

Language-Independent Navigation of Pan-European of Legal Content

Wolters Kluwer and EPAM Systems
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Submission to 11th Annual Conference on Semantic Systems, Vienna 2015
Candidate for European Linked Open Data Contest

Project Title: Pan-European Navigation of Legal Content (2012)

Project Owner:
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Abstract

Wolters Kluwer¹ recognizes the changing needs of its evolving markets to supply customers, especially corporate counsel and corporate advisors with content services covering multiple countries and languages. Consolidation and globalization in the legal markets has created new needs to cover many regions and languages in one solution. For years, Wolters Kluwer has been curating its knowledge organization systems (KOS)² in the tax, legal, and regulatory domains, optimized to local markets, and needed to create visualizations on how to exploit these in a broader, European-wide context. To investigate this, Wolters Kluwer collaborated with EPAM Systems³ to build a user experience that demonstrates navigation from Wolters Kluwer's KOS to related content and repositories in a language independent manner. The project team selected European Union Directives as the content focal point and linked data techniques, particularly SPARQL⁴. The KOS have already been implemented using the World Wide Web Consortium (W3C)'s⁵ standards of Resource Description Framework (RDF)⁶, RDF Schema (RDFS)⁷, Web Ontology Language (OWL)⁸, and Simple Knowledge Organization System (SKOS)⁹. Combined with help from Wolters Kluwer Netherlands¹⁰ and Germany¹¹ units, application construction by EPAM was fast and inexpensive. In addition, the project now includes content from DBpedia¹², EuroVoc¹³, LOD2¹⁴, and EUR-Lex¹⁵ initiatives. Given the application's ability to navigate pan-European legal KOS in a language independent manner, this solution is presented as a candidate for the European Linked Open Data Contest.

¹ <http://www.wolterskluwer.com/>

² https://en.wikipedia.org/wiki/Knowledge_Organization_Systems

³ <http://www.epam.com/>

⁴ <http://www.w3.org/TR/rdf-sparql-query/>

⁵ <http://www.w3.org/>

⁶ <http://www.w3.org/RDF/>

⁷ <https://www.w3.org/2001/sw/wiki/RDFS>

⁸ <http://www.w3.org/OWL/>

⁹ <http://www.w3.org/2004/02/skos/>

¹⁰ <http://www.wolterskluwer.nl/>

¹¹ <http://www.wolterskluwer.de/>

¹² <http://dbpedia.org/>

¹³ <http://eurovoc.europa.eu/>

¹⁴ <http://lod2.eu/>

¹⁵ <http://eur-lex.europa.eu/homepage.html>

Wolters Kluwer Knowledge and Concept Navigation

Navigating Metadata as a Graph

Traditionally, content management solutions use tables and relational database management systems to store and retrieve metadata about documents. However, to organize knowledge, the use of a graph is more natural. The development of standards, such as RDF, RDFS, OWL, and SKOS, which are graph-based, allows such represents to be easily implemented. For this project, a triple store is used to act the repository for the KOS and SPARQL as the query language. These standards, including SPARQL, enable applications to implement typical product navigations.

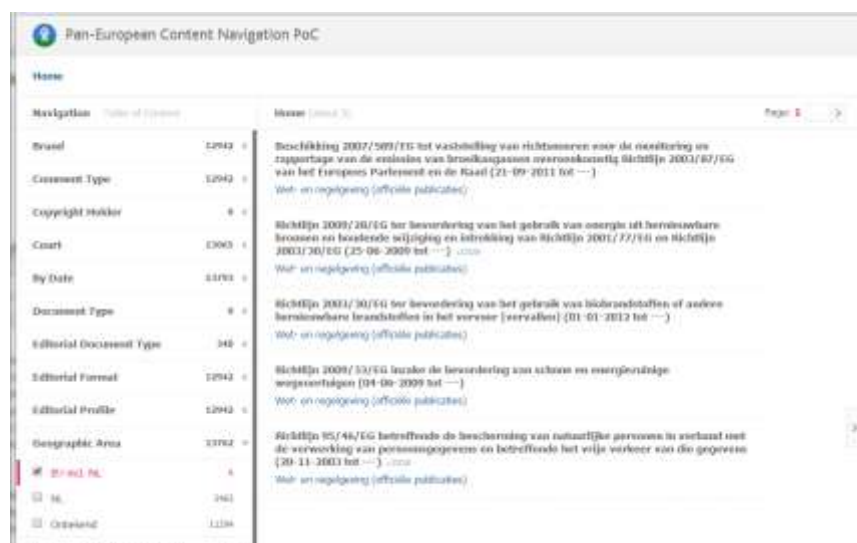
For example, from a very small subset of Kluwer Netherland’s content, a typical left-hand panel, tree navigation can be built and hierarchies displayed:



This simple feature is done via curated, controlled vocabularies, represented in RDF, which load natively into a triple store.

It is straightforward to query the content for documents that are connected to one or more concepts, selected from the left-hand navigation.

For example, from the same content set, the selection of the concept with the label “EU incl. NL” returns the following list of documents:

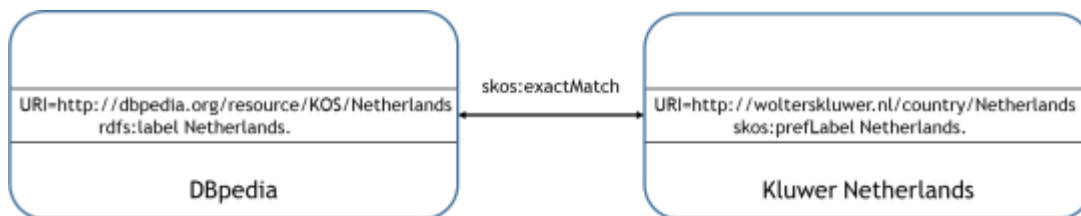


Connecting Concepts in Wolters Kluwer’s KOS with DBpedia

From this base KOS of Kluwer Netherlands, the project then started to connect well-known, public concepts (resources) in DBpedia to the Wolters Kluwer content. The first step: Create a relationship between the URIs in Kluwer Netherlands’ KOS and DBpedia’s. The implementation was simple: Add 1 triple to the Kluwer Netherlands’ KOS:

```
<http://wolterskluwer.nl/country/Netherlands> skos:exactMatch <http://dbpedia.org/resource/Netherlands>.
```

This made a connection between the proprietary KOS of Kluwer Netherlands and DBpedia for same concept:

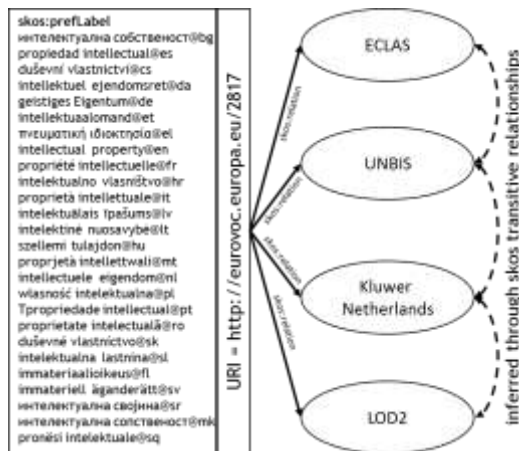


From this connection, the application can easily query DBpedia and include the display of information about public resources, like countries (“Netherlands”), courts (“Hoge Raad”), etc.

Navigating to LOD2 - Eurovoc

From the DBpedia step, the project then extended its connections to the LOD2 project’s implementation with Wolters Kluwer Germany’s KOS, but this time by transitively connecting through Eurovoc. The project took advantage of the inferencing standards defined in in SKOS and OWL to accurately navigate across concept schemes.

Using “intellectual property” as an example, the solution used a graph, similar to the following to create the navigation:



Compatibility with Search

Also, as part of the project, other non-SPARQL sources are included, such as EUR-Lex, which provides a more web services-oriented API. Because the labels of the concepts are well-curated and accurate, they can be used with reliability in querying a more search-oriented API.

In this example, the court decision from the Netherlands' Hoge Raad, also has related in content in EUR-Lex:

The screenshot shows a legal document page with the following content:

Content [Show Document Map](#) **3rd-party Documents**

HR, 15-04-2011, nr 09/04864

Instantie:	Hoge Raad (Civiele kamer)	Datum:	15-04-2011
Magistraten:	Mrs. J.B. Fieers, E.J. Nuijtinck, A. Hammarstein, J.C. van Oort, F.B. Bakke	Zaaknr.:	09/04864
Conclusie:	Mr. O.W.F. Verhade	LJN:	BP6601

Uitspraak

Arrest
in de zaak van:

1. **STICHTING PENSIOENFONDS METAAL EN TECHNIEK**,
gevestigd te 's-Gravenhage,
2. **STICHTING OPLEIDINGS- EN ONTWIKKELINGSFONDS VOOR HET TECHNISCH-INSTALLATIEBEDRIJF**,
gevestigd te 's-Gravenhage,
3. **STICHTING SOCIAAL-FONDS METAAL EN TECHNIEK**,
gevestigd te 's-Gravenhage,
4. **SCHADEVERZEKERING METAAL EN TECHNISCHE BEDRIJFSTAKKEN N.V.**,
gevestigd te 's-Gravenhage,

EISERESSEN tot cassatie,
advocaat: mr. R.A.A. Duk,
tegen
[verweester],
gevestigd te [vestigingsplaats],
VERWEESTER in cassatie,
met verschieren.

Partijen zullen hierna ook worden aangeduid als de Fondsen en [verweester].

1. Het geding in feitelijke instanties

Voor het verloop van het geding in feitelijke instanties verwijst de Hoge Raad naar de navolgende stukken:

- a. de vonnissen in de zaak 170600 CV EXP, 06-7896 van de kantonrechter te Dordrecht van 30 maart 2006 en 5 oktober 2006;
- b. het arrest in de zaak 105.006.110/01 van het gerechtshof te 's-Gravenhage van 18 augustus 2009.

Het arrest van het hof is aan dit arrest gerechtigd.

2. Het geding in cassatie

Tegen het arrest van het hof hebben de Fondsen beroep in cassatie ingesteld. De cassatiedaagvaarding is aan dit arrest gerechtigd en maakt daarvan deel uit.

Tegen [verweester] is verzoek verleend.

De zaak is voor de Fondsen toegelicht door mr. S.F. Sageel, advocaat te Amsterdam.

De conclusie van de Advocaat-Generaal O.W.F. Verhade strekt tot verworping van het beroep.

Mr. S.F. Sageel, advocaat te Amsterdam, heeft namens de Fondsen bij brief van 11 maart 2011 op de conclusie gereageerd.

3. Bespreking van het middel

3.1 In cassatie kan worden uitgegaan van de feiten die zijn vermeld in de conclusie van de Advocaat-Generaal onder 2. Voorts moet verondersteld worden dat, zoals door de Fondsen is gesteld en door het hof in het midden is gelaten, alle door de werknemers van [verweester] verrichte werkzaamheden betrekking hebben op het monitoren van

LOD2 Documents [View](#)

Eur-Lex documents (keywords) [View](#)

Eur-Lex documents (PA) [View](#)

[2011/0114/11: Commission Decision of 3 March 2011 annulling Decision 2009/24/EC laying down rules for the implementation of Decision No 374/2007/EC of the European Parliament and of the Council establishing the Pension Refundable Fund for the period 2008 to 2011 as part of the General programme 'Solidarity and Management of Mobility Flows' in regards Member States' administrative and financial management and the eligibility of expenditure on projects co-financed by the Fund \(notified under document C\(2011\)11290\)](#)

EPAM Application Construction

EPAM designed and built an application for Wolters Kluwer, based on lightweight web application technologies and integrating triple store repositories. Reusing standards from Semantic Web avoided the need to construct proprietary and complex solutions and heavy business logic implementation. Within a short timeframe, EPAM created a complete “Semantic Navigation of Pan-European Legal Content” solution with all required features implemented, including navigation capabilities like faceted browse and text search, contextual information navigation.

In addition, enhanced content discovery options were introduced through cross-KOS navigation using RDF resources:

- 1) Content-independent searching and filtering using metadata,
- 2) Connecting to related information using [DBpedia](#),
- 3) Discovering of relations inside Wolters Kluwer content and using those relations for user-friendly navigation,
- 4) Discovering of relations between Wolters Kluwer content and external data sources: LOD2 project, [EuroLex](#) law initiative, and [Eurovoc](#) dictionary,
- 5) Finding interconnections between laws of Netherlands and Germany, using EU law set as central point,
- 6) Staying with a specific practice areas, such as intellectual property, but moving across different data stores and different languages,
- 7) Creating graph visualization of document and their relations which shows logical interconnections inside content and enabling navigation through that view.

Critical Factors that brought success to the project:

- **Understanding of the business domain: legal practice areas and personas.**

For a technology company like EPAM knowledge of Legal Domain was a big challenge. Wolters Kluwer invested into the training of EPAM team members on various aspects of legal business knowledge and granted access to SMEs in-house who provided support and consultancy.

- **Ability to rapidly scale and bring deep technology expertis.**

EPAM brought to the table a complementary, deep technology expertise in Semantic Web and text analytics. EPAM's innovative approach and ability to rapidly scale and bring technology experts at the point of need within matter of hours and days secured project milestones.

From this project in 2012, EPAM and Wolters Kluwer have also applied extensions of this technique for working with US tax regulations and CCH's market leading content in 2013 and re-envisioning traditionally structured content as graph to enable new methods of information discovery in 2014.