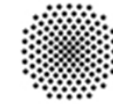




Universidad  
Carlos III de Madrid



University of Stuttgart  
Germany

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# Towards Interoperable Folksonomies – Linking and Opening Tagging Vocabularies

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Steffen Lohmann

LOV Symposium – Linking and Opening Vocabularies

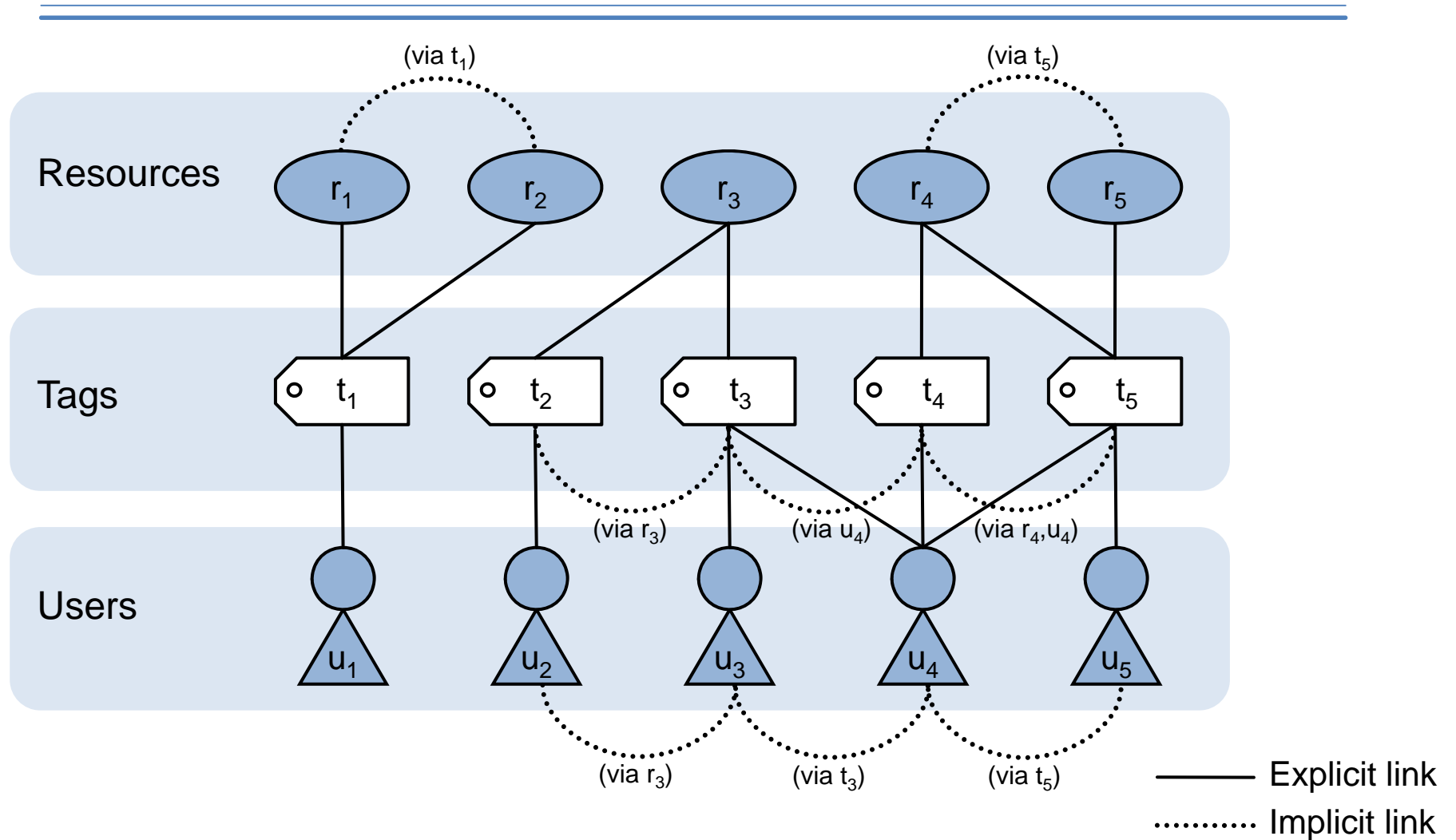
June 18th, 2012

Faculty of Humanities, Communication  
and Information Science

Universidad Carlos III de Madrid

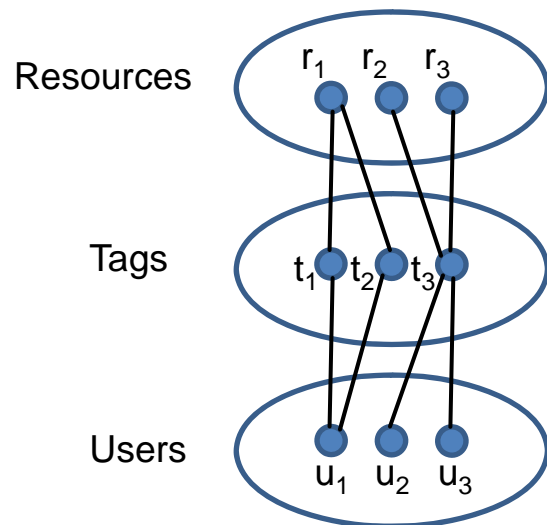


# Three-Layer Model of Tagging

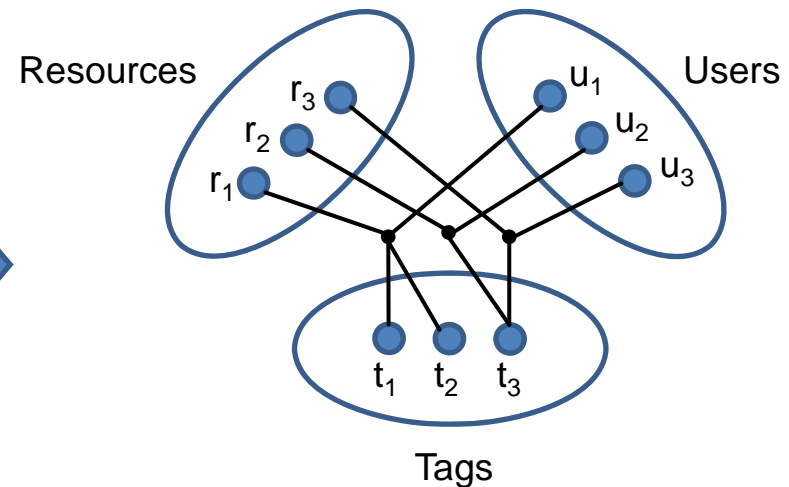


# Hypergraph Structure of Folksonomies

*Layered Tagging Model*

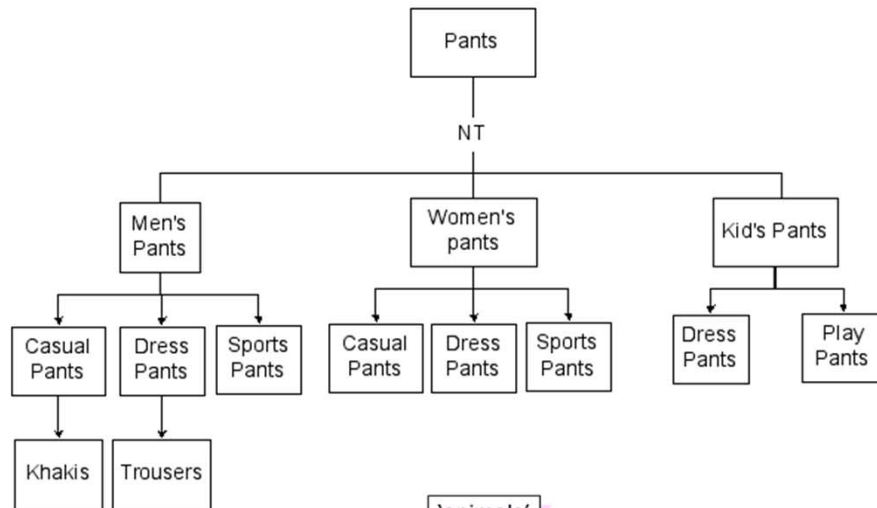


*Folksonomy Hypergraph*

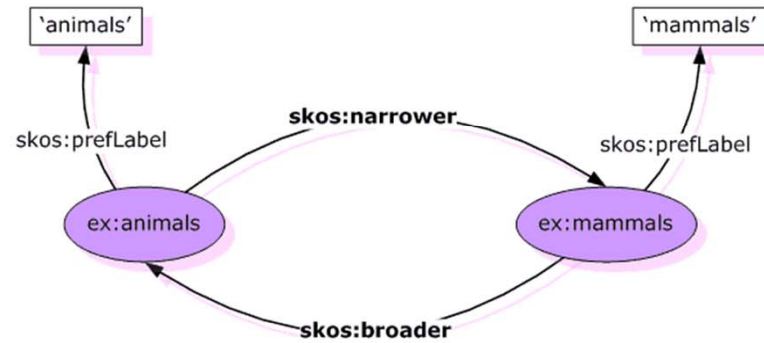


**Tagging Axiom:** Each tagging links one resource with one user account and one or more tags.

# Taxonomies vs. Folksonomies



animals architecture art asia australia autumn baby band barcelona beach berlin bike bird  
 birds birthday black blackandwhite blue bw california canada canon car cat  
 chicago china christmas church city clouds color concert dance day de dog england  
 europe fall family fashion festival film florida flower flowers food football  
 france friends fun garden geotagged germany girl graffiti green halloween hawaii holiday  
 house india instagramapp iphone iphoneography island italia italy  
 japan kids la lake landscape light live london love macro me mexico model museum  
 music nature new newyork newyorkcity night nikon nyc ocean old paris  
 park party people photo photography photos portrait raw red river rock  
 san sanfrancisco scotland sea seattle show sky snow spain spring square  
 squareformat street summer sun sunset taiwan texas thailand tokyo  
 travel tree trees trip uk unitedstates urban usa vacation vintage washington water  
 wedding white winter woman yellow zoo



prefix ex: <http://www.example.com/concepts#>  
 prefix skos: <http://www.w3.org/2004/02/skos/core#>

SKOS = Simple Knowledge Organization System

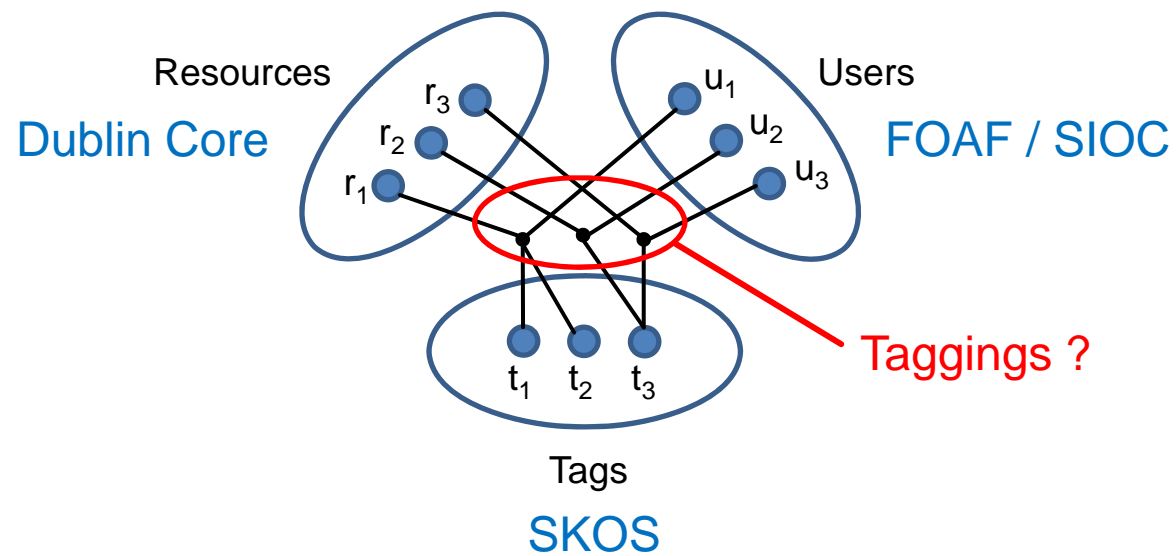
# Semantifying Folksonomies – Two Approaches

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1. Transforming folksonomies into controlled vocabularies
  - Tag clustering
  - Disambiguation
  - Synonym mapping
  - ...
2. Making folksonomies interoperable, i.e. independent from individual tagging systems
  - Using ontologies
  - *Goal:* Exchanging folksonomies as we exchange controlled vocabularies

# What's there? What's needed?

*Folksonomy Hypergraph*



## Related Work

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- Several initiatives (in the past)
  - TagCommons (Tom Gruber et al.)
  - Dublin Core Social Tagging Community
  - CommonTag (DERI, Yahoo!, Zemanta, Faviki, ...)
  - ...
- Several tagging ontologies exist already
- But: Selection and alignment is difficult
- Review and unification is needed



# Overview of Tagging Ontologies

Name	Authors	Release (latest update)	Main purpose	Newly introduced concepts	Reused vocabularies	OWL sublanguage
Tag Ontology	Newman et al.	2005-03-23 (2005-12-21)	First formal tagging ontology	Fundamental concepts and structure, restricted tagging	DC, FOAF, SKOS	OWL Full
Tagging Ontology	Knerr	2006 (2007-01-15)	Comprehensive domain description	Tagging source and note, private and group tagging	DC, DCTERMS, DCTYPE, FOAF, SKOS	OWL Full
Ontology of Folksonomy	Echarte et al.	2007 (—)	Comprehensive domain description	Aggregated tag, tag position, polarity, and type	--	OWL DL
Social Semantic Cloud of Tags	Kim et al.	2007-03-23 (2008-06-13)	TAGS extension for tag clouds	Tag clouds, frequencies, coccurrences, and spelling variants	FOAF, SIOC (DC, SKOS via TAGS)	OWL Full
Meaning of a Tag	Passant & Laublet	2008-01-15 (—)	TAGS extension for semantic tagging	Tag meaning, automatic tagging	FOAF, SIOC, (DC, SKOS via TAGS)	OWL Full
Upper Tag Ontology	Ding et al.	2008 (—)	Upper ontology	Voting via tags	DCTERMS, FOAF, SIOC, SKOS	OWL Lite (OWL Full)
Common Tag	Tori et al.	2009-06-08 (—)	Minimal ontology (optimized for RDFa)	Author vs. reader tags	DCTERMS, (MOAT, SIOC, SIOCT, SKOS, TAGS)	OWL Full
TAGora Tagging Ontology	Szomszor et al.	2009 (2010)	Automatic tag sense disambiguation	--	--	OWL Lite
NiceTag Ontology	Limpens et al.	2009-01-09 (2010-09-09)	Taggings as speech acts (intention of tags)	Named graphs, tag intensions	FOAF,IRW, SIOC, RDFG	OWL Full
<b>Modular Unified Tagging Ontology</b>	<b>Lohmann et al.</b>	<b>2011-09-02 (2011-11-16)</b>	<b>Unification, modularization</b>	--	<b>DCTERMS, SIOC, SKOS, (FOAF, all tagging ont.)</b>	<b>OWL Lite</b>



# Modular Unified Tagging Ontology (MUTO)

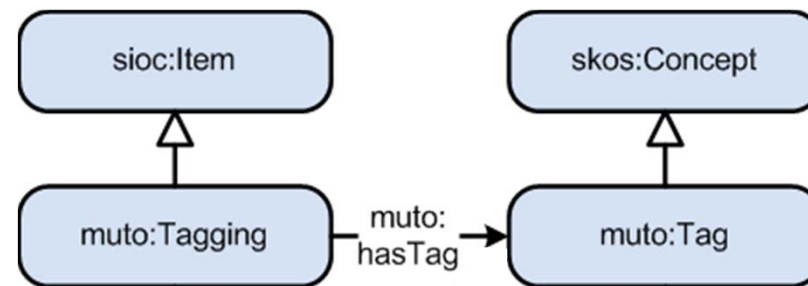
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- Unification of existing approaches
- Compact and consistent design
- Modular architecture (core <> extensions)
- Conform to OWL Lite/DL and OWL 2
- Specification at: <http://purl.org/muto>



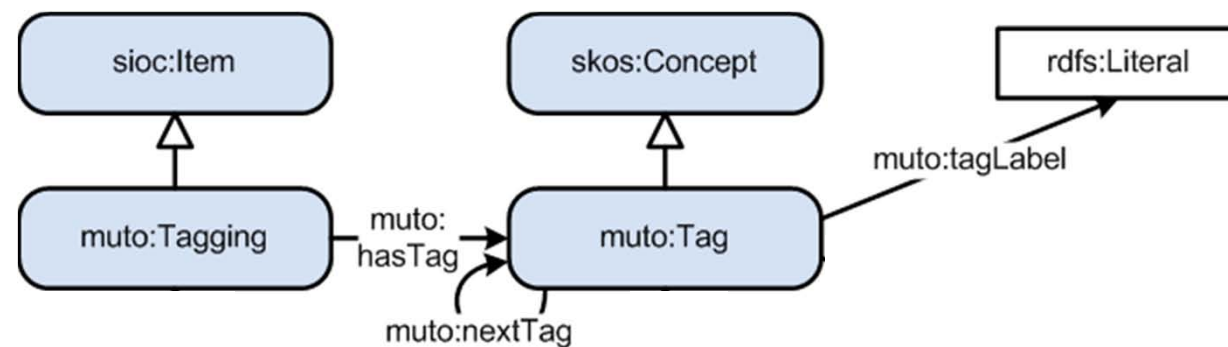
# MUTO Core Ontology

- Tags are aligned with SKOS
- Taggings are aligned with SIOC



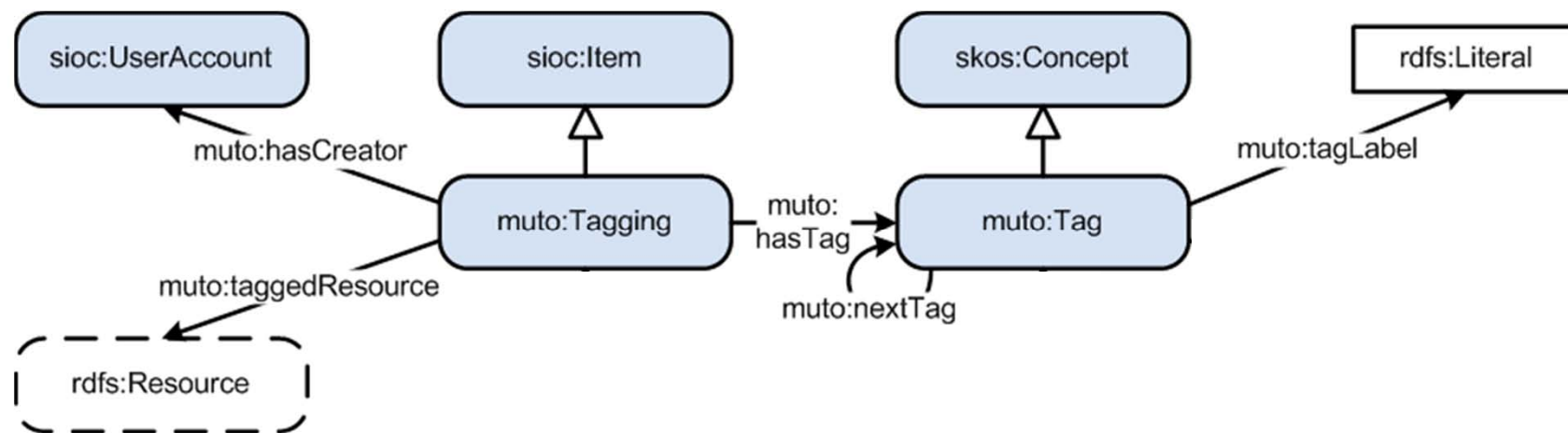
# MUTO Core Ontology

- Tags have a label (exactly one label).
- Tags are entered in a certain order.



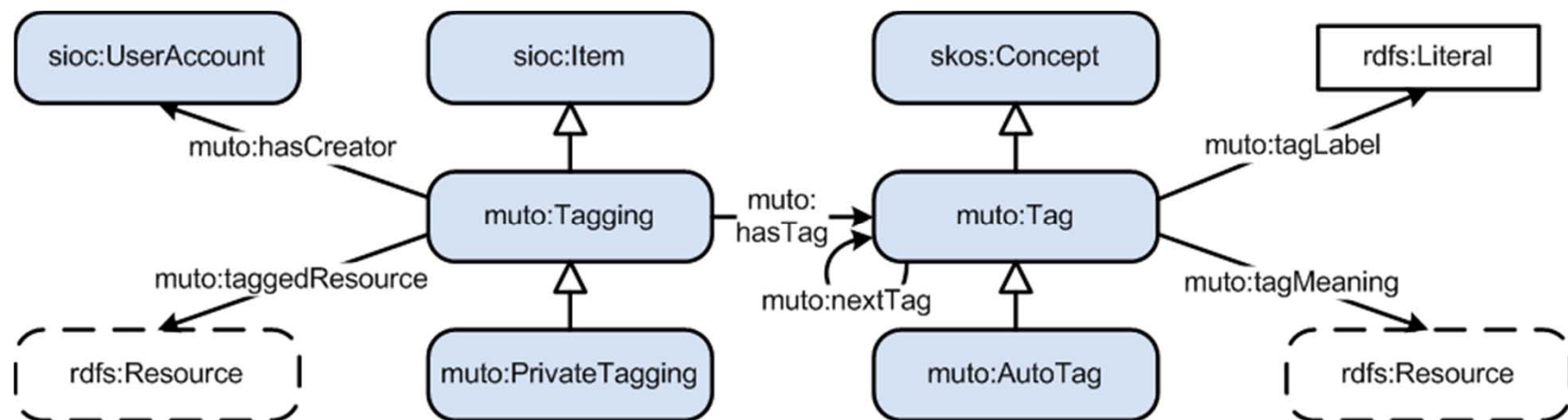
# MUTO Core Ontology

- Users are linked via SIOC (and FOAF)
- Resources can be anything (rdfs:Resource)

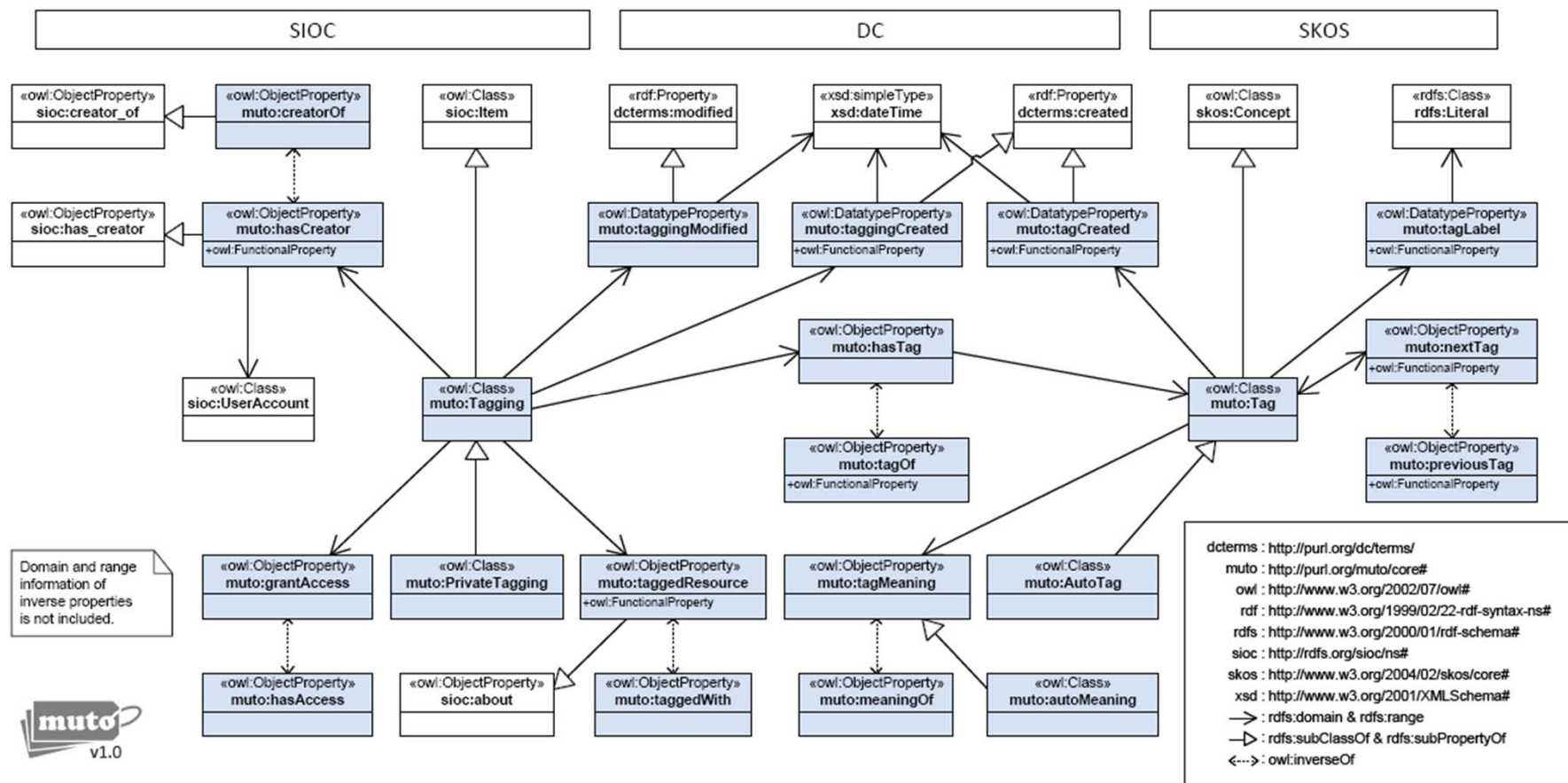


# MUTO Core Ontology

- Supports private, automatic, and semantic tagging

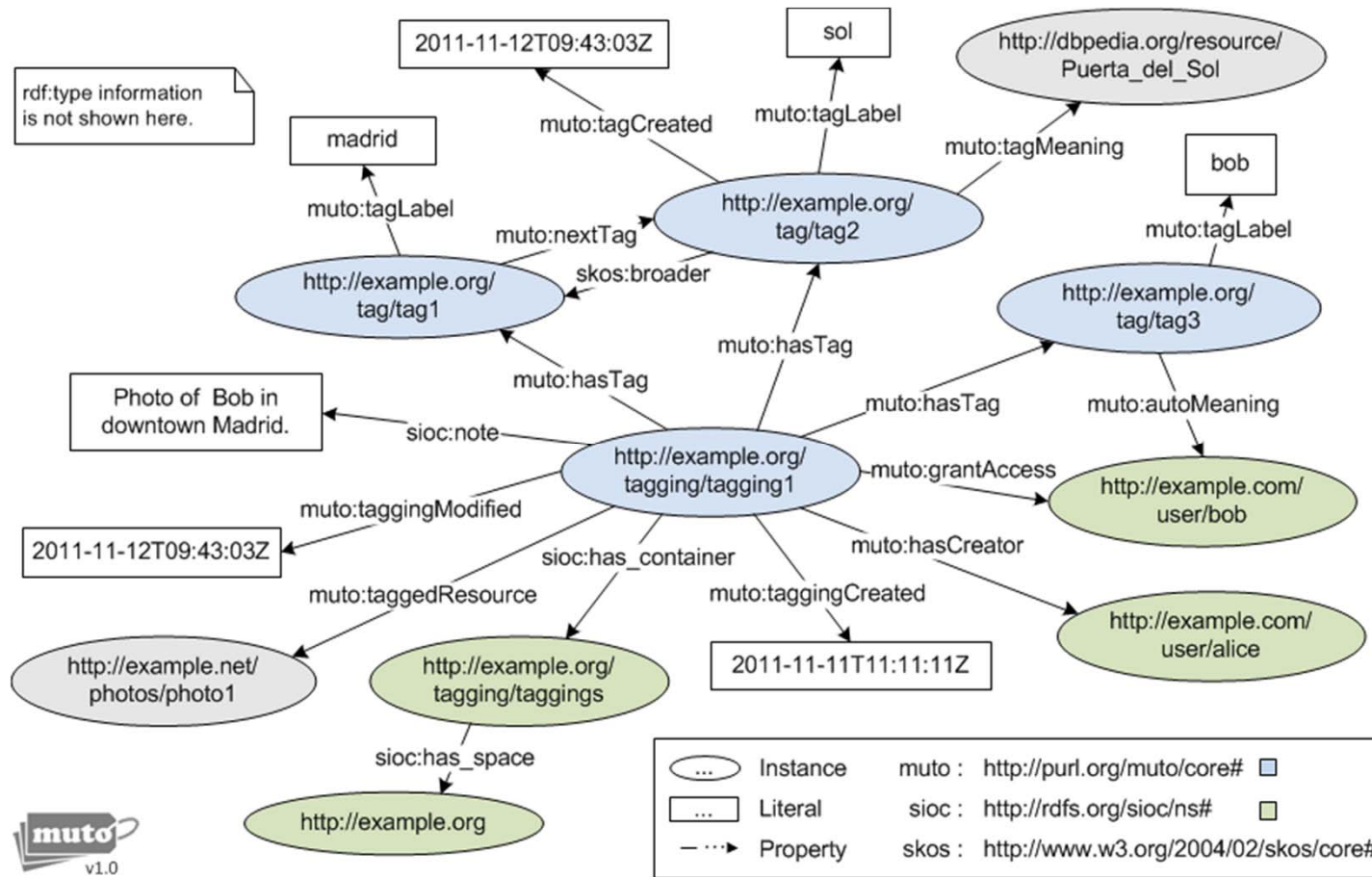


# Complete UML Diagram of MUTO



More information at: <http://purl.org/muto>

# Example of Using MUTO



## Summary

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### MUTO:

- Not yet another tagging ontology
- But: Unification of existing tagging ontologies

### And:

- Review of available tagging ontologies
- Shared conceptualization of the domain of tagging



# Outlook

- Interoperable folksonomies
- Graph visualizations:
  - [ChainGraph](#)

