



University of Rome “Tor Vergata”

---

# An ecosystem of KOS tools

**Armando Stellato**

ART Research Group, Dept. of Enterprise Engineering (DII),  
University of Rome, Tor Vergata

**NKOS Consolidated Workshop 2021**

**Networked Knowledge Organization Systems**

(22/09/2021, online)

# Outline

The ART Knowledge Engineering Unit at University of Tor Vergata : A few words about us and our university

## ART KE Technology Asset

A quick run-through the various development directions and realized platforms

## VocBench 3

An overview of some of the most recent features, with particular focus on dataset alignment

## ShowVoc

The ideal companion to VocBench, ShowVoc is optimized for data publication and browsing

## Loddy

A flexible data publication tool

**CODA:** An already known guest for VB. And yet one that has much still to say...

# My Research Lab

Università degli Studi di Roma Tor Vergata



A R T  
r e s t o r  
I n t e l l i g e n c e  
<http://art.uniroma2.it>  
f i c i a l  
i n g e e n g e e r i n g  
...and LAB!

- Realized as a University Campus distributed over a wide area in the SE of Rome



We are located at the Faculty of Engineering, Information Engineering Building

# The ART Group



## Areas of Interest

### Natural Language Processing

- Robust Parsing
- Information Extraction
- Semantic Role Labeling
- Textual Entailment
- ML for Natural Language



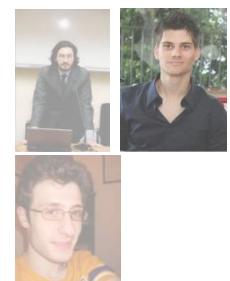
### Machine Learning

- ML for Natural Language
- Computational Language Learning
- Ontology Learning
- Classification, Multimedia IR
- Music IR



### Knowledge Engineering

- Ontologies and Knowledge Modeling
- Semantic Web Technologies
- Knowledge Acquisition
- Knowledge Sharing
- Knowledge-based Systems



A R T  
r e o  
t s r  
I n t e l l i g e n c e  
f a V  
i r e  
c c r  
i h g  
a a g  
l t a

ART Knowledge Engineering Unit's Research is oriented at finding solutions for information gathering, elaboration, elicitation and organization

Aiming at:

- improving the experience of "humans in the loop"
- elaborating better scenarios for machine2machine collaboration

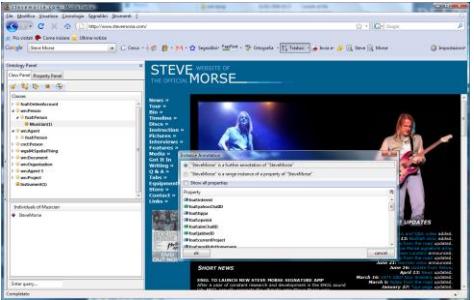


*A byproduct of this work is the realization of systems for realizing the above tasks.*

*Usually they are born as proof-of-concepts, at times evolve as testbeds for further speculation, until sometimes the "child" has grown enough to claim his own space in life*

# ART Technology Asset (some history)

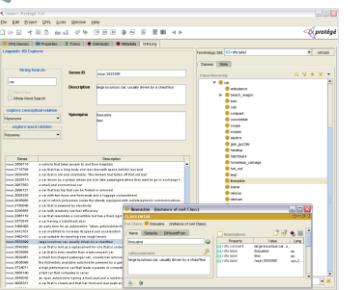
Semantic Turkey



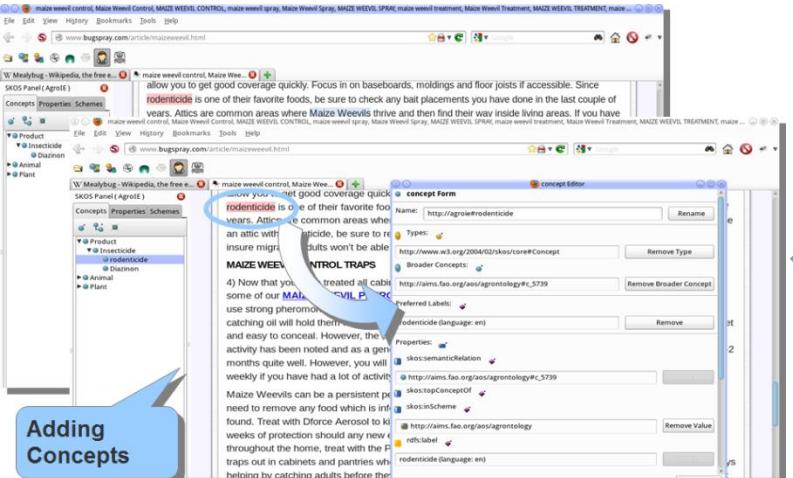
Flagship KM&A Platform



OntoLing



Semantic Turkey extensions for Knowledge Acquisition



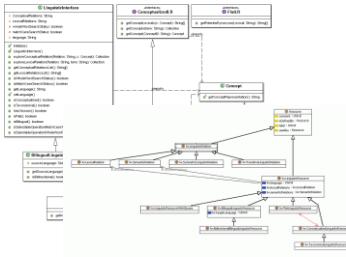
Adding Concepts

ALE



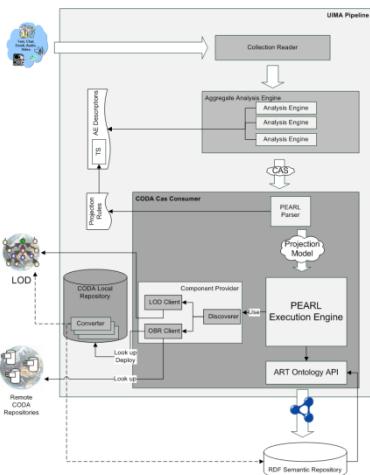
Automatic  
Linguistic  
Enrichment

Linguistic Watermark



Library and Ontologies for Accessing Heterogeneous Linguistic Resources

CODA



Computer-aided Ontology  
Development Architecture



Java Multi WordNet  
Library

These systems  
have been  
developed  
around 2004-  
2010



# Appetite comes with eating...

Thanks to EU funding and specific missions, some of these systems have come to industry-standard level, yet open-source and freely licensed to open communities



*We'll show how these systems have gone past from their initial research status and became pieces of a bigger picture, aiming at unleashing a full ecosystem of platforms and tools for knowledge acquisition and management.*

# The ART SW Team

## The Developers



University of Rome Tor Vergata  
Today, the University of tomorrow

[Armando Stellato](#)

PhD, Researcher, Project Leader  
University of Rome Tor Vergata, Italy

An *insane love for insane architectures...* he  
has two imaginary friends, sitting on each of  
his shoulders, fighting an eternal battle  
between order and chaos.



[Andrea Turbati](#)

PhD, Research Associate  
University of Rome Tor Vergata, Italy

[Semantic Turkey](#) developer  
VocBench OSGI extension for Semantic  
Turkey

*He can carve any system bit by bit, but don't  
talk to him about 'frameworks'...  
His motto? "if it works, it's good and if it ain't  
broke don't fix it!"*



[Manuel Fiorelli](#)

PhD, Research Associate  
University of Rome Tor Vergata, Italy

[Semantic Turkey](#) developer

*Dangerously following and amplifying  
Armando's architectural leaps...  
his hobby is (before breakfast) refactoring 10  
levels of abstraction into what Andrea just  
made work so well.*



[Tiziano Lorenzetti](#)

Research Assistant  
University of Rome Tor Vergata, Italy

[Semantic Turkey](#) developer

<A> Uh...Tiziano...if you have time could you  
implement...  
<T>: Done.  
<A> Well, then, you could move on to...  
<T>: I'm already on it, done by end of today.  
<A> This guy is so efficient it's frustrating!



## The Users

a whole community supporting its development



funding sponsors

EU law and publications

ISA<sup>2</sup>

Interoperability solutions for public administrations, businesses and citizens

and other users (the community now is much much  
bigger, those here were there since the beginning...and  
pls forgive any omission!)



Food and Agriculture Organization  
of the United Nations



IEDA  
INTERDISCIPLINARY  
EARTH DATA ALLIANCE



INRA  
SCIENCE & IMPACT



Scottish Government  
Riaghlas na h-Alba  
gov.scot

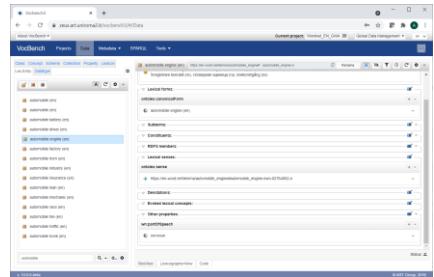


Armando Stellato [stellato@uniroma2.it](mailto:stellato@uniroma2.it)  
<http://art.uniroma2.it/stellato>



# ART Contributions to EU Data Infrastructure

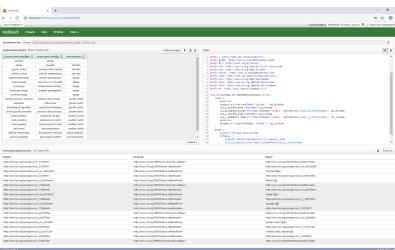
## Support for OntoLex



Ontolex porting of  
many LRs

VocBench

## Sheet2RDF

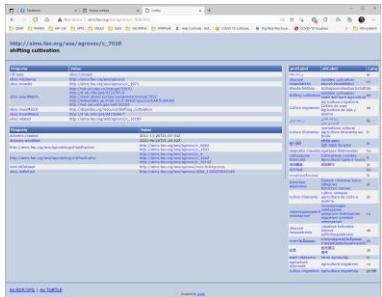


## Flagship KM&A Platform

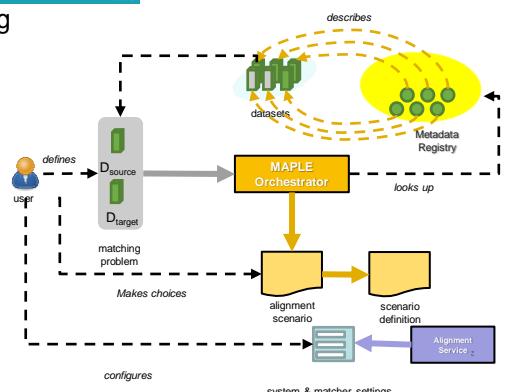


Semantic Turkey

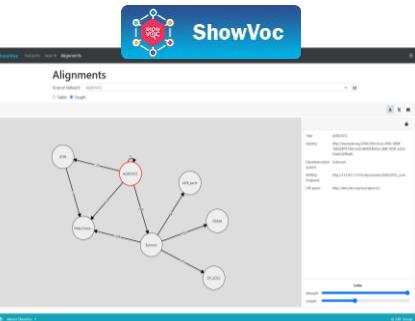
## Loddy



## Data Browsing

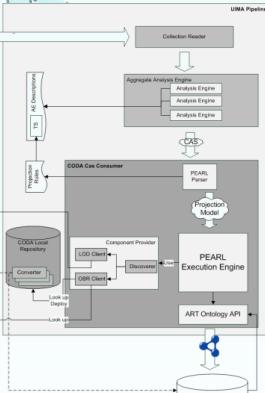


## Data Publication



## Spreadsheet RDF Data Lifting

## CODA



Next steps!

# Supporting an Open Ecosystem for the Development of Semantic Web Resources

## The Developers



University of Rome Tor Vergata  
Today, the University of tomorrow

[Armando Stellato](#)

PhD, Researcher, Project Leader  
University of Rome Tor Vergata, Italy

An *insane love for insane architectures...* he has two imaginary friends, sitting on each of his shoulders, fighting an eternal battle between order and chaos.



[Andrea Turbati](#)

PhD, Research Associate  
University of Rome Tor Vergata, Italy

[Semantic Turkey](#) developer  
VocBench OSGI extension for Semantic Turkey

*He can carve any system bit by bit, but don't talk to him about 'frameworks'... His motto? "if it works, it's good and if it ain't broke don't fix it!"*



[Manuel Fiorelli](#)

PhD, Research Associate  
University of Rome Tor Vergata, Italy

[Semantic Turkey](#) developer

*Dangerously following and amplifying Armando's architectural leaps... his hobby is (before breakfast) refactoring 10 levels of abstraction into what Andrea just made work so well.*



[Tiziano Lorenzetti](#)

Research Assistant  
University of Rome Tor Vergata, Italy

[Semantic Turkey](#) developer

<A> Uh...Tiziano...if you have time could you implement...  
<T>: Done.  
<A> Well, then, you could move on to...  
<T>: I'm already on it, done by end of today.  
<A> This guy is so efficient it's frustrating!

## The Users

a whole community supporting this ecosystem development



funding sponsors  
EU law and publications

ISA<sup>2</sup>

Interoperability solutions for public administrations, businesses and citizens

and other users (the community now is much much bigger, those here were there since the beginning...and pls forgive any omission!)



Food and Agriculture Organization  
of the United Nations



IEDA  
INTERDISCIPLINARY  
EARTH DATA ALLIANCE



INRA  
SCIENCE & IMPACT



Scottish Government  
Riaghlas na h-Alba  
gov.scot



Senato  
della Repubblica



[www.cabi.org](http://www.cabi.org)



UNCCD



United Nations  
Environment Programme



VocBench

127.0.0.1:8080/Class

App PAPERS TV-SERIES PROGRAMMA\_SERA... 2BUY 2READ CASA ART-SW FAO MAIL ONTOLEX PROJECTS PHONE APPS JIRA

Altri Preferiti

VocBench Projects Class Property Concepts Schemes SPARQL Test Sign Up Login

Resource: ☰ Author http://iasted#Author

Types:

- Class
- rdfs:Class
- rdfs:Resource
- Thing

Class Axioms:

rdfs:subClassOf

- Author
- :send SOME :Registration\_form
- :occupy SOME :Presenter\_house
- :prepare SOME :Transparency
- :obtain SOME :Invitation\_letter
- Speaker
- rdfs:Resource
- (:go\_through SOME :Registration AND :is\_present\_in SOME :Conference\_days AND :is\_present\_in SOME :Conference\_building)
- :give SOME :Brief\_introduction\_for\_Session\_chair
- :occupy SOME :Presenter\_city
- :pay SOME :Registration\_fee
- Person
- :need SOME :Viza
- :write SOME :Final\_manuscript
- :give SOME :Lecture
- :occupy SOME :Presenter\_state

VOCBENCH 3

owl:Thing

- City
- Place
- Time
- Person
  - Delegate
    - Technical\_committee
    - Session\_chair
  - Speaker
    - Author
      - Author\_cd\_proceedings\_include
      - Author\_book\_proceedings\_include
      - Plenary\_lecture\_speaker
      - Tutorial\_speaker
    - Lecturer
    - Reviewer
    - IASTED\_non\_member
    - One\_day\_presenter
    - Non\_speaker
    - Hotel\_presenter
    - IASTED\_member

Search... ☰

# Requirements that drove the development of VB3

**R1.** Multilingualism

**R2.** Controlled Collaboration

**R3.** Data Interoperability and Consistency

**R4.** Software Interoperability/Extensibility

**R5.** Data Scalability

**R6.** Under-the-hood data access/modification

**R7.** Adaptive Context and Ease-of-use

**R8.** RDF Languages Support

**R9.** Maintainability (Architecture and Code Scalability)

**R10.** Full Editing Capability (RDF Observability&Reachability)

**R11.** Provenance

**R12.** Versioning Support

**R13.** Metadata Descriptions

**R14.** Customizable UI

**R15.** Everything's RDF

# VocBench UI

The screenshot shows the VocBench UI interface. On the left, there is a navigation bar with tabs: 'VocBench' (selected), 'Projects', 'Data', 'SPARQL', and 'Tools'. Below the tabs is a dropdown menu 'About VocBench'. The main area has tabs: 'Class', 'Concept', 'Scheme', 'Collection', and 'Property'. A search bar at the bottom left contains the text 'Search...'. On the right, a detailed view of a term is shown. The term is 'administrative law (en), diritto amministrativo (it)' with the URI 'http://eurovoc.europa.eu/517'. The view includes sections for 'Notes' (empty) and 'Properties'. Under 'Properties', there are several entries: 'skos:notation' with value '517'; 'dct:created' with value '1995-10-02'; 'skos:related' with several items like 'public law (en), diritto pubblico (it)', 'administrative code (en), codice amministrativo (it)', etc.; 'http://purl.org/iso25964/skos-thes#status' with value 'http://publications.europa.eu/resource/authority/status/active'; 'dct:modified' with value '2015-12-10'; and 'owl:versionInfo' with value 'n/a'. The top right of the window shows the user 'Armando' and the current project 'EUROVOC'.

© ART Group, 2016

VocBench    X | Repositories | GraphDB Workbench | PmkiPortal    X | +

localhost:1979/pmki/#/datasets/Eurovoc\_4.9.1/data

**PMKI** Datasets Search Mappings    Login

### Eurovoc\_4.9.1

Data Sparql

Concept	Collection	Scheme	Property
AAMS countries (en)			
access to the courts (en)			
accounting (en)			
accounting system (en)			
<b>ACP countries (en)</b>			
administrative law (en)			
administrative personnel (en)			
administrative structures (en)			
advanced materials (en)			
amorphous materials (en)			
biomaterials (en)			
composite materials (en)			
shape-memory alloys (en)			
special polymer (en)			
superconducting alloy (en)			
technical ceramics (en)			
ultra-fine particle (en)			
<b>Africa (en)</b>			
English-speaking Africa (en)			
French-speaking Africa (en)			
Portuguese-speaking Africa (en)			
<b>African organisations (en)</b>			
African and Malagasy (en)			
African Development Bank (en)			
<b>African Union (en)</b>			
African Court of Justice and Human Rights (en)			
Arab Maghreb Union (en)			
CCAM countries (en)			

**VocBench**

# A quick tour through some of its recent features

http://art.uniroma2.it/stellato

# UI and Multilingualism (R1)

The screenshot shows the VocBench application interface for managing semantic data. The main window displays a list of concepts under the category 'financial accounting (en), contabilità generale (it)'. Several concepts are highlighted with red boxes, and arrows point from these boxes to specific features:

- ..and visualization:** Points to the 'skos:inScheme' section where multiple language versions of the concept are listed.
- Language preferences:** Points to the 'skos:prefLabel' section, which shows the concept name in various languages (e.g., 'общо счетоводство', 'finanční účetnictví', 'eksternt regnskab', 'allgemeine Buchhaltung', 'γενική λογιστική', 'financial accounting').
- multilingual editing:** Points to the 'Tools' menu in the top navigation bar, which includes options like 'View profile', 'Preferences' (highlighted with a red box), 'Administration', and 'Log out'.

The interface includes a sidebar with navigation tabs: Class, Concept, Scheme, Collection, Property. The 'Data' tab is selected. The top right shows the current user 'Armando' and project 'EUROVOC'.

© ART Group, 2016

# UI and Multilingualism (R1)

The screenshot shows the 'VocBench Preferences' page. On the left, under 'Rendering Languages:', there is a list of languages with checkboxes. Some are checked (el, en, it) and some are not (en-GB, en-US, es, et, fa, fi, fr, ga, hi, hr, hu, id, ja). To the right of this list is a vertical separator bar. To the right of the separator bar is a panel titled 'Language preferences' containing two checkboxes: 'Show flags' (checked) and 'Show instances number'. Below these checkboxes is a 'Project theme' section with a color palette. At the bottom right of the page is a copyright notice: '© ART Group, 2016'.

**Rendering Languages:**

- el
- en
- en-GB
- en-US
- es
- et
- fa
- fi
- fr
- ga
- hi
- hr
- hu
- id
- it
- ja

**Language preferences**

Show flags ?

Show instances number ?

Project theme ?

# UI and Multilingualism (R1)

The screenshot shows the VocBench3 application interface, version 9.0.0-beta.0, running at [localhost:1979/vocabbench3/#/Data](http://localhost:1979/vocabbench3/#/Data). The title bar indicates the current project is "EUROVOC\_ALIGN\_CUT". The interface features a top navigation bar with tabs for "VocBench", "Progetti", "Data", "Metadati", "SPARQL", and "Strumenti". A banner in the center says "...and multilingual UI!". The main area is divided into several sections: "Tipi:" (Types) showing "rdfs:type" and "skos:Concept"; "Top concept di:" (Top concept of) showing "4821 See- und Binnenschiffsverkehr" and "EuroVoc"; "Schemi:" (Schemes) showing "skos:inScheme" and "4821 See- und Binnenschiffsverkehr"; "Broader:" (Broader) showing "skosxl:prefLabel" with various language entries; and "Lessicalizzazioni:" (Lexicalizations). On the left, there is a sidebar with a tree view of concepts and a search bar. The bottom of the screen shows navigation buttons for "ResView", "TermView", and "Code".

# Graph Visualization

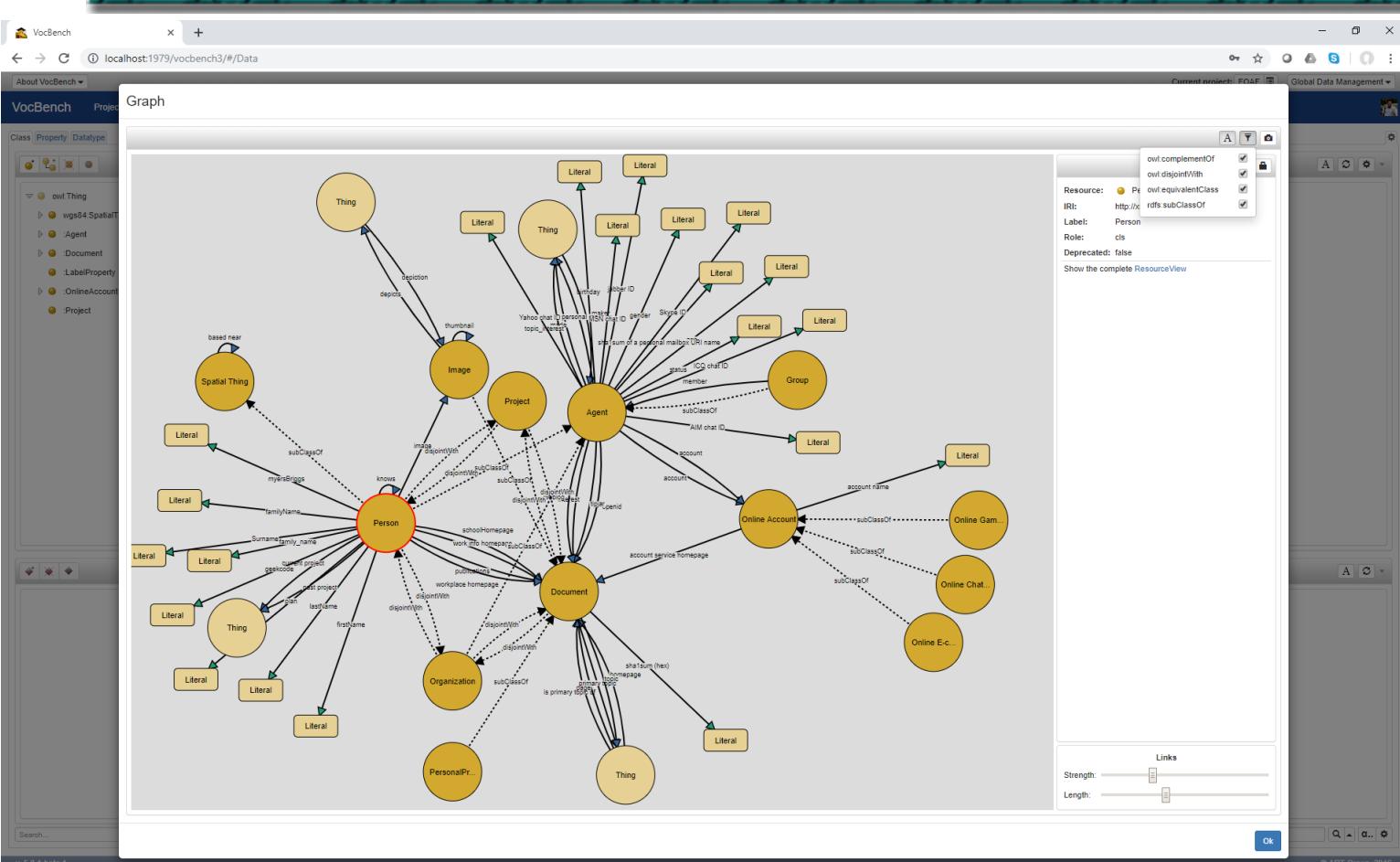
Two Views:

- **Model View**: strongly abstracted from triples, oriented to describing vocabularies
- **Data View**: more adherent to triples in the graph

Interwoven with different organization approaches:

- Exploration/Visualization: self-organizing diagram
- Diagram Editing: possibility to organize the elements of the graph

# Graph View: Model View



Properties are described as connectors between classes, by using their domain and range descriptors

The model view describes all classes in an ontology and their relevant axioms (a filter is available)

# Graph View: Data View

The screenshot shows the VocBench Graph View interface. On the left, a semantic graph visualization displays nodes like '7231 economic' and 'APEC country' connected by various edges such as 'skos:broader', 'skos:related', and 'skos:notation'. A central panel titled 'Expand node' allows users to filter relations based on type (e.g., rdfs:type), scheme (e.g., skos:inScheme), broader (e.g., skos:broader), lexicalizations (e.g., skos:prefLabel), and other properties. A right-hand panel provides detailed information about a selected resource, including its URI, type ('international organisation'), and predicates. A bottom panel shows a list of languages with checkboxes for filtering results.

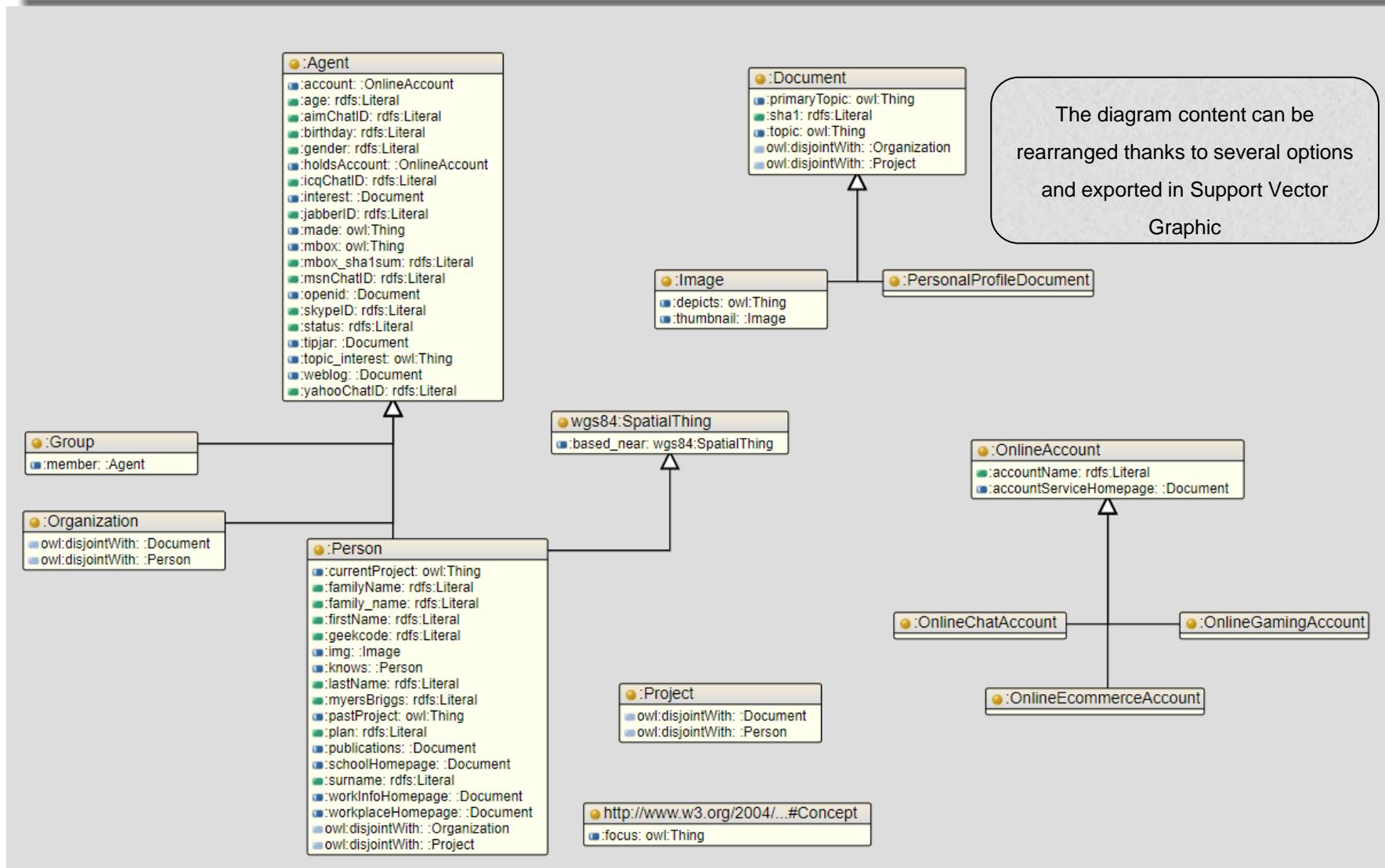
Resources can be dragged in or discovered by progressively expanding the boundary nodes in the graph

Any resource can be viewed in the data-oriented graph-view, which shows an almost triple-by-triple view of the resources managed in VocBench

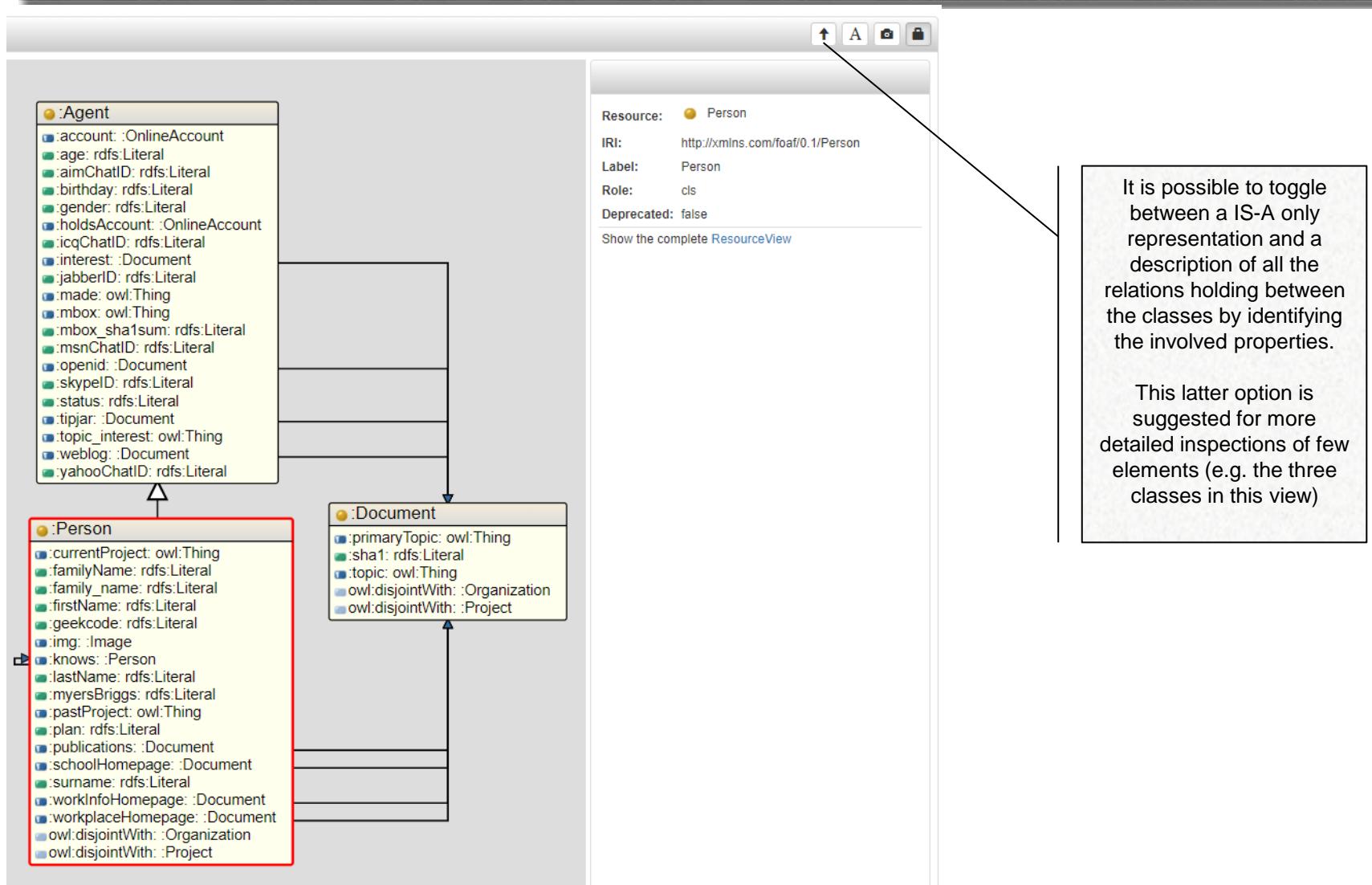
A detailed configuration provides several filters, based on specific languages, on a global toggle for all literals or on properties from specific sections of the resource view

Whenever a resource is inspected, if the number of connected nodes is in any case too high, a dedicated window shows all the properties being used within that specific resource so that the user can prepare a tailored set of filters

# Graph View: Class Diagram



# Graph View: Class Diagram



# Sheet2RDF

VocBench About VocBench ▾

localhost:1979/vocbench3/#/Sheet2RDF

Current project: Sheet2RDF\_Example\_Agrovoc Global Data Management

**VocBench** Projects Data SPARQL Tools ▾

Spreadsheet file: Browse AgrovocSample\_2 (NO explicit references, qname) - SKOSXL.xlsx

Spreadsheet preview (Rows: 20 out of 30)

skosx:prefLabel@it	skosx:prefLabel@en	skos:broader
activities	attività	
design	progetto	activities
growth control	controllo della crescita	activities
weather control	controllo meteorologico	activities
experimental design	schema sperimentale	design
project design	ideazione di un progetto	design
plot design	configurazione dell'app...	design
landscape design	progetto paesaggistico	design
universal design		design
animal husbandry methods	metodi di allevamento ...	growth control
cultivation	coltivazione	growth control
physiological regulation	regolazione fisiologica	growth control
animal growth promoters	promotori della crescita...	growth control
frost protection	protezione dal gelo	weather control
wind protection	protezione dal vento	weather control
cloud seeding	inseminazione di nubi	weather control
hail control	lotta all'grandine	weather control
artificial insemination	fecondazione artificiale	animal husband...
barrier husbandry	allevamento protetto	animal husband...

Subject mapping ▶ ↕ ↗ ↘

Pearl

```

1 prefix : <http://aims.fao.org/aos/agrovoc/>
2 prefix gddl: <http://www.w3.org/2003/g/data-view#>
3 prefix dct: <http://purl.org/dc/terms/>
4 prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
5 prefix owl: <http://www.w3.org/2002/07/owl#>
6 prefix skosxl: <http://www.w3.org/2008/05/skos-xl#>
7 prefix coda: <http://art.uniroma2.it/coda/contracts/>
8 prefix xsd: <http://www.w3.org/2001/XMLSchema#>
9 prefix skos: <http://www.w3.org/2004/02/skos/core#>
10 prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
11 prefix dc: <http://purl.org/dc/elements/1.1/>
12
13 rule it.uniroma2.art.Sheet2RDFAnnotation id:row {
14   nodes = {
15     @Memoized
16     subject uri:coda:randIdGen('concept') col_0/value .
17     col_0_litForm_node literal@en col_0/value .
18     col_0_xlabelUri_node uri:coda:randIdGen('xLabel',(lexicalForm = $col_0_litForm_node)) col_0/value .
19     col_1_litForm_node literal@it col_1/value .
20     col_1_xlabelUri_node uri:coda:randIdGen('xLabel',(lexicalForm = $col_1_litForm_node)) col_1/value .
21     @Memoized
22     broader uri:coda:randIdGen('concept') col_2/value .
23   }
24   graph = {
25     $subject rdf:type skos:concept .
26     OPTIONAL {
27       $subject skosx:prefLabel $col_0_xlabelUri_node .
28       $col_0_xlabelUri_node skosxl:literalForm $col_0_litForm_node .

```

And produced triples

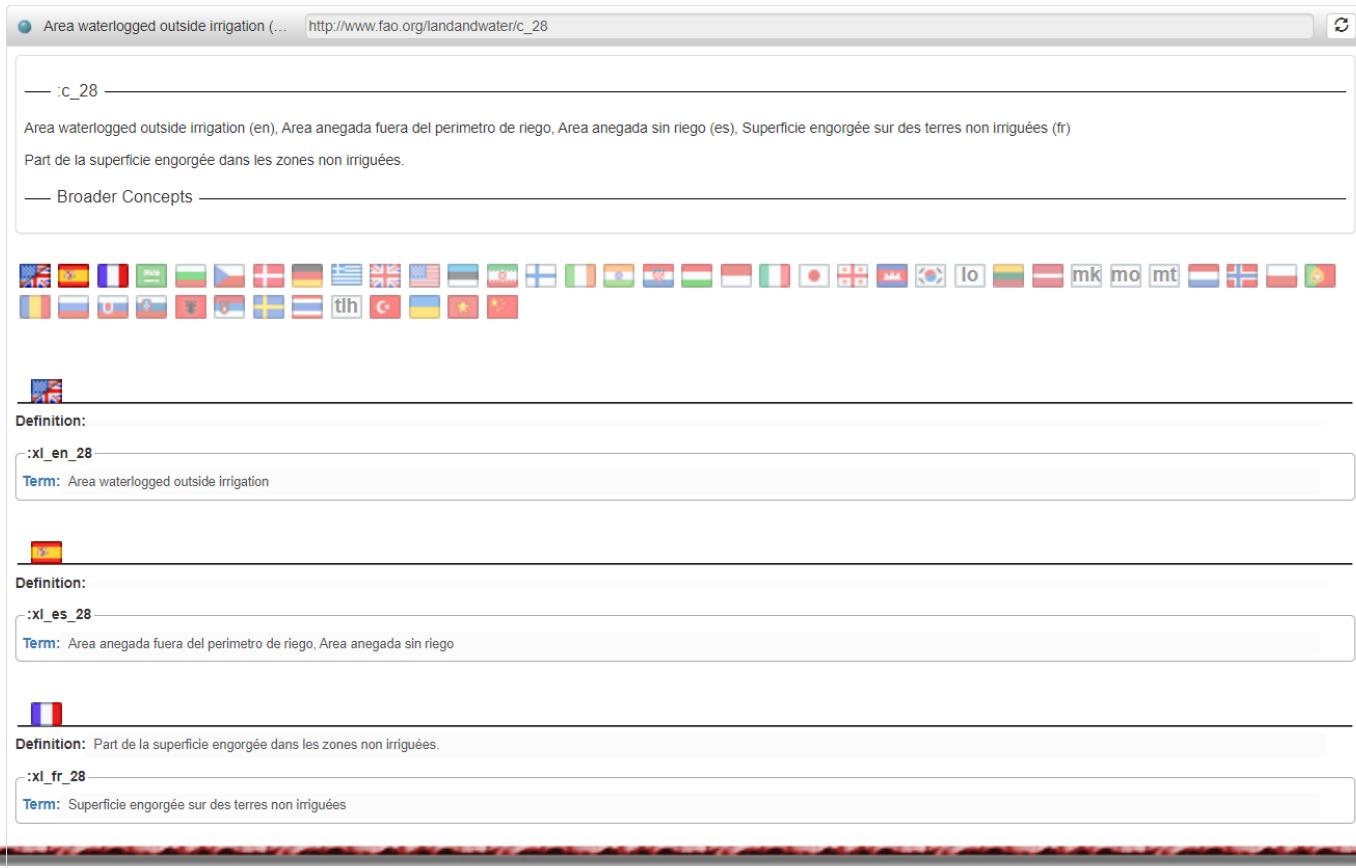
Generated triples preview (117 out of 175)

Subject	Predicate	Object
<http://aims.fao.org/aos/agrovoc/c_333290f7>	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	<http://www.w3.org/2004/02/skos/core#Concept>
<http://aims.fao.org/aos/agrovoc/c_333290f7>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	<http://aims.fao.org/aos/agrovoc/xl_en_e682a060>
<http://aims.fao.org/aos/agrovoc/xl_en_e682a060>	<http://www.w3.org/2008/05/skos-xl#literalForm>	"activities"@en
<http://aims.fao.org/aos/agrovoc/c_333290f7>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	<http://aims.fao.org/aos/agrovoc/xl_it_3e8e1be6>
<http://aims.fao.org/aos/agrovoc/xl_it_3e8e1be6>	<http://www.w3.org/2008/05/skos-xl#literalForm>	"attività"@it
<http://aims.fao.org/aos/agrovoc/c_738664e8>	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	<http://www.w3.org/2004/02/skos/core#Concept>
<http://aims.fao.org/aos/agrovoc/c_738664e8>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	<http://aims.fao.org/aos/agrovoc/xl_bd76f2b5>
<http://aims.fao.org/aos/agrovoc/xl_en_bd76f2b5>	<http://www.w3.org/2008/05/skos-xl#literalForm>	"design"@en
<http://aims.fao.org/aos/agrovoc/c_738664e8>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	<http://aims.fao.org/aos/agrovoc/xl_it_440559d4>
<http://aims.fao.org/aos/agrovoc/xl_it_440559d4>	<http://www.w3.org/2008/05/skos-xl#literalForm>	"progetto"@it
<http://aims.fao.org/aos/agrovoc/c_738664e8>	<http://www.w3.org/2004/02/skos/core#broader>	<http://aims.fao.org/aos/agrovoc/c_333290f7>
<http://aims.fao.org/aos/agrovoc/c_edd7090a>	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	<http://www.w3.org/2004/02/skos/core#Concept>
<http://aims.fao.org/aos/agrovoc/c_edd7090a>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	<http://aims.fao.org/aos/agrovoc/xl_en_3d1fa5fb>
<http://aims.fao.org/aos/agrovoc/xl_en_3d1fa5fb>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	"growth control"@en
<http://aims.fao.org/aos/agrovoc/xl_edd7090a>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	<http://aims.fao.org/aos/agrovoc/xl_it_cec972c0>
<http://aims.fao.org/aos/agrovoc/xl_it_cec972c0>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	"controllo della crescita "@it
<http://aims.fao.org/aos/agrovoc/xl_edd7090a>	<http://www.w3.org/2008/05/skos-xl#prefLabel>	<http://aims.fao.org/aos/agrovoc/c_333290f7>
<http://aims.fao.org/aos/agrovoc/c_14437dee>	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	<http://www.w3.org/2004/02/skos/core#Concept>

Possible to export produced triples or to load them in the dataset

# Simplified Views: Terminologist View

An alternative to the resource-view for editing SKOS-concepts – inspired by the IATE User Interface – with simplified experience, less RDF-centric



The screenshot shows a web-based interface for managing SKOS concepts. At the top, there's a header bar with a blue circular icon, the URL 'http://www.fao.org/landandwater/c\_28', and a refresh button. Below the header, the concept identifier ':c\_28' is displayed, followed by its definitions in multiple languages: English ('Area waterlogged outside irrigation'), Spanish ('Área anegada fuera del perímetro de riego'), and French ('Superficie engorgée sur des terres non irriguées'). A section for 'Broader Concepts' is shown with a list of flags representing other concepts. Below the definitions, there are three separate sections for each language, each containing a small flag icon, the definition identifier (:xl\_en\_28, :xl\_es\_28, :xl\_fr\_28), and the term itself ('Area waterlogged outside irrigation', 'Área anegada fuera del perímetro de riego', 'Superficie engorgée sur des terres non irriguées').

# Simplified Views: The Lexicographer View

The screenshot shows a web-based application interface for managing lexical entries. At the top, there's a navigation bar with tabs for 'Person (en)' and a URL 'http://ontolex#ontolexLexicalEntry\_981c1aa3'. To the right of the URL are icons for refresh ('C') and settings ('g'). Below the navigation is a main content area with a title 'Person' and a subtitle 'People'. A yellow-highlighted box contains several key pieces of information: 'Definition: A human being', 'Concept: http://ontolex#c\_8f6b7b5e', and 'Semantic reference: http://xmlns.com/foaf/0.1/Person'. To the right of this box is a small menu with options 'Add definition' and 'Set concept'. The overall layout is clean and modern, designed to facilitate the creation and editing of lexical entries.

A new simplified view for lexicographers:

- structured as an *editable* dictionary page
- fully exploits the Ontolex-lemon standard
- hides the complexities of the Ontolex model in RDF

# **DATASET ALIGNMENT IN VB3**

# Dataset Alignment: an Introduction

Ontology<sup>1</sup> Alignment (aka Ontology Matching, Ontology Mapping) defines the task of discovering and assessing alignments between ontologies

<sup>1</sup> the term ontology is to be intended in its broadest meaning, including thesauri, terminologies, authoritative lists and other datasets in general

- The task is well-defined
  - There are variations: Tbox/Schema matching, instance matching, instance-to-schema (also called annotation) etc..
- It is intensive and error-prone
- Several approaches for its automation have been devised
  - An Ontology Alignment Evaluation Initiative is run every year since 2004
- However...

...

## It is not limited to automatic discovery of alignments!

Once developed, alignments should be subject to a full maintenance lifecycle, which includes differential updates, taking into account newly added or deleted resources, topological changes in the mapped datasets, possibly collaboration between teams of the involved resources, etc..

# Alignment Maintenance: Some Literature



- Chimæra
  - Web based environment for merging ontologies and checking their correctness.
  - Mixes automatic mapping procedures with UI for content visualization and mapping validation

- MAFRA Toolkit



- Agreement Maker

- Visual tool for creating and managing mappings (includes automatic alignment)
- Focus on geospatial resources

- Alignment API

- Reusable set of API
- Alignment Server: online service for alignment manipulation
- EDOAL: a dedicated language for representing alignments as first-class citizens. A de-facto standard and interchange format

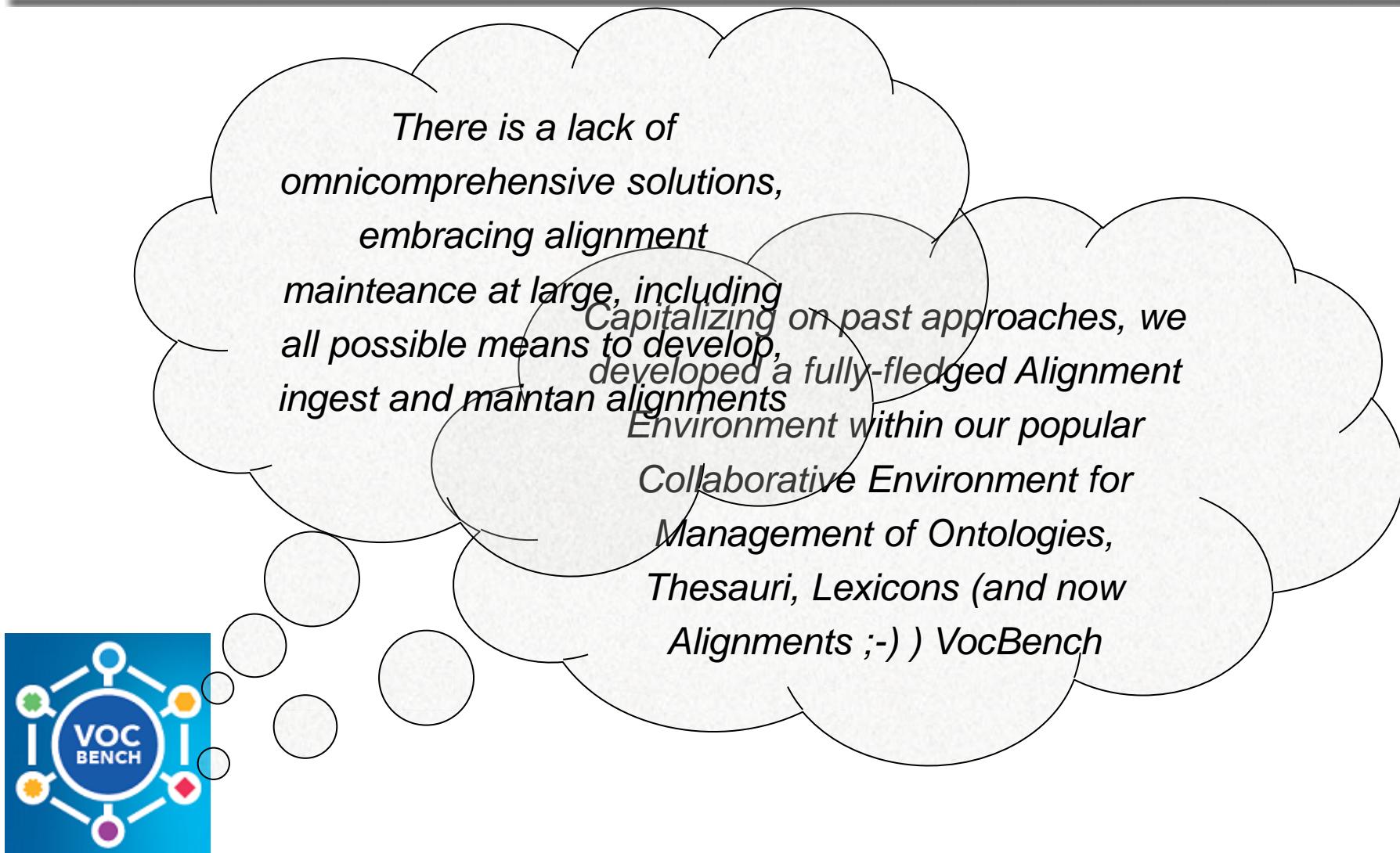
- Integrated Mapping Environments (within editors), e.g. PoolParty or Topbraid Enterprise Data Governance



David L. DILLON, PETER G. HORN, INGRID M. KRUMHISCH, STEPHANIE TIGGES, ANDREAS WILHELM, AND JÖRG WILHELM, "A Comparison of Tools for Ontology Alignment," *Journal of Web Semantics*, 11(1), pp. 11-20 (2009);  
 David L. DILLON, PETER G. HORN, INGRID M. KRUMHISCH, STEPHANIE TIGGES, ANDREAS WILHELM, AND JÖRG WILHELM, "A Comparison of Tools for Ontology Alignment," *Journal of Web Semantics*, 11(1), pp. 11-20 (2009);  
 Koenigsegg, R., & Stellato, A. (2007). Semantic Web alignment: A survey. In *Proceedings of the 2007 International Conference on Knowledge and Information Management (KIM 2007)* (pp. 235-250) (2002).



# Rethinking Alignment Support



# Alignment Support at Large

*Not a single entry point for alignment development*

*Alignment is a pervasive aspect appearing in diverse points of the UX*

- Alignment from within the resource-view
  - Manual alignment (search based)
  - Semi-automatic (search keywords based on available labels)
- Alignment Validation
  - Input coming from a static EDOAL file
  - Input coming from the invocation of an automatic alignment system
- EDOAL projects

# Alignment from within the Resource View (1)

The screenshot shows the VocBench interface for managing semantic alignments between vocabularies. The main focus is on the resource view for the Italian term 'PARLAMENTO' (id: 00002321).

**Left Panel (Resource View):**

- Shows a tree of concepts under the project 'PMKI\_TESEO\_CUT300'. The node 'PARLAMENTO (it)' is selected.
- Below the tree, a search bar and some navigation icons are visible.

**Middle Panel (Resource View):**

- Header:** PARLAMENTO (it) | http://www.senato.it/teseo/test/00002321 | Rename | A |
- Broader:** (empty)
- Lexicalizations:**
  - skos:prefLabel: PARLAMENTO (with an Italian flag icon)
- Notes:**
  - skos:note: AREA: Aspetti tipici del diritto parlamentare; altri descrittori dell'area costituzionale sono presenti in DIRITTO PUBBLICO e ORDINAMENTO DELLA REPUBBLICA.
- Other properties:**
  - dct:modified: 2018-04-28T20:01:26.155+02:00
  - skos:exactMatch: parlamento (it)
  - skos:narrower:
    - CAMERE DEL PARLAMENTO E PARLAMENTO NEL SUO COMPLESSO (it)
    - ORGANIZZAZIONE PARLAMENTARE (it)
    - PARLAMENTARI (it)
    - PROCEDURA PARLAMENTARE (it)
    - SEDUTE (it)
    - SENATO DELLA REPUBBLICA (it)

**Right Panel (Global Data Management):**

- Types:** rdf:type, skos:Concept
- Top Concept of:** skos:topConceptOf (list of various parliament terms in multiple languages)
- Schemes:** skos:inScheme (list of various parliament terms in multiple languages)

# Alignment from within the Resource View (2)

About VocBench ▾ Current project: PMKI TESEO CUT300 Global Data Management ▾ en ▾

VocBench Projects

Class Concept Schema Collection Datatype

A

- ▶ DIFESA NAZIONALE (it)
- ▶ DIRITTO CIVILE (it)
- ▶ LAVORO (it)
- ▶ PARLAMENTO (it)
- ▶ SPORT (it)
- ▶ TRASPORTI (it)
- ▶ UNIONE EUROPEA (it)

Search  . 

ResView TermView Code

v. 9.0.0-beta.0 © ART Group, 2016

### Assisted search

Local Remote

**Remote datasets**

- PMKI\_EUROVOC\_CUT300: <http://eurovoc.europa.eu/>
- Wikidata: <http://www.wikidata.org/entity/>
- EuroVoc: <http://eurovoc.europa.eu/>**
- Agrovoc: <http://aims.fao.org/aos/agrovoc/>

**Paired Lexicalization Sets** 

Language	Loading...	LexModel
<input checked="" type="checkbox"/> it		SKOSXL

**Search mode** 

- Starts with
- Contains
- Ends with
- Exact
- Fuzzy

**Ok** **Cancel**

# Alignment from within the Resource View (3)

The screenshot shows the VocBench interface at [localhost:1979/vocbench3/#/Data](http://localhost:1979/vocbench3/#/Data). The current project is PMKI\_TESEO\_CUT300.

**Left Panel:** A tree view of categories: DIFESA NAZIONALE (it), DIRITTO CIVILE (it), LAVORO (it), PARLAMENTO (it) (selected), SPORT (it), TRASPORTI (it), UNIONE EUROPEA (it).

**Middle Panel:** Resource view for PARLAMENTO (it). It shows:

- Notes:** skos:note: AREA: Aspetti tipici del diritto parlamentare; altri descrittori dell'area costituzionale sono presenti in DIRITTO PUBBLICO e ORDINAMENTO DELLA REPUBBLICA.
- Other properties:**
  - dct:modified: 2021-07-23T19:20:37
  - skos:exactMatch: parlamento (it)
  - skos:narrower: CAMERE DEL PARLAMENTO E PARLAMENTO NEL SUO COMPLESSO (it), ORGANIZZAZIONE PARLAMENTARE (it), PARLAMENTARI (it), PROCEDURA PARLAMENTARE (it), SEDUTE (it), SENATO DELLA REPUBBLICA (it)
  - skos:notation: 342.53
  - skos:related:

**Right Panel:** Alignment details for the selected resource.

- Types:** rdf:type: skos:Concept
- Top Concept of:** skos:topConceptOf: 0421 парламент (bg), 0421 parlament (cs), 0421 parlament (da), 0421 Parlament (de), 0421 Κοινοβούλιο (el), 0421 parliament (en), 0421 Parlamento (es), 0421 parlament (et), 0421 parlamenti (fi), 0421 Parlement (fr), 0421 parliament (ga), 0421 parlament (hr), 0421 parliament (hu), 0421 Parlamento (it), 0421 parlamentos (lt), 0421 parlamets (lv), 0421 парламент (mk), 0421 parlament (mt), 0421 parlament (nl), 0421 parliament (pl), 0421 assembleia (pt), 0421 Parlament (ro), 0421 parliament (sk), 0421 parliament (sl), 0421 parlamenti (sq), 0421 Парламент (sr), 0421 parlament (sv)
- Schemes:** skos:inScheme: 0421 парламент (bg), 0421 parlament (cs), 0421 parlament (da), 0421 Parlament (de), 0421 Κοινοβούλιο (el), 0421 parliament (en), 0421 Parlamento (es), 0421 parlament (et), 0421 parlamenti (fi), 0421 Parlement (fr), 0421 parliament (ga), 0421 parlament (hr), 0421 parliament (hu), 0421 Parlamento (it), 0421 parlamentos (lt), 0421 parlamets (lv), 0421 парламент (mk), 0421 parlament (mt), 0421 parlament (nl), 0421 parliament (pl), 0421 assembleia (pt), 0421 Parlament (ro), 0421 parliament (sk), 0421 parliament (sl), 0421 parlamenti (sq), 0421 Парламент (sr), 0421 parlament (sv)

# Dataset Metadata Exploitation

- The second option for alignment exploits ***datasets' metadata*** in order to automatically select the search keywords for the target dataset.
- The keywords basically come from the labels of the resource to be aligned
- Language selection through metadata comparison, thanks to a rich metadata description of the lexical asset

# The Metadata Registry

The Metadata Registry is based on a application profile

mixing several dataset metadata vocabularies:

– DCAT

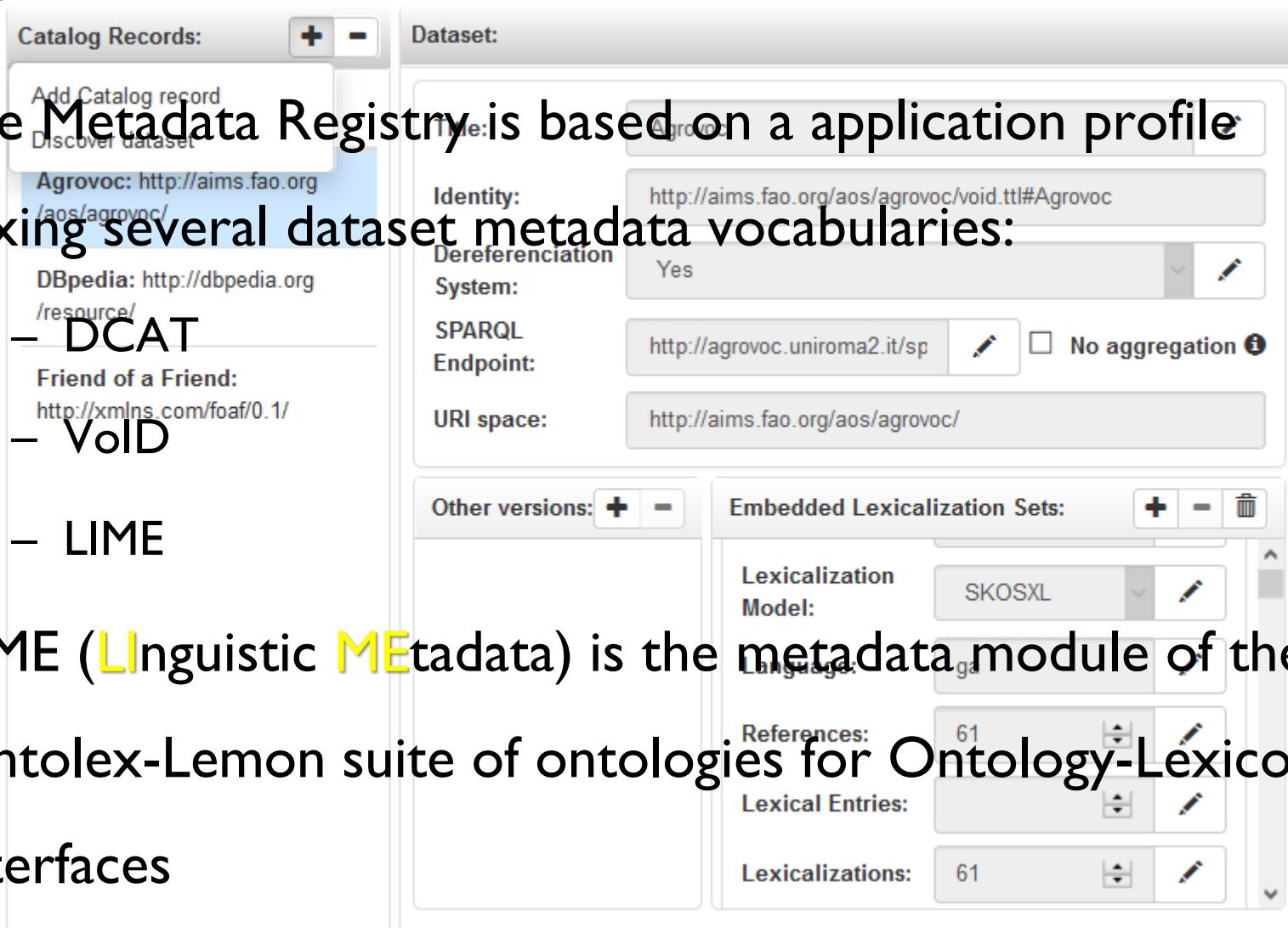
Friend of a Friend:

<http://xmlns.com/foaf/0.1/>

– VoID

– LIME

LIME (Linguistic MEdia) is the metadata module of the Ontolex-Lemon suite of ontologies for Ontology-Lexicon interfaces



The screenshot shows the Metadata Registry interface. On the left, under 'Catalog Records', there is a list with 'Agrovoc' selected. On the right, under 'Dataset', various configuration fields are shown:

- Title:** Agrovoc
- Identity:** <http://aims.fao.org/aos/agrovoc/void.ttl#Agrovoc>
- Dereferentiation System:** Yes
- SPARQL Endpoint:** <http://agrovoc.uniroma2.it/sparql>  No aggregation
- URI space:** <http://aims.fao.org/aos/agrovoc/>
- Other versions:** + -
- Embedded Lexicalization Sets:** + -
- Lexicalization Model:** SKOSXL
- Language:** [en](#)
- References:** 61
- Lexical Entries:**
- Lexicalizations:** 61

# Alignment Validation

Alignments computed through different means (alignment systems, manually etc...) can be compared through a dedicated UI

The EDOAL model has been adopted, providing a rich, vocabulary-neutral, perspective on alignments

Alignments can be validated, refined, projected onto a specific model (e.g. OWL/SKOS mapping properties/axioms)

Vetted alignments can be compared to other ones, and/or can be ingested into hosted datasets

Source entity	target entity	Relation	Mapping Property	Action	Status
<a href="#">http://iasted#Main_office</a>	<a href="#">http://sigkdd#Main_office</a>	=	owl:equivalentClass	<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Conference_hall</a>	<a href="#">http://sigkdd#Conference_hall</a>	=	owl:equivalentClass	<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Deadline</a>	<a href="#">http://sigkdd#Deadline</a>	=	owl:sameAs	<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Deadline_for_notification_of_acceptance</a>	<a href="#">http://sigkdd#Deadline_Author_notification</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Fee</a>	<a href="#">http://sigkdd#Fee</a>	<		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Listener</a>	<a href="#">http://sigkdd#Listener</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Nonmember_registration_fee</a>	<a href="#">http://sigkdd#Registration_Non-Member</a>	=	owl:equivalentClass	<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Person</a>	<a href="#">http://sigkdd#Person</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Place</a>	<a href="#">http://sigkdd#Place</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Registration_fee</a>	<a href="#">http://sigkdd#Registration_fee</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Review</a>	<a href="#">http://sigkdd#Review</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Speaker</a>	<a href="#">http://sigkdd#Speaker</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	
<a href="#">http://iasted#Student_registration_fee</a>	<a href="#">http://sigkdd#Registration_Student</a>	=		<a href="#">Accept</a> <a href="#">Reject</a>	

Quick Actions: -- [Do quick action](#) [Apply to Ontology](#) [Export as...](#)

© ART Group, 2016

# EDOAL Projects

The screenshot shows the VocBench interface for managing EDOAL Projects. The top navigation bar includes tabs for 'VocBench' (selected), 'Projects', 'Data', 'Metadata' (selected), 'SPARQL', and 'Tools'. The 'Current project' is set to 'EDOAL\_EuroVoc-Teseo'. The main area displays three panels:

- Left Panel:** Shows a tree view of concepts under the 'parliament' entity. A search bar at the bottom is set to 'parliament'. A callout box highlights the 'parliament (en), parlamento (it)' entry.
- Middle Panel:** Displays the 'New alignment' interface between 'PMKI\_EUROVOC\_CUT300\_REMOTE' and 'PMKI\_TESEO\_CUT300\_REMOTE'. It shows an alignment between 'parlament (en), parlamento (it)' and 'PARLAMENTO (it)'. A callout box states: "A new type of project, based on the EDOAL standard".
- Right Panel:** Shows another tree view of concepts under the 'PARLAMENTO (it)' entity. A callout box states: "Alignments are first class citizens in the project, which is linked to two other projects in VocBench".

# AUTOMATIC ALIGNMENT

# Metadata-driven Ontology Alignment: MAPLE

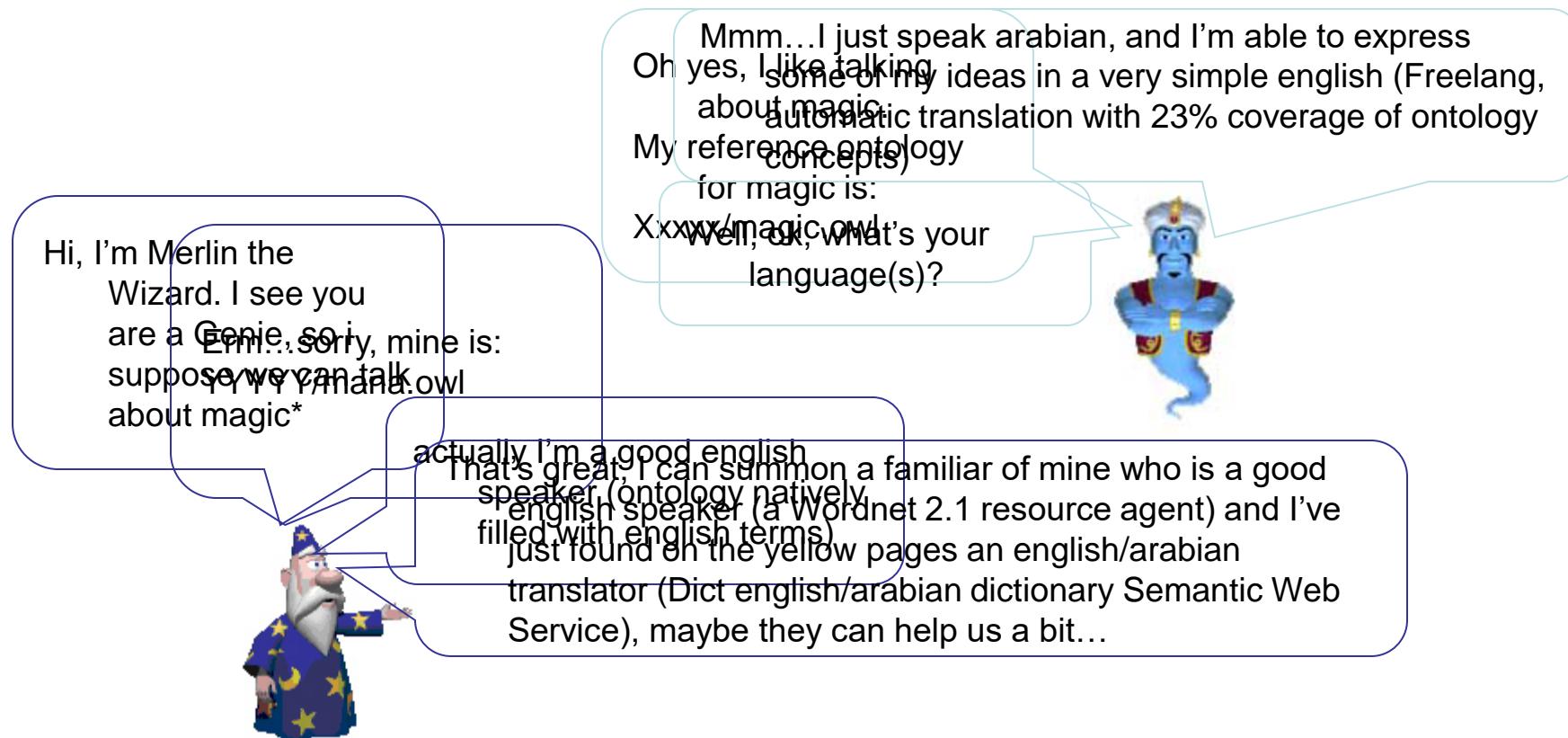
- MAPLE is an orchestrator for ontology alignment scenarios
- By analyzing the metadata of the datasets involved in a mediation process, MAPLE can inform alignment systems on the proper configuration and best strategies to adopt
- In VB3, MAPLE analysis can be inspected by the user, who can override several of its performed choices
- VB provides an Open API for Alignment Systems so that they can interact with it
- Possibility for connected Alignment Systems to define a set of matchers and to export their configuration schemes
  - General configuration
  - Matchers Configuration
- Currently available systems
  - Genoma (a simple alignment system meant to prove the potentialities of MAPLE) [Roberto Enea, Maria Teresa Pazienza, Andrea Turbati GENOMA: GENeric Ontology Matching Architecture, IA\*IA 2015 (2015) doi:10.1007/978-3-319-24309-2\_23 (Gavanelli, Marco and Lamma, Evelina and Riguzzi, Fabrizio eds.), Lecture Notes in Computer Science, 9336, 303-315, Springer International Publishing, 2015]
  - NAISC [created by the SFI Insight Centre for Data Analytics in the context of the Horizon 2020 ELEXIS project (grant agreement No 731015 McCrae, J.P., Buitelaar, P.: Linking Datasets Using Semantic Textual Similarity. Cybernetics and Information Technologies 8(1), 109-123 (2018)]
  - More to come... AgreementMakerLight: AML [ D. Faria, C. Pesquita, E. Santos, M. Palmonari, I. Cruz, and F. Couto, The AgreementMakerLight ontology matching system, ODBASE 2013 ]

# Semantic/Linguistic Coordination

...I have to summon here

...two very dear old friends...

# Semantic/Linguistic Coordination



\*agents are talking on the basis of a minimal agreed protocol which can then start a semantic coordination activity

# Semantic/Linguistic Coordination

...let's see what happens

behind the stages...

# "Alignment Scenario" Evaluation by MAPLE

Short Description of the datasets to be compared

Description of the **support datasets**: usually lexicalizations of the same datasets to be aligned, but can include external supporting resources (e.g. lexical resources such as WordNet to expand language coverage, so called *synonymizers*)

Possible suggested pairings between lexicalization sets (supported by *synonymizers, translators etc.*) and

summarized into a score

```

result:
  ▼ sourceDataset:
    @type: null
    ▼ @id: "http://example.org/59a81cd5-cfd7-435b-8d65-e0f303e105f4/void.ttl#9a64ce19-27a0-48ca-9294-c13f823604e1"
    uriSpace: "http://www.senato.it/teseo/teseo"
    sparqlEndpoint: "http://localhost:7200/repositories/TESEO_core"

  ▼ targetDataset:
    @type: null
    ▼ @id: "http://example.org/3753f4f6-b68b-4c4a-a71b-2535718602da/void.ttl#a3f50b1e-5100-49a4-b703-40c6daad777f"
    uriSpace: "http://eurovoc.europa.eu/"
    sparqlEndpoint: "http://localhost:7200/repositories/EuroVoc_core"

  ▼ supportDatasets:
    ▼ 0:
      ▼ @id: "http://example.org/3753f4f6-b68b-4c4a-a71b-2535718602da/void.ttl#a3f50b1e-5100-49a4-b703-40c6daad777f_it_Lexicalization_set"
      uriSpace: null
      sparqlEndpoint: "http://localhost:7200/repositories/EuroVoc_core"
      ▼ referenceDataset:
        lexiconDataset: null
        lexicalizationModel: "http://www.w3.org/2008/05/skos-xl"
        lexicalizations: 18545
        references: 7282
        lexicalEntries: null
        avgNumOfLexicalizations: 2.546
        percentage: 1
        languageTag: "it"
        @type: "http://www.w3.org/ns/Lemon/Lime#LexicalizationSet"
    ▼ 1:
      ▼ @id: "http://example.org/59a81cd5-cfd7-435b-8d65-e0f303e105f4/void.ttl#9a64ce19-27a0-48ca-9294-c13f823604e1_it_Lexicalization_set"
      uriSpace: null
      sparqlEndpoint: "http://localhost:7200/repositories/TESEO_core"
      ▼ referenceDataset:
        lexiconDataset: null
        lexicalizationModel: "http://www.w3.org/2008/05/skos-xl"
        lexicalizations: 3378
        references: 3378
        lexicalEntries: null
        avgNumOfLexicalizations: 1
        percentage: 1
        languageTag: "it"
        @type: "http://www.w3.org/ns/Lemon/Lime#LexicalizationSet"

  ▼ pairings:
    ▼ 0:
      score: 0.5716210939615214
      ▼ source:
        ▼ lexicalizationSet: "http://example.org/59a81cd5-cfd7-435b-8d65-e0f303e105f4/void.ttl#9a64ce19-27a0-48ca-9294-c13f823604e1_it_Lexicalization_set"
        synonymizer: null
        ▼ aspect:
          lexicalizationSet: "http://example.org/3753f4f6-b68b-4c4a-a71b-2535718602da/void.ttl#a3f50b1e-5100-49a4-b703-40c6daad777f_it_Lexicalization_set"
          synonymizer: "Armando Stellato stellato@uniroma2.it"
        synonymizer: "http://art.uniroma2.it/stellato"

```

# Semantic/Linguistic Coordination

...and, in VocBench,  
what the user sees...

# Semantic/Linguistic Coordination

## Create task

**Left project**

Teseo-CUT

**Left project**

Eurovoc-CUT

**Profile matching**

Type: Dataset

URI space: <http://www.teseo.it/teseo/tes/>

Conforms to: SKOS

SPARQL endpoint: <http://localhost:7200/repositories/Teseo-CUT>

Type: Dataset

URI space: <http://eurovoc.europa.eu/>

Conforms to: SKOS

SPARQL endpoint: <http://localhost:7200/repositories/Eurovoc-CUT>

**Pairings**

Use

**Synonymizers**

- MultiWordNet Score: 0.991
- ItalWordnet Score: 0.886

**Matchers**

Optionally a matcher can be provided to the alignment system. Click [here](#) to search for available matchers.

Quality of potential pairings is mainly measured in terms of:

- coverage of the dataset (percentage of resources that are lexicalized in that given language)
- on a second order, on the lexical richness in that language (overall number of lexicalizations, thus revealing the presence of alternative expressions, synonyms etc..).
- Availability of support resources (that can expand the possible anchors between resources)

VocBench | Repositories | GraphDB Workbench | PmkiPortal

localhost:1979/pmki/#/datasets/Eurovoc\_4.9.1/data

**PMKI** Datasets Search Mappings Login

**Eurovoc\_4.9.1**

Concept Collection Scheme Property Data Sparql

A ACP countries (en) http://eurovoc.europa.eu/5083

Type	skos:Concept
Top Concept Of	7231 economic geography (en) EuroVoc (en)
In Scheme	7231 economic geography (en) EuroVoc (en)
Preferred Label	AKP-Staaten (de) χώρες ΑΚΕ (el) paesi membri ACP (it) ACP countries (en) pays ACP (fr)
Alternative Label	AKP-Länder (de)
Scope Note	À utiliser pour les documents qui traitent de l'ensemble de ces pays. (fr) Use for documents which deal with all of these countries. (en)
Version Info	n/a
Notation	5083 5083
Related	ACP-EU Countries (en)
Start Date	1952-06-16
Created	1995-10-02

**ShowVoc**

# A browsing & publication companion to VocBench

Search...  

# The PMKI Project

- PMKI (Public Multilingual Knowledge Infrastructure) is a project funded by the ISA2 programme of the EU, aimed at the development of open data portals focusing on terminological and linguistic content.
- Within the project, the idea of a specific portal mutated into a sort of read-only VocBench, including the resource view and much of the browsing views, with a focus on efficiency and streamlined fruition of content.
- Besides browsing UX, the system features capabilities oriented at showing datasets as whole resources
- These features include, among others
  - global free-text search over all datasets and machine translation API
  - browse linksets between datasets through a dedicated graph exploration
    - each node represents a dataset as a whole
    - the arcs represent the linksets
  - For each linkset, it is possible to list its mapping statements and browse the involved aligned resources

# The ShowVoc Platform

- Revised resource-view thought for a more readable and streamlined visualization of resource details
- Exploitation of VocBench advanced visualization solutions (e.g. Custom Forms, adapted to the new resource-view)
- Focus on language resources, from (multilingual) thesauri to lexicons
- Global index-based search separated from the dataset-specific indexes (which are stored per-repository)
- SPARQL interface (*reused and adapted from VocBench*)
- Graph View (*reused and adapted from VocBench*)
  - Dataset-oriented graph-view
- Mappings Page
- Contributors' Services and Pages
- Administration Panel

# Dataset List View

VocBench   |  Repositories | GraphDB Workben...   |  PmkiPortal

localhost:1979/pmki/#/datasets

**PMKI** Datasets Search Mappings Login

## Browse PMKI datasets

**Dataset type**

- KOS
- Lexicons
- Only open projects

**Language**

- de
- fr
- en
- es
- it

**Search**

🔍

<a href="#">IATE_en-fr</a>	Model: <b>OntoLex</b> Lexicalization: <b>OntoLex</b>
<a href="#">LandAndWater</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>
<a href="#">OntoLex_Demo</a>	Model: <b>OntoLex</b> Lexicalization: <b>OntoLex</b>
<a href="#">OntoLex_Test</a>	Model: <b>OntoLex</b> Lexicalization: <b>OntoLex</b>
<a href="#">PMKI_EUROVOC_CUT300</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>
<a href="#">PMKI_EUROVOC_CUT300_REMOTE</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>
<a href="#">PMKI_TESEO_CUT300</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>
<a href="#">PMKI_TESEO_CUT300_REMOTE</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>
<a href="#">Sheet2RDF_AgrovocDemo</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>
<a href="#">Sheet2RDF_Example_Agrovoc</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>
<a href="#">Sheet2RDF_SKOSTest</a>	Model: <b>SKOS</b> Lexicalization: <b>SKOSXL</b>

All datasets in the connected triple store are reported by the platform. These can be filtered by:

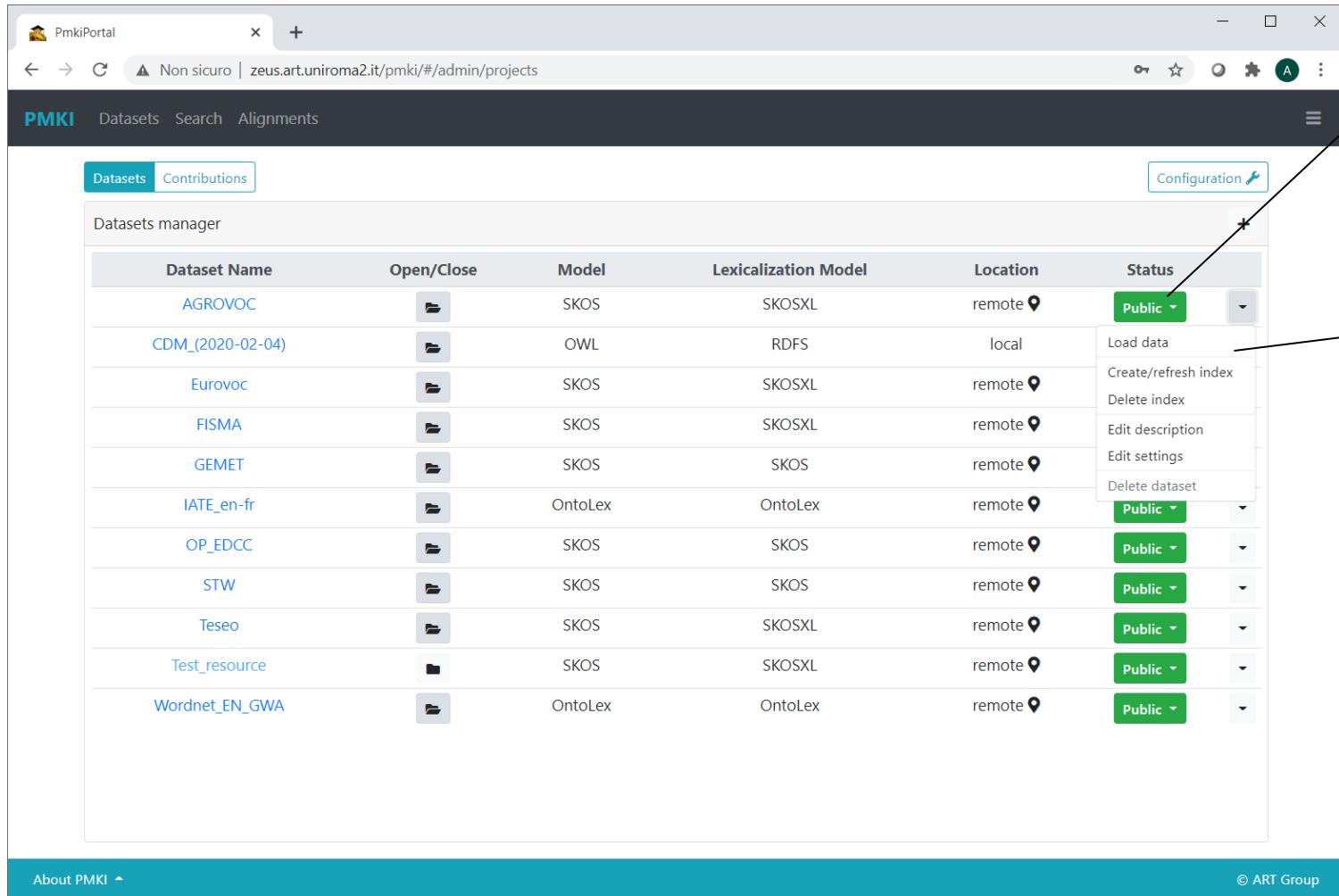
- Open-only repositories
- Language
- Type of dataset (KOS or Lexicon)

About PMKI ▾

graph (1).svg

Mostra tutto X

# Administrator Dashboard



The screenshot shows the PMKI Portal Administrator Dashboard. It features a table of datasets with columns for Name, Open/Close, Model, Lexicalization Model, Location, and Status. The Status column includes a dropdown menu with options: pristine, staging, public, Load data, Create/refresh index, Delete index, Edit description, Edit settings, and Delete dataset.

Dataset Name	Open/Close	Model	Lexicalization Model	Location	Status
AGROVOC		SKOS	SKOSXL	remote	Public
CDM_(2020-02-04)		OWL	RDFS	local	
Eurovoc		SKOS	SKOSXL	remote	
FISMA		SKOS	SKOSXL	remote	
GEMET		SKOS	SKOS	remote	
IATE_en-fr		OntoLex	OntoLex	remote	Public
OP_EDCC		SKOS	SKOS	remote	Public
STW		SKOS	SKOS	remote	Public
Teseo		SKOS	SKOSXL	remote	Public
Test_resource		SKOS	SKOSXL	remote	Public
Wordnet_EN_GWA		OntoLex	OntoLex	remote	Public

The status can be:

- pristine
- staging
- public

Various operations can be performed by the admin directly from this dashboard

# Browsing Datasets

(1)

ShowVoc x +

zeus.art.uniroma2.it/showvoc/#/datasets/Eurovoc/data?resId=http%3F%2Feurovoc.europa.eu%2F2160

ShowVoc Datasets Search Alignments

**Eurovoc**

Data Sparql

Concept	Collection	Scheme	Property	Alignments												
<ul style="list-style-type: none"> <li>ownership (en), propriété des biens (fr), Eigentum an Gütern (de), proprietà patrimoniale (it)</li> <li>parliament (en), parlement (fr), Parlament (de), parlamento (it)                     <ul style="list-style-type: none"> <li>national parliament (en), parlement national (fr), nationales Parlament (de), parlamento nazionale (it)</li> <li>regional parliament (en), parlement régional (fr), regionales Parlament (de), parlamento regionale (it)</li> </ul> </li> <li>parliamentary procedure (en), procédure parlementaire (fr), parlamentarisches Verfahren (de), procedura parlamentare (it)                     <ul style="list-style-type: none"> <li>adjournment (en), ajournement (fr), Vertagung (de), aggiornamento (it)</li> <li>parliamentary rules of procedure (en), règlement du Parlement (fr), Geschäftsordnung des Parlaments (de), regolamento del parlamento (it)</li> <li>parliamentary session (en), session parlementaire (fr), Sitzungsperiode des Parlaments (de), sessione parlamentare (it)</li> </ul> </li> <li>parliamentary sitting (en), séance parlementaire (fr), Parlamentssitzung (de), seduta parlamentare (it)                     <ul style="list-style-type: none"> <li>agenda (en), ordre du jour (fr), Tagesordnung (de), ordine del giorno (it)</li> <li>document for discussion at a sitting (en), document de séance (fr), Sitzungsdokument (de), documento di seduta (it)</li> <li>explanation of voting (en), déclaration de vote (fr), Erklärung zur Abstimmung (de), dichiarazione di voto (it)</li> <li>parliamentary debate (en), débat parlementaire (fr), Parlamentsdébatte (de), dibattito parlamentare (it)</li> <li>question time (en), heure des questions (fr), Fragestunde (de), ora delle interrogazioni (it)</li> </ul> </li> <li>parliamentary vote (en), vote parlementaire (fr), parlamentarische Abstimmung (de), voto del parlamento (it)                     <ul style="list-style-type: none"> <li>public hearing (en), audition publique (fr), öffentliche Anhörung (de)</li> </ul> </li> </ul>	A 🔍 ⚙️															
<table border="1"> <tr> <td>agenda (en), ordre du jour (fr), Ta...</td> <td>http://eurovoc.europa.eu/2160</td> </tr> <tr> <td colspan="2"> <b>Alternative Label</b> <ul style="list-style-type: none"> <li>dnevni red (hr)</li> <li>napirend (hu)</li> <li>ordine del giorno (it)</li> <li>darbotvarké (lt)</li> <li>darba kārtība (lv)</li> <li>дневен ред (mk)</li> <li>ağenda (mt)</li> <li>agenda (nl)</li> <li>porządek dzienny (pl)</li> <li>ordem do dia (pt)</li> <li>agendă parlamentară (ro)</li> <li>program schôdze (sk)</li> <li>dnevní red (sl)</li> <li>rend dite (sq)</li> <li>дневни ред (sr)</li> <li>dagordning (sv)</li> <li>pořad dne (cs)</li> <li>pořad schůze (cs)</li> <li>program zasedání (cs)</li> <li>progetto di ordine del giorno (it)</li> </ul> </td> </tr> <tr> <td colspan="2"> <b>Broader</b> <ul style="list-style-type: none"> <li>parliamentary sitting (en), séance parlementaire (fr), Parlamentssitzung (de), seduta parlamentare (it)</li> </ul> </td> </tr> <tr> <td colspan="2"> <b>Version Info</b> <ul style="list-style-type: none"> <li>n/a</li> </ul> </td> </tr> <tr> <td colspan="2"> <b>Notation</b> <ul style="list-style-type: none"> <li>2160</li> </ul> </td> </tr> <tr> <td colspan="2"> <b>Exact Match</b> <ul style="list-style-type: none"> <li>http://FinReg#xl_en_ec7de929</li> </ul> </td> </tr> </table>					agenda (en), ordre du jour (fr), Ta...	http://eurovoc.europa.eu/2160	<b>Alternative Label</b> <ul style="list-style-type: none"> <li>dnevni red (hr)</li> <li>napirend (hu)</li> <li>ordine del giorno (it)</li> <li>darbotvarké (lt)</li> <li>darba kārtība (lv)</li> <li>дневен ред (mk)</li> <li>ağenda (mt)</li> <li>agenda (nl)</li> <li>porządek dzienny (pl)</li> <li>ordem do dia (pt)</li> <li>agendă parlamentară (ro)</li> <li>program schôdze (sk)</li> <li>dnevní red (sl)</li> <li>rend dite (sq)</li> <li>дневни ред (sr)</li> <li>dagordning (sv)</li> <li>pořad dne (cs)</li> <li>pořad schůze (cs)</li> <li>program zasedání (cs)</li> <li>progetto di ordine del giorno (it)</li> </ul>		<b>Broader</b> <ul style="list-style-type: none"> <li>parliamentary sitting (en), séance parlementaire (fr), Parlamentssitzung (de), seduta parlamentare (it)</li> </ul>		<b>Version Info</b> <ul style="list-style-type: none"> <li>n/a</li> </ul>		<b>Notation</b> <ul style="list-style-type: none"> <li>2160</li> </ul>		<b>Exact Match</b> <ul style="list-style-type: none"> <li>http://FinReg#xl_en_ec7de929</li> </ul>	
agenda (en), ordre du jour (fr), Ta...	http://eurovoc.europa.eu/2160															
<b>Alternative Label</b> <ul style="list-style-type: none"> <li>dnevni red (hr)</li> <li>napirend (hu)</li> <li>ordine del giorno (it)</li> <li>darbotvarké (lt)</li> <li>darba kārtība (lv)</li> <li>дневен ред (mk)</li> <li>ağenda (mt)</li> <li>agenda (nl)</li> <li>porządek dzienny (pl)</li> <li>ordem do dia (pt)</li> <li>agendă parlamentară (ro)</li> <li>program schôdze (sk)</li> <li>dnevní red (sl)</li> <li>rend dite (sq)</li> <li>дневни ред (sr)</li> <li>dagordning (sv)</li> <li>pořad dne (cs)</li> <li>pořad schůze (cs)</li> <li>program zasedání (cs)</li> <li>progetto di ordine del giorno (it)</li> </ul>																
<b>Broader</b> <ul style="list-style-type: none"> <li>parliamentary sitting (en), séance parlementaire (fr), Parlamentssitzung (de), seduta parlamentare (it)</li> </ul>																
<b>Version Info</b> <ul style="list-style-type: none"> <li>n/a</li> </ul>																
<b>Notation</b> <ul style="list-style-type: none"> <li>2160</li> </ul>																
<b>Exact Match</b> <ul style="list-style-type: none"> <li>http://FinReg#xl_en_ec7de929</li> </ul>																

About ShowVoc ▾ © ART Group

# Browsing Datasets (2)

VocBench    Repositories | GraphDB Workbenches    PmkiPortal

localhost:1979/pmki/#/datasets/Eurovoc\_4.9.1/data

**PMKI** Datasets Search Mappings Login

**Eurovoc\_4.9.1**

Concept Collection Scheme Property

A ACP countries (en) http://eurovoc.europa.eu/5083

Type	skos:Concept
Top Concept Of	7231 economic geography (en) EuroVoc (en)
In Scheme	7231 economic geography (en) EuroVoc (en)
Preferred Label	AKP-Staaten (de) χώρες ΑΚΕ (el) paesi membri ACP (it) ACP countries (en) pays ACP (fr)
Alternative Label	AKP-Länder (de)
Scope Note	À utiliser pour les documents qui traitent de l'ensemble de ces pays. (fr) Use for documents which deal with all of these countries. (en)
Version Info	n/a
Notation	5083 5083
Related	ACP-EU Convention (en) ACP-EU institution (en) protocol on sugar (en)
Start Date	1952-06-16
Created	1995-10-02

The view is highly customizable! PMKI exploits VB's custom forms making them uniform with the new lightweight UI.

e.g. in this concept, scope notes and notations are both reified, yet their indirectly linked content is shown seamlessly in the resource-view

AAMS countries (en)  
access to the courts (en)  
accounting (en)  
accounting system (en)  
**ACP countries (en)**  
administrative law (en)  
administrative personnel (en)  
administrative structures (en)  
advanced materials (en)  
amorphous materials (en)  
biomaterials (en)  
composite materials (en)  
shape-memory alloy (en)  
special polymer (en)  
superconducting alloy (en)  
technical ceramics (en)  
ultra-fine particle (en)  
Africa (en)  
English-speaking Africa (en)  
French-speaking Africa (en)  
Portuguese-speaking Africa (en)  
African organisation (en)  
African and Mauritan Common Organisation (en)  
African Development Bank (en)  
African Union (en)  
African Court of Justice and Human Rights (en)  
Arab Maghreb Union (en)  
CCAM countries (en)

Search...  

# SPARQL querying in ShowVoc

VocBench    x    Repositories | GraphDB Workben...    PmkiPortal    x

localhost:1979/pmki/#/datasets/Eurovoc\_4.9.1/sparql

**PMKI** Datasets Search Mappings    Login

**Eurovoc\_4.9.1**

Query +

```

Fetch prefix from prefix.cc
PREFIX geo-pos: <http://www.w3.org/2003/01/geo/wgs84_pos#>
PREFIX lexvo: <http://lexvo.org/ontology#>
PREFIX sesame: <http://www.openrdf.org/schema/sesame#>
PREFIX luc: <http://www.ontotext.com/owlim/lucene#>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
SELECT ?s ?p ?form WHERE {
  ?s a skos:Concept .
  ?s skosxli:prefLabel ?x1 .
  ?x1 skosxli:literalForm "administrative structures"
  ?s ?x12 .
  ?x12 a skosxli:Label .
  ?x12 skosxli:literalForm ?form
} LIMIT 100
  
```

Submit Clear  Include Inferred

<http://eurovoc.europa.eu/2166>  
<http://eurovoc.europa.eu/2166>

Results count: 44 (Done in 129 millisec)

● administrative structures (en) <http://eurovoc.europa.eu/2166>   

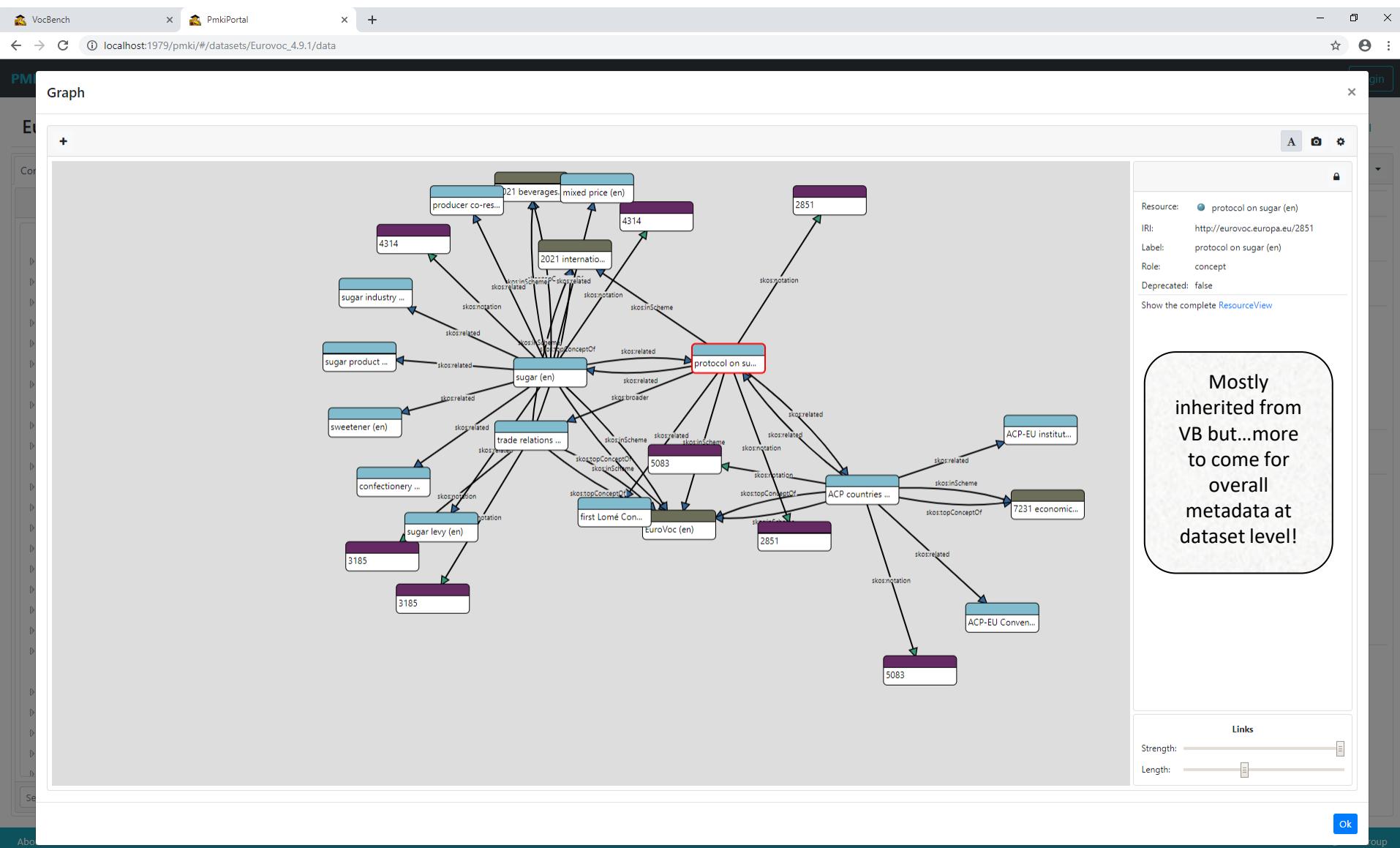
Type	skos:Concept
Top Concept Of	0436 executive power and public service (en) EuroVoc (en)
In Scheme	0436 executive power and public service (en) EuroVoc (en)
Preferred Label	organisation administrative (fr) administrative structures (en) Διοικητική οργάνωση (el) Verwaltungsorganisation (de) organizzazione amministrativa (it) organizzazione amministrativa diretta (it) organizzazione amministrativa indiretta (it) administrative organisation (en)
Alternative Label	
Version Info	n/a
Notation	2166 2166
Related	administrative science (en)
Start Date	1952-06-16
Created	1995-10-02

Powered by YASGUI

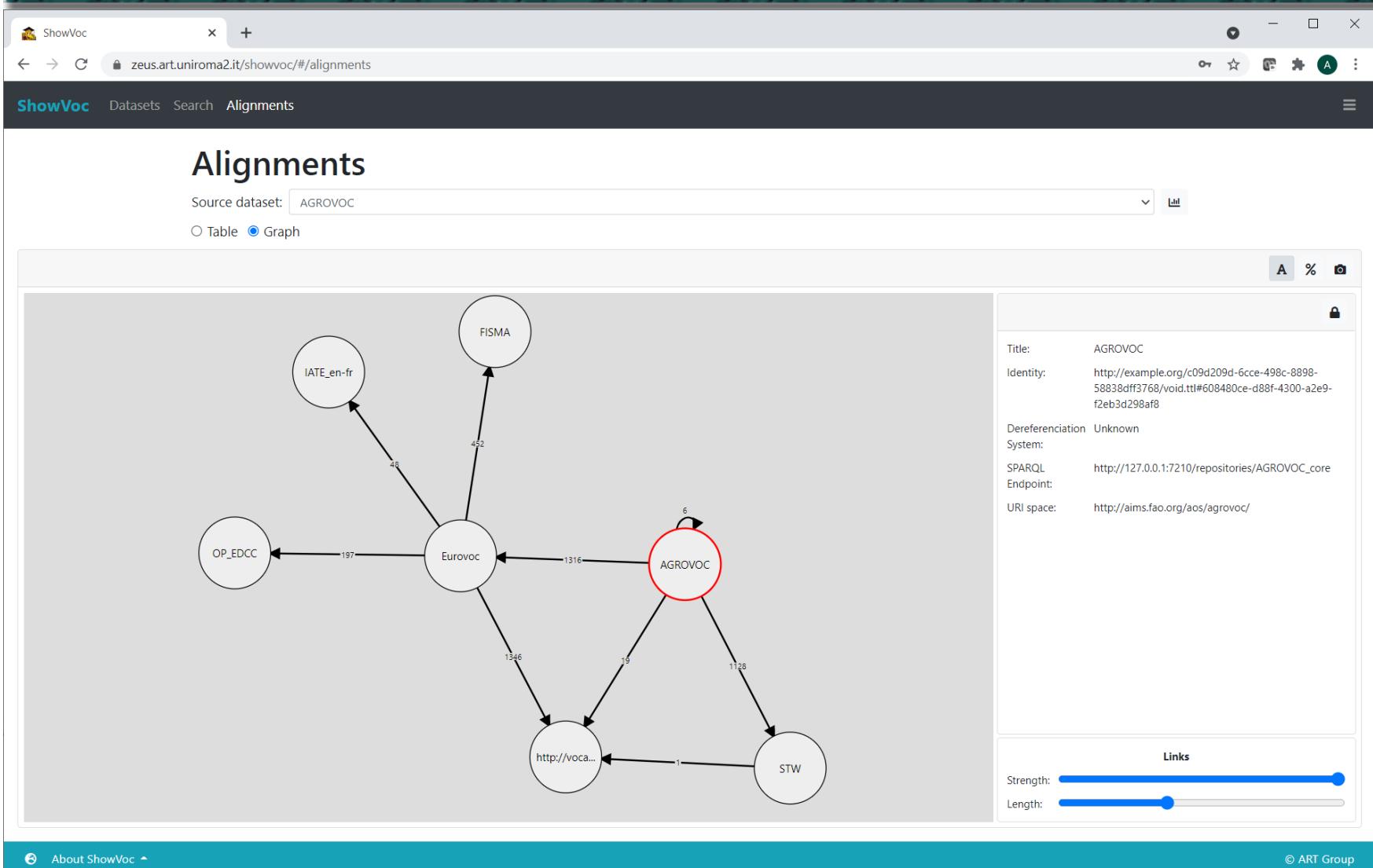
Save results as... ▾ 1 of 1 ▾

About PMKI ▾ © ART Group

# ShowVoc Graph View



# Browsing Alignments (1)



# Browsing Alignments (2)

The screenshot shows a web browser window for the ShowVoc platform, specifically the 'Alignments' section. The URL in the address bar is [zeus.art.uniroma2.it/showvoc/#/alignments](http://zeus.art.uniroma2.it/showvoc/#/alignments). The interface includes a navigation bar with 'ShowVoc', 'Datasets', 'Search', and 'Alignments' tabs, and a sidebar listing various source datasets.

The main content area displays a table titled 'Alignments' comparing terms from 'AGROVOC' and 'Eurovoc'. The columns are 'AGROVOC', 'Predicate', and 'Eurovoc'. Each row shows a term from AGROVOC, its predicate (e.g., <http://www.w3.org/2004/02/skos/core#exactMatch>), and its corresponding term in Eurovoc with its language code (e.g., en, fr, de, it). A search bar at the bottom allows users to filter the results.

AGROVOC	Predicate	Eurovoc
artificial insemination (en), Fecondazione artificiale (it), 人工授精 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	artificial insemination (en), insémination artificielle (fr), künstliche Besamung (de), inseminazione artificiale (it)
wool (en), Lana (it), 羊毛 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	wool (en), laine (fr), Wolle (de), lana (it)
migration (en), Migrazione (it), 迁徙 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	migration (en), migration (fr), Wanderung (de), migrazione (it)
nomadism (en), Nomadismo (it), 游牧制度 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	nomadism (en), nomadisme (fr), Nomadentum (de), nomadismo (it)
incorporation (en), Incorporazione (it), 摶合(土壤) (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	incorporation (en), constitution de société (fr), Gesellschaftsgründung (de), costituzione di società (it)
seed (en), Seme (it), 种子 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	seed (en), semence (fr), Saatgut (de), sementi (it)
genetic engineering (en), Ingegneria genetica (it), 遗传工程 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	genetic engineering (en), génie génétique (fr), Gentechnologie (de), ingegneria genetica (it)
cloning (en), Clonazione (it), 克隆 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	cloning (en), clonage (fr), Klonen (de), clonazione (it)
water analysis (en), Analisi dell'acqua (it), 水分析 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	water analysis (en), analyse de l'eau (fr), Wasseranalyse (de), analisi dell'acqua (it)
spectrometry (en), Spettrometria (it), 光谱测定法 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	spectrometry (en), spectrométrie (fr), Spektrometrie (de), spettrometria (it)
nitrogen (en), Azoto (it), 氮 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	nitrogen (en), azote (fr), Stickstoff (de), azoto (it)
quantitative analysis (en), Analisi quantitativa (it), 定量分析 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	quantitative analysis (en), analyse quantitative (fr), quantitative Analyse (de), analisi quantitativa (it)
qualitative analysis (en), Analisi qualitativa (it), 定性分析 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	qualitative analysis (en), analyse qualitative (fr), qualitative Analyse (de), analisi qualitativa (it)
traditional fishing (en), Pesca tradizionale (it), 传统捕捞 (zh)	<http://www.w3.org/2004/02/skos/core#exactMatch>	traditional fishing (en), pêche traditionnelle (fr), handwerkliche Fischerei (de), pesca tradizionale (it)

At the bottom of the table, there is a search bar labeled 'Search' and a button labeled 'Ok'. Below the table, a message indicates 'Mappings: 1316' and '1 of 27'.

# Support for OWL Ontologies

PMKI Datasets Search Alignments ≡

**CDM\_(2020-02-04)** Data Sparql

**Class** [Property](#) [Alignments](#)

- owl:Thing
- :agent
- entity\_temporal
  - :period
- :expression
- :item
- :manifestation
  - :manifestation\_case-law**
  - :manifestation\_distribution
- :manifestation\_print
  - :manifestation\_court-report
  - :manifestation\_court-report\_part

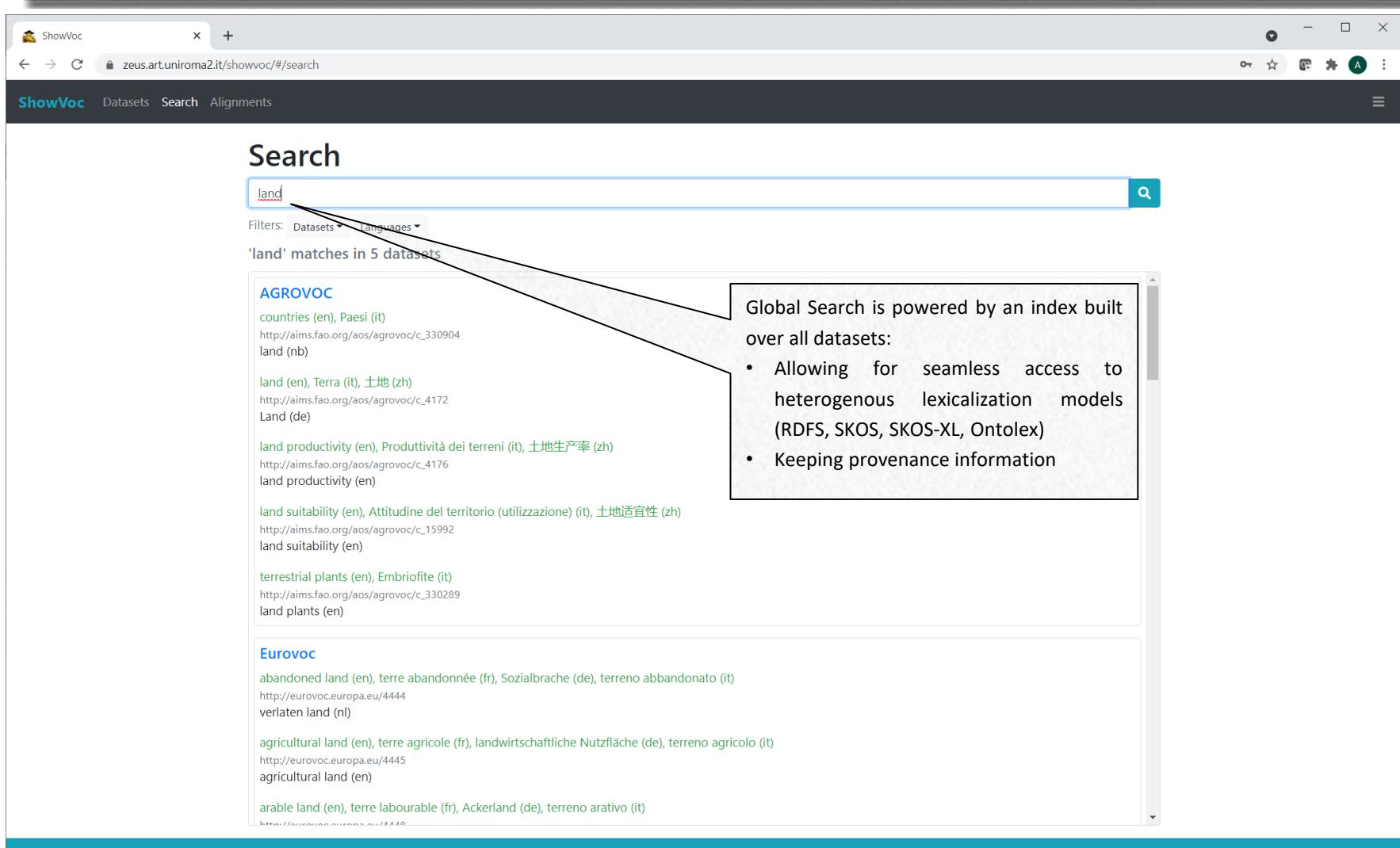
 Manifestation of case law [http://publications.europa.eu/ontology/cdm#manifestation\\_case-law](http://publications.europa.eu/ontology/cdm#manifestation_case-law) 🔍 A ⚙️

Type	owl:Class
Label	Manifestation of case law
Sub Class Of	:manifestation_case-law_operative_part MAX 1 :manifestation_case-law_subject MAX 1 :manifestation_case-law_keywords MAX 1 :manifestation_case-law_endorsements MAX 1 :manifestation_case-law_costs_decisions MAX 1 :manifestation_case-law_grounds MAX 1 :manifestation_case-law_parties MAX 1 :manifestation
Comment	Note: Conciously suppressed are: 1, décision + 2, sommaire proprement dit (avec référence aux affaires précédentes) -

Search...

About PMKI ▾ © ART Group

# Global Search



The screenshot shows a web browser window for the ShowVoc platform. The URL is [zeus.art.uniroma2.it/showvoc/#/search](http://zeus.art.uniroma2.it/showvoc/#/search). The search bar contains the word "land". Below the search bar, a message says "'land' matches in 5 datasets". The results are divided into two sections: AGROVOC and Eurovoc.

**AGROVOC**

- countries (en), Paesi (it) [http://aims.fao.org/aos/agrovoc/c\\_330904](http://aims.fao.org/aos/agrovoc/c_330904)  
land (nb)
- land (en), Terra (it), 土地 (zh) [http://aims.fao.org/aos/agrovoc/c\\_4172](http://aims.fao.org/aos/agrovoc/c_4172)  
Land (de)
- land productivity (en), Produttività dei terreni (it), 土地生产率 (zh) [http://aims.fao.org/aos/agrovoc/c\\_4176](http://aims.fao.org/aos/agrovoc/c_4176)  
land productivity (en)
- land suitability (en), Attitudine del territorio (utilizzazione) (it), 土地适宜性 (zh) [http://aims.fao.org/aos/agrovoc/c\\_15992](http://aims.fao.org/aos/agrovoc/c_15992)  
land suitability (en)
- terrestrial plants (en), Embriofite (it) [http://aims.fao.org/aos/agrovoc/c\\_330289](http://aims.fao.org/aos/agrovoc/c_330289)  
land plants (en)

**Eurovoc**

- abandoned land (en), terre abandonnée (fr), Sozialbrache (de), terreno abbandonato (it) <http://eurovoc.europa.eu/4444>  
verlaten land (nl)
- agricultural land (en), terre agricole (fr), landwirtschaftliche Nutzfläche (de), terreno agricolo (it) <http://eurovoc.europa.eu/4445>  
agricultural land (en)
- arable land (en), terre labourable (fr), Ackerland (de), terreno arativo (it) <http://eurovoc.europa.eu/4440>

A callout box on the right side of the search results area contains the following text:

Global Search is powered by an index built over all datasets:

- Allowing for seamless access to heterogenous lexicalization models (RDFS, SKOS, SKOS-XL, Ontolex)
- Keeping provenance information

# High-level Translation API

```

▼ {result: [{resource: "http://eurovoc.europa.eu/563", resourceLocalName: "563",...},...]}
  ▶ result: [{resource: "http://eurovoc.europa.eu/563", resourceLocalName: "563",...},...]
    ▷ 0: {resource: "http://eurovoc.europa.eu/563", resourceLocalName: "563",...}
    ▷ 1: {resource: "http://eurovoc.europa.eu/565", resourceLocalName: "565",...}
    ▷ 2: {resource: "http://eurovoc.europa.eu/1699", resourceLocalName: "1699",...}
      ▶ descriptions: [{lang: "en",...}]
        ▷ 0: {lang: "en",...}
          lang: "en"
          ▶ values: [{value: "outline law", predicate: "http://www.w3.org/2008/05/skos-xl#prefLabel",...}, {...}]
            ▷ 0: {value: "outline law", predicate: "http://www.w3.org/2008/05/skos-xl#prefLabel",...}
              predicate: "http://www.w3.org/2008/05/skos-xl#prefLabel"
              type: "lexicalization"
              value: "outline law"
            ▷ 1: {...}
              predicate: "http://www.w3.org/2004/02/skos/core#scopeNote"
              type: "note"
              value: "Law outlining general principles but allowing the government to use its parliamentary power to develop them further."
      ▶ matches: [{lang: "en",...}]
        ▷ 0: {lang: "en",...}
      ▶ repository: {id: "Eurovoc", open: true}
        id: "Eurovoc"
        open: true
        resource: "http://eurovoc.europa.eu/1699"
        resourceLocalName: "1699"
        resourceType: "http://www.w3.org/2004/02/skos/core#Concept"
        role: "http://eurovoc.europa.eu/1699"
      ▶ translations: [{lang: "it",...}]
        ▷ 0: {lang: "it",...}
          lang: "it"
          ▶ values: [{value: "legge quadro", predicate: "http://www.w3.org/2008/05/skos-xl#prefLabel",...}, {...}]
            ▷ 0: {value: "legge quadro", predicate: "http://www.w3.org/2008/05/skos-xl#prefLabel",...}
            ▷ 1: {...}
              predicate: "http://www.w3.org/2004/02/skos/core#scopeNote"
              type: "note"
              value: "Provvedimento normativo che indica i criteri fondamentali in base ai quali la materia a cui si riferiscono verrà successivamente regolata da altre leggi."
        ▷ 3: {resource: "http://eurovoc.europa.eu/561", resourceLocalName: "561",...}
        ▷ 4: {resource: "http://eurovoc.europa.eu/5711", resourceLocalName: "5711",...}
        ▷ 5: {resource: "http://eurovoc.europa.eu/6565", resourceLocalName: "6565",...}
        ▷ 6: {resource: "http://eurovoc.europa.eu/7350", resourceLocalName: "7350",...}
        ▷ 7: {resource: "http://eurovoc.europa.eu/518", resourceLocalName: "518",...}
        ▷ 8: {resource: "http://aims.fao.org/aos/agrovoc/c_12106", resourceLocalName: "c_12106",...}
        ▷ 9: {resource: "http://eurovoc.europa.eu/535", resourceLocalName: "535",...}
        ▷ 10: {resource: "http://eurovoc.europa.eu/5107", resourceLocalName: "5107",...}
  
```

# Contributors' Page

PMKI
[Datasets](#)
[Search](#)
[Alignments](#)
≡

Name

Last name

Email  ⓘ

Organization \*

Contribution

Base URI

Discover

Resource name

Identity \*  ⓘ

Dereferenciation system \*

Sparql endpoint \*

No aggregation

URI space \*

(\*) Optional field
Submit request

About PMKI ▾
© ART Group

# ShowVoc: Where do I find it?

ShowVoc has been publicly released to the  
community...

...just today!

<http://showvoc.uniroma2.it>

VocBench | Repositories | GraphDB Workbench | PmkiPortal | + | localhost:1979/pmki/#/datasets/Eurovoc\_4.9.1/data

**PMKI** Datasets Search Mappings Login

**Eurovoc\_4.9.1**

Concept Collection Scheme Property Data Sparql

A ACP countries (en) http://eurovoc.europa.eu/5083

Type	skos:Concept
Top Concept Of	7231 economic geography (en) EuroVoc (en)
In Scheme	7231 economic geography (en) EuroVoc (en)
Preferred Label	AKP-Staaten (de) χώρες ΑΚΕ (el) paesi membri ACP (it) ACP countries (en) pays ACP (fr)
Alternative Label	AKP-Länder (de)
Scope Note	À utiliser pour les documents qui traitent de l'ensemble de ces pays. (fr) Use for documents which deal with all of these countries. (en)
Version Info	n/a
Notation	5083 5083
Related To	Ad-Ex Convention (en) African Development Bank (en) African Union (en)
Start Date	1952-06-16
Created	1995-10-02

**Loddy**

# An easy and flexible solution for publishing your data

Search...  

# Loddy

[http://aims.fao.org/aos/agrovoc/c\\_7038](http://aims.fao.org/aos/agrovoc/c_7038)

shifting cultivation

Core Properties

Property	Value
rdf:type	skos:Concept
skos:inScheme	<a href="http://aims.fao.org/aos/agrovoc">http://aims.fao.org/aos/agrovoc</a>
skos:broad	<a href="http://aims.fao.org/aos/agrovoc/c_1971">http://aims.fao.org/aos/agrovoc/c_1971</a> <a href="http://cat.ail.caas.cn/concept/29101">http://cat.ail.caas.cn/concept/29101</a> <a href="http://d-nb.info/gnd/4132785-8">http://d-nb.info/gnd/4132785-8</a> <a href="http://www.elonet.europa.eu/gemet/concept/7652">http://www.elonet.europa.eu/gemet/concept/7652</a> <a href="http://linkedgeodata.ge.imati.cnr.it:2020/resource/EARTH/64360">http://linkedgeodata.ge.imati.cnr.it:2020/resource/EARTH/64360</a> <a href="http://lod.nal.usda.gov/nalt/20559">http://lod.nal.usda.gov/nalt/20559</a>
skos:exactMatch	<a href="http://dbpedia.org/resource/Shifting_cultivation">http://dbpedia.org/resource/Shifting_cultivation</a>
skos:closeMatch	<a href="http://d-nb.info/gnd/4415548-7">http://d-nb.info/gnd/4415548-7</a>
skos:broadMatch	<a href="http://aims.fao.org/aos/agrovoc/c_16189">http://aims.fao.org/aos/agrovoc/c_16189</a>
skos:related	

Property	Value
dcterms:created	2011-11-20T21:07:54Z
dcterms:modified	2021-06-16T21:24:42Z
<a href="http://aims.fao.org/aos/agronotology#hasPractice">http://aims.fao.org/aos/agronotology#hasPractice</a>	<a href="http://aims.fao.org/aos/agrovoc/c_6662">http://aims.fao.org/aos/agrovoc/c_6662</a> <a href="http://aims.fao.org/aos/agrovoc/c_1843">http://aims.fao.org/aos/agrovoc/c_1843</a>
<a href="http://aims.fao.org/aos/agronotology#isPracticeFor">http://aims.fao.org/aos/agronotology#isPracticeFor</a>	<a href="http://aims.fao.org/aos/agrovoc/c_6">http://aims.fao.org/aos/agrovoc/c_6</a> <a href="http://aims.fao.org/aos/agrovoc/c_1662">http://aims.fao.org/aos/agrovoc/c_1662</a> <a href="http://aims.fao.org/aos/agrovoc/c_16142">http://aims.fao.org/aos/agrovoc/c_16142</a>
void:inDataset	<a href="http://aims.fao.org/aos/agrovoc/void.ttl#Agrovoc">http://aims.fao.org/aos/agrovoc/void.ttl#Agrovoc</a>
skos:definition	<a href="http://aims.fao.org/aos/agrovoc/xDef_1328253045149">http://aims.fao.org/aos/agrovoc/xDef_1328253045149</a>

In this example, a page template for:

- SKOS thesauri
- described by SKOS-XL labels has been adopted.

Only one query is fired on the connected dataset, but different, complementary, filters, take out information on the left columns

All other properties Properties

prefLabel	altLabel	Lang
زراعة متنقلة	swidden cultivation	ar
úhoroé hospodářství	žárové zemědělství	cs
Wanderfeldbau	Schlagbrennlandwirtschaft	de
shifting cultivation	swidden cultivation	en
Cultivo migratorio	slash and burn agriculture	es
أgricultura migratoria	Agricultura de roza	es
زراعات نوبتى	Agricultura de tala y quema	fa
culture itinérante	nomadisme cultural	fr
खेती संत्रिय	agriculture itinérante sur brûlis	hi
talajváltó művelés	égettépes földművelés	hu
Coltivazione itinerante	Coltivazione nomade	it
燒畠農業	Agricoltura taglia e brucia	ja
왕지재배	燒畠耕作	ko
ရာဇ်အောင်ဆိပ်		lo
Rolnictwo wędrownie	System rolnictwa leśno-odgrodowego	pl
cultivo itinerante	Rolnictwo żarowe	pt
перемещающееся земледелие	cultivo nómade	pt
мигрирующее земледелие	agricultura de corte e queima	ru
шведское земледелие	агрикультурное земледелие	ru
úhoroé hospodárenie	подсечно-огневое земледелие	sk
ភរៀបុល្យកុំដាត	výpalová kultivácia	th
ភរៀបុល្យកុំដាត	ភរៀបុល្យកុំដាត	zh
arazi rotasyonu	ភរៀបុល្យកុំដាត	tr
agricultură itinerantă	ភរៀបុល្យកុំដាត	ro
cultivo migratório	agricultura migratória	pt-BR

Similar in principle to the dear old **Pubby**<sup>1</sup>, which provided:

- a **Linked Data interface** to local or remote SPARQL protocol servers
- a **dereferrable URIs** by rewriting URIs found in the SPARQL-exposed dataset into the Pubby server's namespace
- Provides a simple **HTML interface** showing the data available about each resource
- Takes care of handling **redirects and content negotiation**

<sup>1</sup> <http://wifo5-03.informatik.uni-mannheim.de/pubby/>

Pubby features use of the Velocity template engine, for tinkering with the graphical view

Loddy:

- Based on JSF/Facelets, projects a data model onto a plain HTML page
- Offers a layered configuration based on reusable query components that can be edited even by RDF neophytes

SKOS-XL column!

VocBench | Repositories | GraphDB Workbench | PmkiPortal | localhost:1979/pmki/#/datasets/Eurovoc\_4.9.1/data | +

**PMKI** Datasets Search Mappings Login

**Eurovoc\_4.9.1**

Concept Collection Scheme Property Data Sparql

A ACP countries (en) http://eurovoc.europa.eu/5083

Type	skos:Concept
Top Concept Of	7231 economic geography (en) EuroVoc (en)
In Scheme	7231 economic geography (en) EuroVoc (en)
Preferred Label	AKP-Staaten (de) χώρες ΑΚΕ (el) paesi membri ACP (it) ACP countries (en) pays ACP (fr)
Alternative Label	AKP-Länder (de)
Scope Note	À utiliser pour les documents qui traitent de l'ensemble de ces pays. (fr) Use for documents which deal with all of these countries. (en)
Version Info	n/a
Notation	5083 5083
Related	ACP-EU Convention (en) ACP-Ukraine protocol (en) 1952-06-16
Start Date	1952-06-16
Created	1995-10-02

**CODA**

# Computer-aided Ontology Development Architecture

Search...  

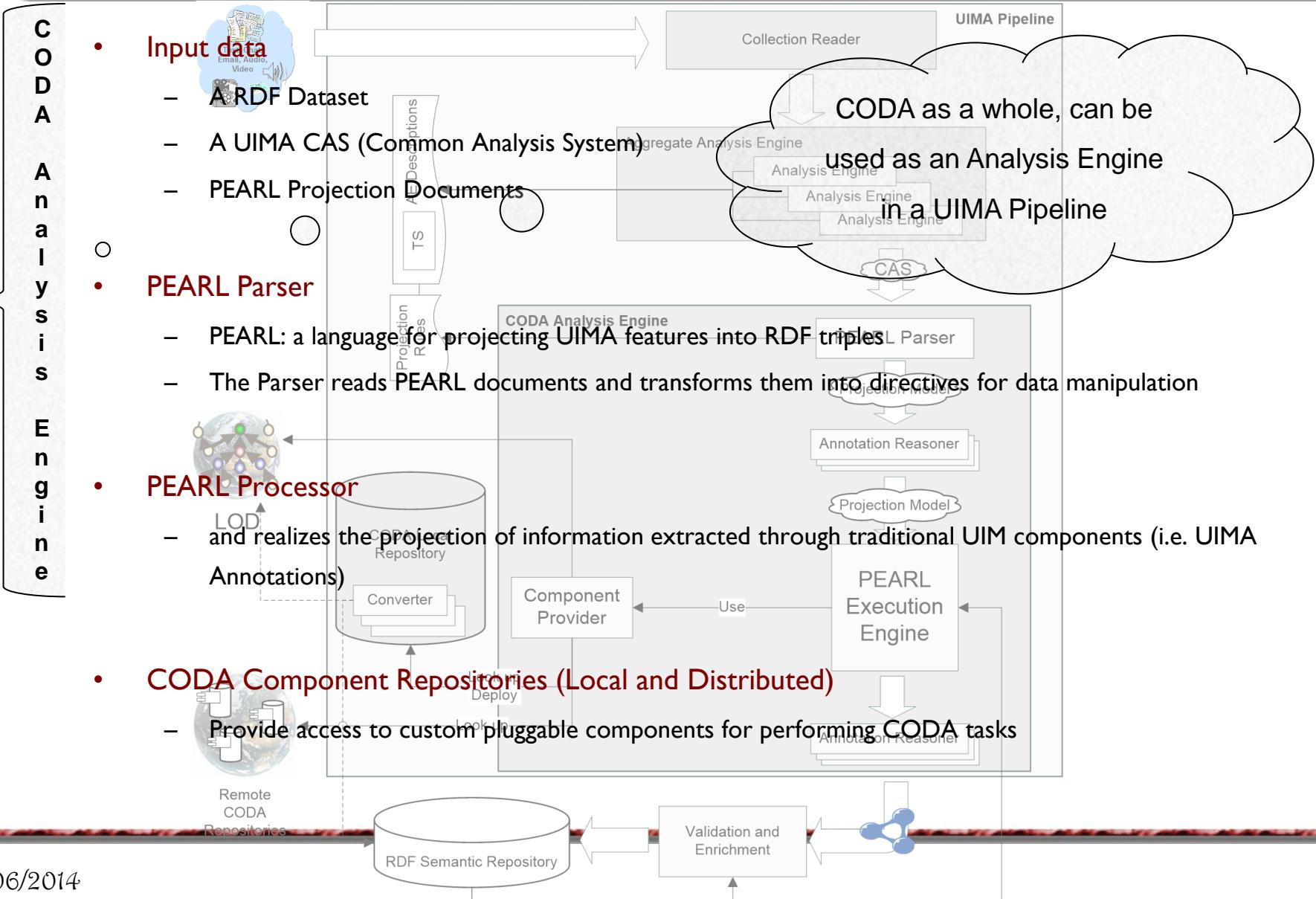
# Some Definitions...

- **COD** (Computer-aided Ontology Development)
  - All processes for enriching ontology content through exploitation of external resources, by using (semi)automatic approaches.
- **CODA**: COD Architecture
  - An Architecture for systems for Computer-aided Ontology Development
  - A Platform supporting development of such systems

# CODA Project Objectives

- A *conceptual systematization*
  - of the tasks covering reuse of data extracted from unstructured information to improve ontology content
- An *architecture*
  - defining the components which take part in such a scenario
- A *framework*
  - supporting all of the above through standard implementations and components orchestration

# CODA Architecture



# CODA Today...

CODA is already part of Semantic Turkey and used in VocBench, for powering:

- **Sheet2RDF** (spreadsheets are converted into feature structures, and then manipulated through CODA transformation language)
- **Custom Forms** rather unorthodox use of the framework: in this case the extraction template is actually what will be asked to the user, and a form is built around this template

## ...and a look ahead on tomorrow

What is missing in the ecosystem is a platform for knowledge acquisition from text, covering diverse tasks, such as ontology learning, document categorization, information extraction and triplification.

This platform could be put at the hands of user, allowing them to work from VocBench, seamlessly moving in between processed content and acquired knowledge

# Showcase – Annotation with AgroIE

**Semantic Turkey**

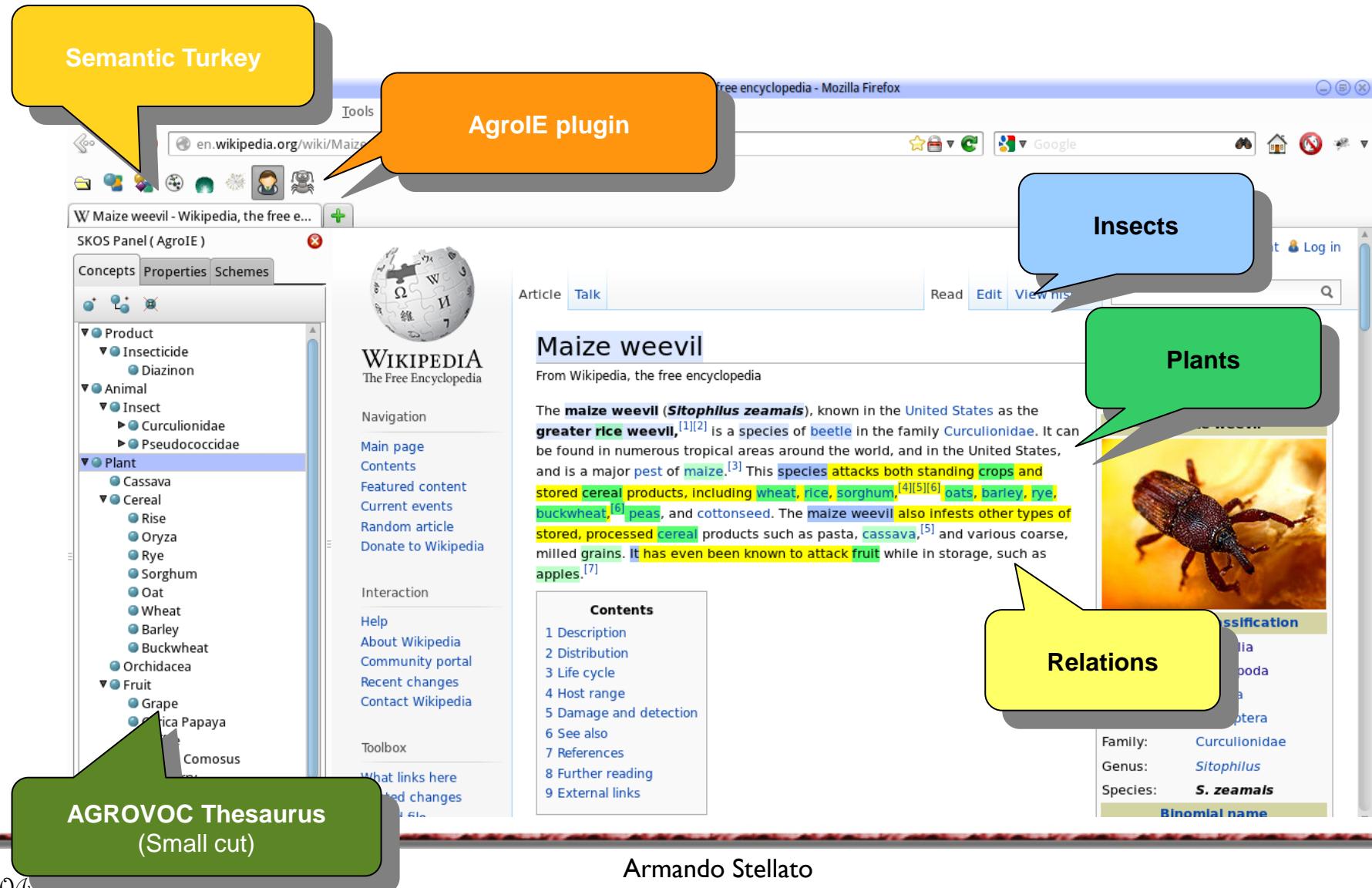
**AgroIE plugin**

**Insects**

**Plants**

**Relations**

**AGROVOC Thesaurus (Small cut)**



free encyclopedia - Mozilla Firefox

en.wikipedia.org/wiki/Maize\_weevil

W Maize weevil - Wikipedia, the free encyclopedia

SKOS Panel (AgroIE)

Article Talk Read Edit View history Log in

**Maize weevil**

From Wikipedia, the free encyclopedia

The **maize weevil** (*Sitophilus zeamais*), known in the **United States** as the **greater rice weevil**,<sup>[1][2]</sup> is a species of **beetle** in the family **Curculionidae**. It can be found in numerous tropical areas around the world, and in the United States, and is a major **pest** of **maize**.<sup>[3]</sup> This species **attacks both standing crops and stored cereal products, including wheat, rice, sorghum**,<sup>[4][5][6]</sup> **oats, barley, rye, buckwheat**,<sup>[6]</sup> **peas, and cottonseed**. The maize weevil also infests other types of **stored, processed cereal** products such as pasta, **cassava**,<sup>[5]</sup> and various coarse, milled grains. It has even been known to attack **fruit** while in storage, such as **apples**.<sup>[7]</sup>

**Contents**

- 1 Description
- 2 Distribution
- 3 Life cycle
- 4 Host range
- 5 Damage and detection
- 6 See also
- 7 References
- 8 Further reading
- 9 External links

Family: Curculionidae  
 Genus: *Sitophilus*  
 Species: *S. zeamais*

Binomial name

Armando Stellato  
 stellato@info.uniroma2.it art.uniroma2.it/stellato

04/06/2011

71

# Showcase - Ontology Enrichment (1)

maize weevil control, Maize Weevil Control, MAIZE WEEVIL CONTROL, maize weevil spray, Maize Weevil Spray, MAIZE WEEVIL SPRAY, maize weevil treatment, Maize Weevil Treatment, MAIZE WEEVIL TREATMENT, maize ...

File Edit View History Bookmarks Tools Help

www.bugspray.com/article/maizeweevil.html Google

W Mealybug - Wikipedia, the free e... maize weevil control, Maize Wee...

allow you to get good coverage quickly. Focus in on baseboards, moldings and floor joists if accessible. Since **rodenticide** is one of their favorite foods, be sure to check any bait placements you have done in the last couple of years. Attics are common areas where Maize Weevils thrive and then find their way inside living areas. If you have **MAIZE WEEVIL CONTROL TRAPS**

SKOS Panel (AgroIE) Concepts Properties Schemes

Product Insecticide Diazinon Animal Plant

W Mealybug - Wikipedia, the free e... maize weevil control, Maize Wee...

allow you to get good coverage quickly. Focus in on baseboards, moldings and floor joists if accessible. Since **rodenticide** is one of their favorite foods, be sure to check any bait placements you have done in the last couple of years. Attics are common areas where Maize Weevils thrive and then find their way inside living areas. If you have **MAIZE WEEVIL CONTROL TRAPS**

SKOS Panel (AgroIE) Concepts Properties Schemes

Product Insecticide **rodenticide** Diazinon Animal Plant

concept Form

Name: <http://agroie#rodenticide>

Types:

http://www.w3.org/2004/02/skos/core#Concept

Broader Concepts:

http://aims.fao.org/aos/agrontology#c\_5739

Preferred Labels:

rodenticide (language: en)

Properties:

skos:semanticRelation

http://aims.fao.org/aos/agrontology#c\_5739

skos:topConceptOf

skos:inScheme

http://aims.fao.org/aos/agrontology

rdfs:label

rodenticide (language: en)

**Adding Concepts**

Armando Stellato

04/03/2014

stellato@info.uniroma2.it art.uniroma2.it/stellato

72

# Showcase - Ontology Enrichment (2)

**Adding Relations**

File Edit View History Bookmarks Tools Help

en.wikipedia.org/wiki/Maize\_weevil

maize weevil control, Maize Weevil | W Hemiptera - Wikipedia, the free ... | W Maize weevil - Wikipedia, the free ... | +

SKOS Panel (AgroIE)

Concepts Properties Schemes

Product Animal

Select Subject Predicate Object

Select	Subject	Predicate	Object
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	oats
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	buckwheat
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	rye
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	barley
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	oats
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	sorghum
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	oryza
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	wheat
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	cereal
	coleoptera	http://aims.fao.org/aos/agrontology#isPestOf	crop
	oats	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	buckwheat	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	rye	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	barley	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	oats	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	sorghum	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	oryza	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	wheat	http://aims.fao.org/aos/agrontology#hasPest	coleoptera
	coleoptera	http://aims.fao.org/aos/agrontology#hasPest	coleoptera

Cancel Add Triple(s)

States, and is a major pest of maize.<sup>[3]</sup> This species attacks both standing crops and stored cereal products, including wheat, rice, sorghum,<sup>[4][5][6]</sup> oats, barley, rye, buckwheat,<sup>[6]</sup> peas, and cottonseed. The maize weevil also infests other types of stored, processed cereal products such as pasta, cassava,<sup>[5]</sup> and various coarse, milled grains. It has even been known to attack fruit while in storage, such as apples.<sup>[7]</sup>

Select triples to Add

Scientific classification

- Animalia
- Arthropoda
- Insecta
- Coleoptera
- Curculionidae
- Sitophilus*
- S. zeamais*

Binomial name

*Sitophilus zeamais* Motschulsky, 1855

It has a long, thin body (about 4 mm long) with a dark brown head and pronotum, and a lighter-colored elytron. The body is covered in numerous small, raised tubercles. The antennae are long and segmented, with distinct clubs at the tip. The legs are relatively short and stout.

Another, there are several subspecies of *S. zeamais*, including *S. oryzae*.

Options... 77

# Conclusions

- In the context of EU ISA2 action, a few attempts at providing an ecosystem of free and open-source platforms for development of digital data have been carried on
- The objective is two-fold:
  - Using state-of-the art findings and technologies in order to deliver industry-standard solutions free and open-sourced
  - Use these same solutions as a basis for further research and improvement
- Development must go vertical on each new platform...  
...but not lose focus on the whole picture
- Future work will focus will
  - Continue on VocBench development, as Semantic Web technologies are continuously evolving and so must do VocBench
  - Explore new directions for expanding information management to the processing of unstructured information and the acquisition of knowledge

"That's all Folks!"



Team

# Contacts

VocBench site: <http://vocbench.uniroma2.it/>

You can also follow VB by registering to:

- VocBench Mailing Lists:
  - User: <http://groups.google.com/group/vocbench-user>
  - Developer: <http://groups.google.com/group/vocbench-developer>
- Semantic Turkey Mailing Lists (only for backend related aspects) :
  - User: <http://groups.google.com/group/semanticturkey-user>
  - Developer: <http://groups.google.com/group/semanticturkey-developer>