

A Novel Vision for Navigation and Enrichment in Cultural Heritage Collections

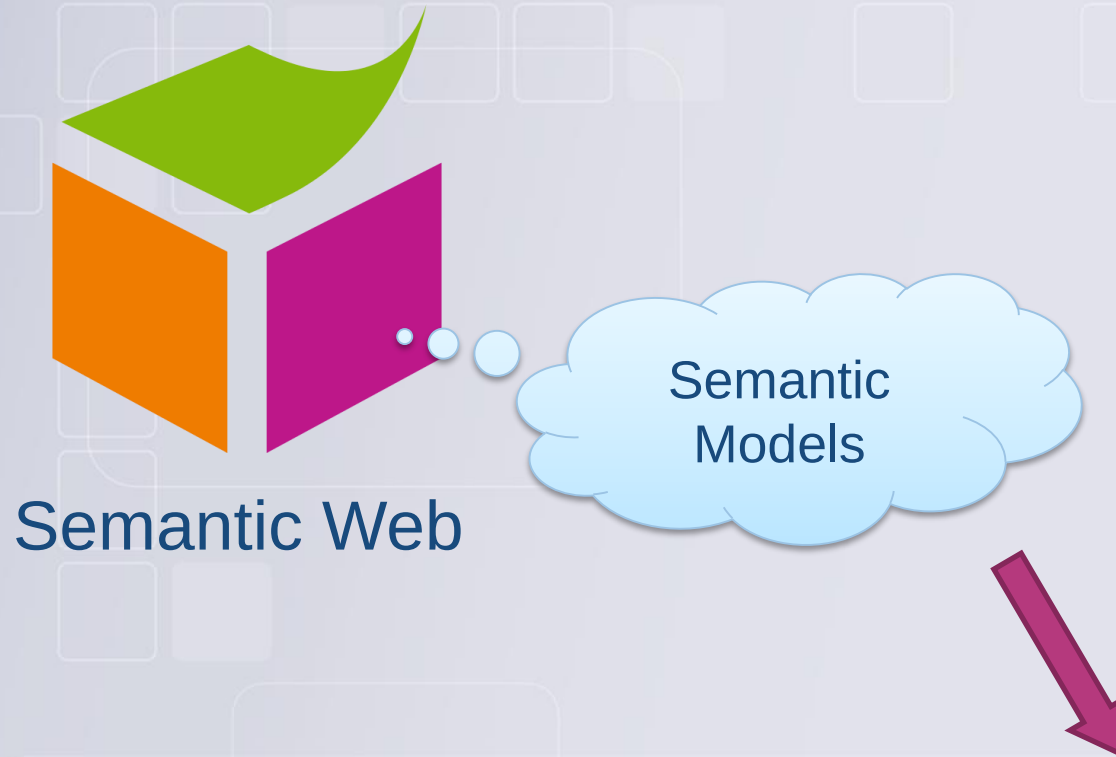
Joffrey Decourselle, Audun Vennesland, Trond Aalberg, Fabien Duchateau & Nicolas Lumineau
08/09/2015 - SW4CH Workshop, Poitiers

Improving features and user experience in Online Public Access Catalog ?



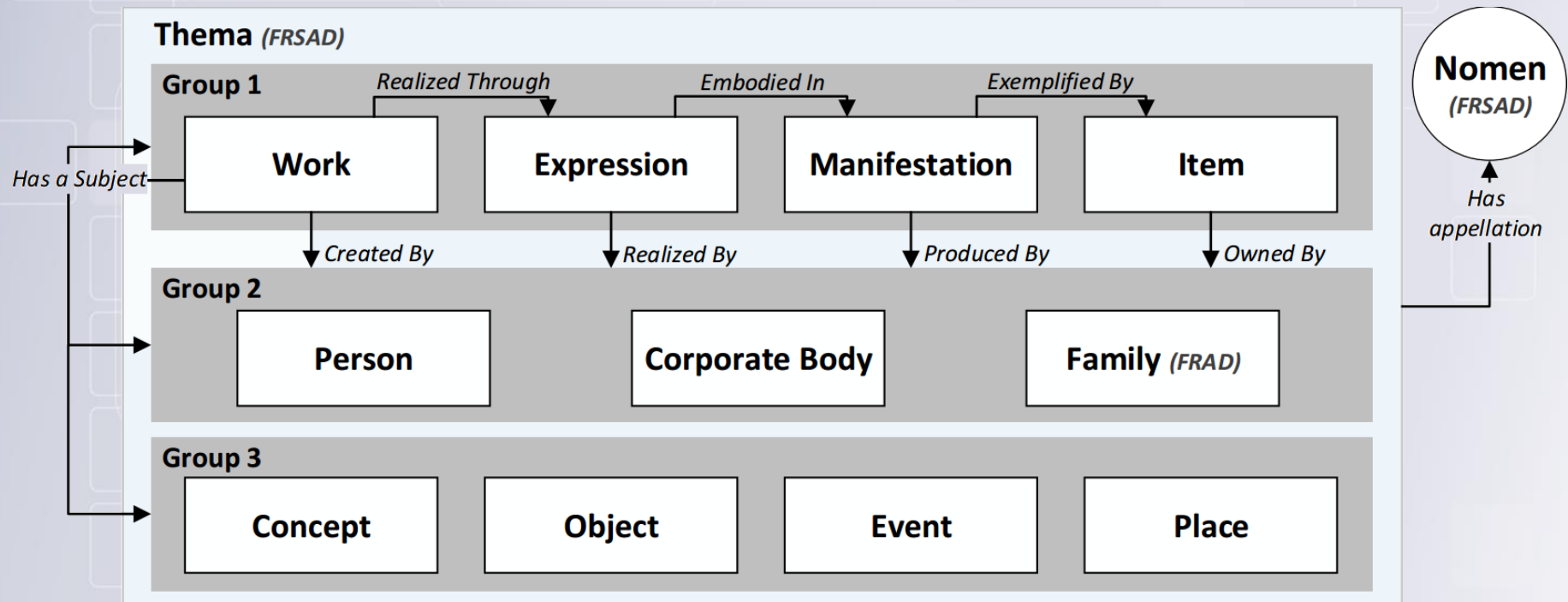
Adopting semantic web technologies

Semantic Web is at the heart of the discussions about cultural heritage improvements !



... towards the FRBR concepts !

The FRBR conceptual model and main extensions



International Federation of Library Associations, & Institutions. Section on Cataloguing. Standing Committee. (1998). *Functional requirements for bibliographic records: final report* (Vol. 19). IFLA Study Group on the Functional Requirements for Bibliographic Records (Ed.). KG Saur Verlag GmbH & Company.

Patton, G. E. (2007). An Introduction to Functional Requirements for Authority Data (FRAD). *Understanding FRBR: what it is and how it will affect our retrieval tools*, 21-27.

Example of FRBRization

Book

The Children of Húrin

Christopher Tolkien

2007

Book

The lord of the rings

J.R.R. Tolkien

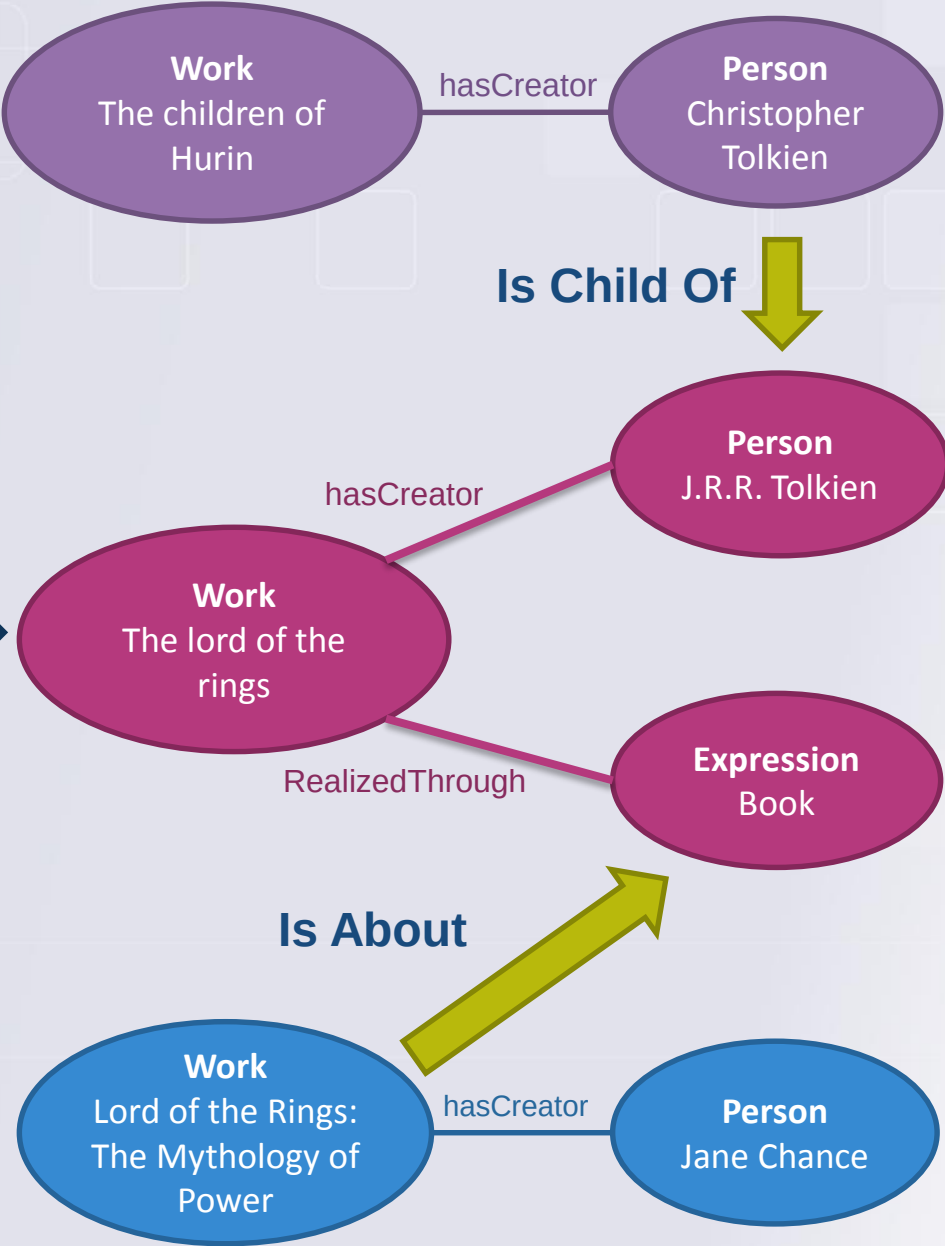
1954

Book

**Lord of the Rings:
The Mythology of Power**

Jane Chance

2001



Limits & needs

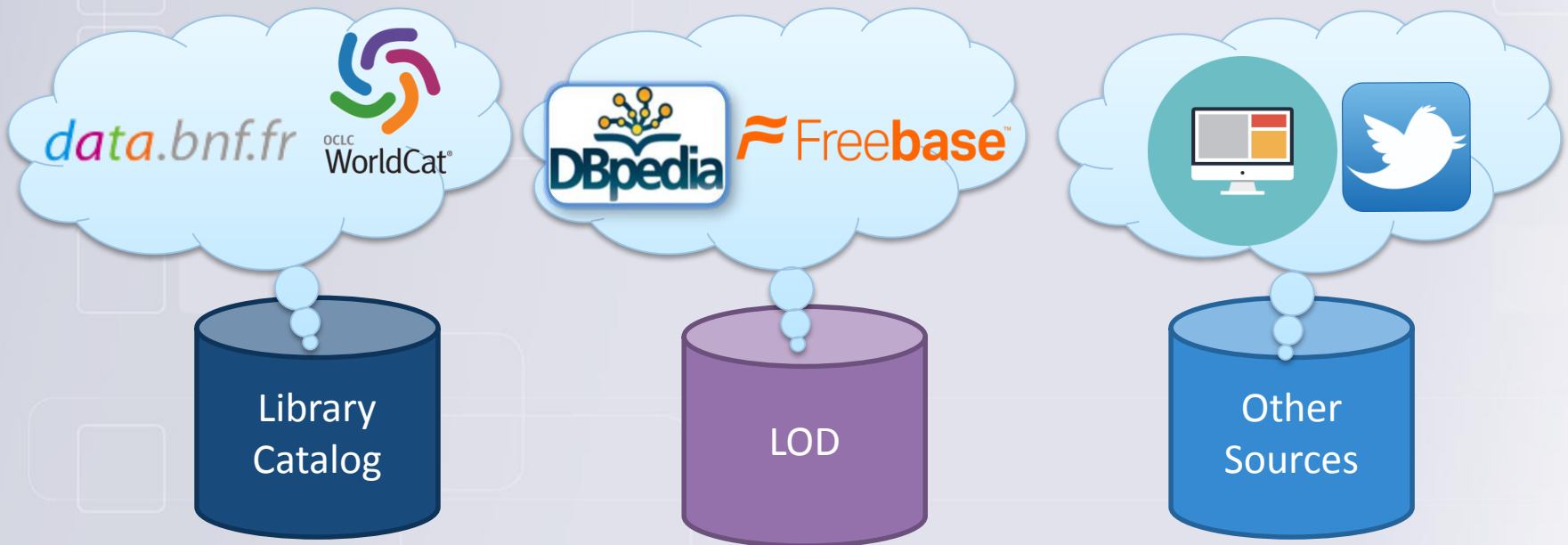
Metadata migration to a new semantic model is not sufficient for a successful transformation.

Need additional steps:

- Validation of transformed data
- Semantic enrichment of entities
- Linkage of data to other repositories

Exploiting multiple sources of data

Mention of a Person(FRBR): **Natalie Dessay**



Aggregating information from multiple sources

Discographie
</p>
<p>
</p>
En 1994, **Natalie Dessay** signe son premier contrat

Particulièrement riche, sa discographie va de l'opéra français à l'opéra italien, en passant par la mélodie allemande et française. Sans oublier l'œuvre de Mozart, Strauss ou le répertoire baroque sous la houlette d'Emmanuelle Haim. À l'automne 2006, paraît l'anthologie "
<i>Le Miracle d'une voix</i>
". Le CD a été plus que double disque d'or et le DVD de platine. Le disque en
en octobre 2013 est lui aussi déjà largement disque d'or. Autre voie de trav
l'emmène aux rives du Brésil en compagnie d'Agnes Jaoui. Hel
l'Opéra à la Chanson » retrace 20 ans de

"Plusieurs DVD ont capté ses inter
<i>La Fille du Régiment</i>
", Mélisande
<i>Pelléas et
M. Zerkine

What a mess !

DBpedia

dbp:name	Natalie Dessay
dbp:placeOfBirth	Lyon, France
dbp:shortDescription	French opera soprano
dbp:website	http://www.natalie-dessay.com
dc:description	French opera soprano French opera soprano
foaf:homepage	http://www.natalie-dessay.com
foaf:isPrimaryTopicOf	http://en.wikipedia.org/wiki/Natalie_Dessay
foaf:name	Natalie Dessay Dessay, Natalie
foaf:surname	Dessay
is foaf:primaryTopic of	http://en.wikipedia.org/wiki/Natalie_Dessay

Gran Teatre Liceu @Liceu_cat · 21 nov.
You can now have a look at the program of [#NatalieDessay](#) concert tomorrow at the [#Liceu](#): bit.ly/1sQ0tR7 [#Händel](#) [#GiulioCesare](#)

WorldCat®

782.1 MONT
100 1 Monteverdi, Claudio, |d1567-1643.
245 12 L'Orfeo|h[sound recording] /|cMonteverdi.
264 [England?] :|bVirgin Veritas :|bManufactured and distributed by EMI,|cp2004.
500 Compact discs.
500 Program notes by Tim Carter.
508 Libretto by Alessandro Striggio.
511 0 European Voices ; Les Sacqueboutiers ; Le Concert D'Astrée ; Emmanuelle Haim, harpsichord, organ, regal & direction ; Cast: **Natalie Dessay** (La Musica), Ian Bostridge (Orfeo), Patrizia Ciofi (Euridice), Alice Coote (Messaggiera), Sonia Prina (Speranza), Mario Luperi (Caronte)
[...]
650 0 Operas.
650 0 Orpheus (Greek mythology)|vDrama.
700 1 Striggio, Alessandro. |4lbr
700 1 Haim, Emmanuelle. |4itr
700 1 **Dessay, Nathalie** |4voc
800 1 Bostridge, Ian. |4voc

LIRIS **progilone**
innovative technologies

8

Challenges

- Information extraction
- Schema & Ontology matching
- Entity resolution

Nakashole, N., Weikum, G., & Suchanek, F. (2012). Discovering and exploring relations on the web. *Proceedings of the VLDB Endowment*, 5(12), 1982-1985.

Euzenat, J., & Shvaiko, P. (2007). *Ontology matching* (Vol. 333). Heidelberg: Springer.

Köpcke, H., Thor, A., & Rahm, E. (2010). Evaluation of entity resolution approaches on real-world match problems. *Proceedings of the VLDB Endowment*, 3(1-2), 484-493.

Related Project



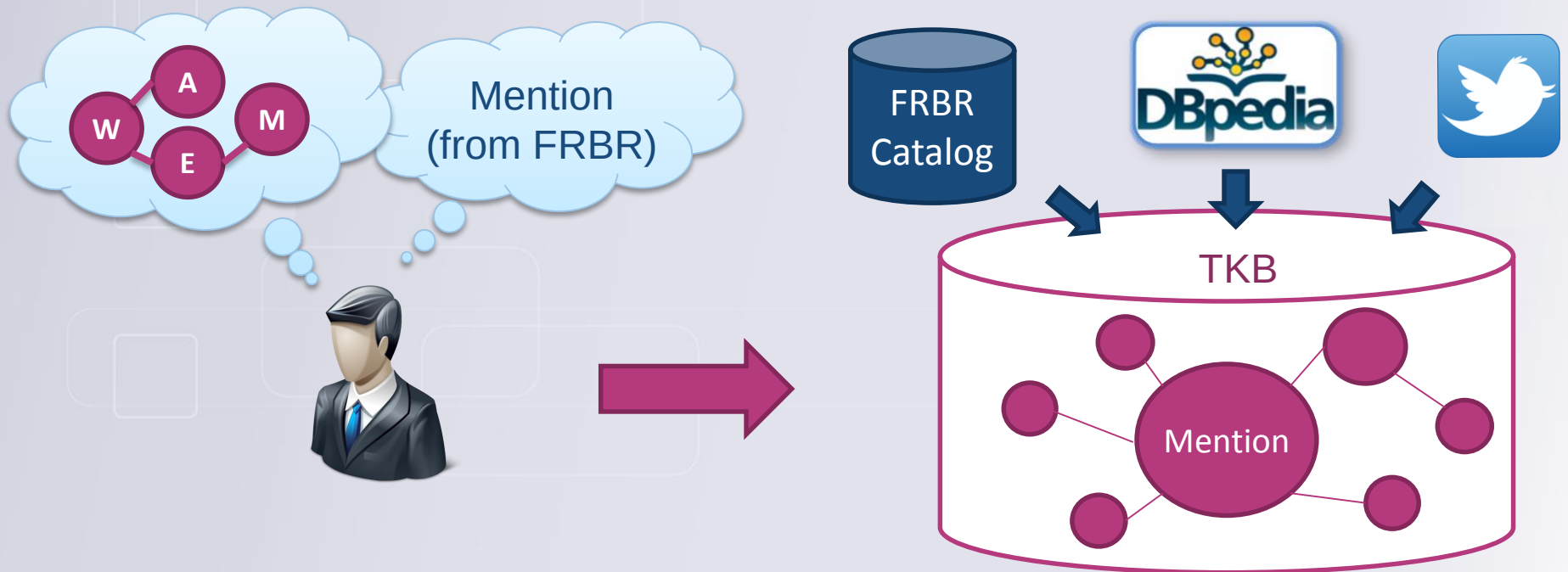
- Building a centralized knowledge base
- Facing the model interoperability challenges
- Machine Learning algorithms for enrichment process
- Alternative schema model: EDM

Berardi, G., Esuli, A., Gordea, S., Marcheggiani, D., & Sebastiani, F. (2012). Metadata enrichment services for the europeana digital library. In *Theory and Practice of Digital Libraries* (pp. 508-511). Springer Berlin Heidelberg.

Our contributions

Framework for building **Thematic Knowledge Bases (TKB)**

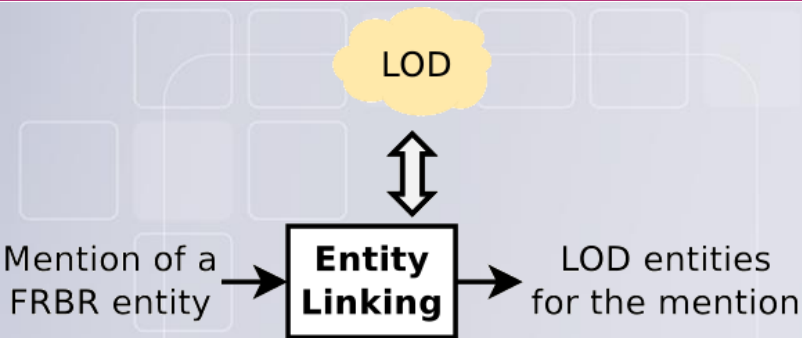
- Enhanced processes using FRBR-based resources
- Aggregation of heterogeneous sources with fresh data



Outline

- Introduction
- Our Framework
 - Entity Linking
 - LOD Extension
 - Fact Extraction
 - Ontology & Entity Matching
- Use Case
- Conclusion

Entity Linking

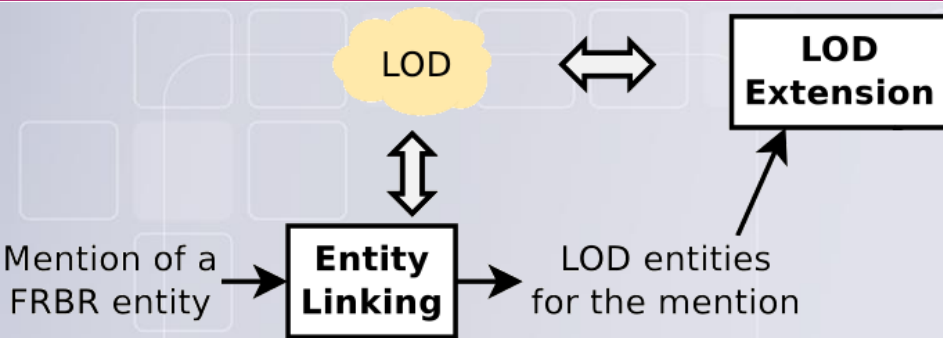


■ Specificities:

Using the network of FRBR entities to improve existing approaches for Entity Linking.

Dai, H. J., Wu, C. Y., Tsai, R., & Hsu, W. (2012, June). From Entity Recognition to Entity Linking: A Survey of Advanced Entity Linking Techniques. In *The 26th Annual Conference of the Japanese Society for Artificial Intelligence* (pp. 1-10).

LOD Extension

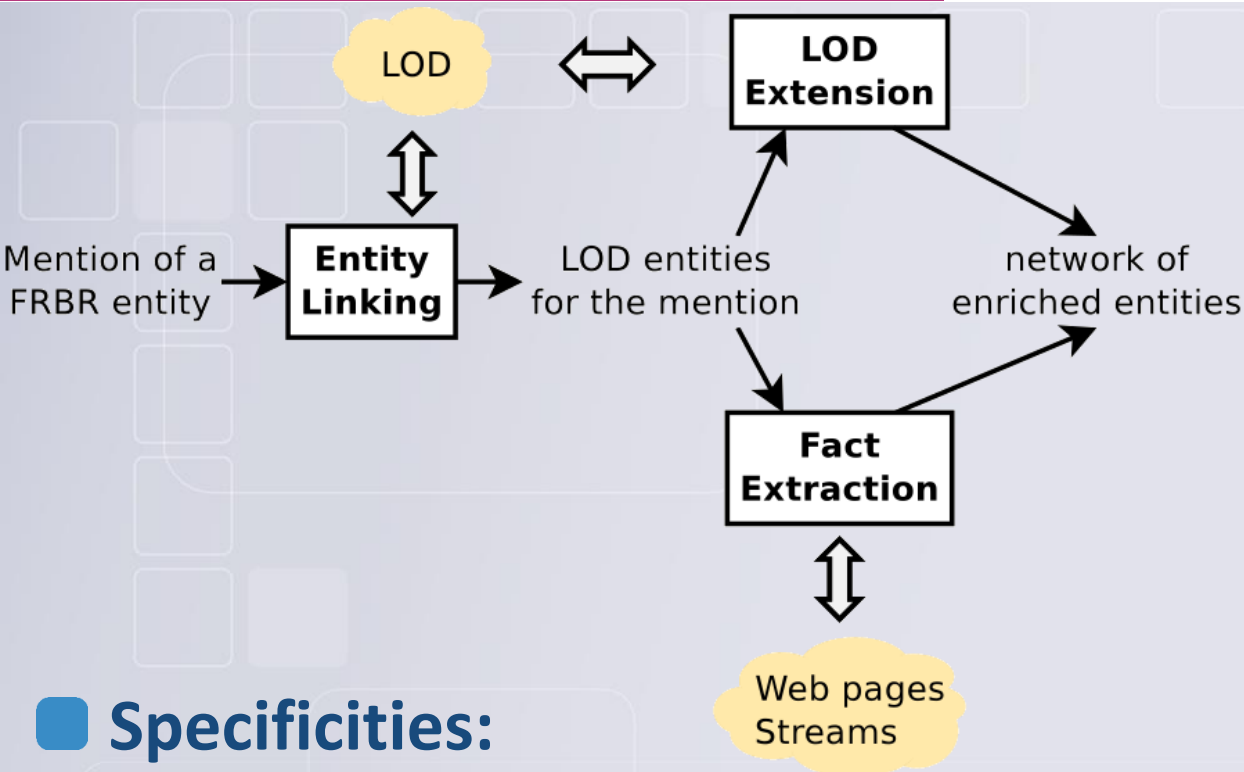


■ Specificities:

Filtering results from predicates with large amount of data or too wide scope

Parameswaran, A., Garcia-Molina, H., & Rajaraman, A. (2010). Towards the web of concepts: Extracting concepts from large datasets. *Proceedings of the VLDB Endowment*, 3(1-2), 566-577.

Fact Extraction

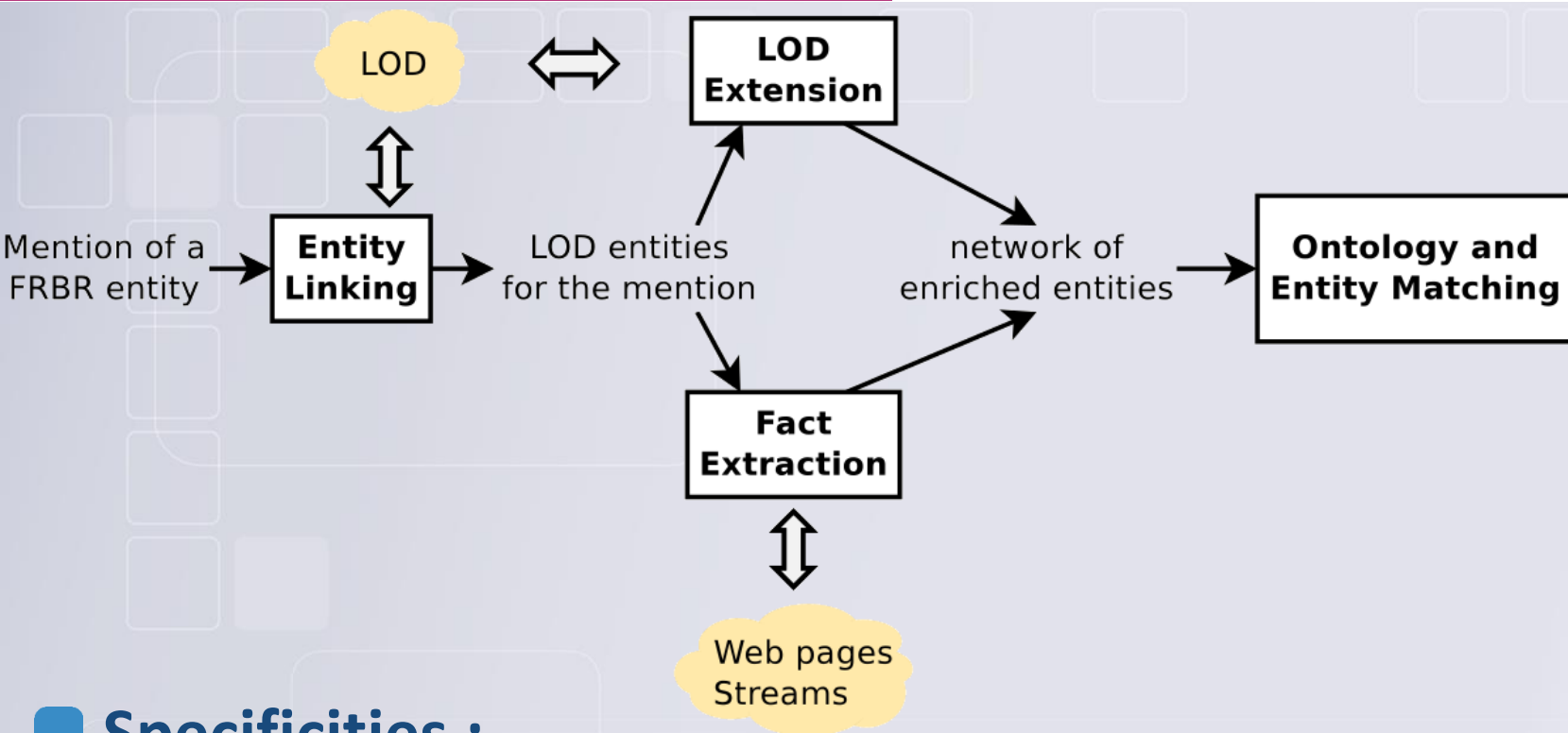


■ Specificities:

- Open information extraction approach
- Involving user feedback

Banko, M., Cafarella, M. J., Soderland, S., Broadhead, M., & Etzioni, O. (2007, January). Open information extraction for the web. In *IJCAI* (Vol. 7, pp. 2670-2676).

Ontology & Entity Matching

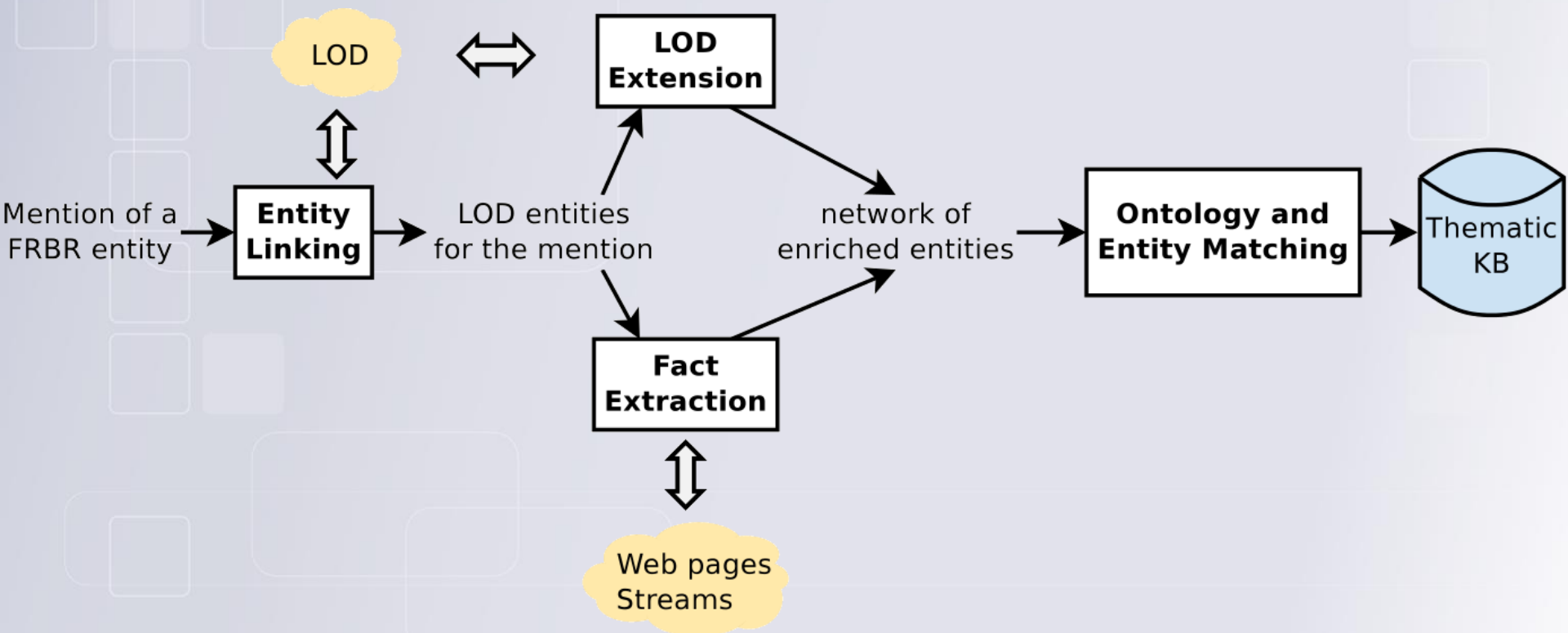


■ Specificities :

Combining the alignment task at schema and instance level

Suchanek, F. M., Abiteboul, S., & Senellart, P. (2011). Paris: Probabilistic alignment of relations, instances, and schema. *Proceedings of the VLDB Endowment*, 5(3), 157-168.

Full representation of the framework



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Use Case

Semantic enrichment of a FRBR Agent using our Framework

Natalie Dessay

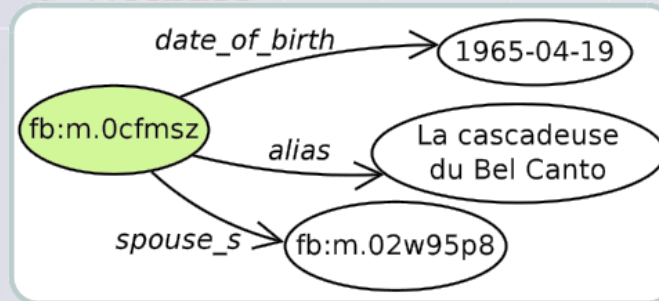
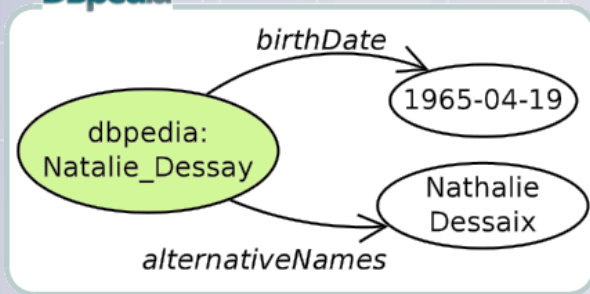


End-User

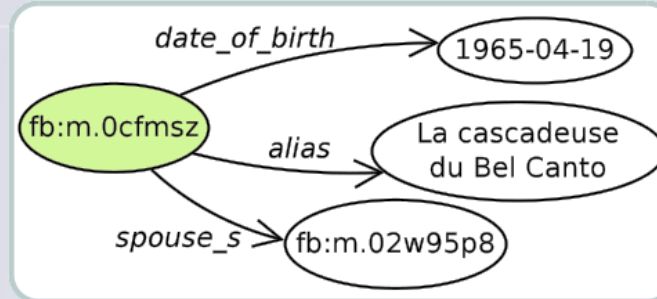
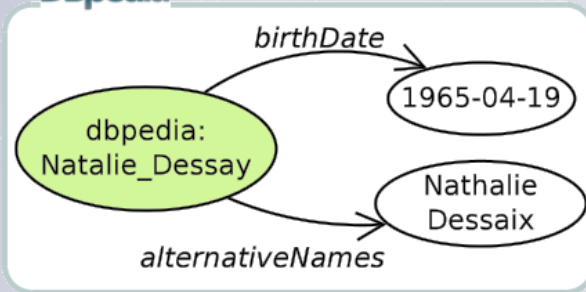


Professional

Use Case



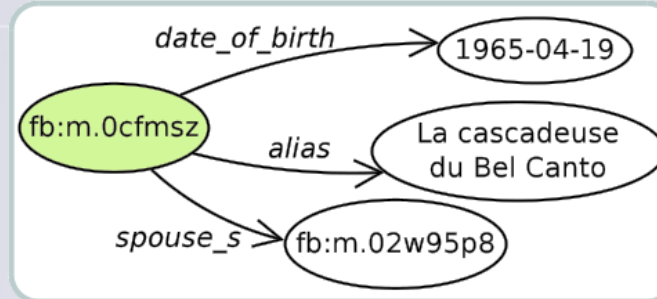
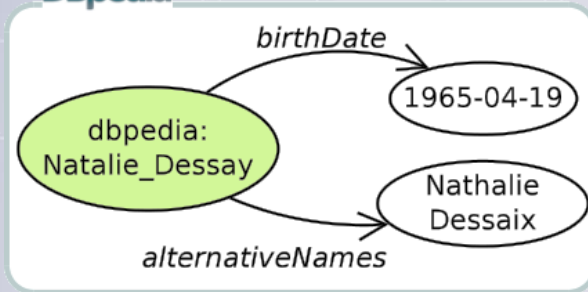
Use Case



Natalie Dessay Fan @N2Cfan

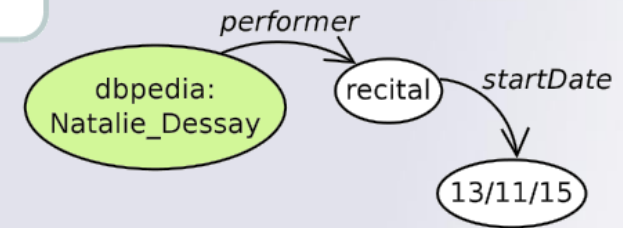
New date for Natalie Dessay's recital event on 13/11/15

Use Case

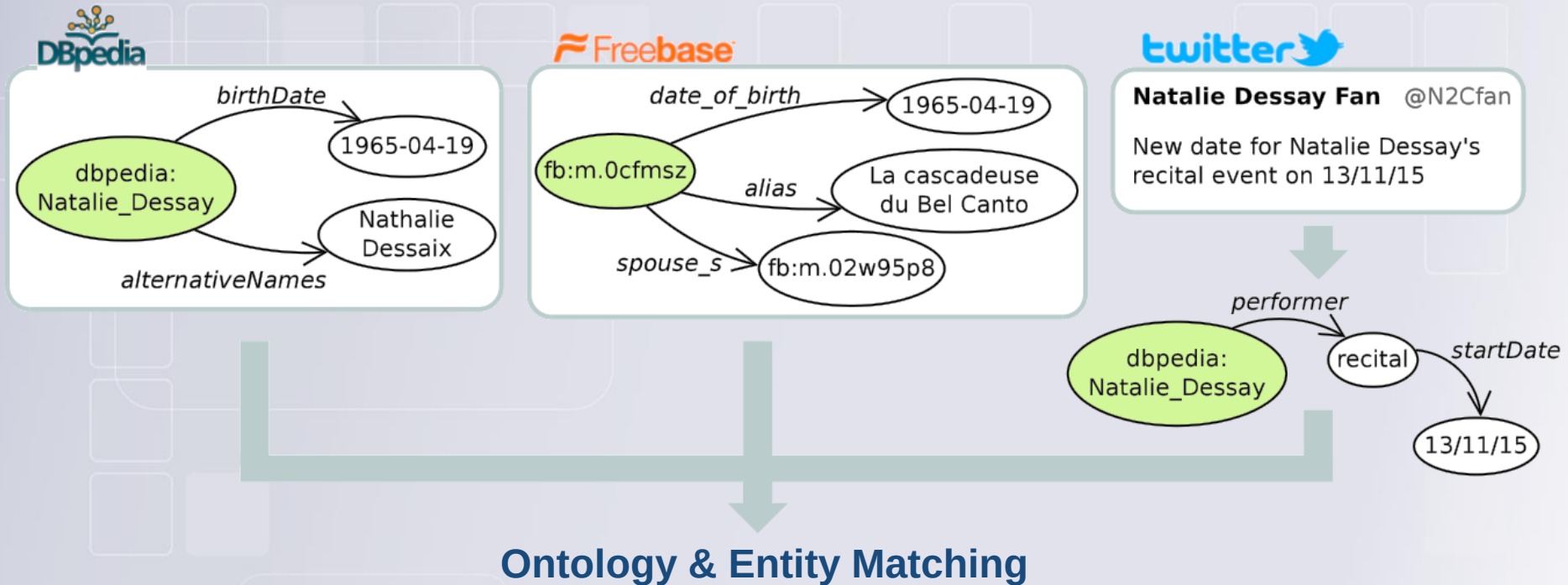


Natalie Dessay Fan @N2Cfan

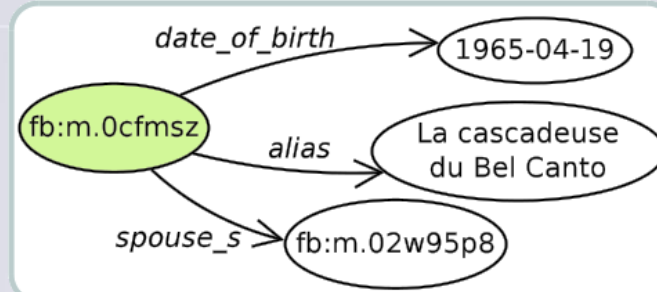
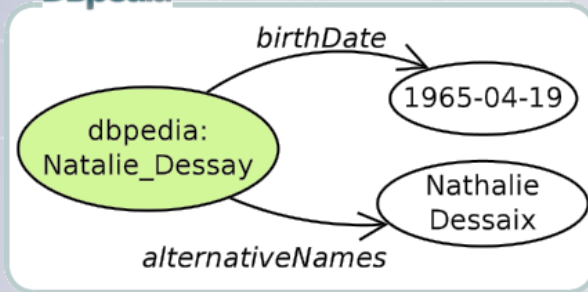
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Use Case

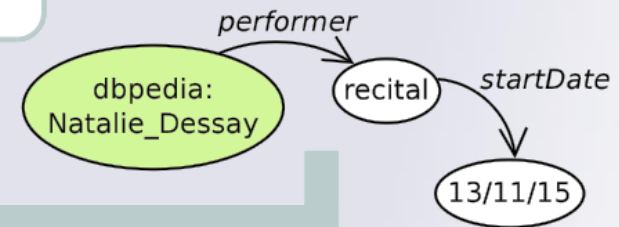


Use Case

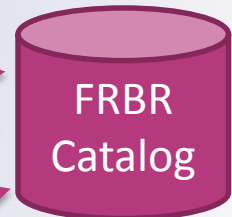
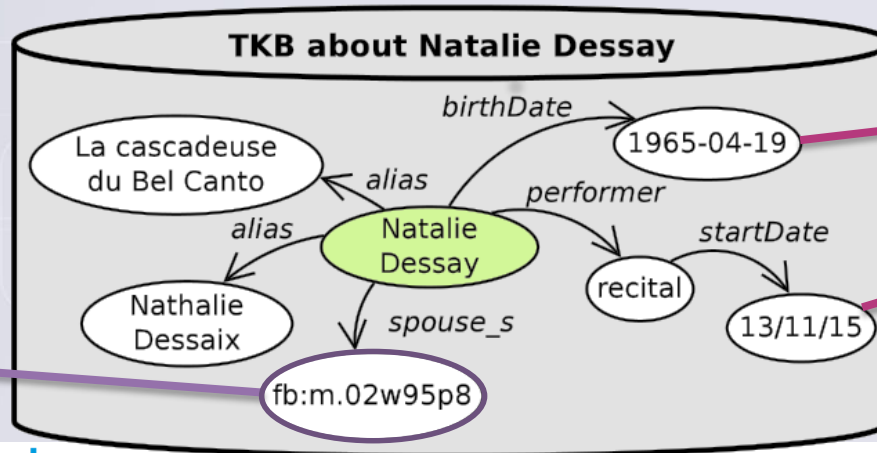


Natalie Dessay Fan @N2Cfan

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TKB about Natalie Dessay



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Conclusion

■ Contributions

- Novel vision leveraging on the FRBR model
- Generic framework for building Thematic K.B.
- Practical scenario to validate the approach both for exploration and enrichment

Perspectives

- Implementation of the framework
 - Adaptation of existing solutions for information retrieval
 - New approach for combined Ontology & Entity Matching
- Association with a solution for metadata migration
- Application with smart graphical interfaces

Thank you !

To get more details about our projects:



<http://liris.cnrs.fr/diricks/>



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<http://www.progilone.fr/en/syrtis>