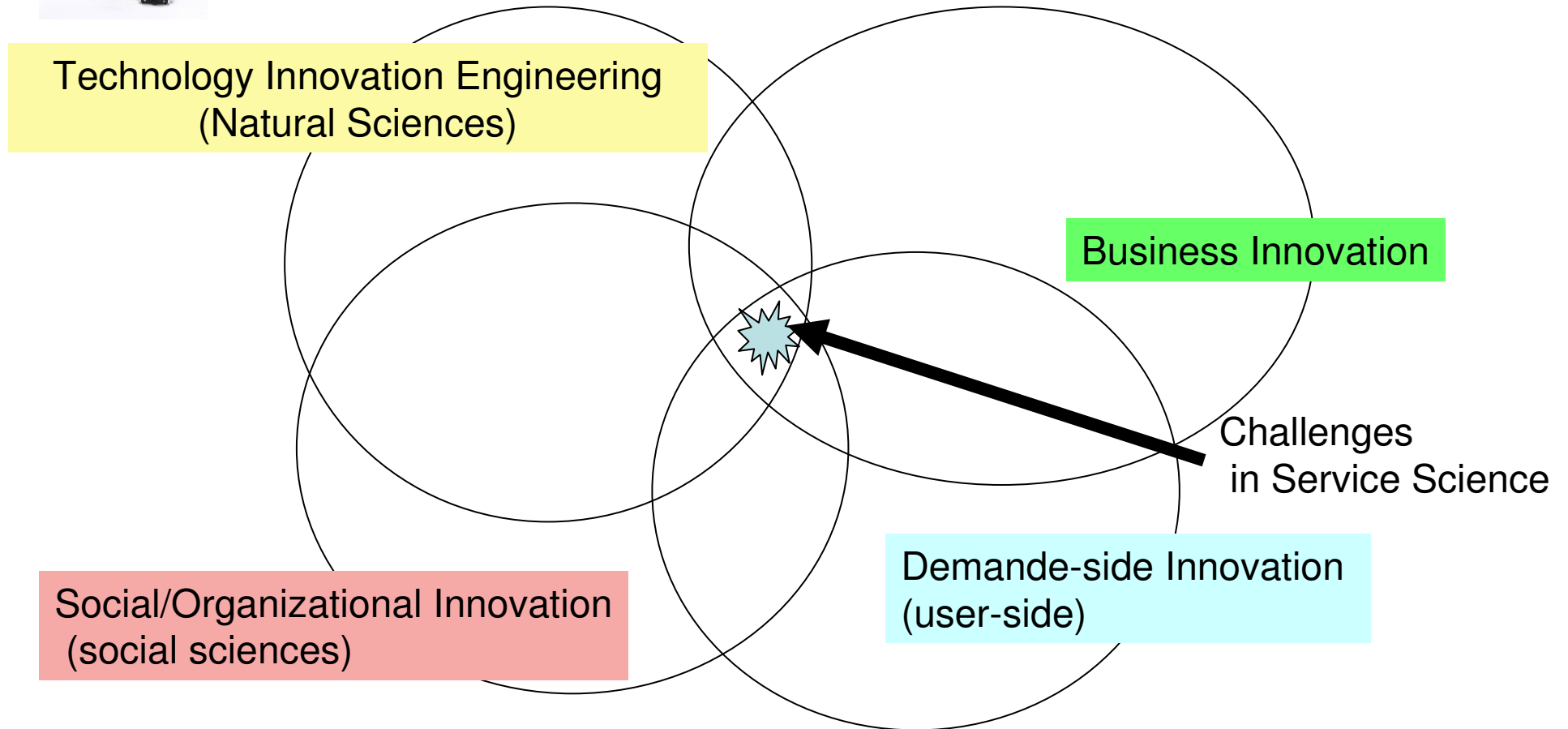


What is SSME ?

- The application of science, management, and engineering disciplines to tasks that one organization beneficially performs for and with another (Wikipedia)
- Information integration needed for boosting innovations (information acquisition, representation, analysis and validation)
- Simplified interaction and automatic negotiation between organization partners.

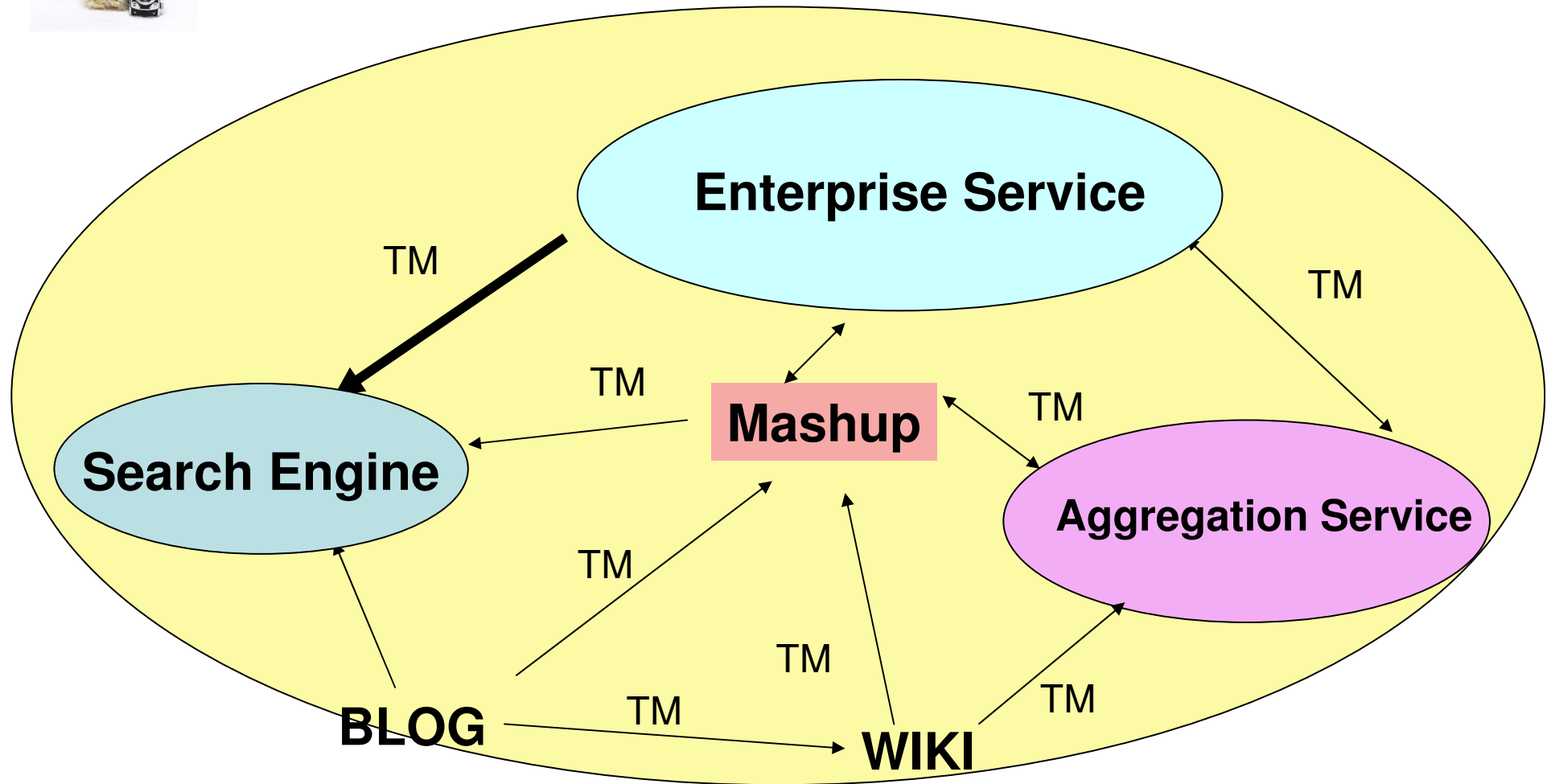


SSME Topology



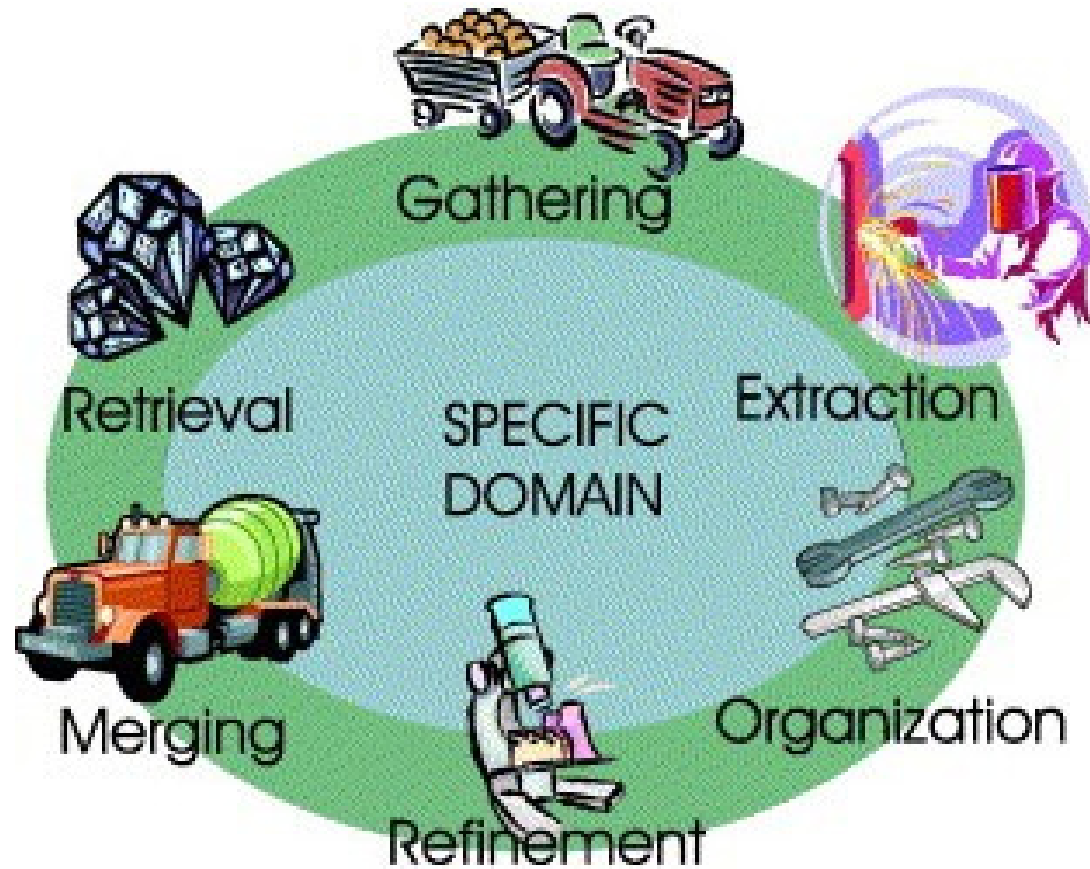


Collaborative Enterprise Services Ecosystem



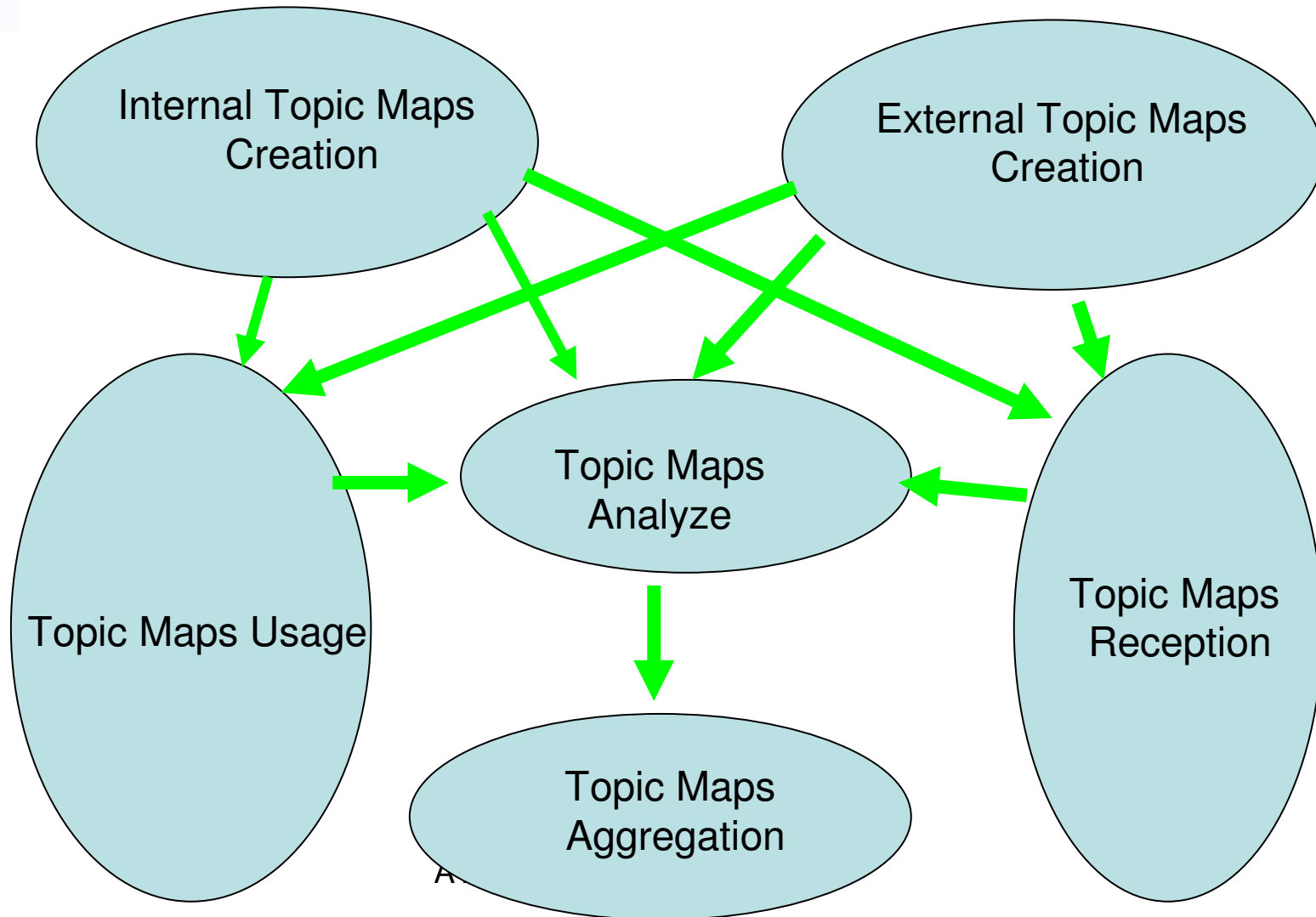


SSME + Topic Maps





Topic Maps Ecosystem



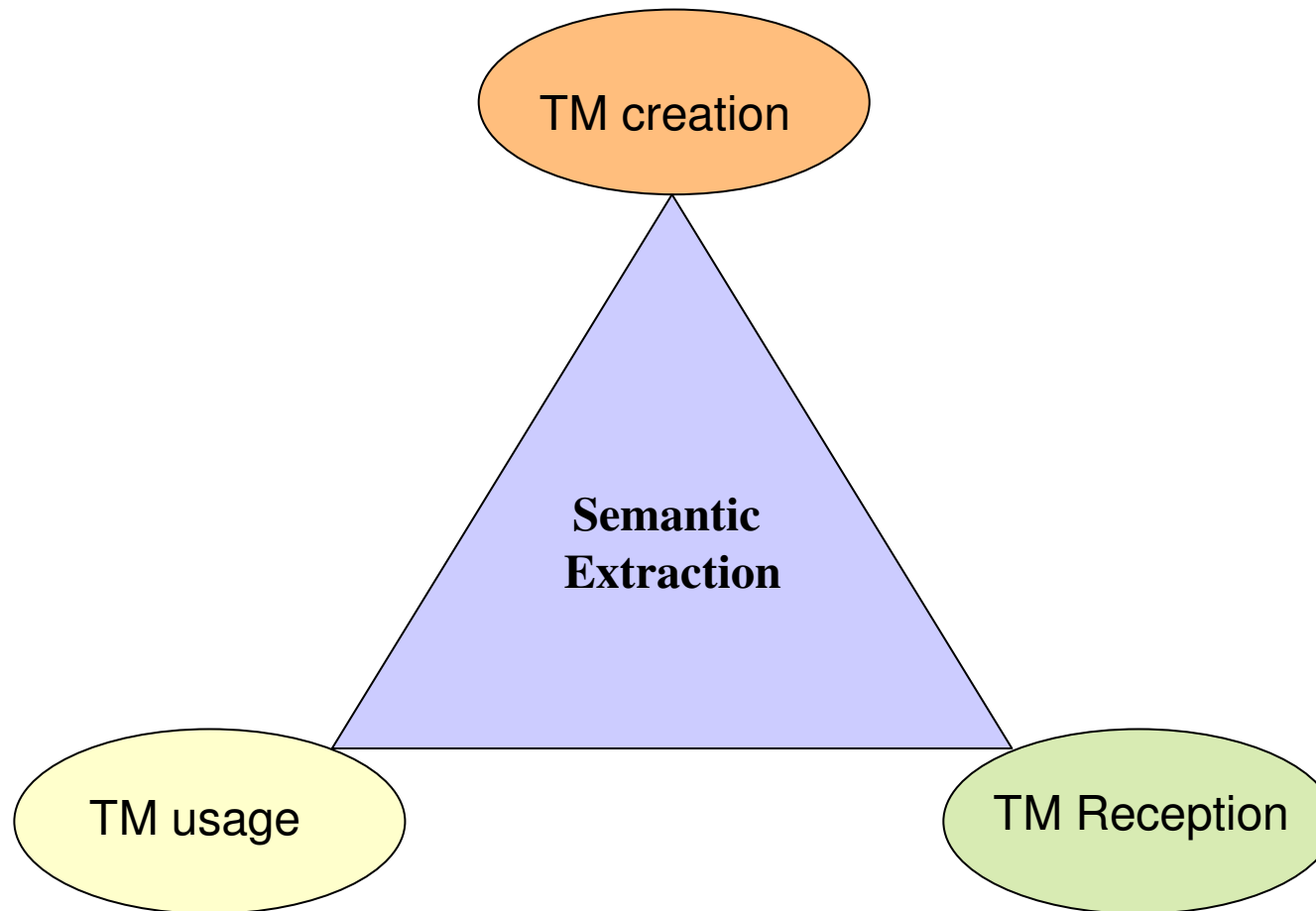


Motivations of Applying TM ecosystem

- Large set of documents
- Multi-lingual contents
- Knowledge shared by various types of end-users (decision makers/general users)
- Software cost reduction/Semantic Improvement

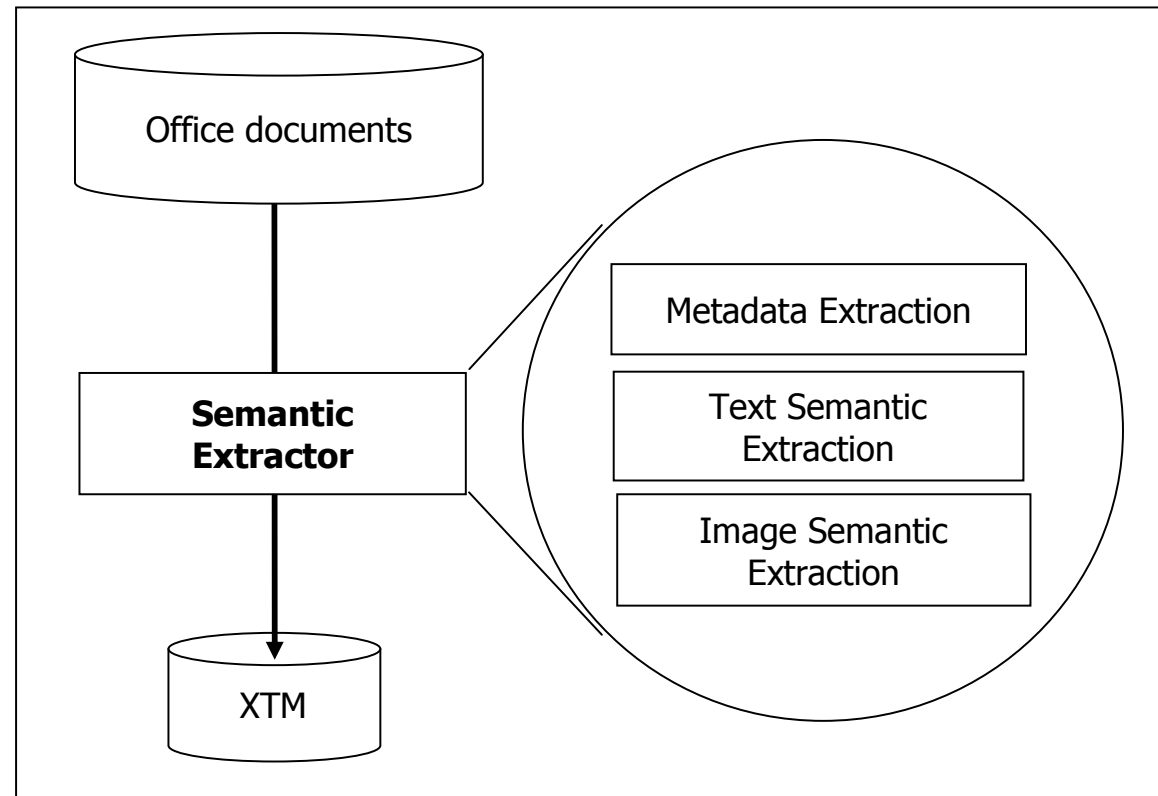


Semantic Tracking



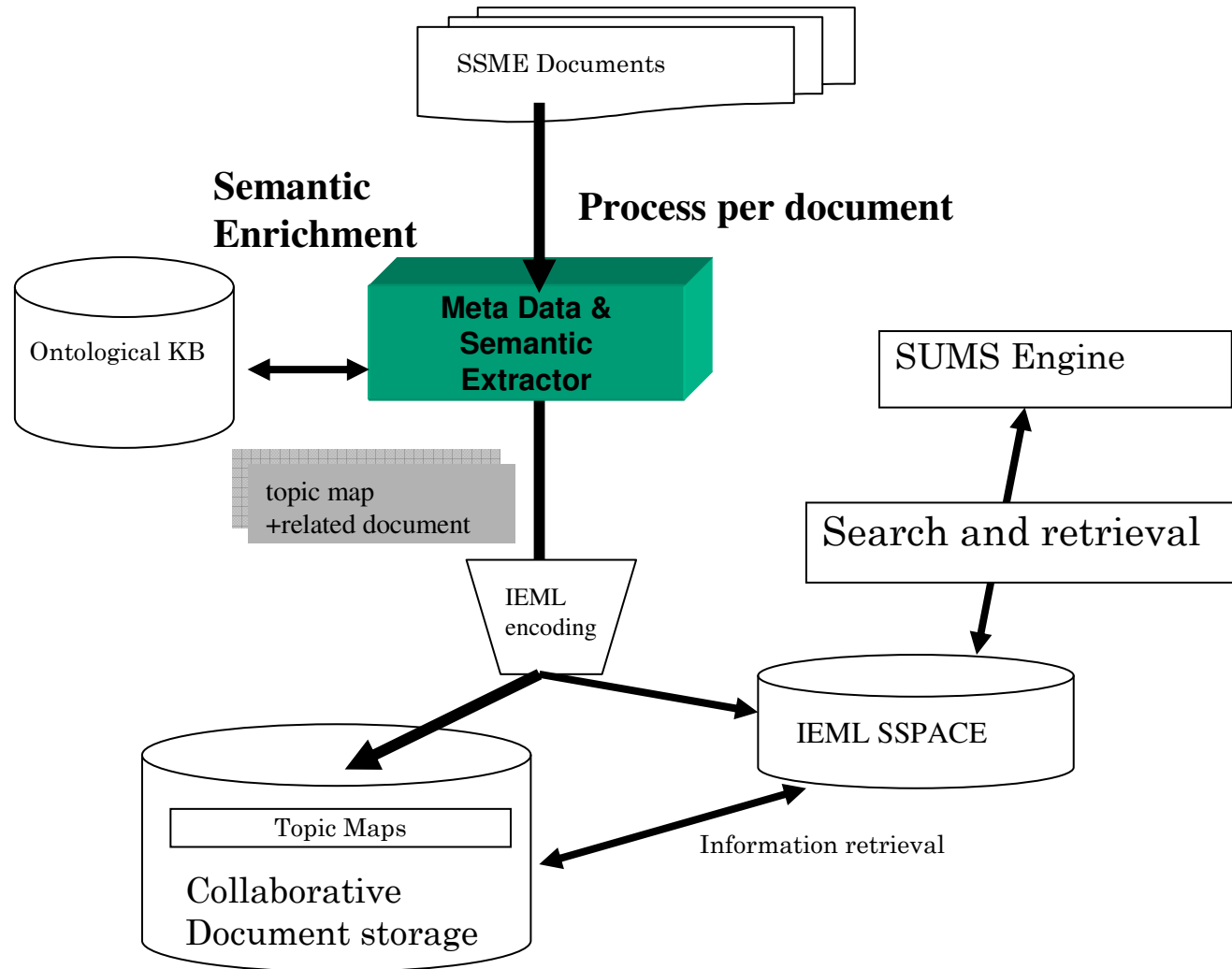


Our Semantic Extractor





Semantic Tracking Architecture



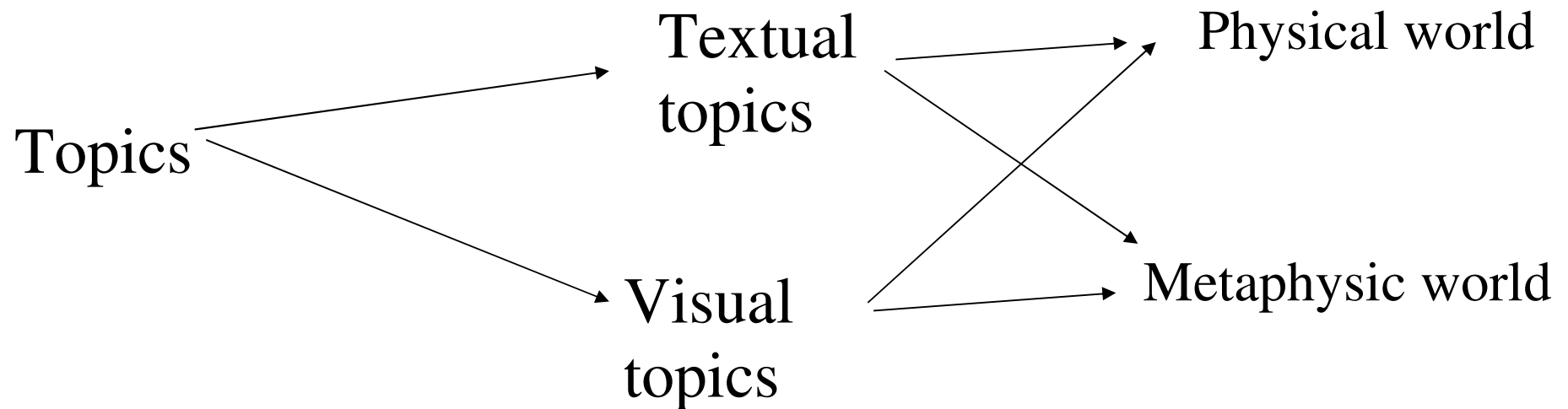


Topic Maps Data Model

- **ISO 13250-2: Topic Maps Data Model**

XTM v1 2002-05-22

XTM v2 2006-05-02





Topic Maps

Many-Sorted Algebra

(Reference Hartmut Güting)

- **Kinds** DATA, RESOURCE, SEMANTIC_DATA, TOPIC_MAPS, SET
- **Type constructor**
 - > DATA topic
 - > RESOURCE pdf, rdf, htm, xml, cvs, jpeg, tiff // resource document type
 - > SEMANTIC_DATA lsi_sm, mpeg7_sm, dc_sm, vra_sm, ecai_sm, objectid_sm

// Semantic and metadata vectors

- > TOPIC_MAPS tm(topic maps)
- TOPIC_MAPS ->SET set



Unary Operations

- \forall Resource in RESOURCE, resource \rightarrow sm: SEMANTIC_DATA, tm **tm_transcribe**
- \forall sm in SEMANTIC_DATA sm \rightarrow set(tm)

semantic_similarity



Binary operations

$\forall tm \text{ in } \text{TOPIC_MAPS},$

$(tm)_+ \rightarrow tm$ topicmaps_merging

$\forall sm \text{ in } \text{SEMANTIC_DATA}, \forall tm \text{ in}$

$\text{TOPIC_MAPS}, sm,tm \rightarrow tm$ semantic_merging

• $\forall topic \text{ in } \text{DATA}, \forall tm \text{ in}$
 $\text{TOPIC_MAPS},$

$set(tm) \times (topic \rightarrow bool) \rightarrow set(tm)$ select



Conclusions

- Semantic tracking is very important for SSME (Innovative multi-disciplinary field)
- Formalization of vertical topic maps management (many sorted algebra)
- Web platform for advanced Semantic management

(using native ISO 13250 semantic management layer)

tmblog (<http://code.google.com/p/tmblog/>)



References (1/2)

SEMANTIC MANAGEMENT

Naito, M., and Andres, F., Application Framework Based on Topic Maps, Lecture Notes in Computer Science, Volume 3873, Feb 2006, Pages 42 - 52, DOI 10.1007/11676904_4, URL http://dx.doi.org/10.1007/11676904_4 Charting the Topic Maps Research and Applications Landscape: First International Workshop on Topic Map Research and Applications, TMRA 2005, Leipzig, Germany, October 6-7, 2005, Revised Selected Papers Editors: Lutz Maicher, Jack Park ISBN: 3-540-32527-1

Rajbhandari, S., Andres, F., Naito, M., and Wuwongse, V., Semantic-augmented support in Spatial-Temporal Multimedia Blog Management, the International Conference on Topic Maps Research and Applications (TMRA 2006), Leipzig, Germany, October 11-12, 2006, Lecture Notes in Artificial Intelligence , Revised selected papers(LNAI4438), Leveraging the Semantics of Topic Maps, pp.215-226, ISSN 0302-9743, ISBN 978-3-540-71944-1

Journal: Okamura, T., Fukami, N., Robert, C., and Andres, F., 2007, Digital Resource Semantic Management of Islamic Historical Buildings Case study on Isfahan Islamic Architecture Digital Collection, the International Journal of Architectural Computing, Multi-Science Publishing Co Ltd, Volume 5, Number 2, June 2007, pp. 356-373(18)

Robert, C., Andres, F., and Veltman, K., Advances in Collaborative Annotation in Semantic Management Environment, in IEEE/ACM ICDIM'2007, Lyon, October 2007.



References (2/2)

- **SEMANTIC TRACKING**

Kawtrakul, A., Permpool, T., Yingsaeree, C., and Andres, F., A Framework of NLP based Information Tracking and related Knowledge Organizing with Topic Maps, in Z. Kedad et al. (Eds): NLDB2007, LNCS No. 4592 Natural Language Processing and Information Systems, Springer-Verlag, pp.272-283, ISBN 978-3-540-73350-8, 12th International Conference on Applications of Natural Language to Information Systems (NLDB 2007), June 27-29, 2007, CNAM, Paris, France



Thank you

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