

A TMDM disclosure using T+

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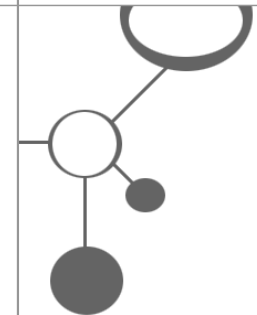
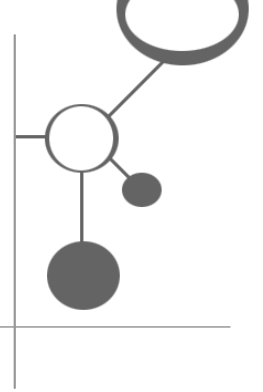
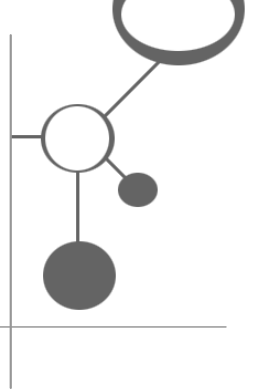


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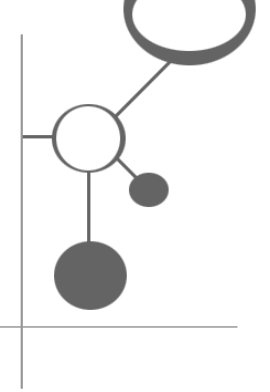


- Introduction
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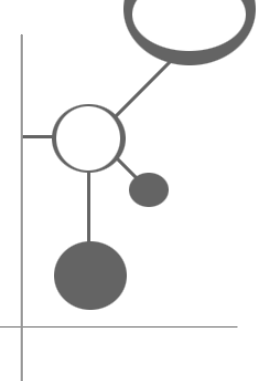
Introduction

- The Topic Maps Data Model (TMDM) defines a set of object classes (topic, association etc.) and lists their properties; additionally it defines constraints that must be fulfilled to call something a „Topic Map“
- The Topic Map Reference Model (TMRM) defines a more abstract model that consists of properties (key/value pairs) which are organized into proxies which form subject maps



Problem / Task

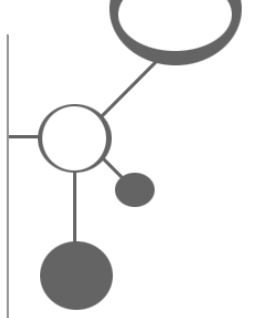
- How can the TMDM mapped to T+ ?
- Representation of TMDM in T+ must not lose information
- Representation of TMDM in T+ must be reversible



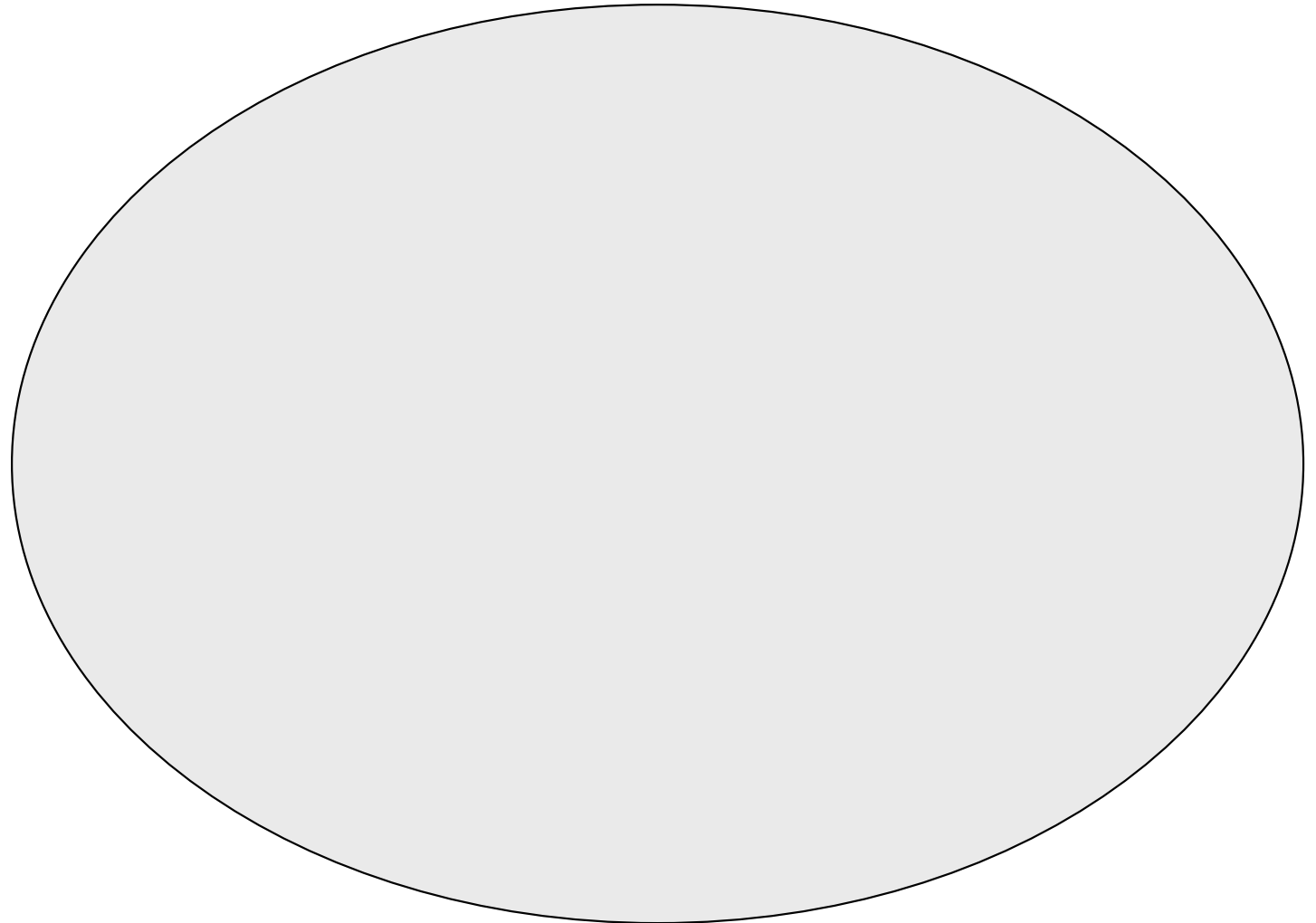
T+ - Overview

- **Property:** key/value pair: (key, value)
Example: (name, "John Lennon")
- **Subject Proxy:** Set of properties
 $empty\text{-}proxy = \{\}$
 $proxy = \{property_0, \dots, property_n\}$
- **Subject Map:** Finite (maybe empty) set of Subject Proxies
 $map = \{proxy_0, \dots, proxy_n\}$

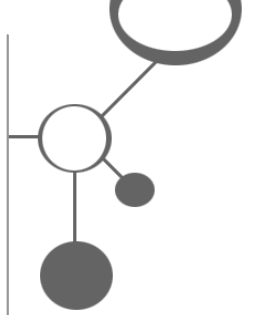
Tau+ - Merging



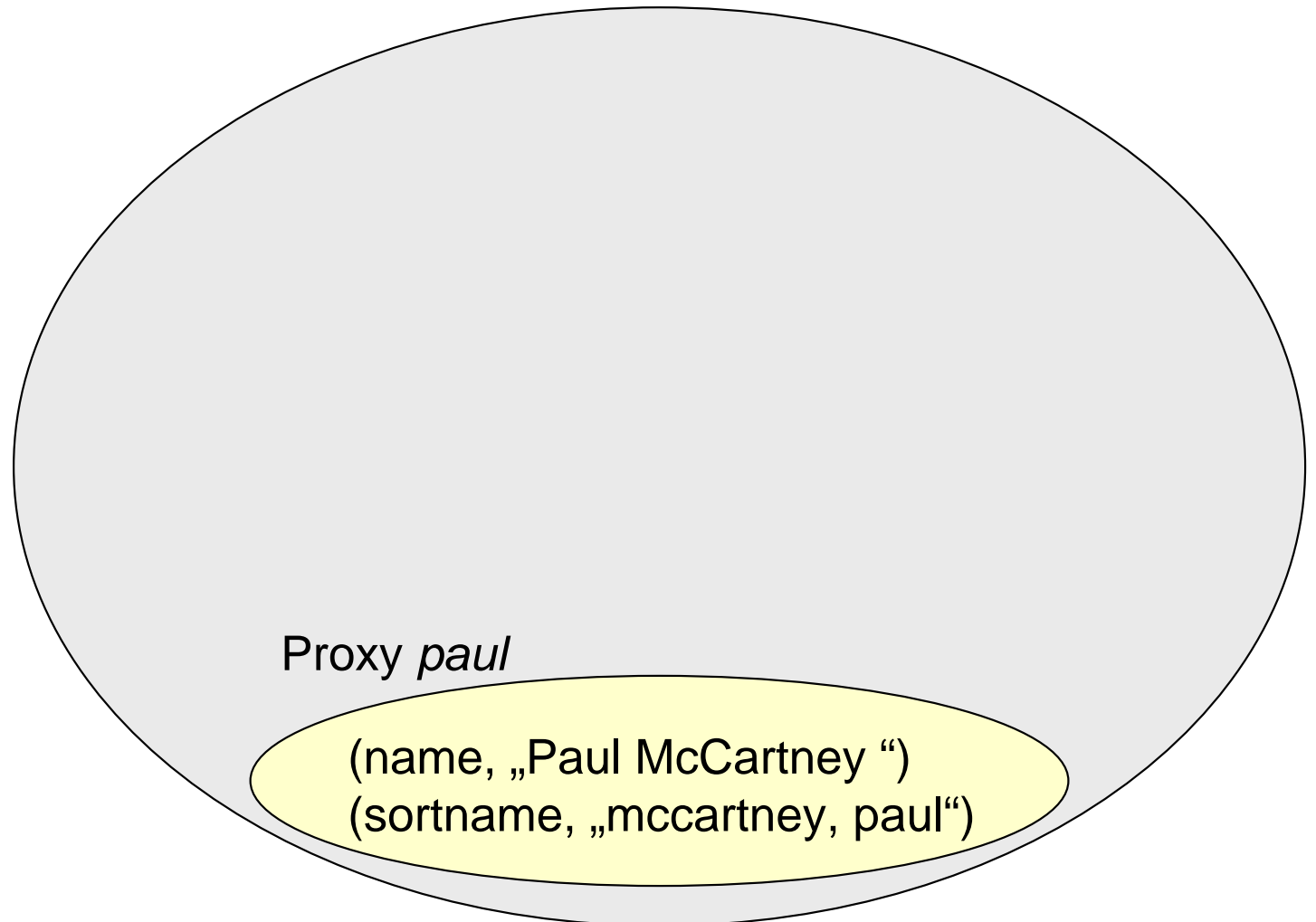
Subject Map *lennon-mccartney*



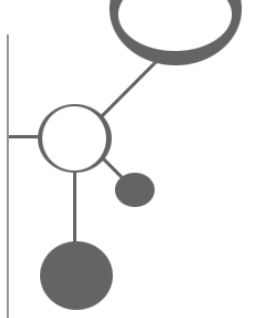
Tau+ - Merging



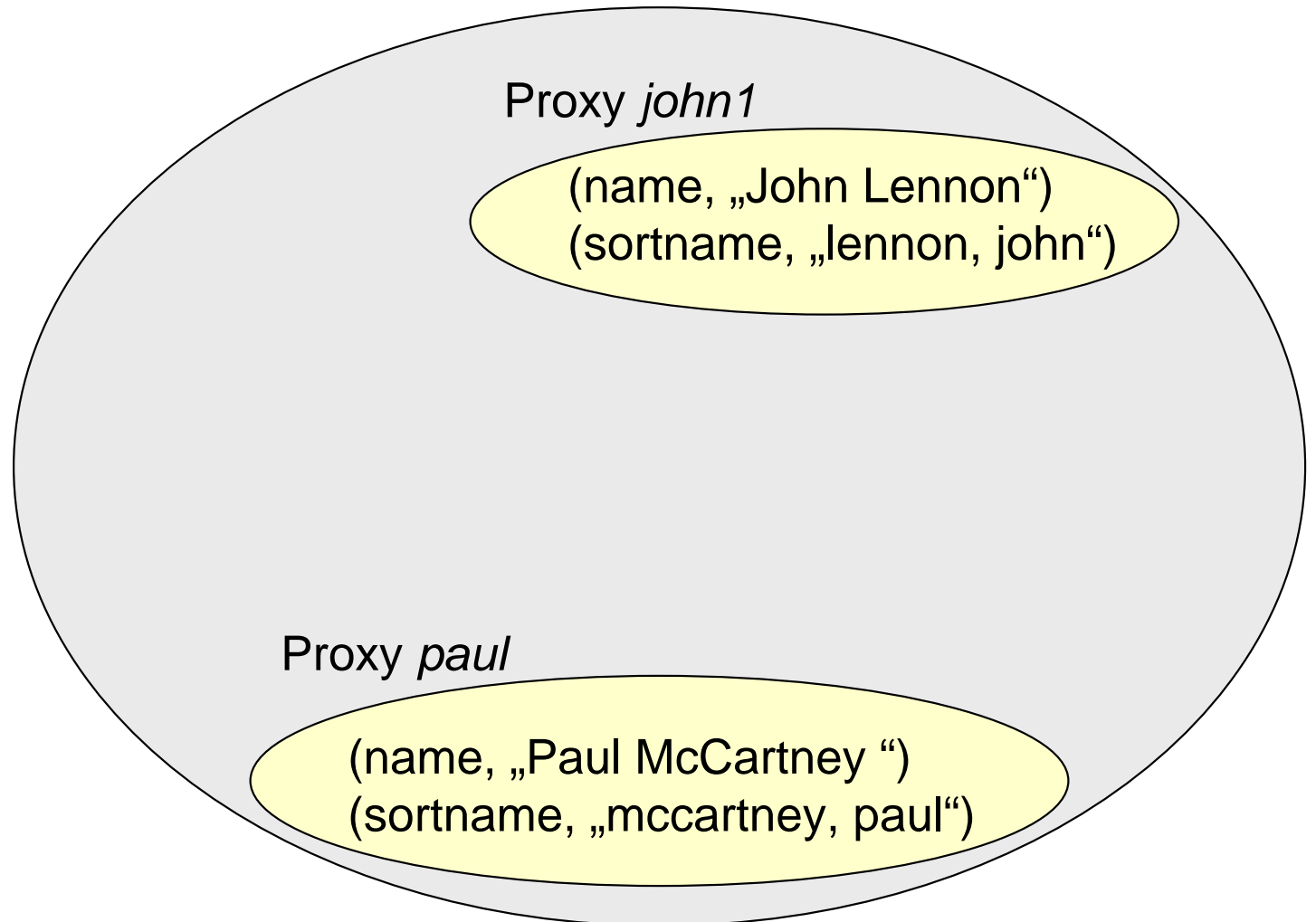
Subject Map *lennon-mccartney*

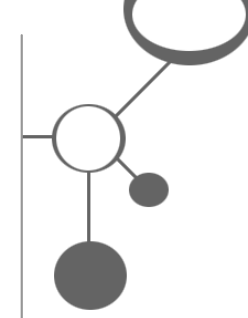


Tau+ - Merging



Subject Map *lennon-mccartney*

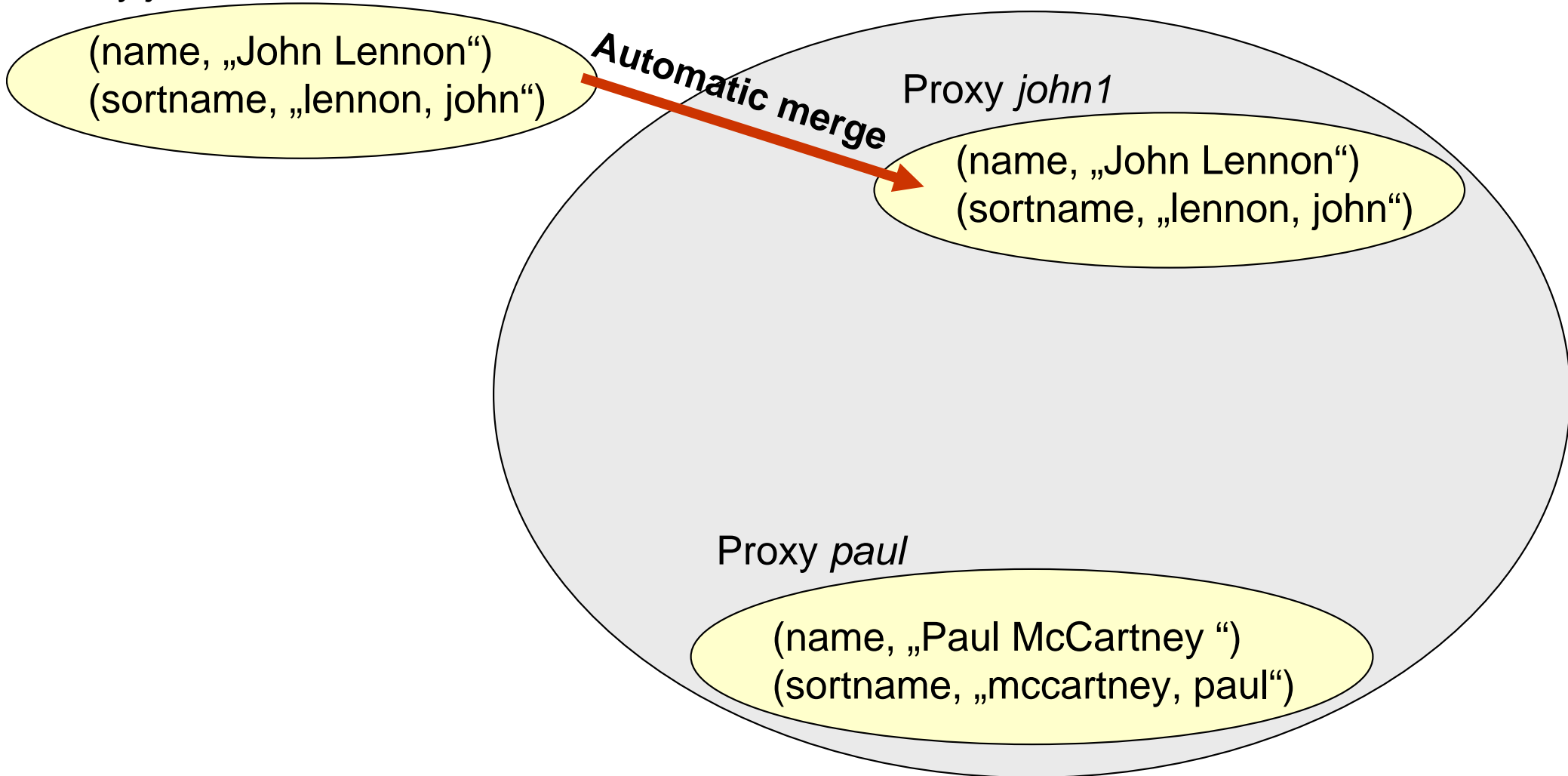




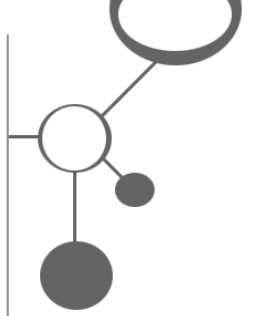
Tau+ - Merging

Proxy *john1*

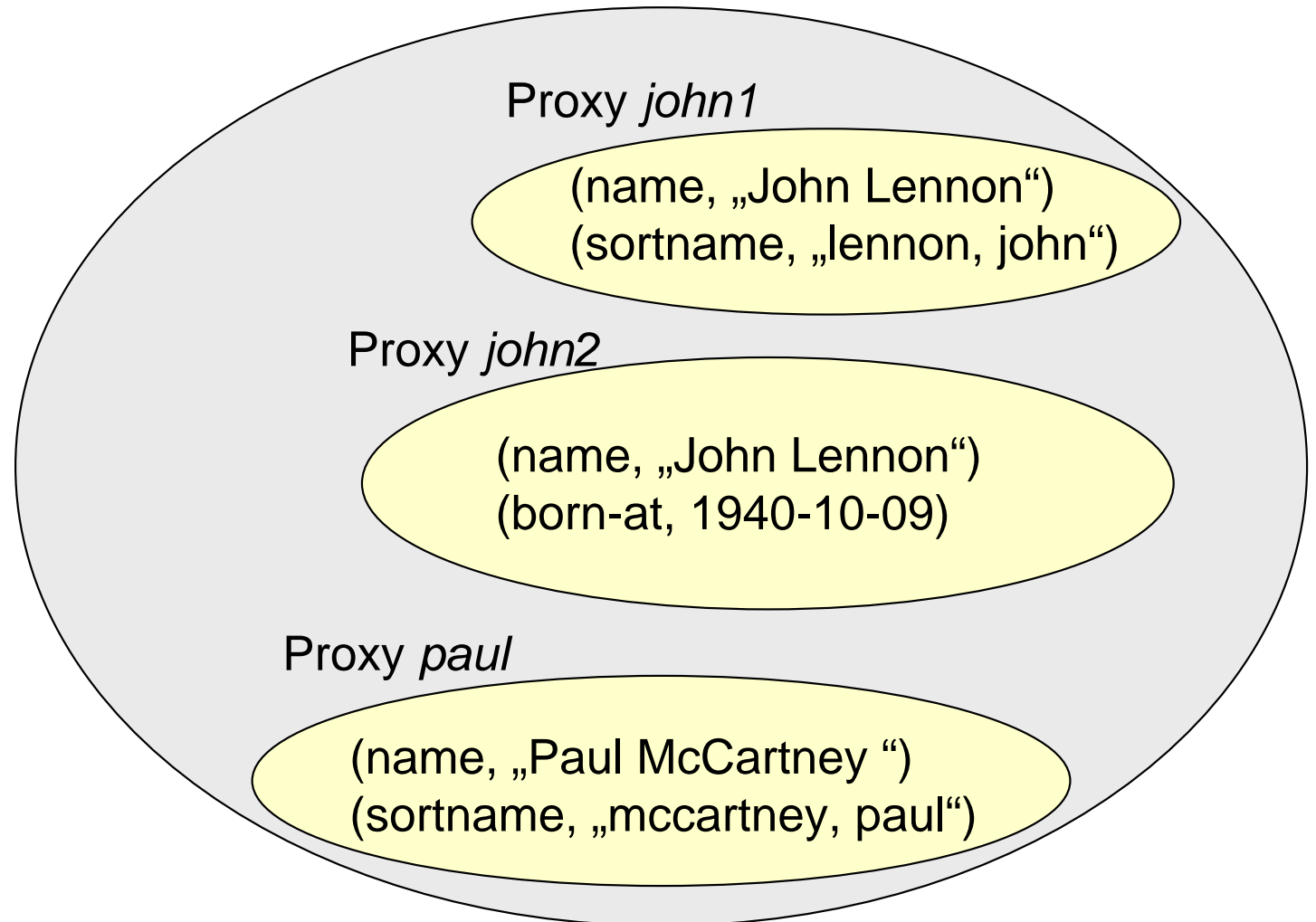
Subject Map *lennon-mccartney*

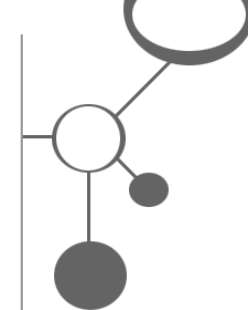


Tau+ - Merging



Subject Map *lennon-mccartney*



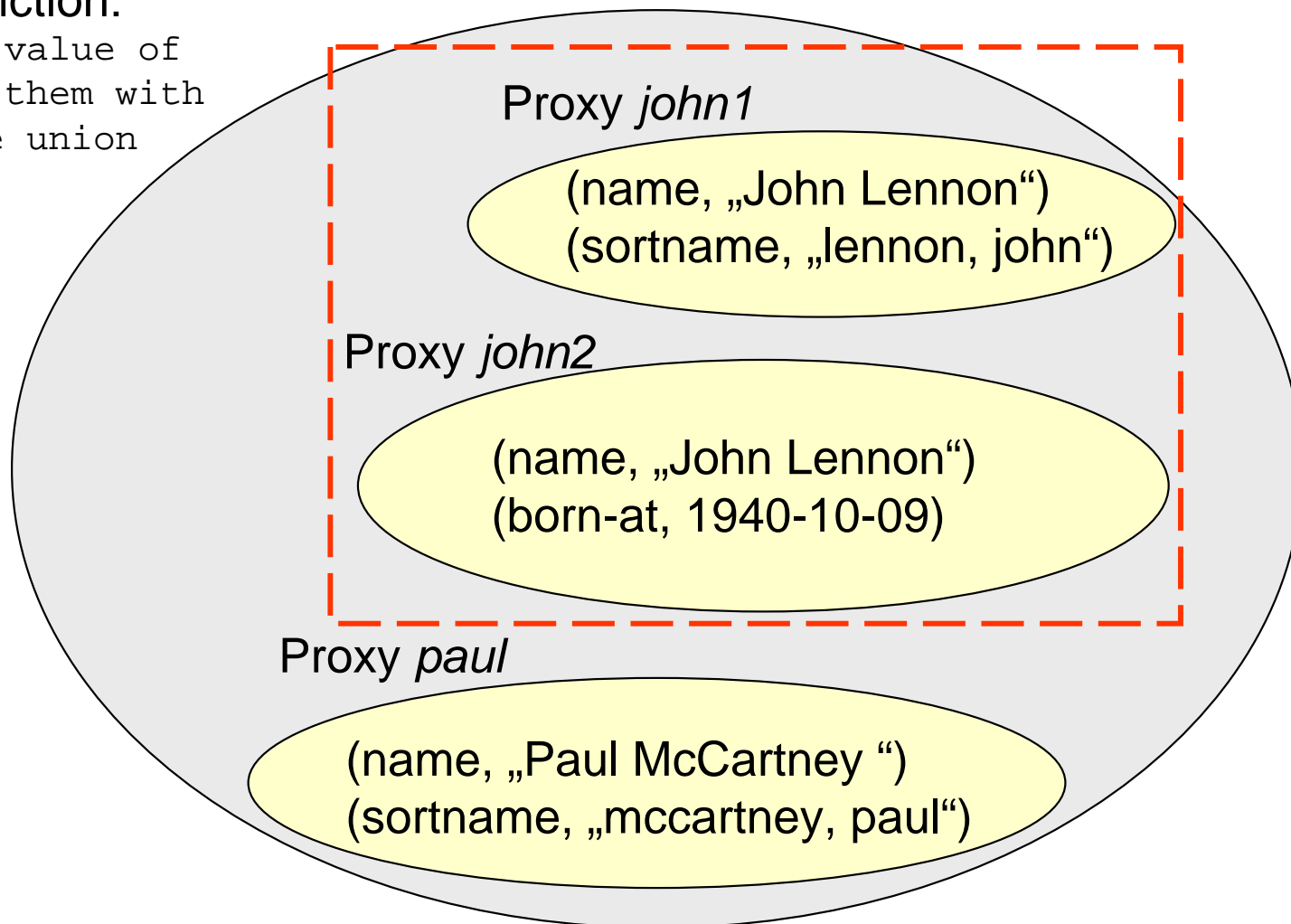


Tau+ - Merging

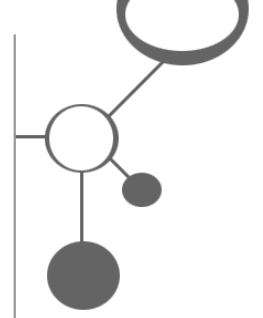
Poor (aka bad) merger function:

if proxies with an equal value of key „name“ exist replace them with a proxy that contains the union of the properties

Subject Map *lennon-mccartney*



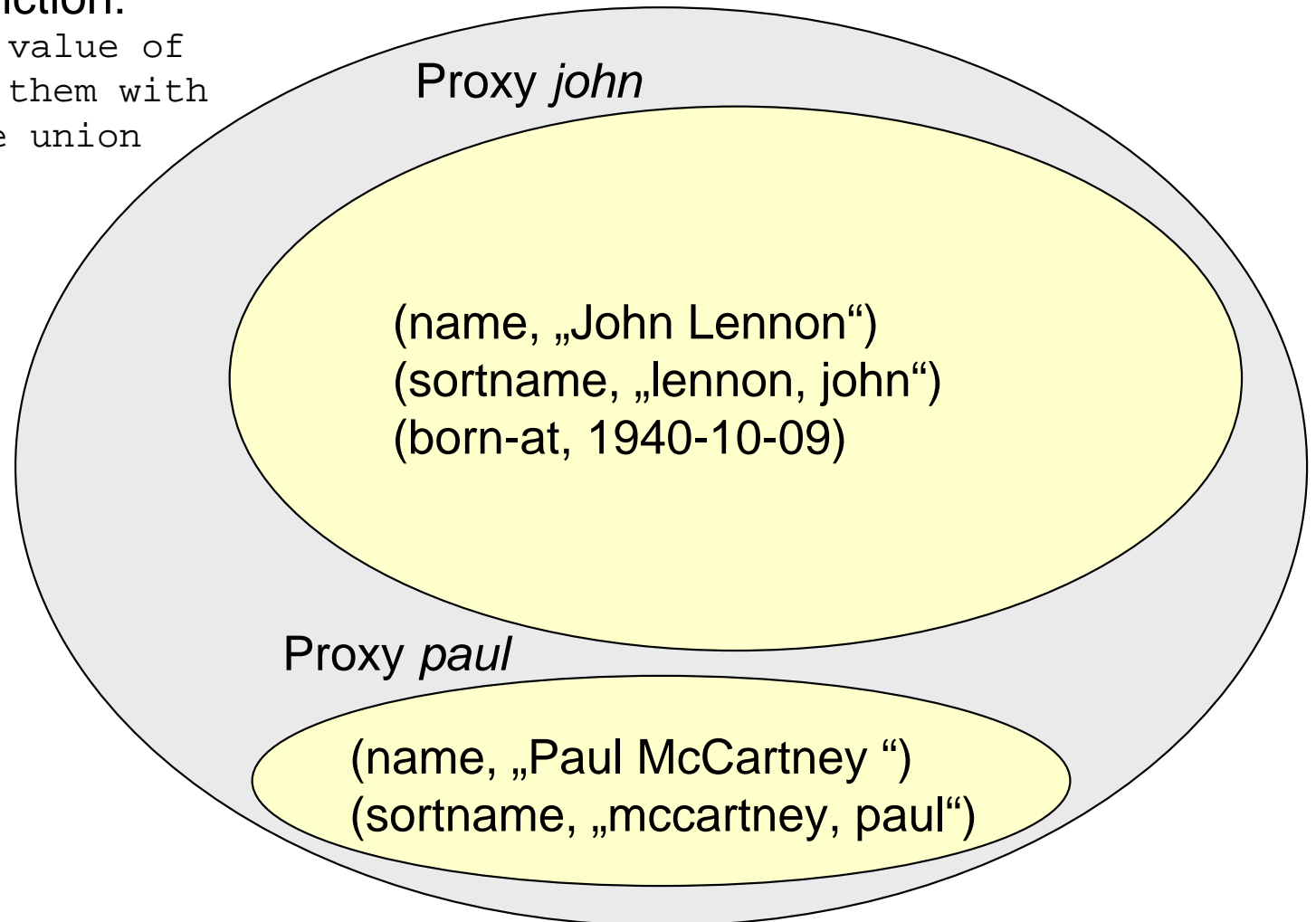
Tau+ - Merging

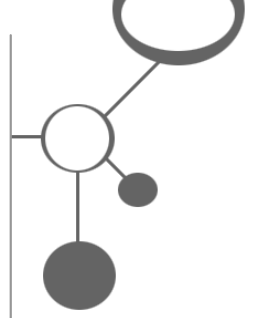


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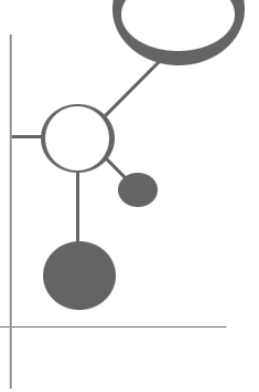




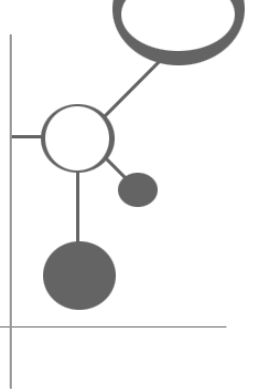
Disclosing TMDM - Basics

- The predefined proxy constants ***instance***, ***class***, ***superclass***, and ***subclass*** are part of T+ to model the ***class-instance*** and the ***superclass-subclass*** relationships
- The TMDM disclosure uses these proxies to model TMDM proxies
- Definition of a TMDM ontology

Disclosing TMDM – Datatypes

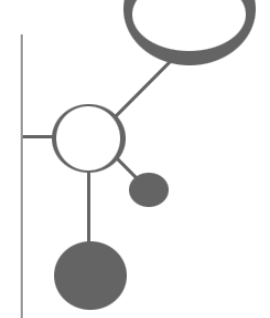


- In TMDM every value (URI, Integer etc.) is stored as *text representation* (in occurrence and variant values) and a datatype locator defines how the text representation must be interpreted
- This disclosure assumes, that the value is stored as the value *itself*
 - > Converters deserialize the string to the value

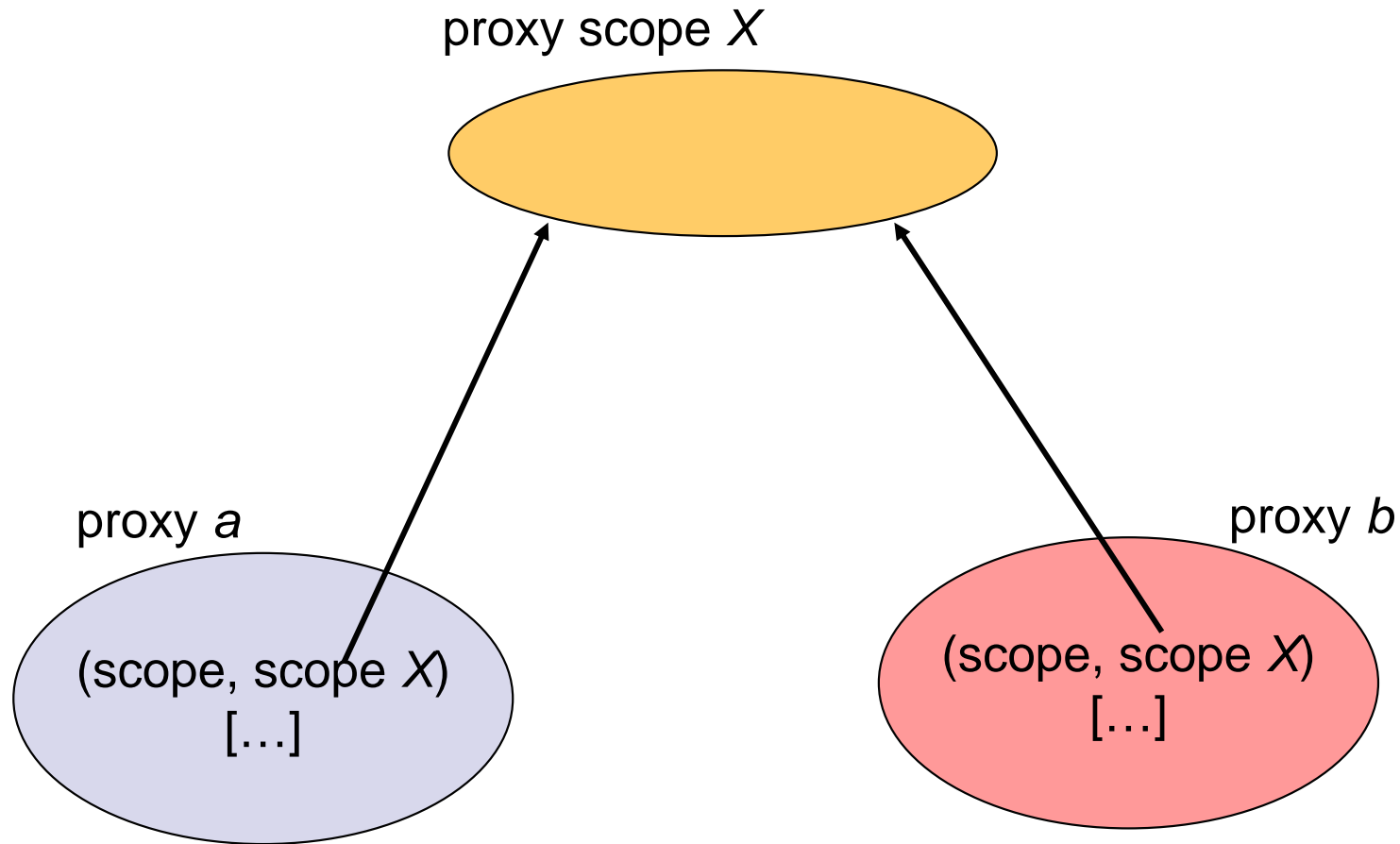


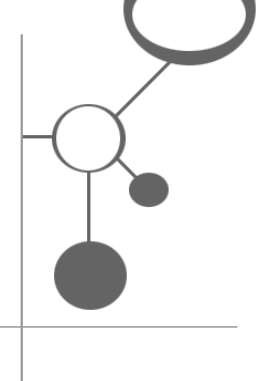
Disclosing TMDM – Scope I

- One proxy is used for the scope of an item
- Alternatives for connecting the scope with the item that should be scoped:
 - Dedicated proxy „scope“: **$\{(item.scope, subject)\}$**
 - Dedicated property with key „scope“ *inside* the item to be scoped: **$\{(scope, item.scope), \dots\}$**



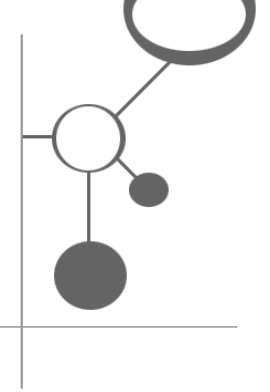
Disclosing TMDM – Scope II





Associations

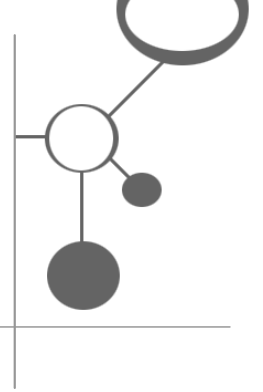
- Each TMDM association generates a proxy:
$$a = \{r_0, \dots, r_n, (\text{scope}, \text{association.scope})\}$$
Where each r is a property that models a role in `association.roles`:
$$r_i = (\text{assoc.roles}[i].\text{type}, \text{assoc.roles}[i].\text{player})$$
- The type of the association is modeled with a dedicated proxy:
$$\{(\text{instance}, a), (\text{type}, \text{association.type})\}$$



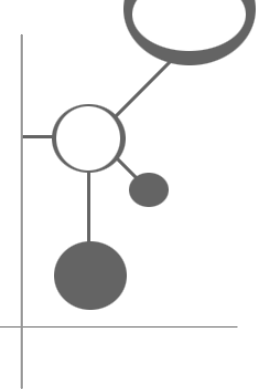
Occurrences

- Each TMDM occurrence generates a proxy:
$$o = \{(\text{value}, \text{occurrence.value}),$$
$$(\text{topic}, \text{occurrence.parent}),$$
$$(\text{scope}, \text{occurrence.scope})\}$$
- The type of the occurrence is modeled with a dedicated proxy:
$$\{(\text{instance}, o), (\text{type}, \text{occurrence.type})\}$$

Topic Names

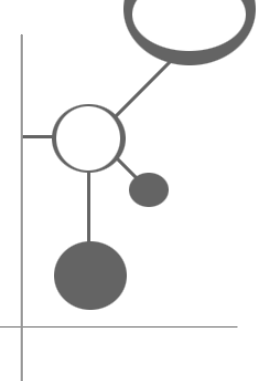


- Each TMDM topic name generates a proxy:
$$n = \{(\text{value}, \text{topicname.value}),$$
$$(\text{topic}, \text{topicname.parent}),$$
$$(\text{scope}, \text{topicname.scope})\}$$
- The type of the topic name is modeled with a dedicated proxy:
$$\{(\text{instance}, n), (\text{type}, \text{topicname.type})\}$$



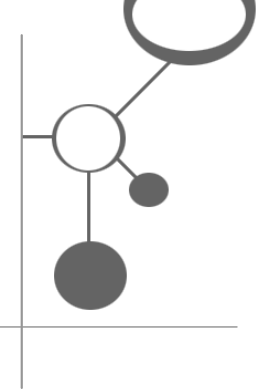
Variants

- Each TMDM variant generates a proxy:
$$v = \{(\text{value}, \text{variant.value}),$$
$$(\text{topicname}, \text{variant.parent}),$$
$$(\text{scope}, \text{variant.scope})\}$$
- Another proxy is created to indicate that v is a variant:
$$\{(\text{instance}, v), (\text{type}, \text{variant})\}$$



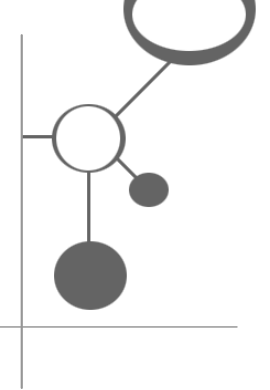
Subject Locators

- For every subject locator l in a TMDM topic t we create a proxy:
$$r = \{(\text{topic}, t), (\text{reifier}, l)\}$$
$$\{(\text{instance}, r), (\text{type}, \text{reifies})\}$$
- Caution: Does not mean TMDM reification!



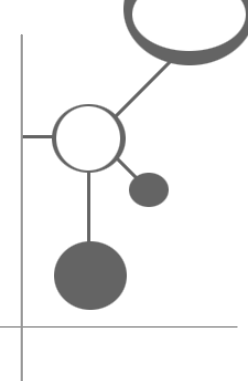
Subject Identifiers

- For every subject identifier l in a TMDM topic t we create a proxy:
 $r = \{(\text{topic}, t), (\text{reifier}, l)\}$
 $\{(\text{instance}, r), (\text{type}, \text{indirectly-reifies})\}$



Conclusions

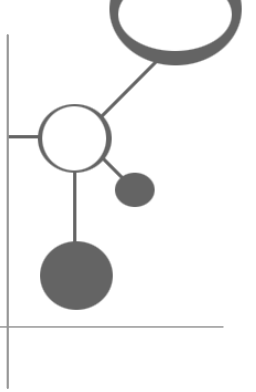
- TMDM can be translated to T+
- Issues:
 - Item identifiers
 - How to handle datatypes?
 - Association roles are absorbed by the association proxy
- Does the translation *model* TMDM?
- How convert a T+ instance (back) to TMDM?



References

- S.R. Newcomp, S. Hunting, J. Algermissen, P. Durusau. „*Topic Map Reference Model*“. <http://isotopicmaps/tmrm/>
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- L.M. Garshol, G. Moore. „*Topic Maps – Data Model*“. <http://isotopicmaps.org/sam/sam-model/>
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Discussion



Questions?

I'll try to answer! 😊