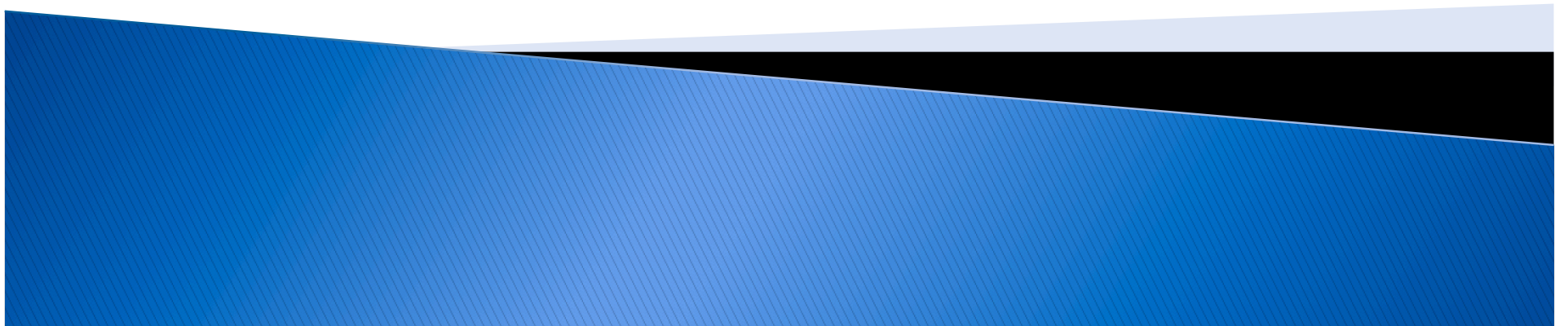


Combining the Social and Semantic Web

Part 4 – Using Semantic Social Data

Sheila Kinsella, DERI / NUIG

Denny Vrandečić, KIT / Wikimedia.de



Agenda

Introduction

- ▶ Social and Semantic Web
- ▶ Data portability
- ▶ Ontologies

Applications: General

- ▶ Semantic Tagging
- ▶ Semantic Microblogging
- ▶ Facebook Open Graph
- ▶ Drupal 7

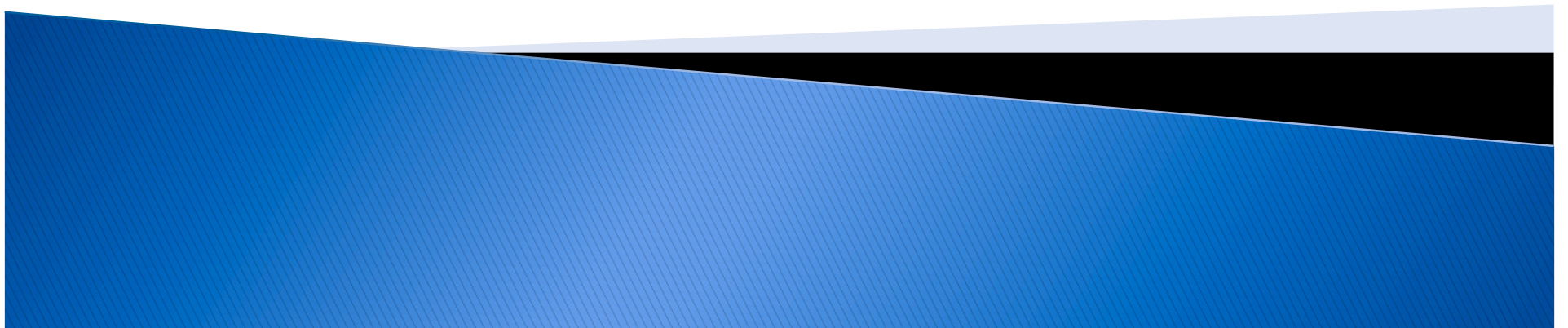
Applications: Wikis

- ▶ Wikis and semantics
- ▶ Semantic MediaWiki
- ▶ Collaboration

Using Semantic Social Data

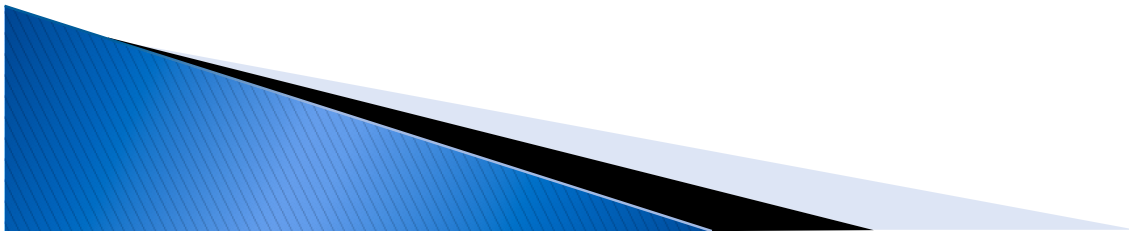
- ▶ Distributed Social Web
- ▶ Recommendations
- ▶ Enhanced visualisations
- ▶ Social network analysis

Enabling a decentralized and distributed Social Web



Federated Social Web

- ▶ Initiative to develop a decentralized Social Web based on open standards
 - Interoperability between networks
 - Data portability
 - User privacy and data control



<http://www.w3.org/2005/Incubator/federatedsocialweb/charter>



Federated Social Web Incubator Group Charter

The **mission** of the [Federated Social Web Incubator Group](#), part of the [Incubator Activity](#), is to provide a set of community-driven specifications and a test-case suite for a [federated social web](#).

[Join the Federated Social Web Incubator Group.](#)

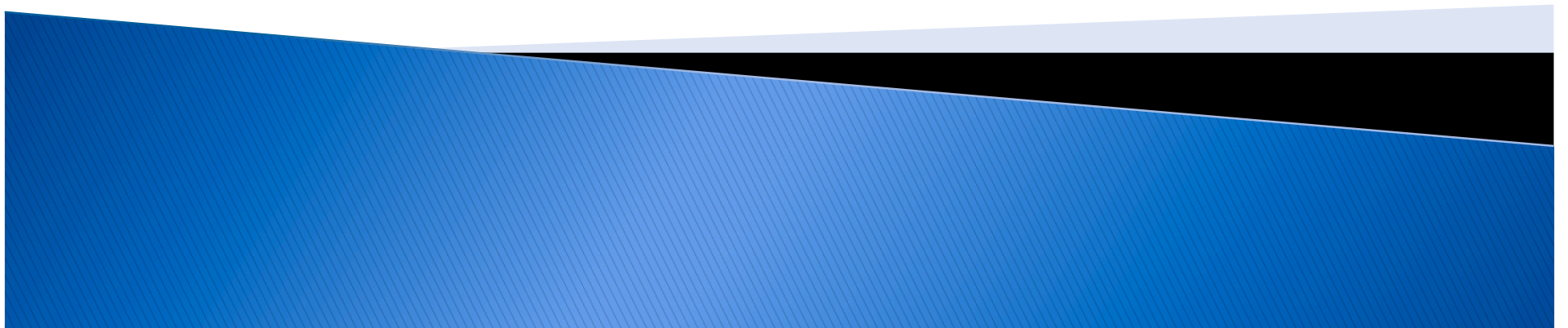
Scope
Deliverables
Dependencies and Liaisons
Participation
Communication
Decision Policy
Patent Policy
Additional Information
About this Charter

End date	15 December 2011
Confidentiality	Proceedings are public
Initial Chairs	Evan Prodromou (Status.Net) Harry Halpin (W3C/University of Edinburgh)
Initiating Members	• DERI • Google • OpenLink • Vodafone
Usual Meeting Schedule	Teleconferences: Monthly Face-to-face: Once Annually

1. Scope

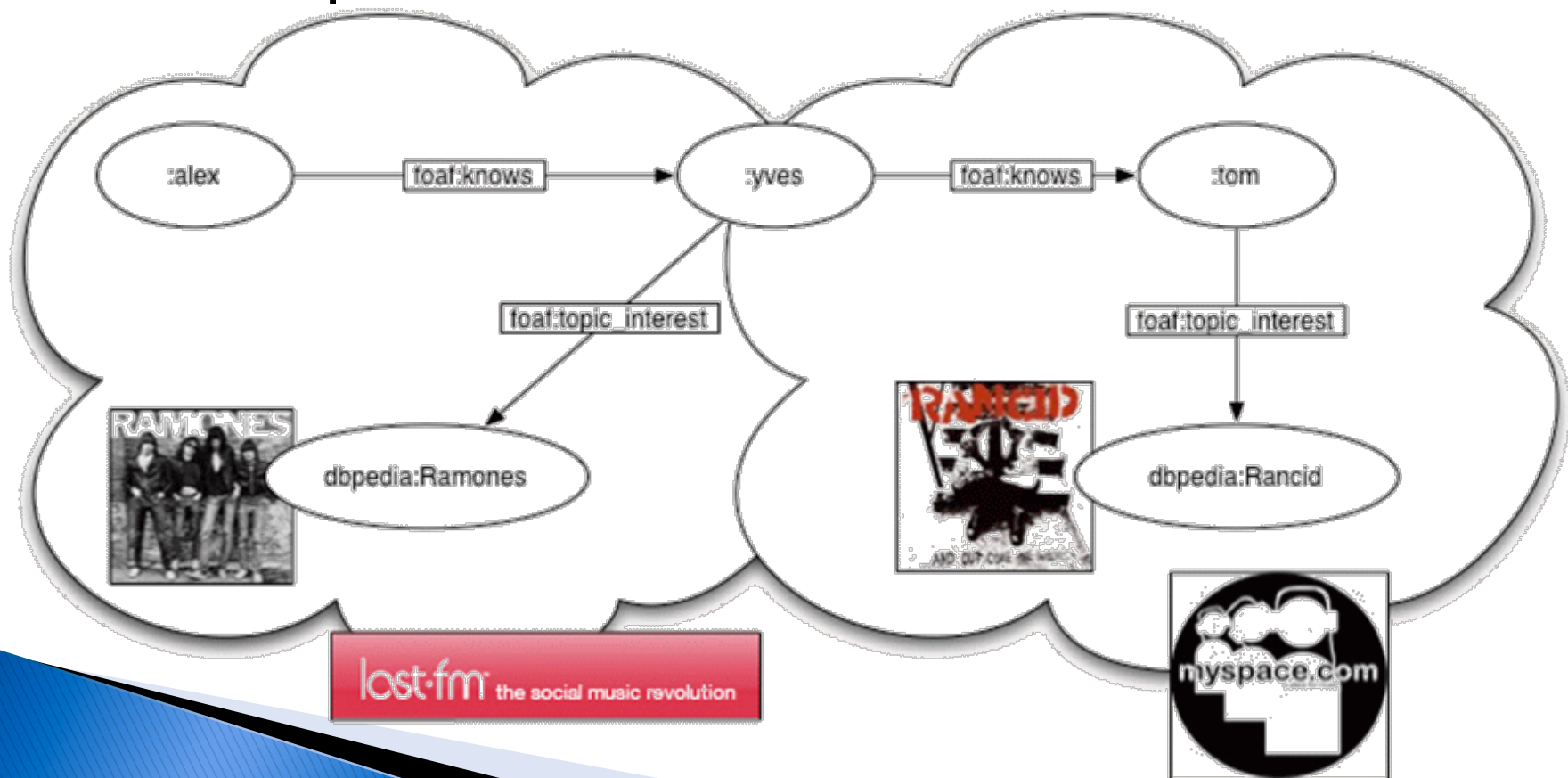
As our social interactions become the central point of our communication using the Web, there is an increasing need for a federated social web that any site, application, and device can easily join and share. In order for there to be massive uptake, the federated social web should offer a compelling experience for users. Furthermore, users would like to have the ability for these applications to respect the privacy of their social data in easy-to-understand and uniform ways.

Recommendation of users and content



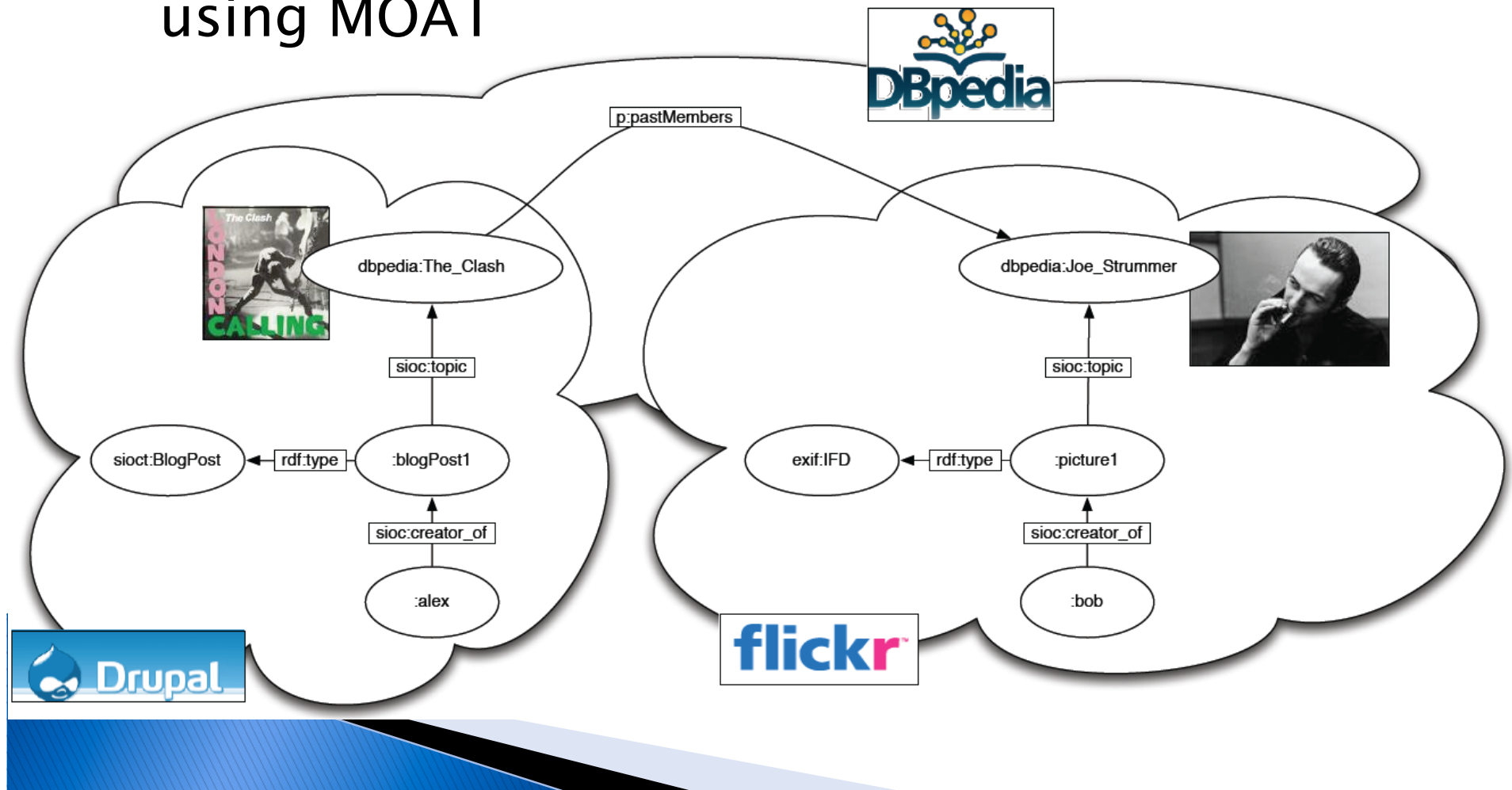
“Combining Social Music and Semantic Web for music-related recommender systems”

- ▶ *Passant and Raimond, SDoW 2008*
- ▶ Cross-platform social recommendation



“Combining Social Music and Semantic Web for music-related recommender systems”

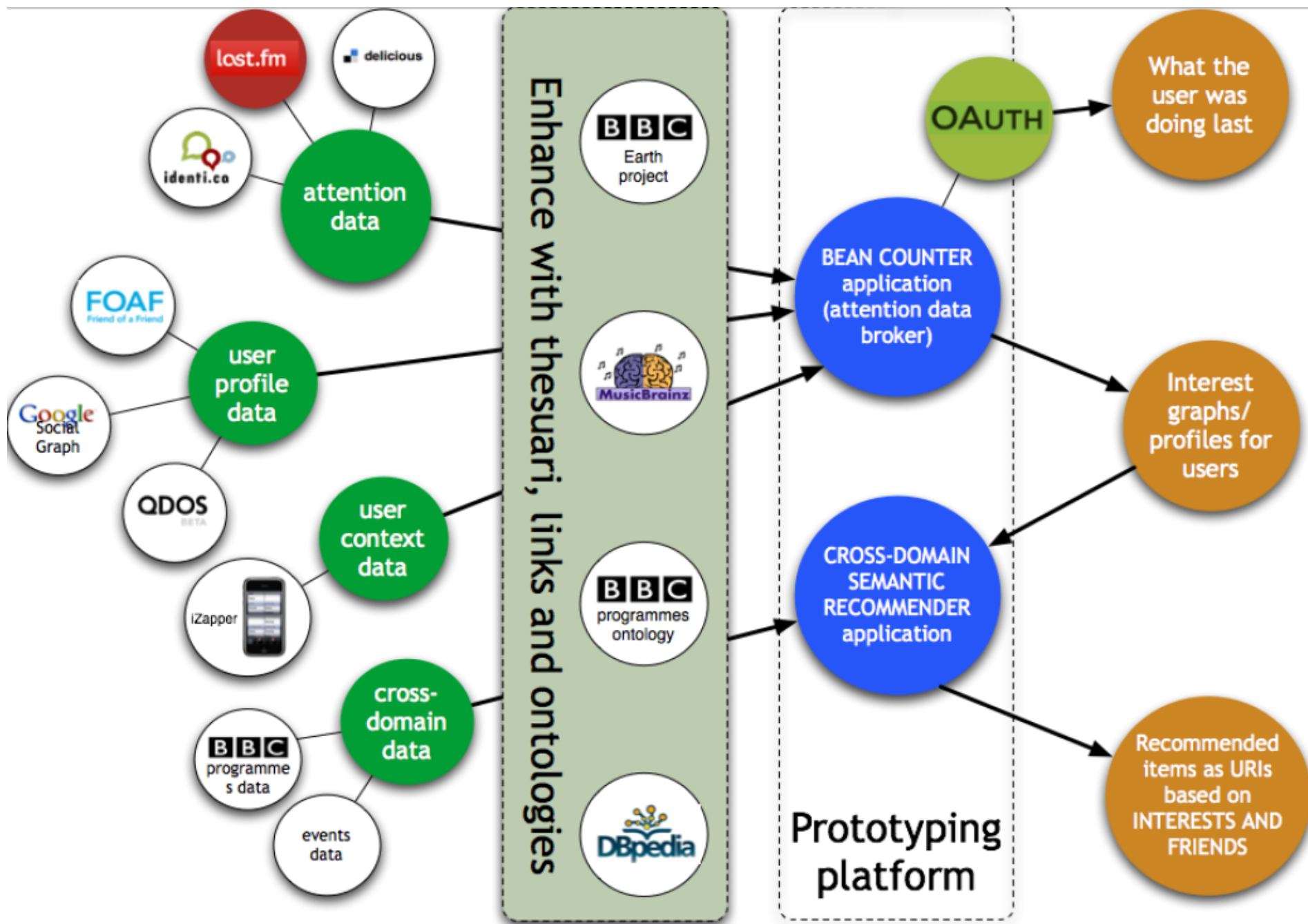
- ▶ Cross-platform tag-based recommendations, using MOAT



<http://notube.tv/>

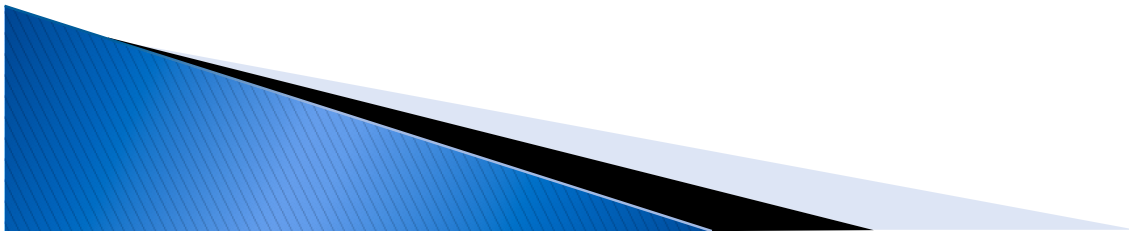
- ▶ Architecture for personalised creation, distribution and consumption of TV content
- ▶ Use Linked Data cloud to provide recommendations
 - Interlink existing user profile data from the Web
 - *e.g., Twitter, Last.fm*
 - Enrich TV programme data with Linked Data
 - *e.g., finding relevant Freebase, Dbpedia concepts*
 - Find relations between user interests and programme info
 - *e.g., what my friends were tweeting about today*





“Looking for Experts? What can Linked Data do for You?”

- ▶ *Stankovic et al., LDOW 2010*
- ▶ Proposes LOD as source of diverse distributed data from Web to obtain comprehensive view of expertise
 - ▶ Online activity: Wikipedia, mailing lists, Q&A sites
 - ▶ Academic activity: DBLP, ACM, SW Conference Corpus
- ▶ Present expertise hypotheses
 - e.g., a chair of a session of a professional event is an expert in that area
- ▶ Evaluate existence of necessary data as LOD



```
PREFIX sioc: <http://rdfs.org/sioc/ns#>
PREFIX akt: <http://www.aktors.org/ontology/portal#>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX dcterms: <http://purl.org/dc/terms/>
PREFIX dbpedia: <http://dbpedia.org/resource/>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX swrc: <http://swrc.ontoware.org/ontology#>
PREFIX swc: <http://data.semanticweb.org/ns/swc#>
```

```
SELECT DISTINCT $person
WHERE {
```

```
  { $person a foaf:Person } UNION { $person a akt:Person } .
```

```
  $person swc:holdsRole $role .
```

```
  $role swc:isRoleAt $event .
```

```
  $role a swc:Chair .
```

```
  $event swc:hasRelatedDocument $proceedings .
```

```
  $paper swc:isPartOf $proceedings .
```

```
  { $paper swc:hasTopic dbpedia:Semantic_Web } UNION
```

```
  { $paper sioc:topic dbpedia:Semantic_Web } UNION
```

```
  { $paper dcterms:subject dbpedia:Semantic_Web }
```

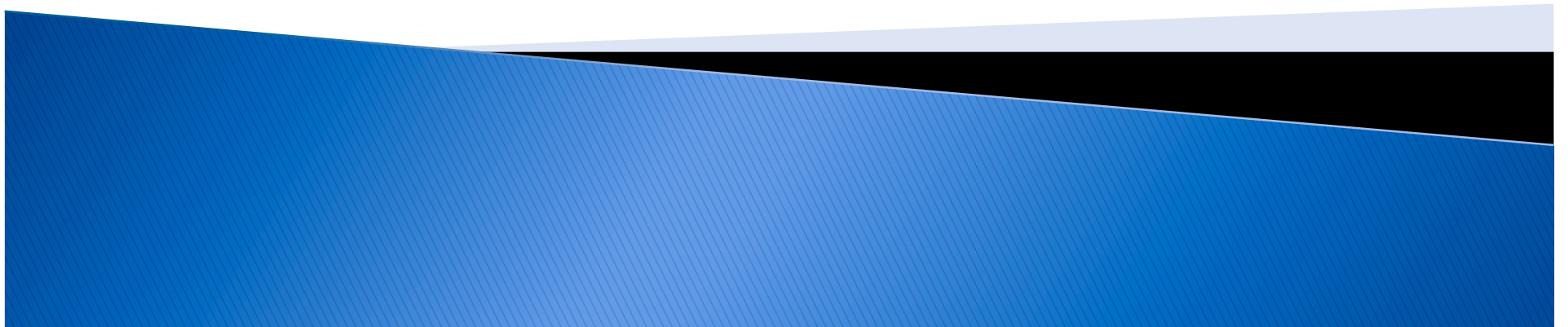
```
}
```

Finding experts
based on
chairing a
session on the
topic of interest

Enhanced visualisations

Combine diverse data from multiple sources

Use the rich semantics of the data



<http://www.google.com/>

[John Breslin - Ireland | LinkedIn](#)

Ireland - Lecturer at NUI Galway; Director of boards.ie Ltd. and Social Media Ltd.

View **John Breslin's** (Ireland) professional profile on LinkedIn. LinkedIn is the world's largest business network, helping professionals like **John Breslin** ...

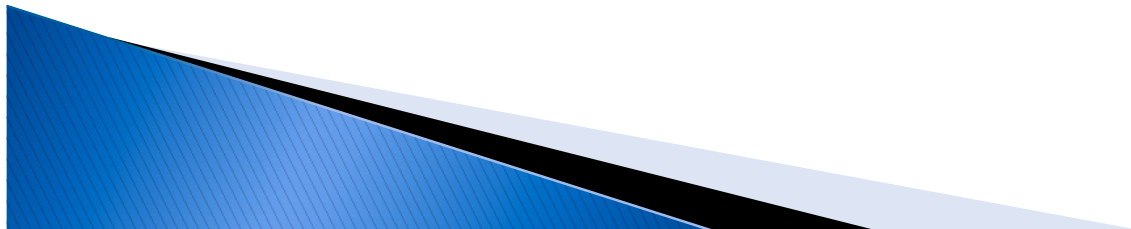
ie.linkedin.com/in/johnbreslin - [Similar](#)

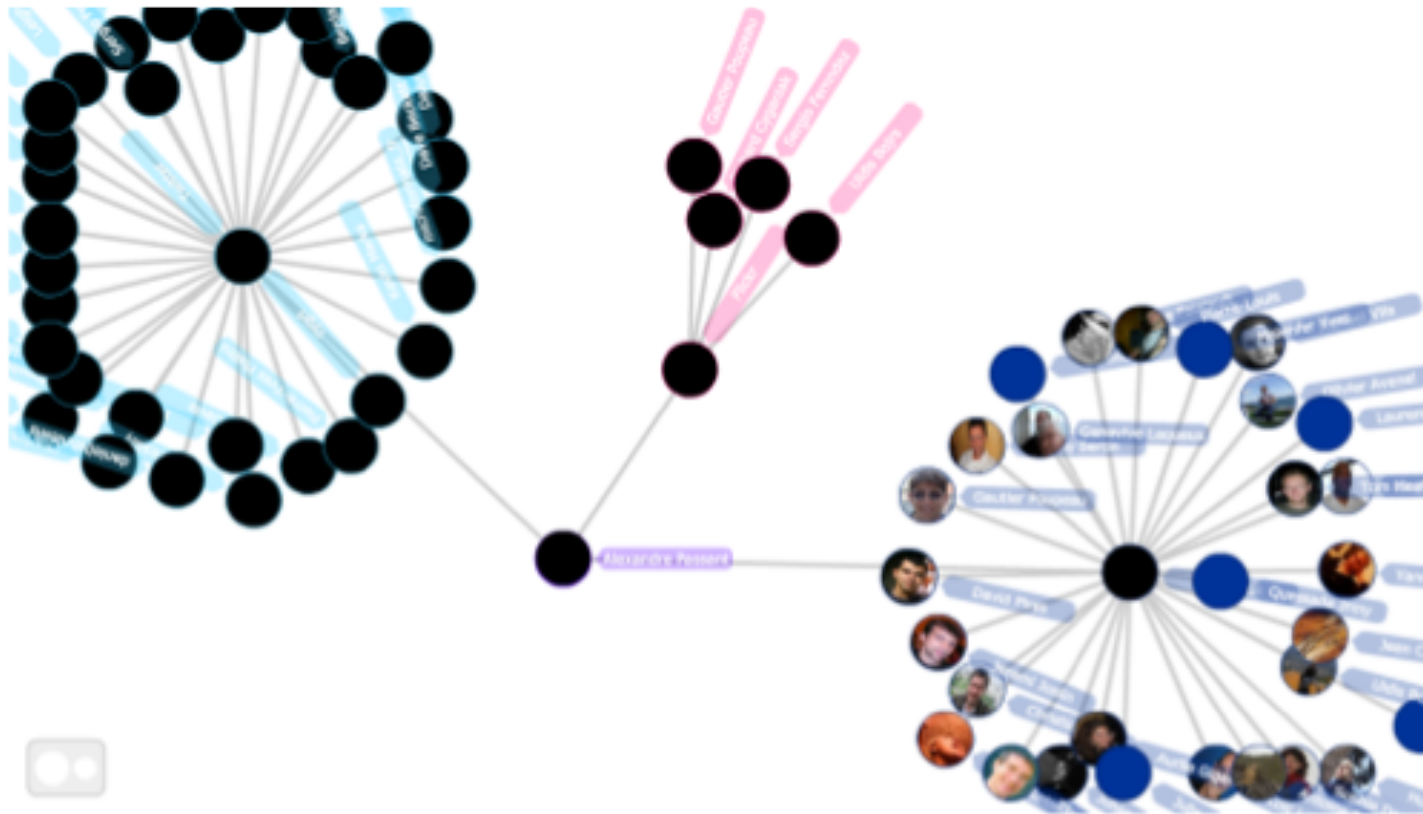
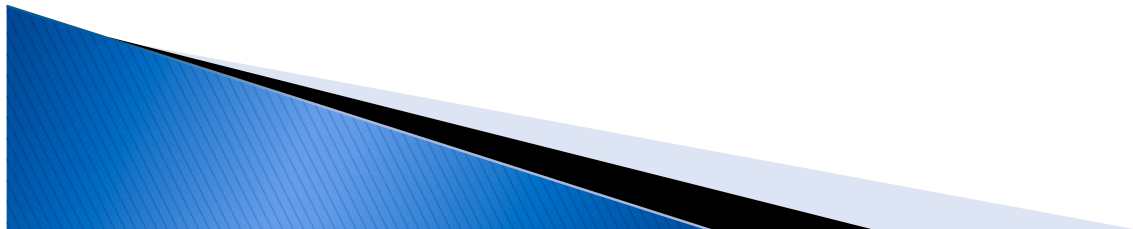
[Black Swan Movie Reviews - Rotten Tomatoes](#)

★★★★★ Rating: 88% - 255 reviews

Directed by [Darren Aronofsky](#). Starring [Natalie Portman](#), [Mila Kunis](#), [Barbara Hershey](#). A psychological thriller set in the world of New York City ballet, **BLACK SWAN** stars Natalie Portman as Nina, a featured dancer who finds herself locked in a web of competitive intrigue with...

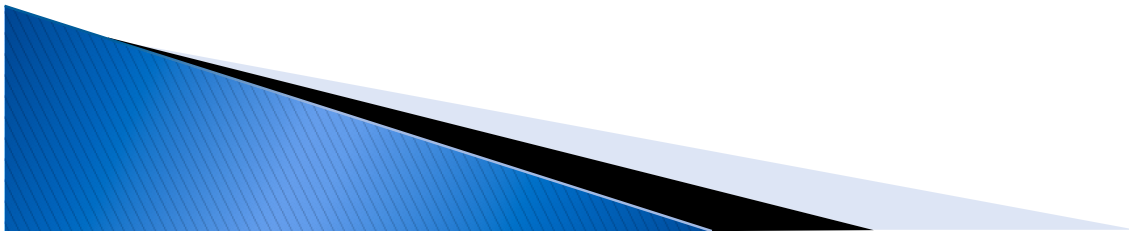
www.rottentomatoes.com/.../black_swan_2010/ - [Cached](#) - [Similar](#) - [Add to iGoogle](#)





Twitris (Kno.e.sis)

- ▶ Analysis and visualisation of *citizen sensors*
- ▶ Many real world events reported real time by multiple people via images, text, videos
- ▶ Identify social signals via **spatial, temporal and thematic slices**
 - Gather topically relevant data
 - Process tweets
 - Find descriptors
 - Semantically enhance
 - Extract entities, semantically annotate, external content
- ▶ Published as LOD



<http://twitris.knoesis.org/>

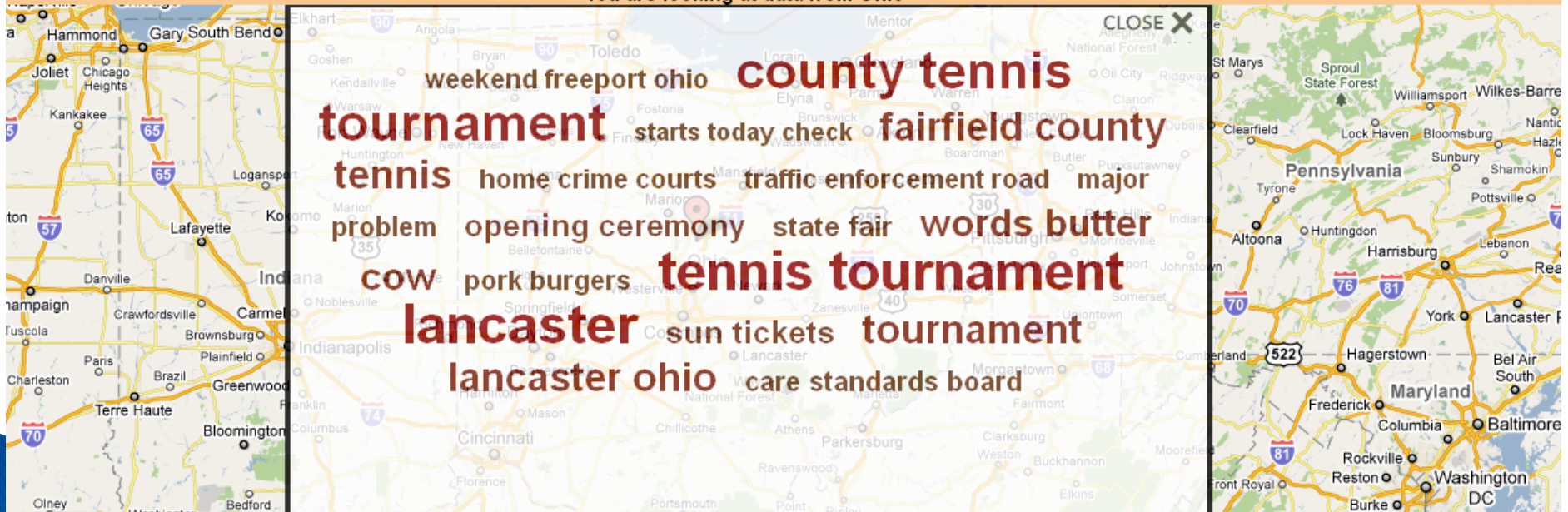
About Us



What is Twitris ?

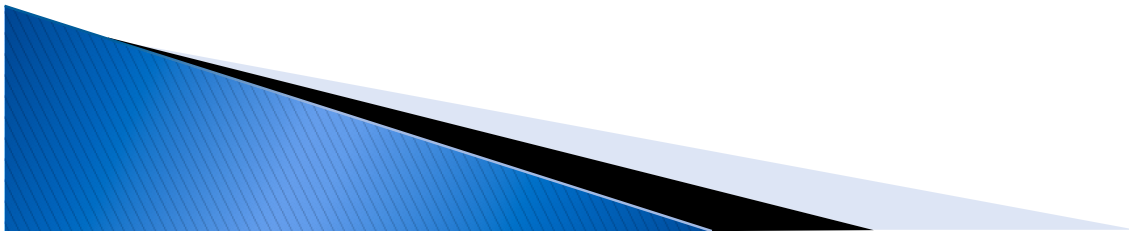
Twitris Map : Ohio State Fair

You are looking at data from Ohio

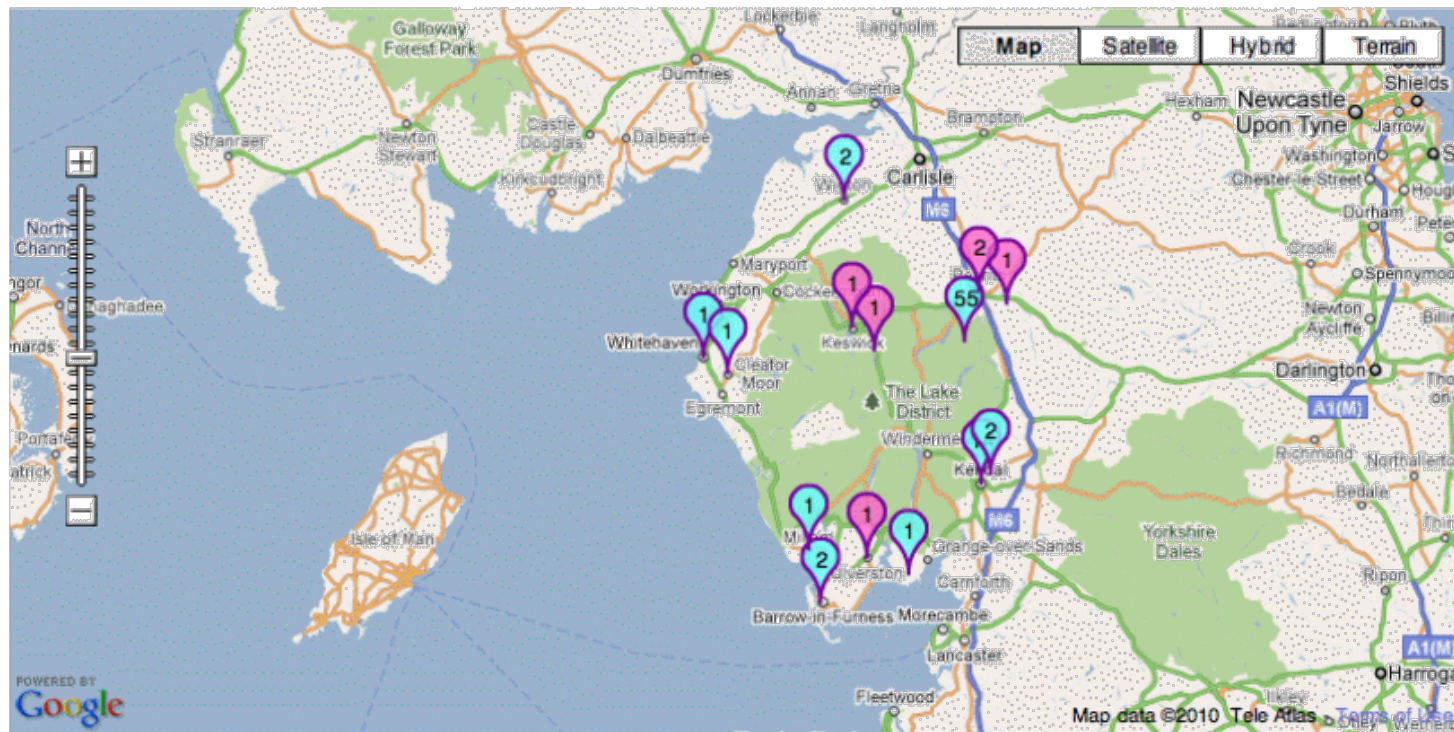


“Interlinking and Interpreting Social Data from Heterogeneous Sources”

- ▶ *Rowe and Mazumdar, LUPAS 2010*
- ▶ Uses SW technologies to interlink and represent data from multiple Social Web platforms
 - Flickr, Twitter
 - Includes provenance, topic, geo
- ▶ Heterogeneous data can be easily queried, analysed and visualised in a consistent way



<http://www.dcs.shef.ac.uk/~suvodeep/ViziSocial>



Items found: 85

Day: 2009/11/23

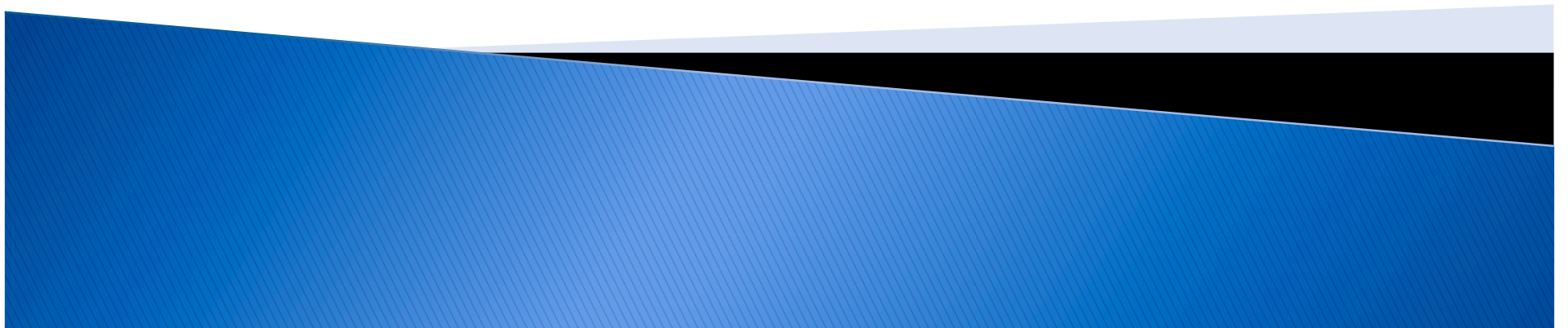
 Flickr data

 Twitter data

Cumbria floods

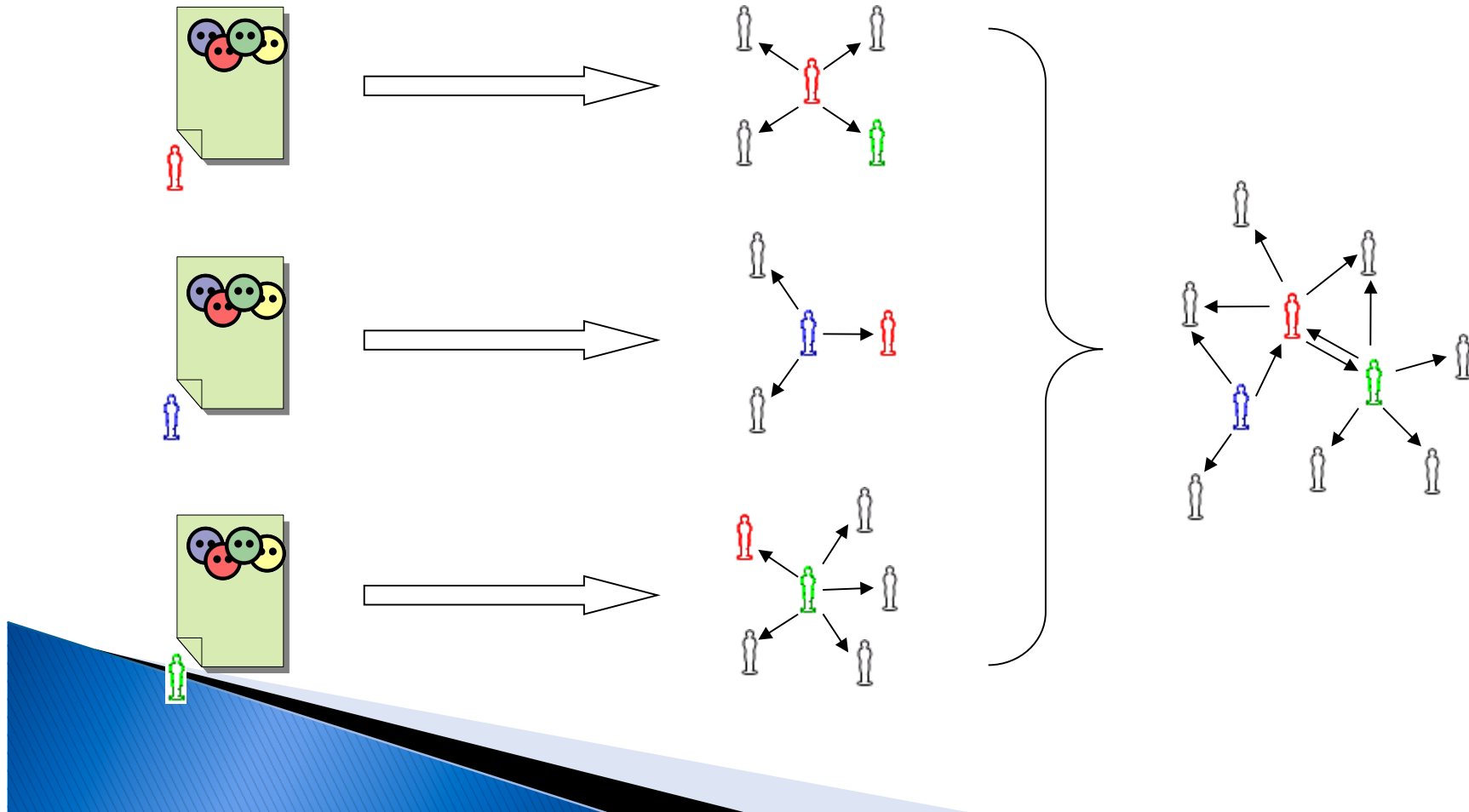
Tiny chat Comments Fb Cumbria flood
Cockermouth Cumbria Religious
oods Daily question Mr Tweet FF Open
webawards Twibbon Jobs Three
strikes Simply Tweet Music Monday 3 strike
es Wildhorses Cloud Horses Paramore UI
version Window Q omph Center parks Lig
hts Roindoor Christmas Lake District Rail
ow flying Panavia Gr4 Tomado Goldstars
Bs 027 Za564 Nailed Boom Queue Traffic
Flood Jam Fool Ludicrous Clothing Englan
d Uk Keswick Lionheart Gavin Lynn Thelak
edistrict Flooding Floods Marketplace

Improving social network analysis



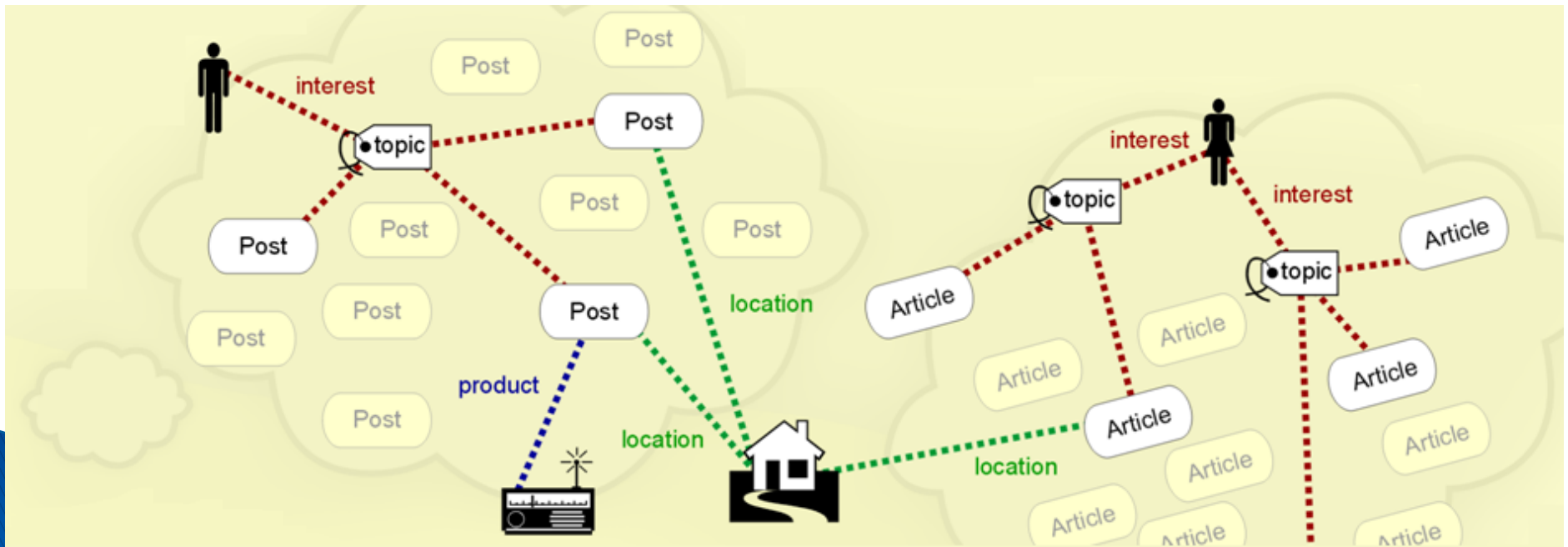
Improving social network analysis

- Simply fusing data from many sources



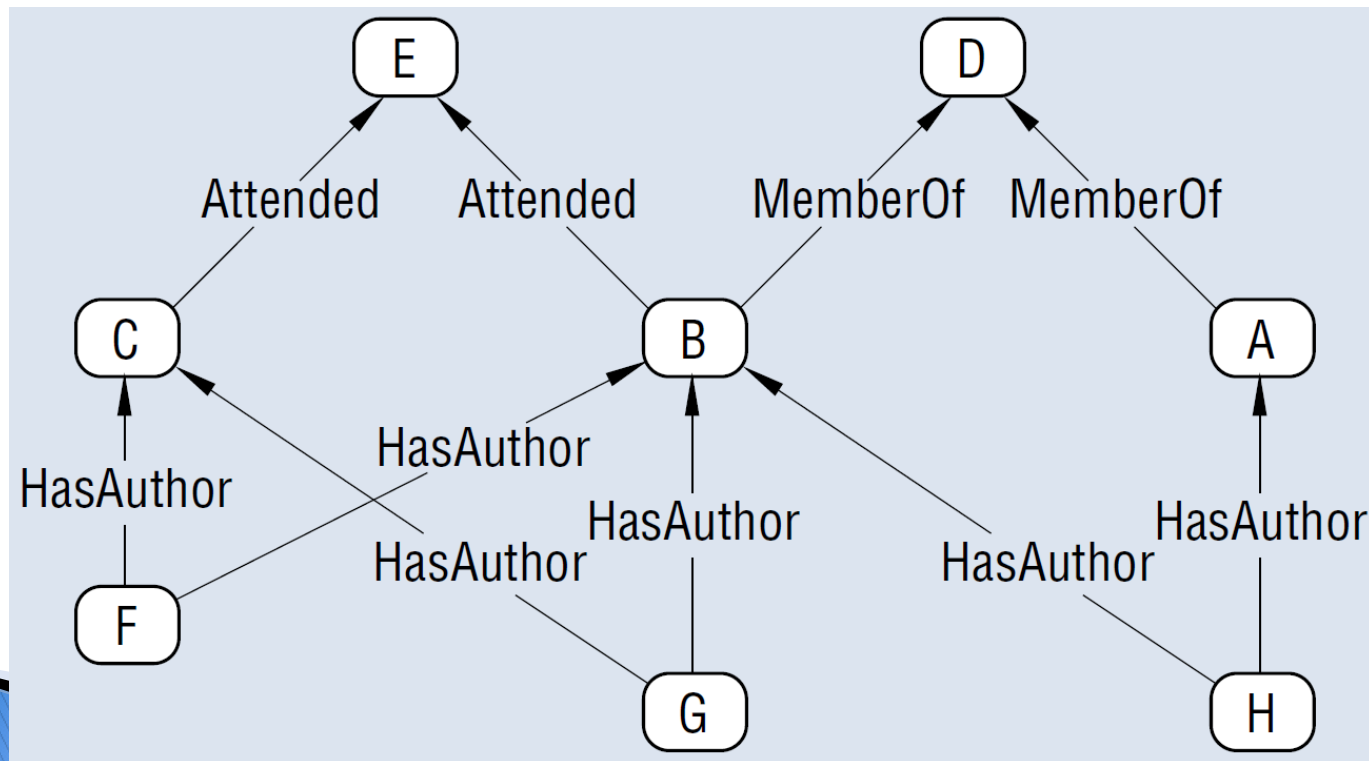
Improving social network analysis

- New methods which take advantage of rich representations of concepts and relationships:
“semantic social network analysis”



“Identifying Communities of Practice through Ontology Network Analysis”

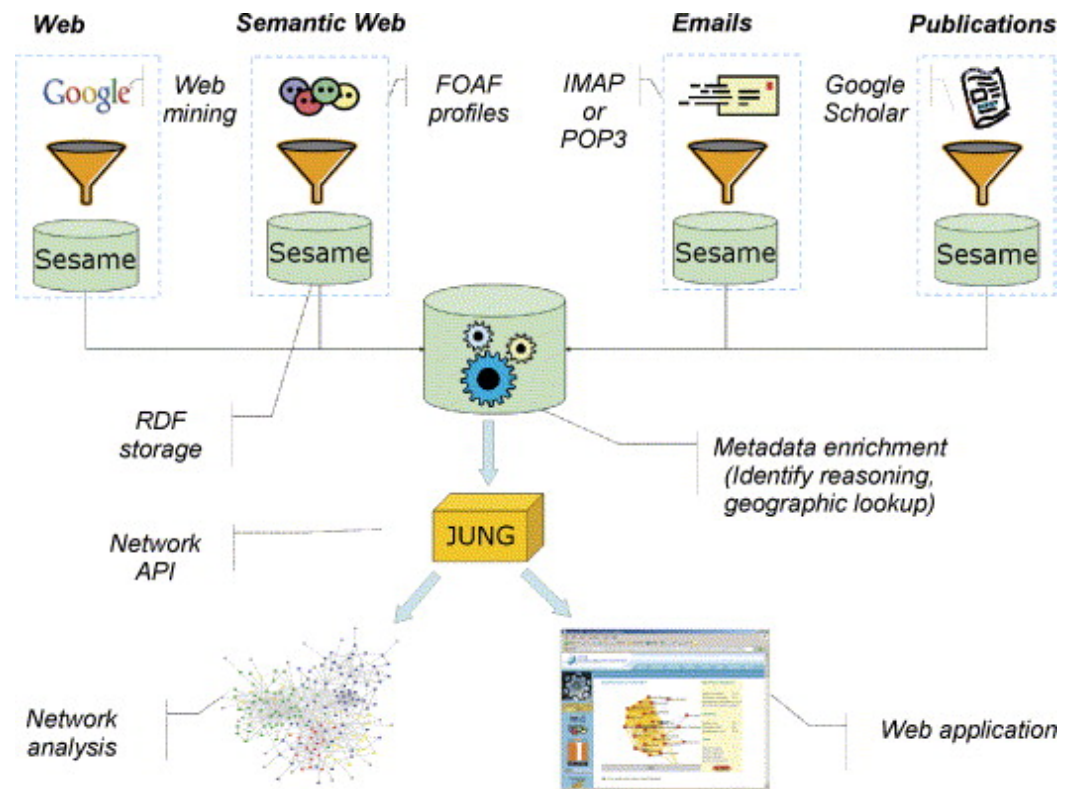
- ▶ *Alani et al., IEEE Int. Sys. (2003)*
- ▶ Discover informal relations from ontologies
 - Spreading activation algorithm



“Flink: Semantic Web technology for the extraction and analysis of social networks”

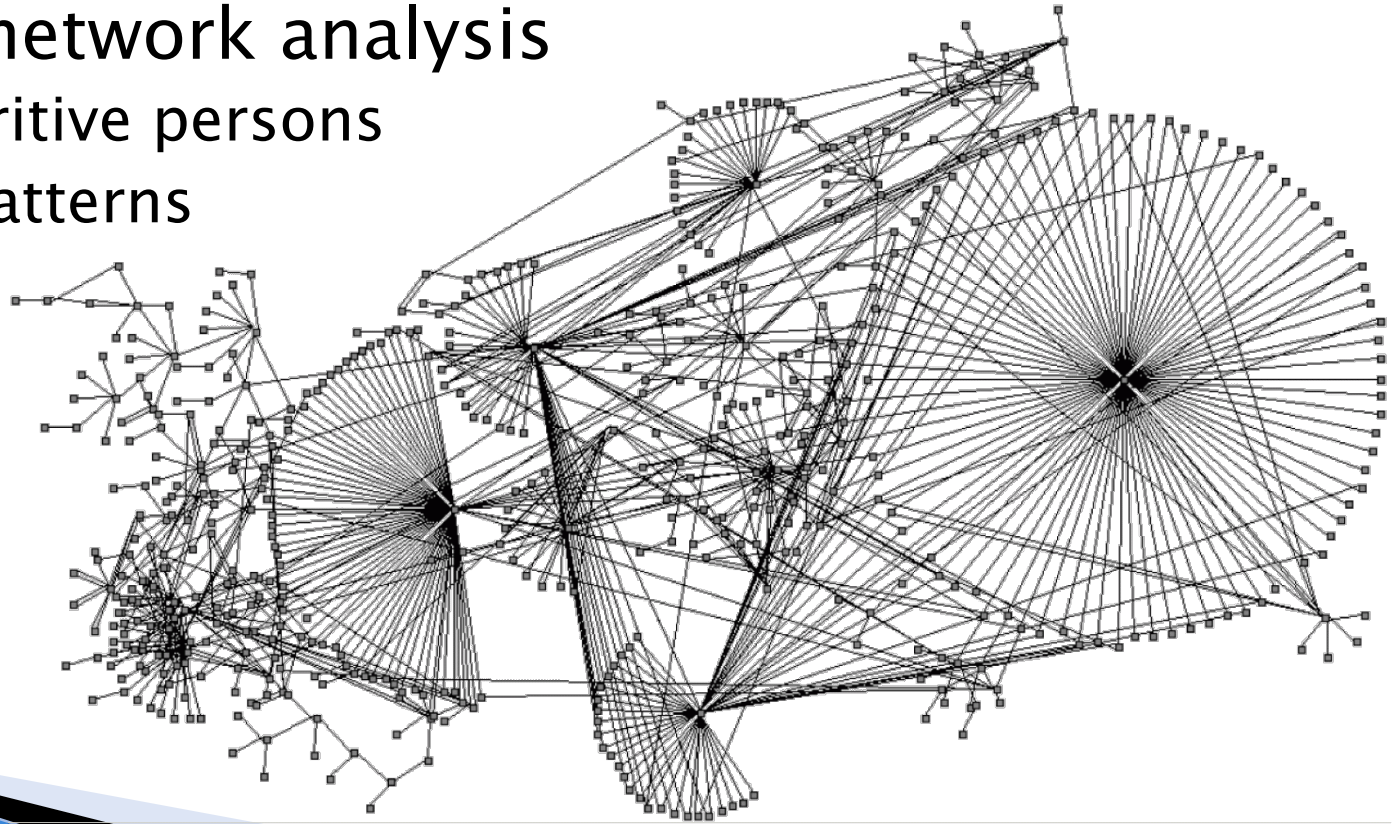
► *Mika, J. Web. Sem., 2005*

- Personal info extracted from many sources
- Reasoning and inference
- Analysis and visualisation



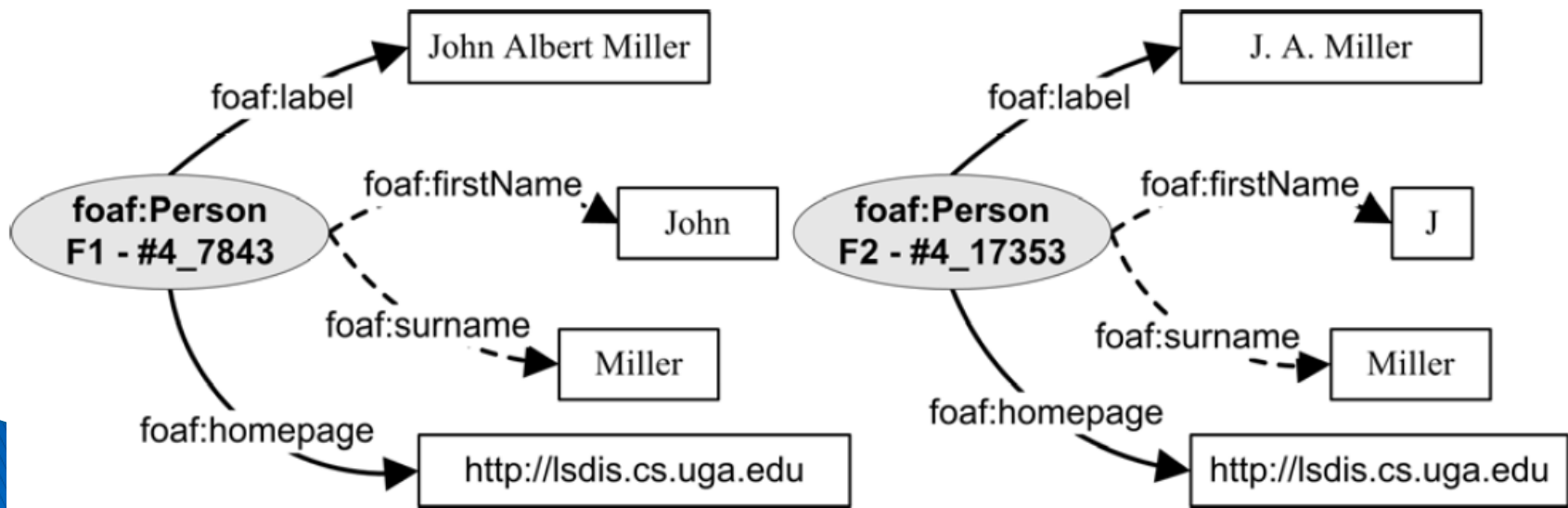
“Social networking on the Semantic Web”

- ▶ *Finin et al., The Learning Organization (2005)*
- ▶ Crawled FOAF documents and smushed (IFPs)
- ▶ Social network analysis
 - Authoritative persons
 - Link patterns



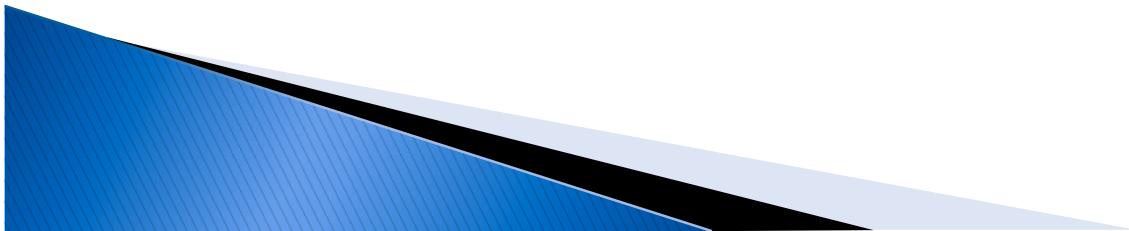
“Semantic Analytics on Social Networks: Experiences in addressing the Problem of Conflict of Interest Detection”

- ▶ *Aleman-Meza et al., WWW 2006*
- ▶ Integrates FOAF and DBLP networks
- ▶ Heuristical disambiguation algorithm
 - e.g., shared name, affiliation, common co-authors
 - Criteria weighted and threshold applied



“Semantic Analytics on Social Networks: Experiences in addressing the Problem of Conflict of Interest Detection”

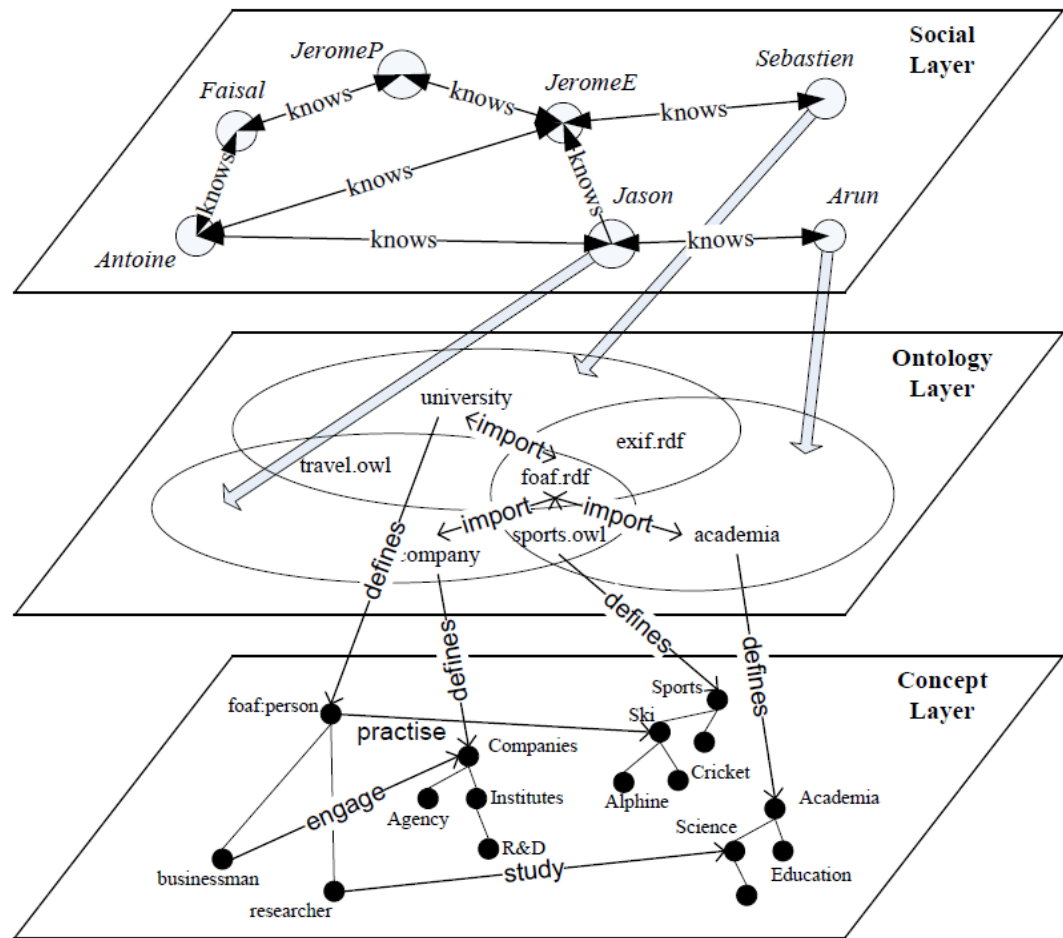
- ▶ Detect COI between authors and reviewers
 - Based on knows (FOAF) and co-author (DBLP) relationships
- ▶ **Assesses level of COI**
 - Reviewer an author/frequent collaborator
 - Multiple intermediary friends/co-authors
 - More distant connections



“Towards semantic social networks”

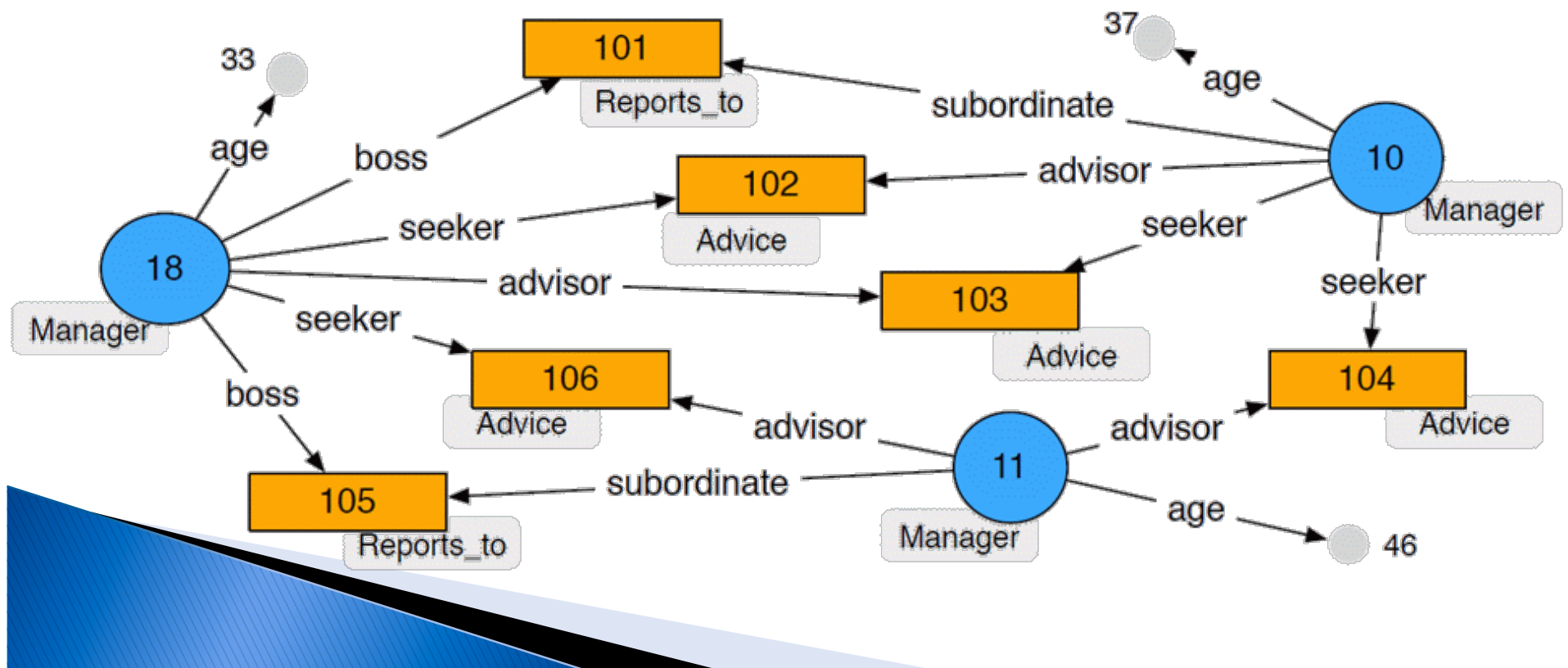
► *Jung and Euzenat, ESWC 2007*

- Use knowledge structure used by people to infer communities
- Relationships discovered can facilitate cooperation



“Representing, Querying and Transforming Social Networks with RDF/SPARQL”

- ▶ *San Martín and Gutierrez, ESWC 2009*
- ▶ Propose a data model based on RDF
 - Considers requirements from SNA community



“Representing, Querying and Transforming Social Networks with RDF/SPARQL”

- ▶ Propose query/transformation language for SNA based on SPARQL/SQL
 - aggregation missing in SPARQL
 - now supported in SPARQL 1.1
- ▶ Structural analysis is more suited to an analysis tool, but SPARQL is suitable for graph transformations
 - E.g., “*extract the subnetwork of seeker–advisor relations for those advisors which have at least 2 advisees, and add the #advisees as an attribute to the advisors*”



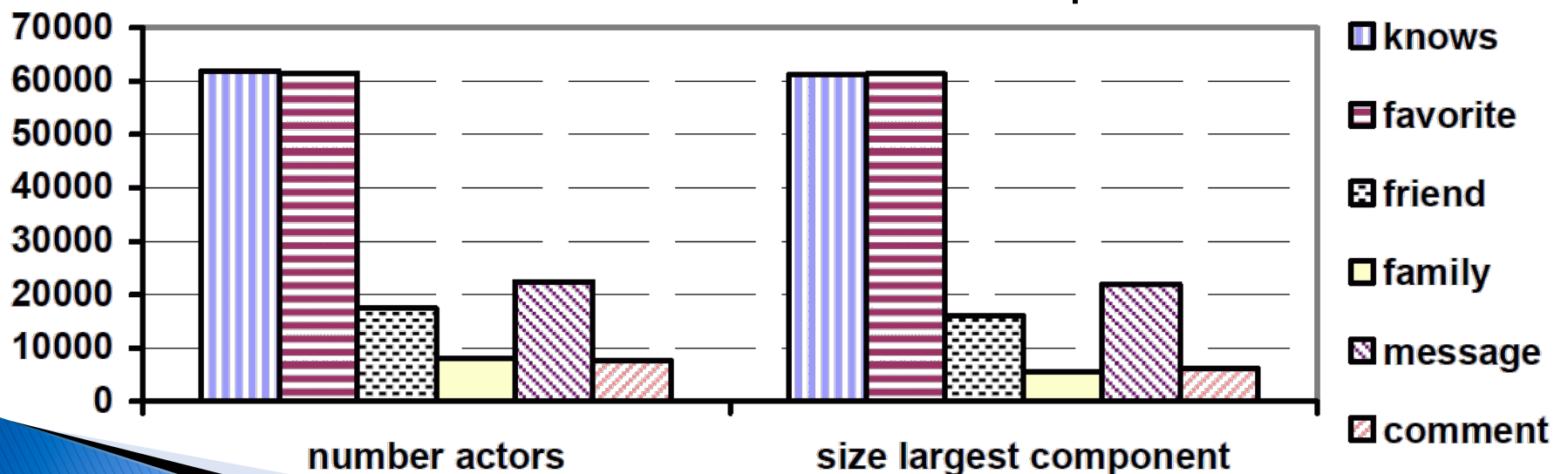
“Analysis of a Real Online Social Network using Semantic Web Frameworks”

- ▶ *Erétéo et al., ISWC 2009*
- ▶ SemSNA: Ontology of Social Network Analysis
 - e.g., Paths, Groups, Measures
- ▶ SPARQL extensions for SNA patterns
 - e.g., path retrieval
- ▶ SemSNI: Ontology of Social Network Interactions
 - e.g., Visit, Private Message
 - Uses SIOC, SCOT
- ▶ This framework enables enhanced representation of social networks and metrics



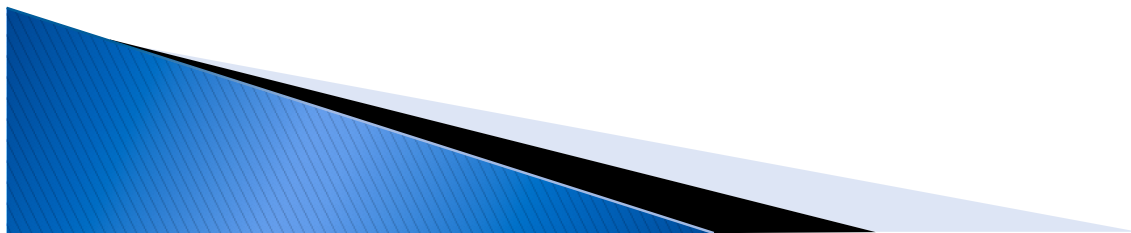
“Analysis of a Real Online Social Network using Semantic Web Frameworks”

- ▶ Analysis of real dataset on networks extracted from various relations
 - Centrality measures results differ for different graphs
 - Diverse relations show different characteristics
 - Conclusion: semantics of relationships matter



“Measuring the dynamic bi-directional influence between content and social networks”

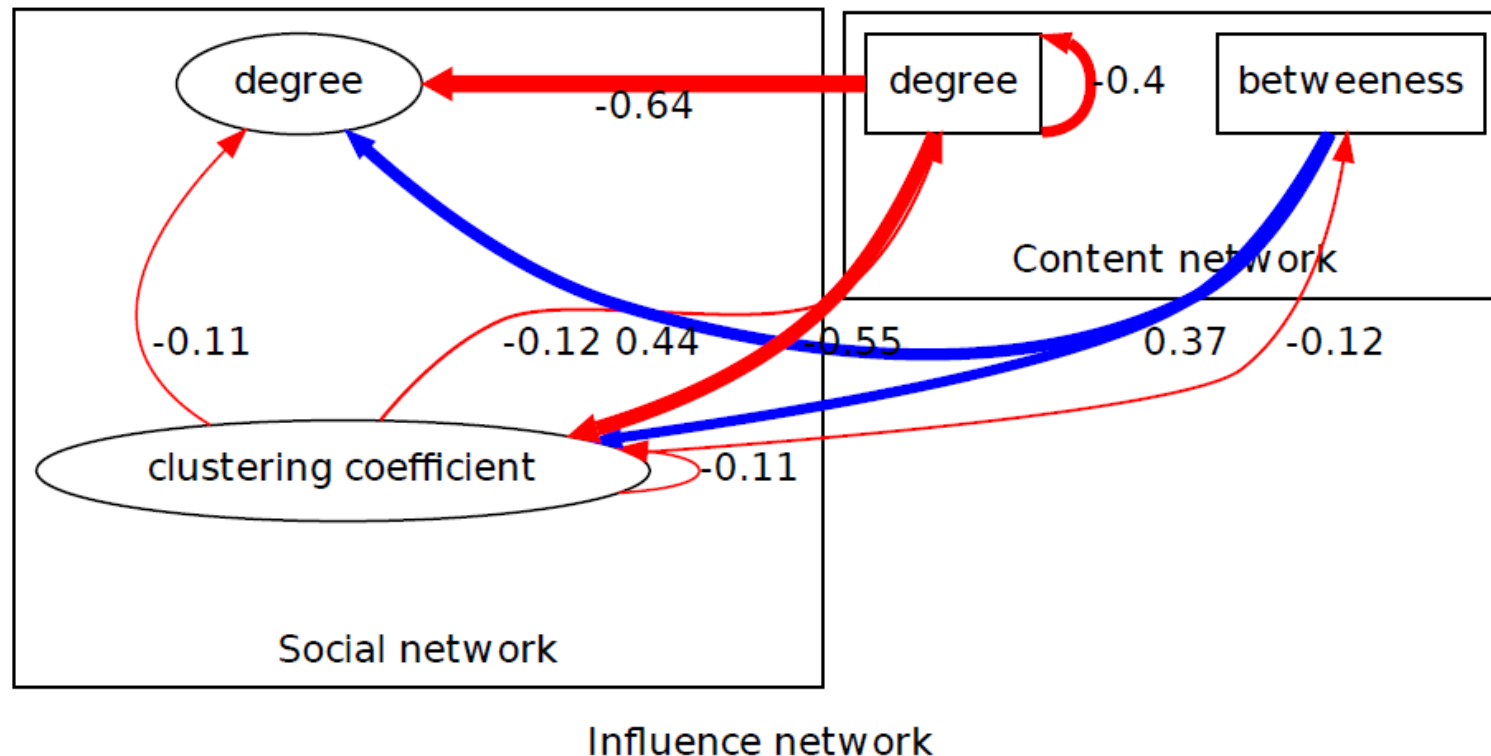
- ▶ *Wang and Groth, ISWC 2010*
- ▶ Influence framework
 - Network generation
 - Social network and content corpus
 - Measuring Network Properties
 - Centrality and clustering coefficient for each actor
 - Time Series Analysis
 - Generates regression model statistics and influence network diagram
 - Shows statistically significant effects between variables



“Measuring the dynamic bi-directional influence between content and social networks”

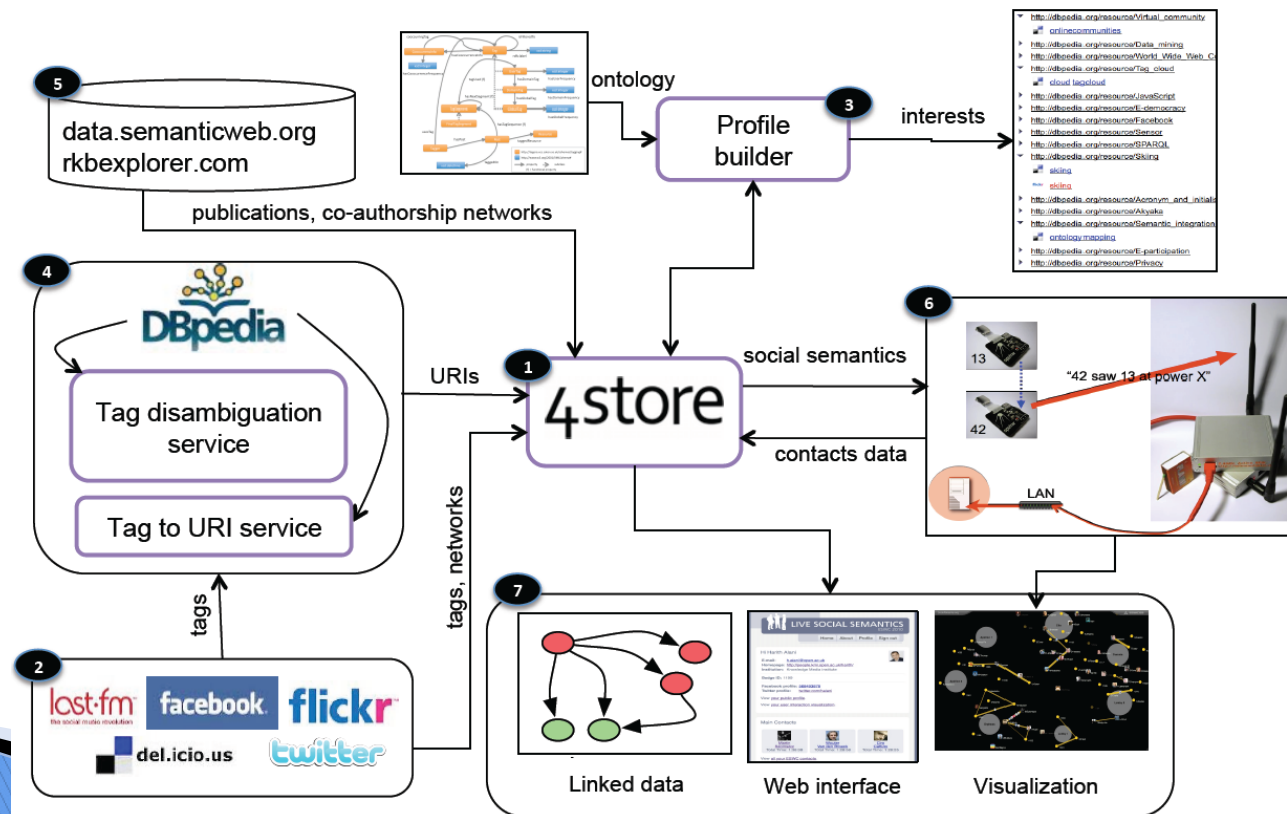
► Use cases:

- NL.politiek (participants, posts)
- Semantic Web Dog Food (authors, papers)



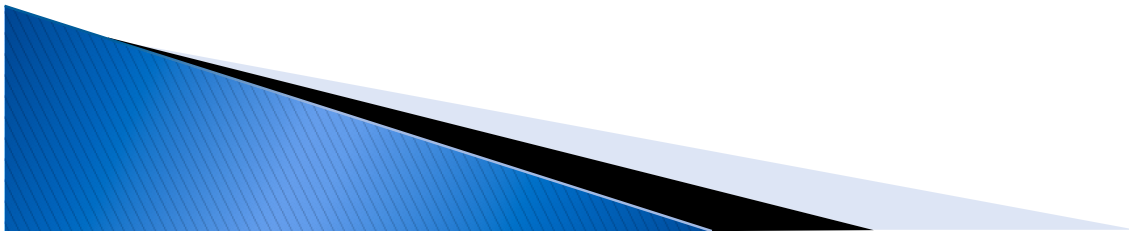
“Social dynamics in conferences: analyses of data from the Live Social Semantics application”

- ▶ *Barrat et al., ISWC 2010*
- ▶ Integrates from SNSs, publications, sensors



“Social dynamics in conferences: analyses of data from the Live Social Semantics application”

- ▶ Allows new analysis of face-to-face activity
 - Senior scientists talk with other senior scientists
 - Chairs interact with more people
- ▶ Allows comparison of face-to-face activity and online activity
 - No relationship between seniority & online popularity
 - People with online links tend to have greater face-to-face interactions



Acknowledgements

- ▶ *John Breslin, Alexandre Passant*
 - ▶ *For more see book “The Social Semantic Web”*
- ▶ *Uldis Bojars*
- ▶ *Lin Clark*
- ▶ *Andreas Harth*
- ▶ *Milan Stankovic*
- ▶ *Our funding agencies:*
 - ▶ *EU FP7 project RENDER*
 - ▶ *Science Foundation Ireland*