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…

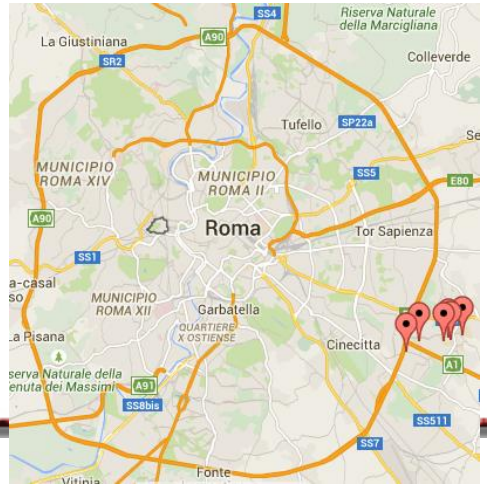
My Research Lab

Università degli Studi di Roma Tor Vergata

http://web.uniroma2.it/

A R T
Artificial Research Torvergata
Intelligence

http://art.uniroma2.it



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

Our offices!

…and LAB!

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

The ART Group

Areas of Interest

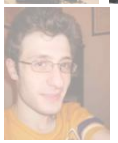
Natural Language Processing

- 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

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ART KE Technology Asset (some history)

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"

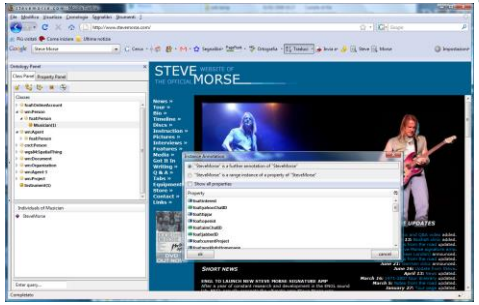
- elaborating better scenarios for machine2machine collaboration

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

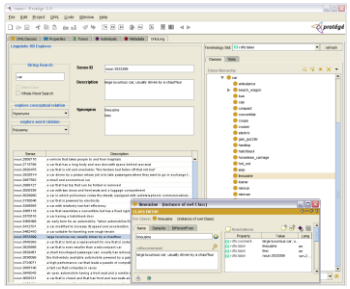
ART Technology Asset (some history)

Semantic Turkey



Flagship KM&A Platform

OntoLing

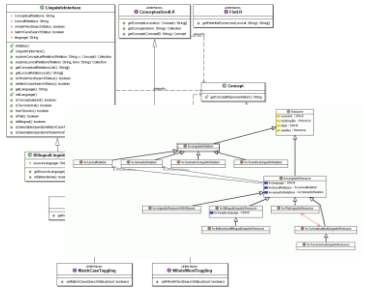


Ontology Linguistic Enrichment Tool

ALE

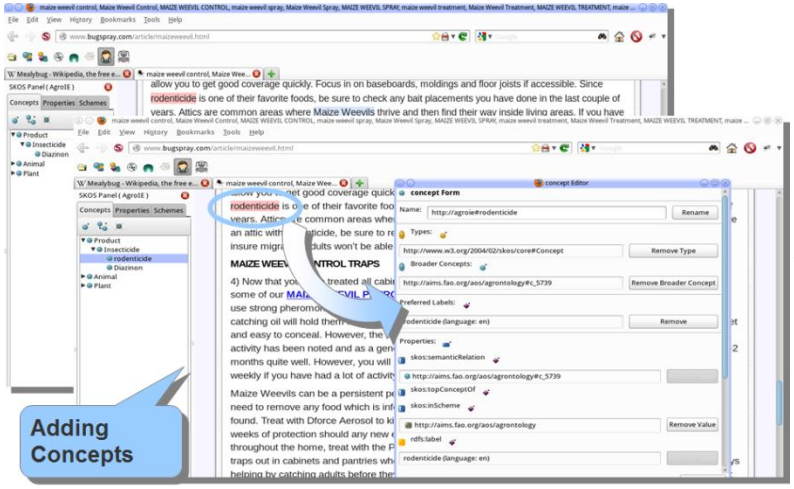
Automatic Linguistic Enrichment

Linguistic Watermark

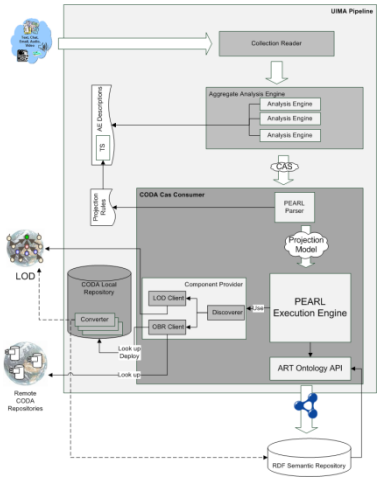


Library and Ontologies for Accessing Heterogeneous Linguistic Resources

Semantic Turkey extensions for Knowledge Acquisition



CODA



Computer-aided Ontology Development Architecture

Wrappers for different LRs

JMWNL

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.

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VocBench OSGi extension for Semantic Turkey

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The Users

a whole community supporting its development

funding sponsors

EU law and publications

ISA²
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

HARVARD UNIVERSITY

IEDA INTERDISCIPLINARY EARTH DATA ALLIANCE

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UNCCD

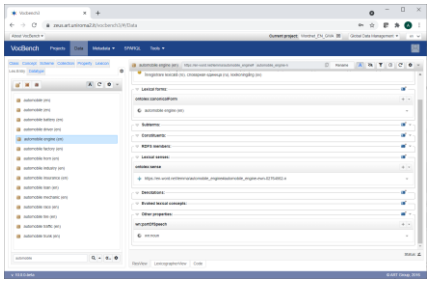
UNEP United Nations Environment Programme

ART Contributions to EU Data Infrastructure

Artificial Intelligence at Roma Tor Vergata

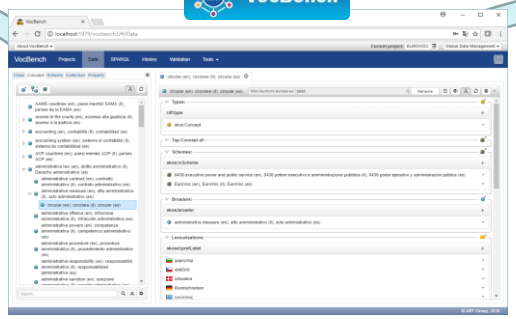
Università di Roma Tor Vergata

Support for OntoLex



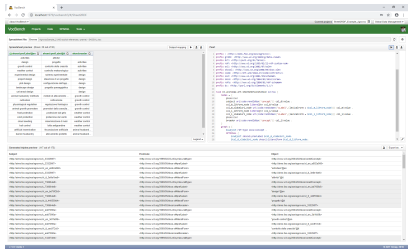
Ontolex porting of many LRs

VocBench



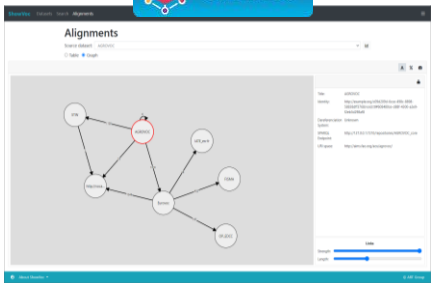
Flagship KM&A Platform

Sheet2RDF



Spreadsheet RDF Data Lifting

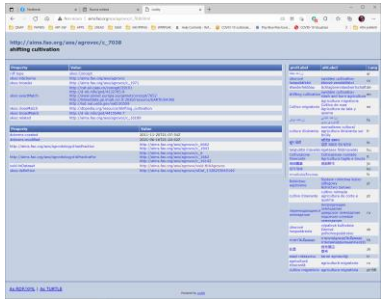
ShowVoc



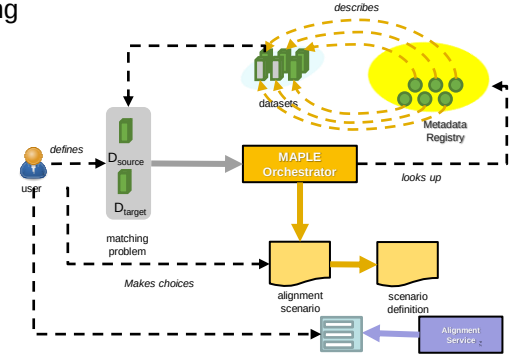
Data Browsing

Semantic Turkey

Loddy



Data Publication



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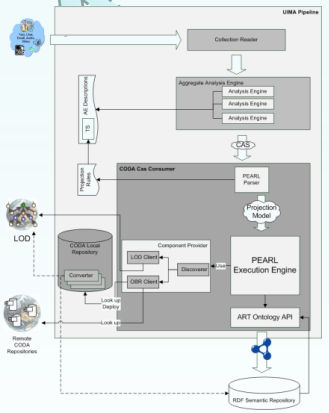

Computer-aided Ontology Development Architecture

Next steps!

Supporting an Open Ecosystem for the Development of Semantic Web Resources

Università di Roma Tor Vergata

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infeurope

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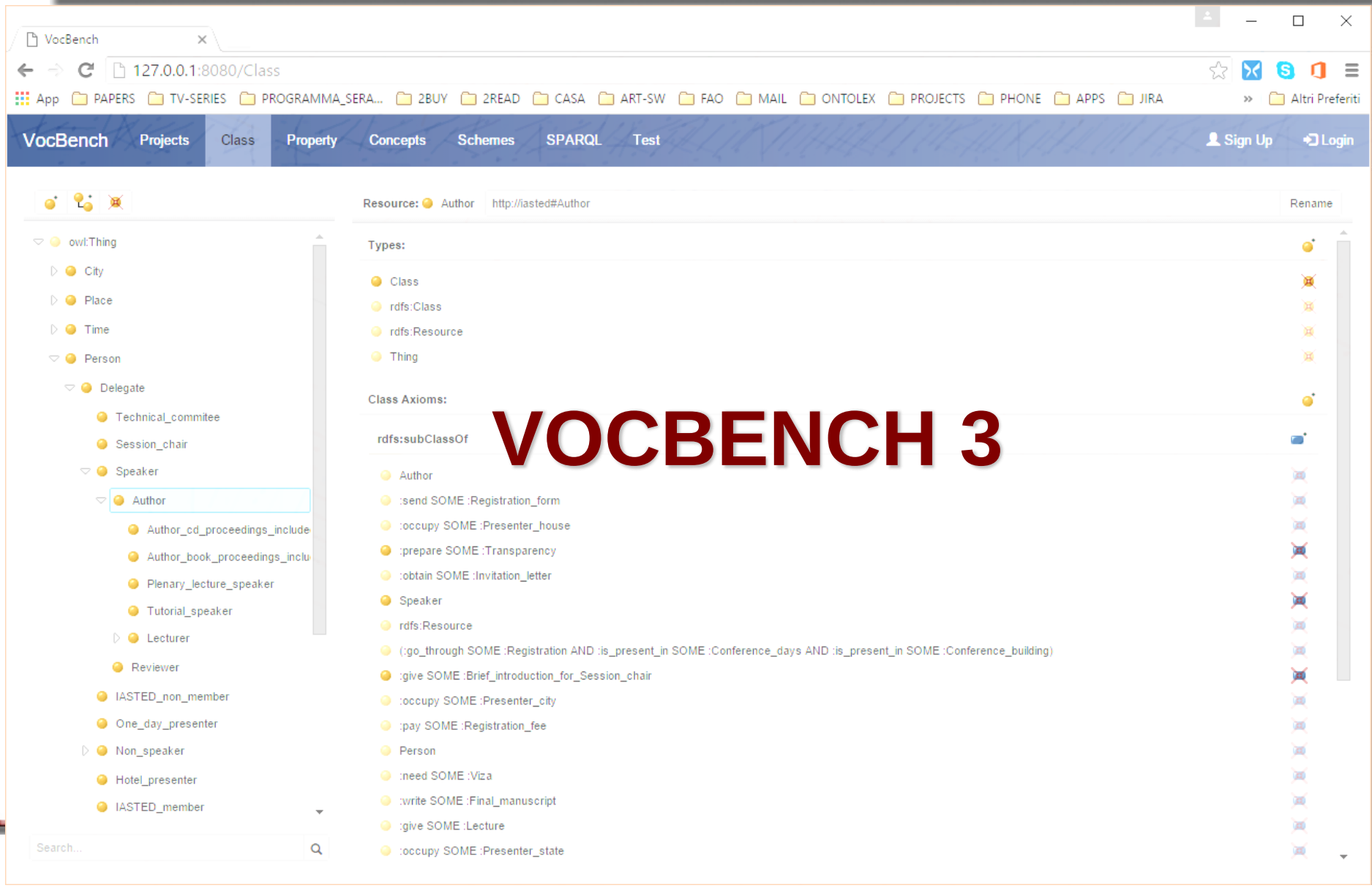


VOCBENCH 3

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

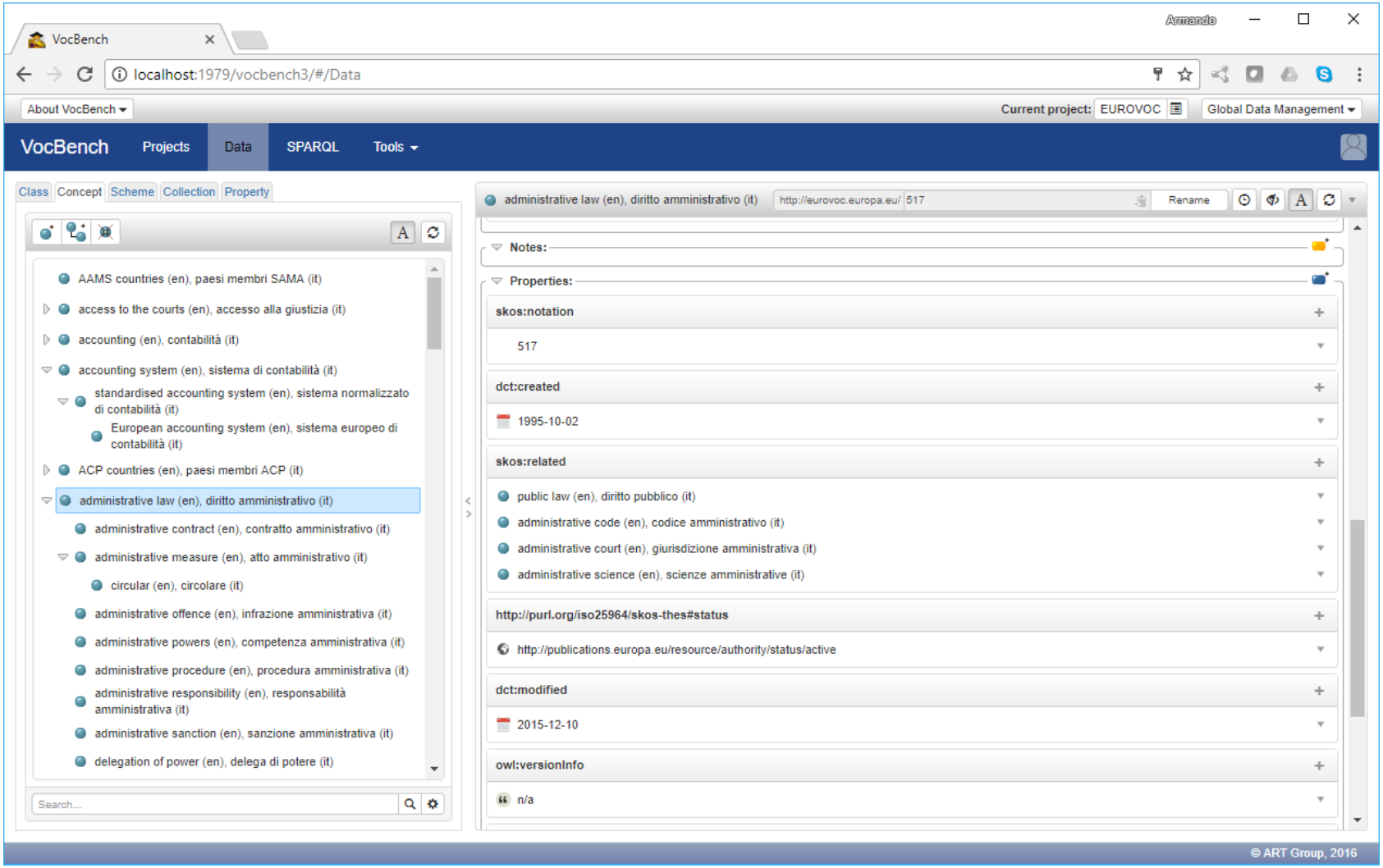
R12. Versioning Support

R13. Metadata Descriptions

R14. Customizable UI

R15. Everything's RDF

VocBench UI



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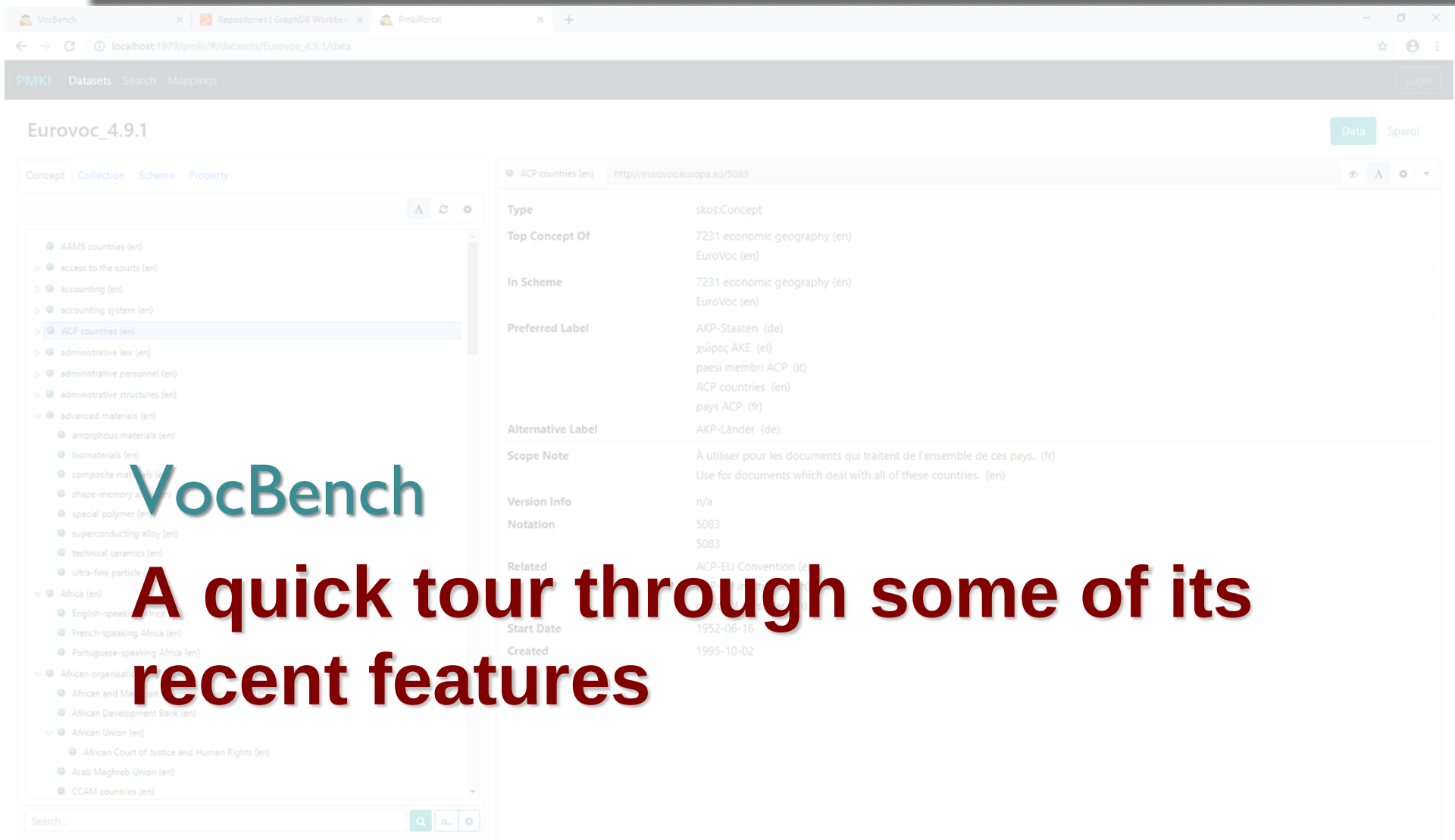

VocBench

A quick tour through some of its recent features

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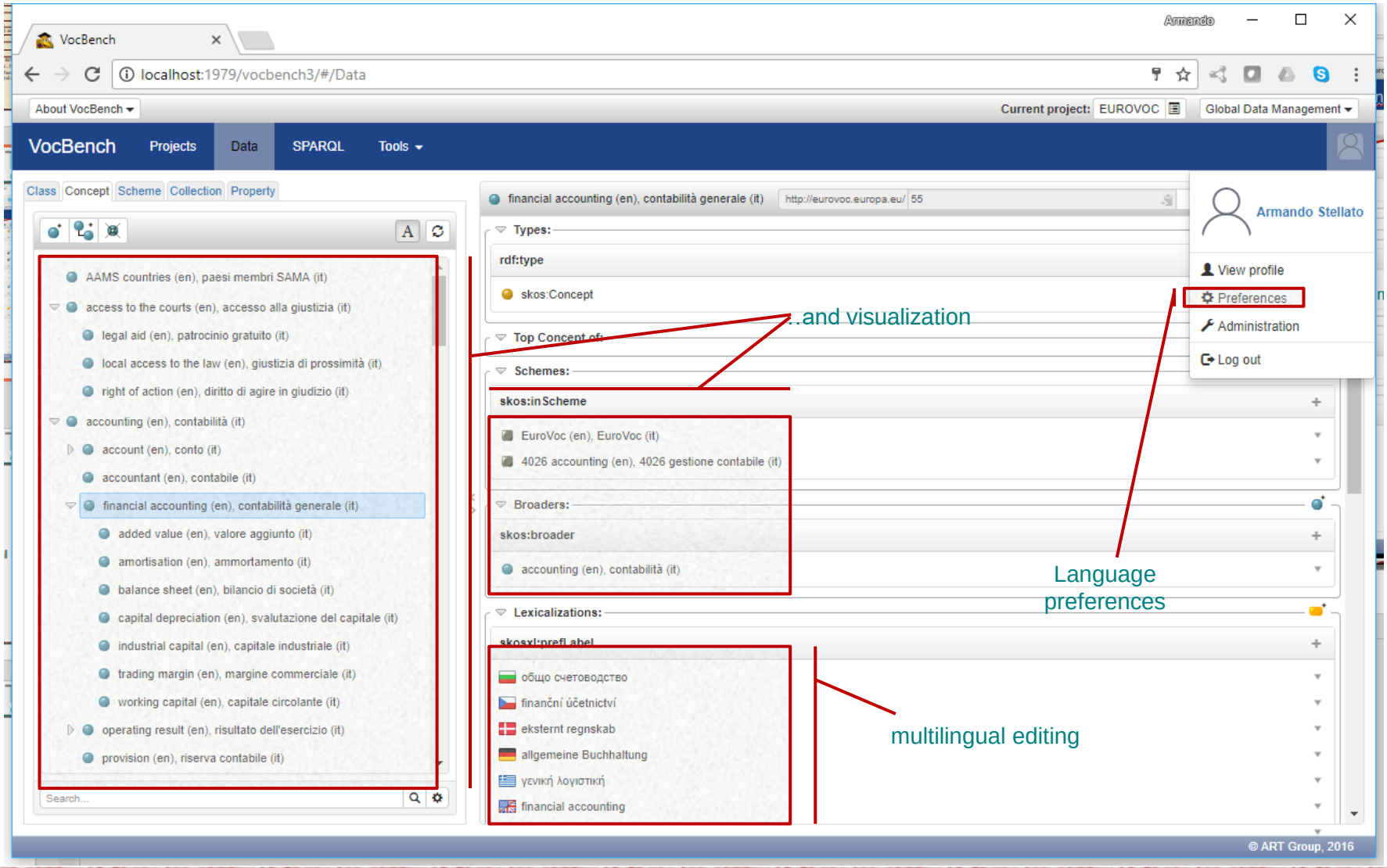
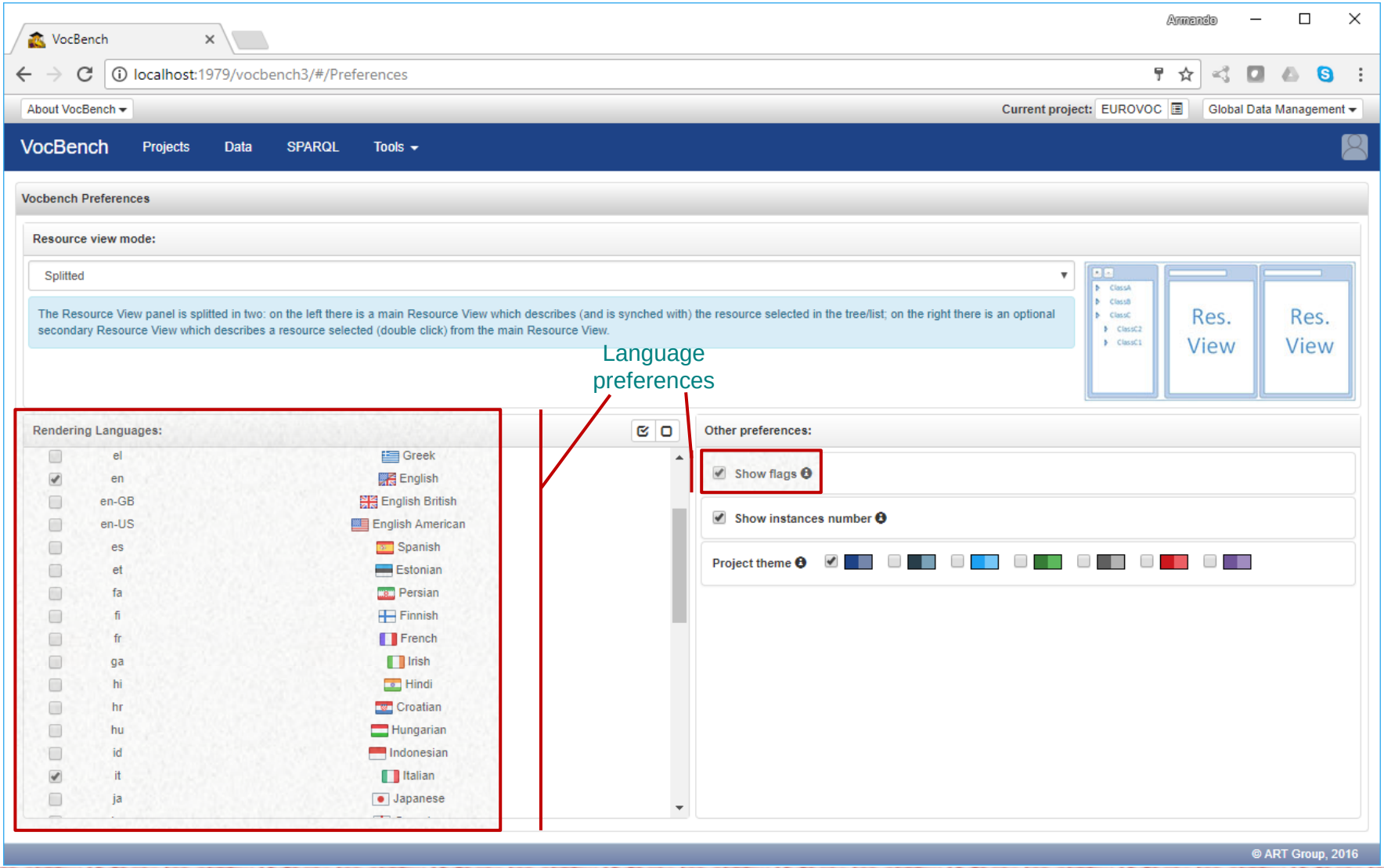
http://art.uniroma2.it/stellato

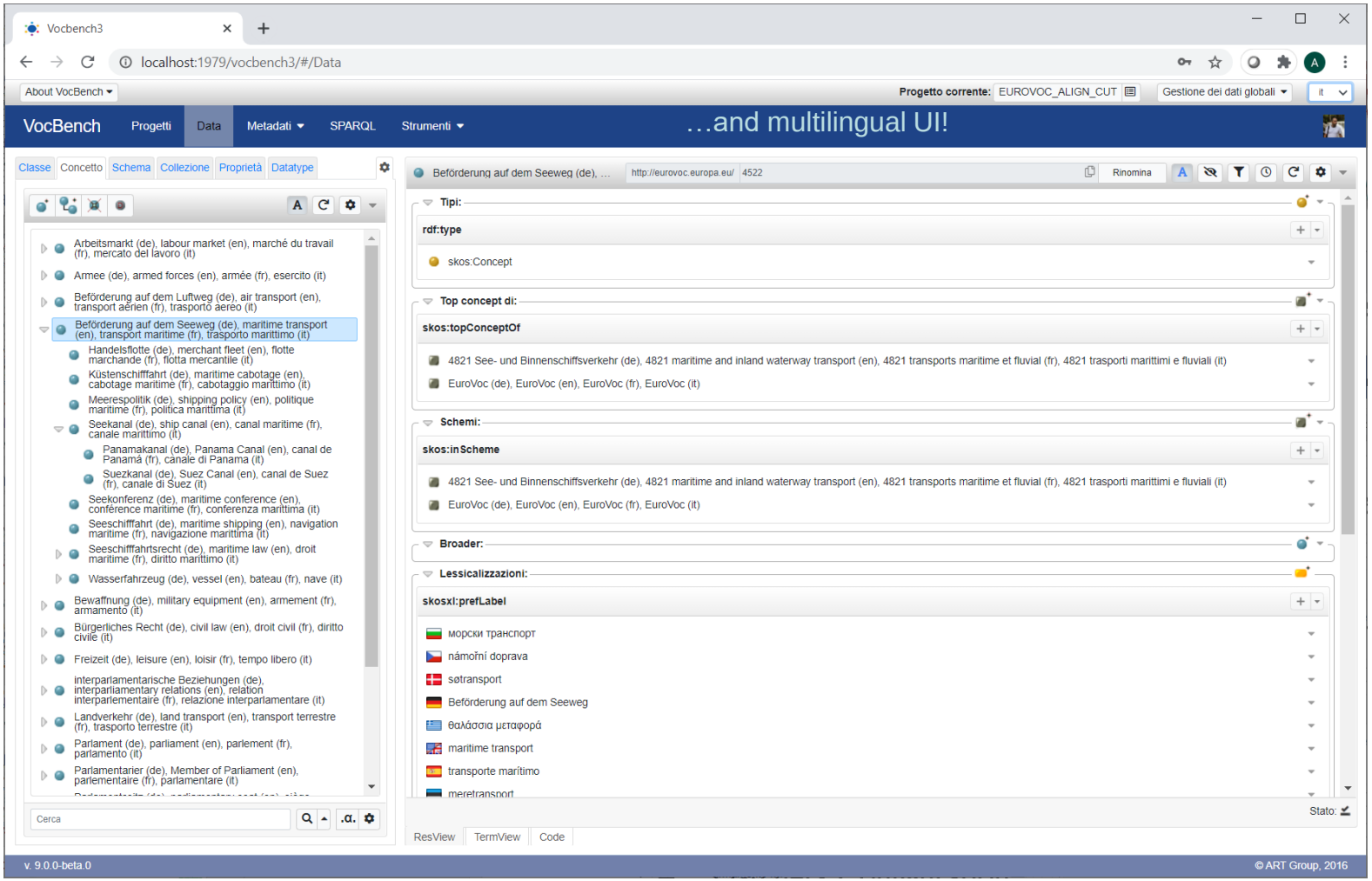
UI and Multilingualism (R1)



UI and Multilingualism (R1)



UI and Multilingualism (R1)



Graph Visualization

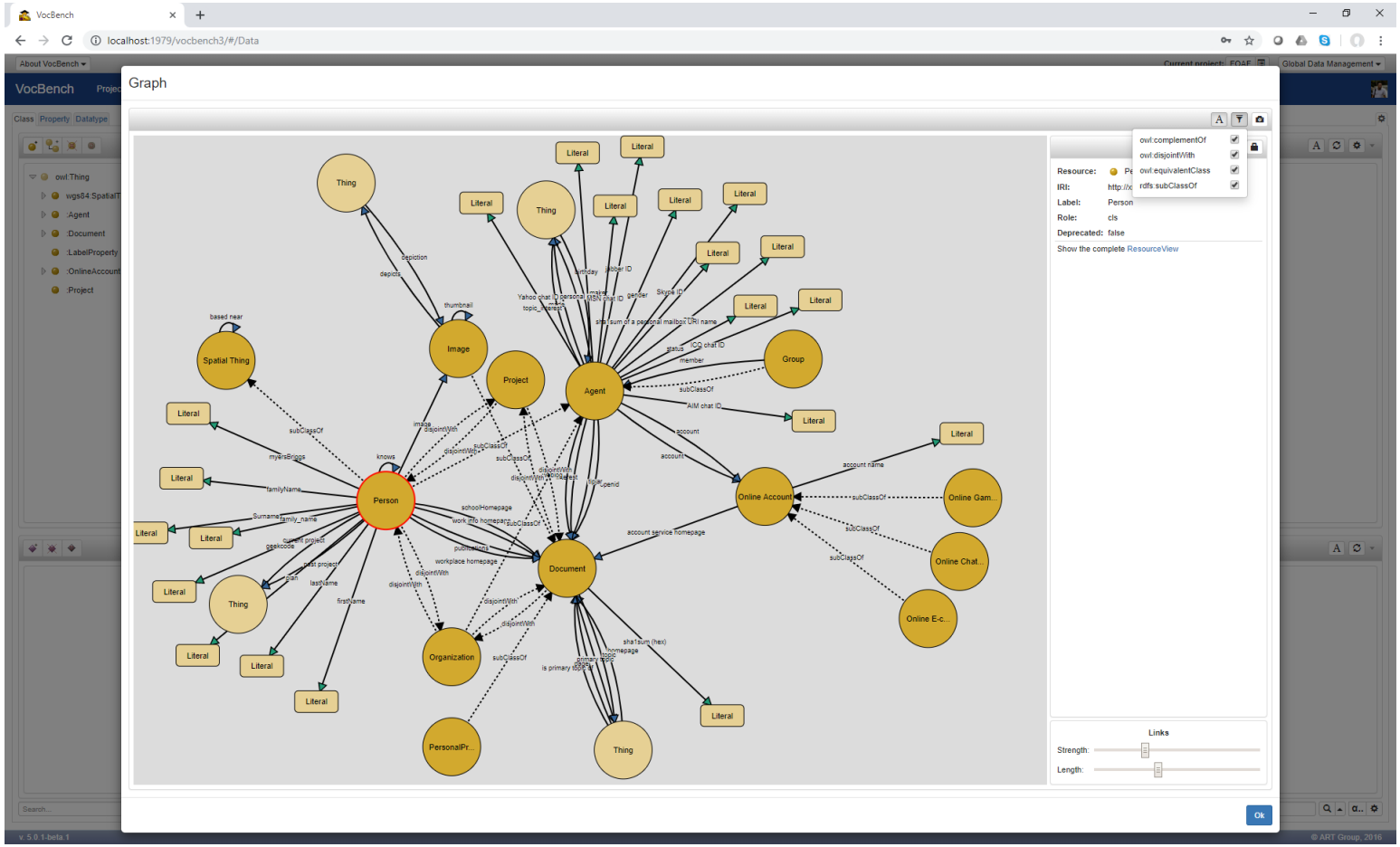
Two Views:

- 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

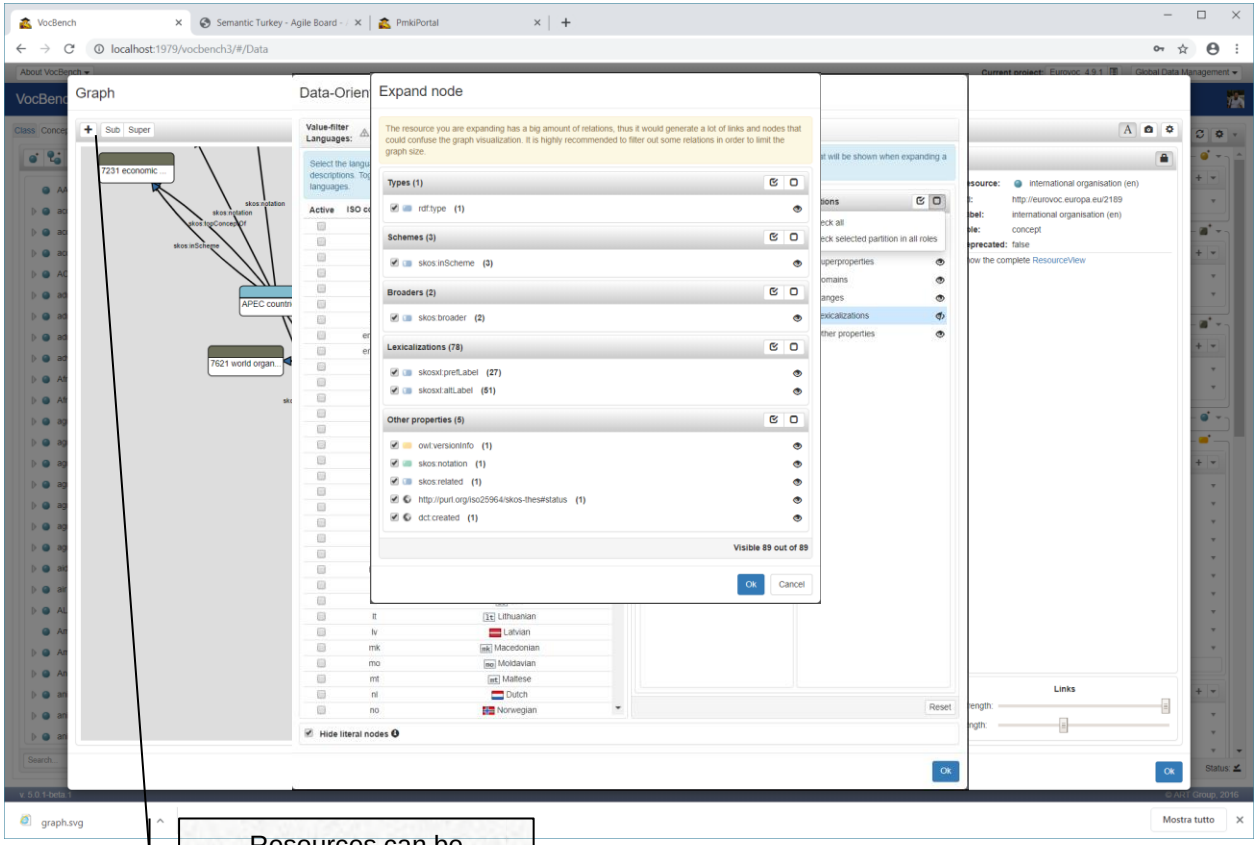
Graph View: Model View



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

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

Graph View: Data View



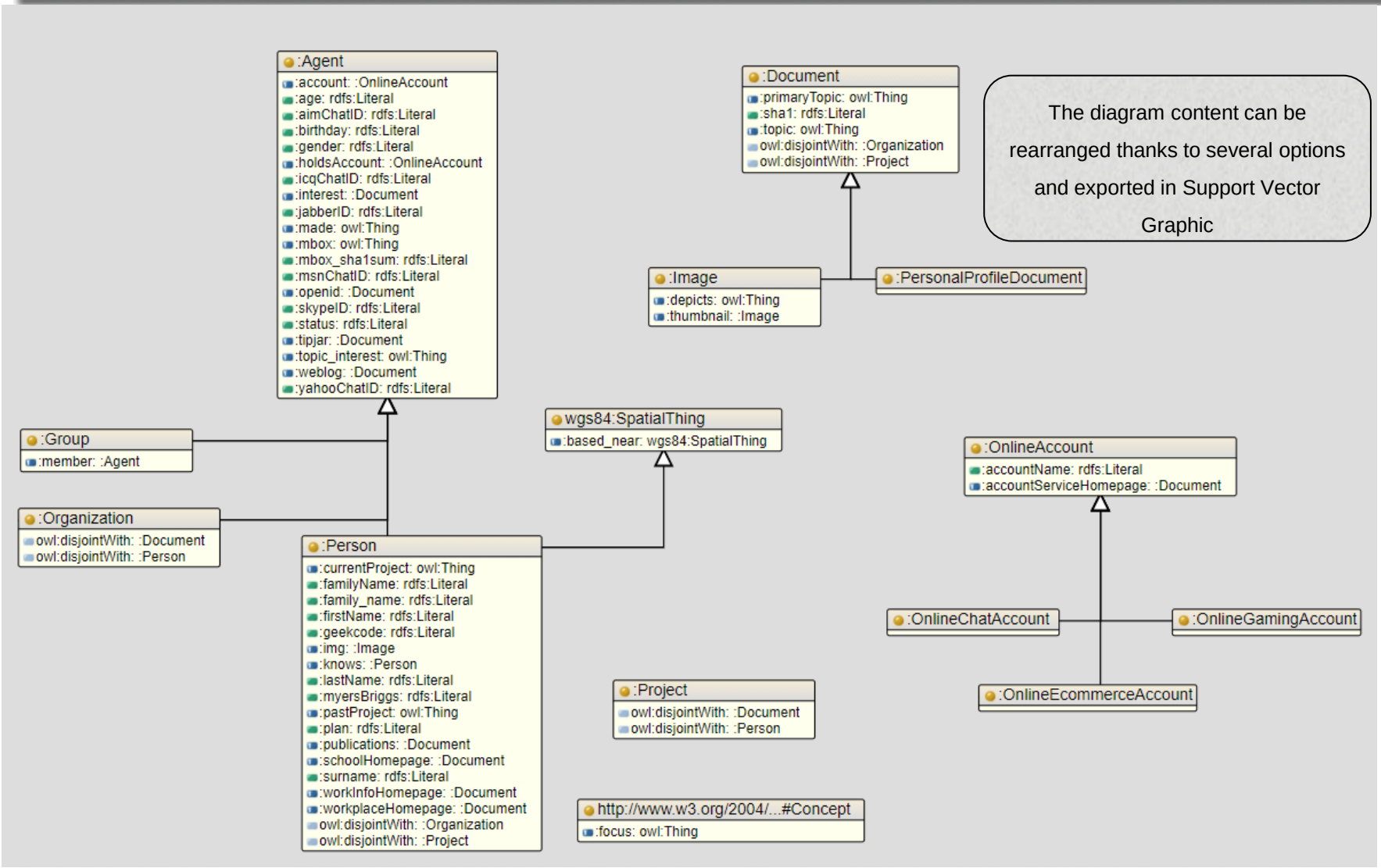
Resources can be dragged in or discovered by progressively expanding the boundary nodes in the graph

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

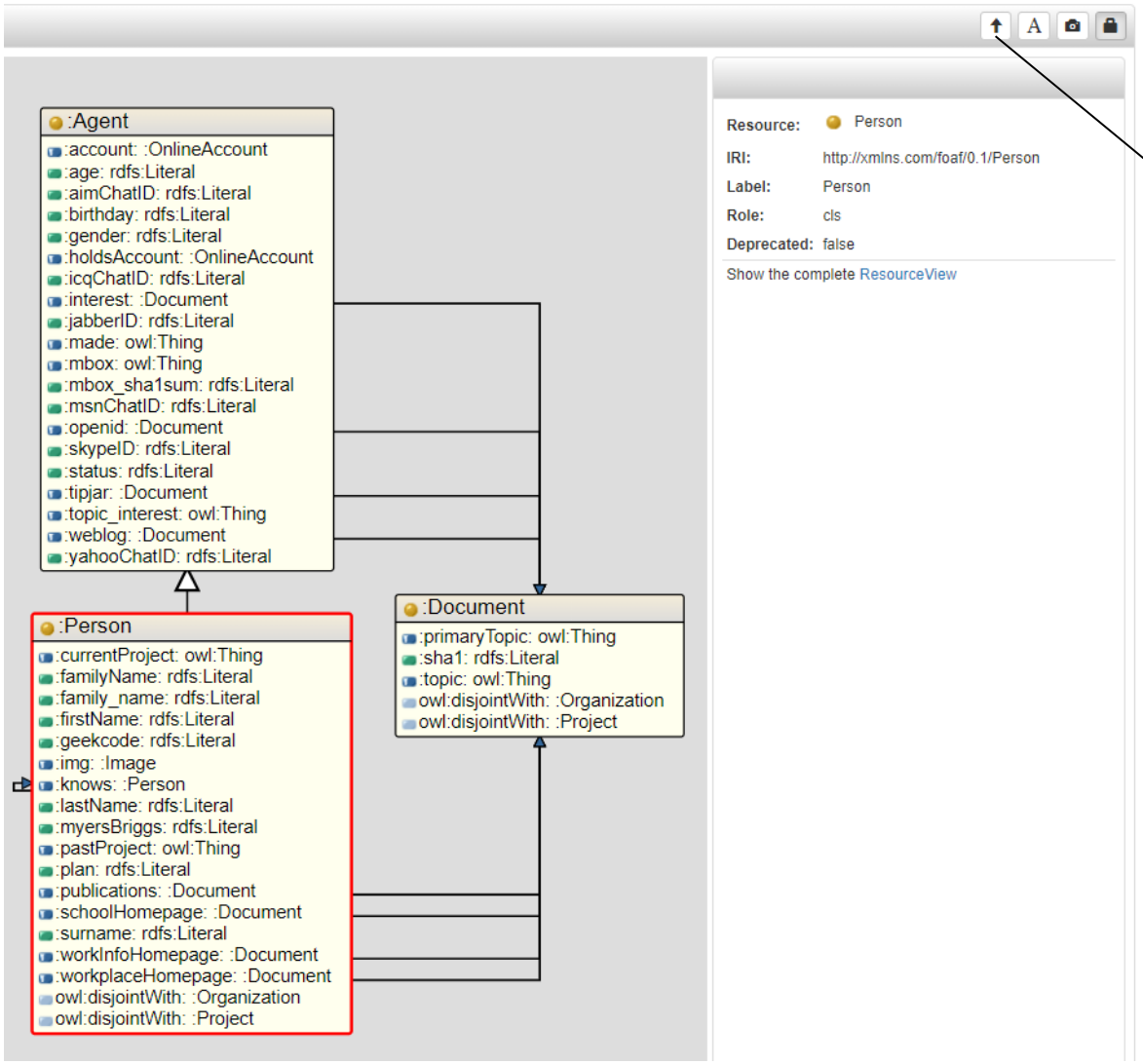
A detailed configuration provides several filters, based on specific languages, on a global toggle for all literals or on properties from specific sections of the resource view

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



It is possible to toggle between a IS-A only representation and a description of all the relations holding between the classes by identifying the involved properties.

This latter option is suggested for more detailed inspections of few elements (e.g. the three classes in this view)

Sheet2RDF

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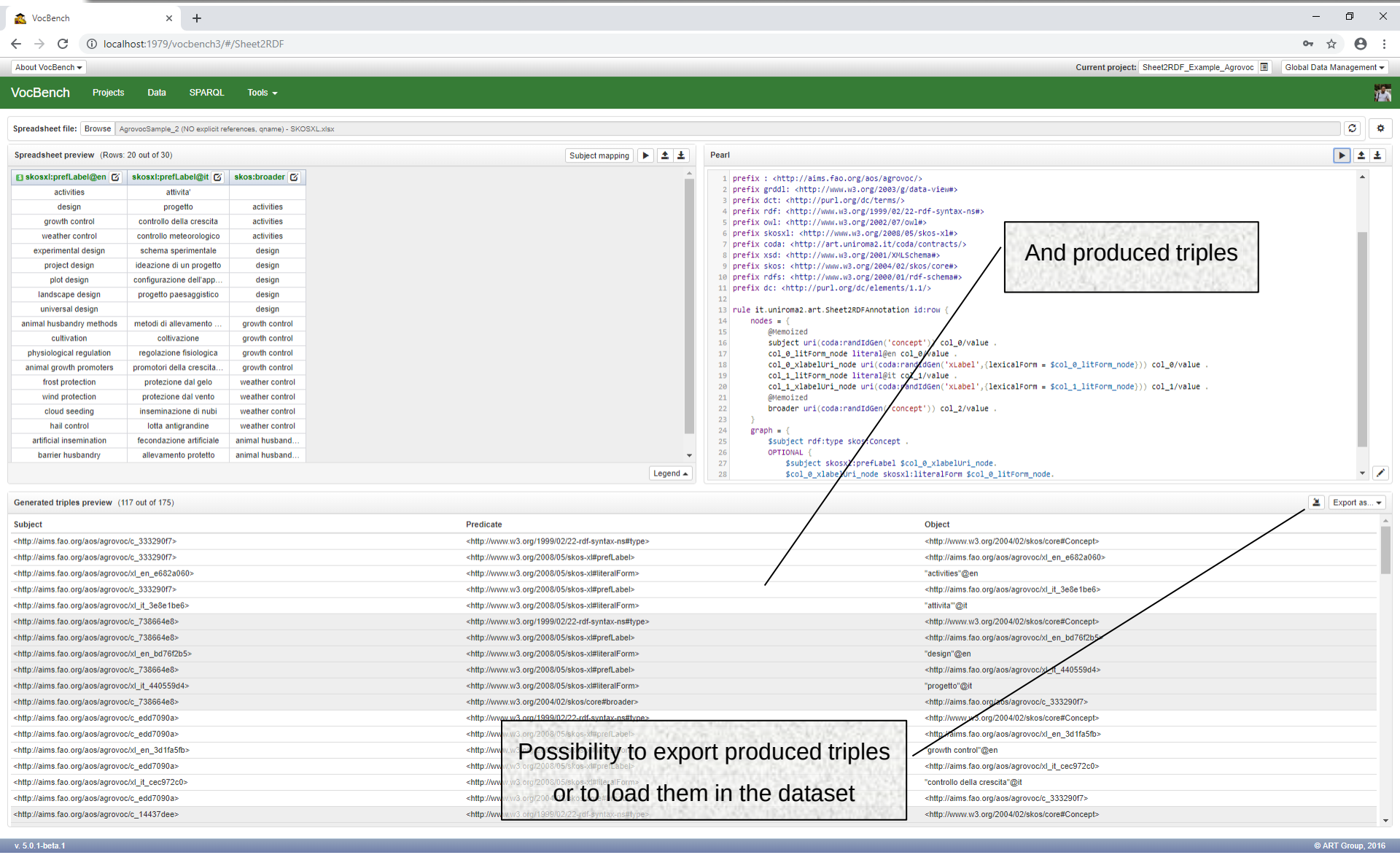
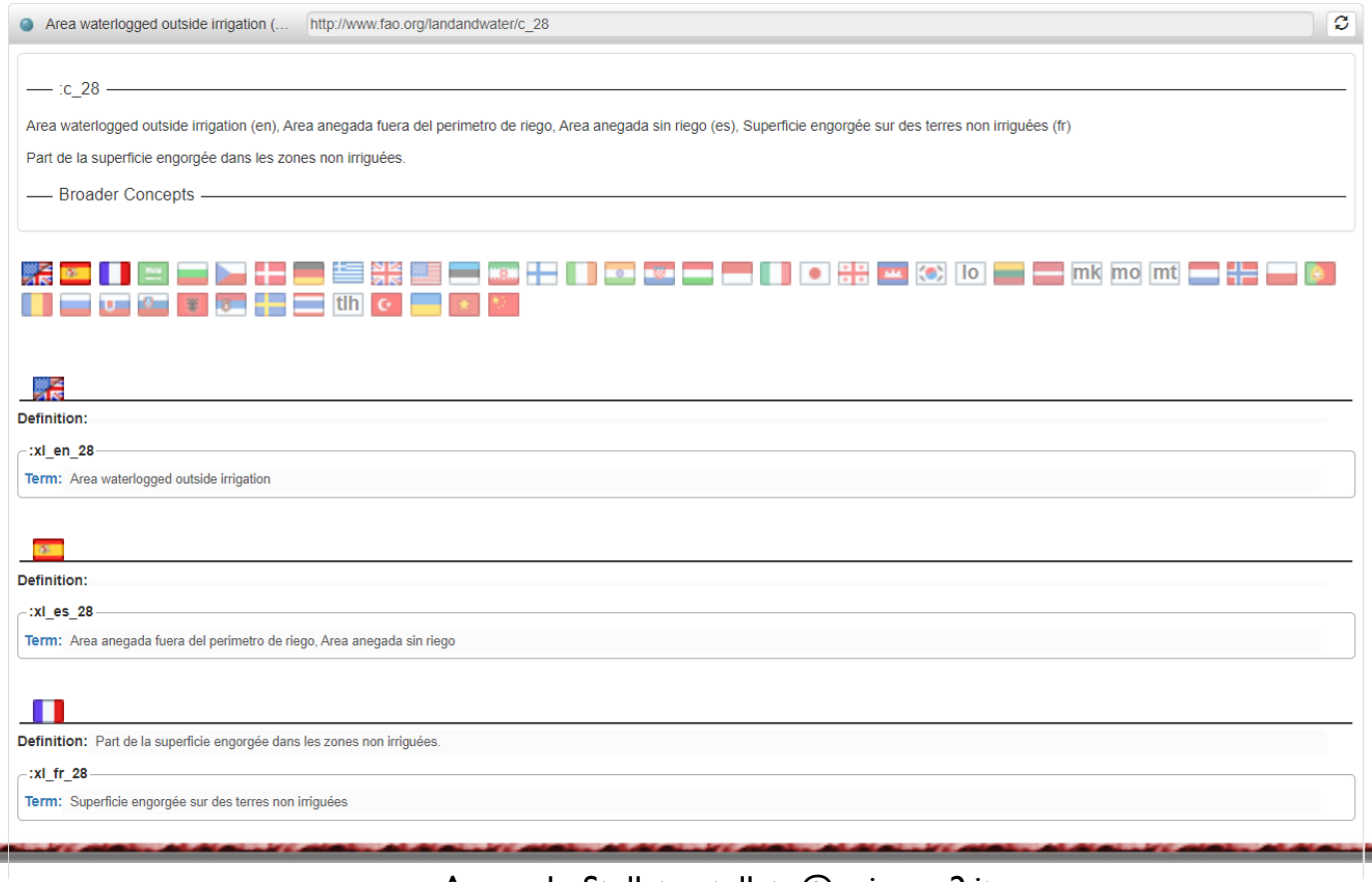
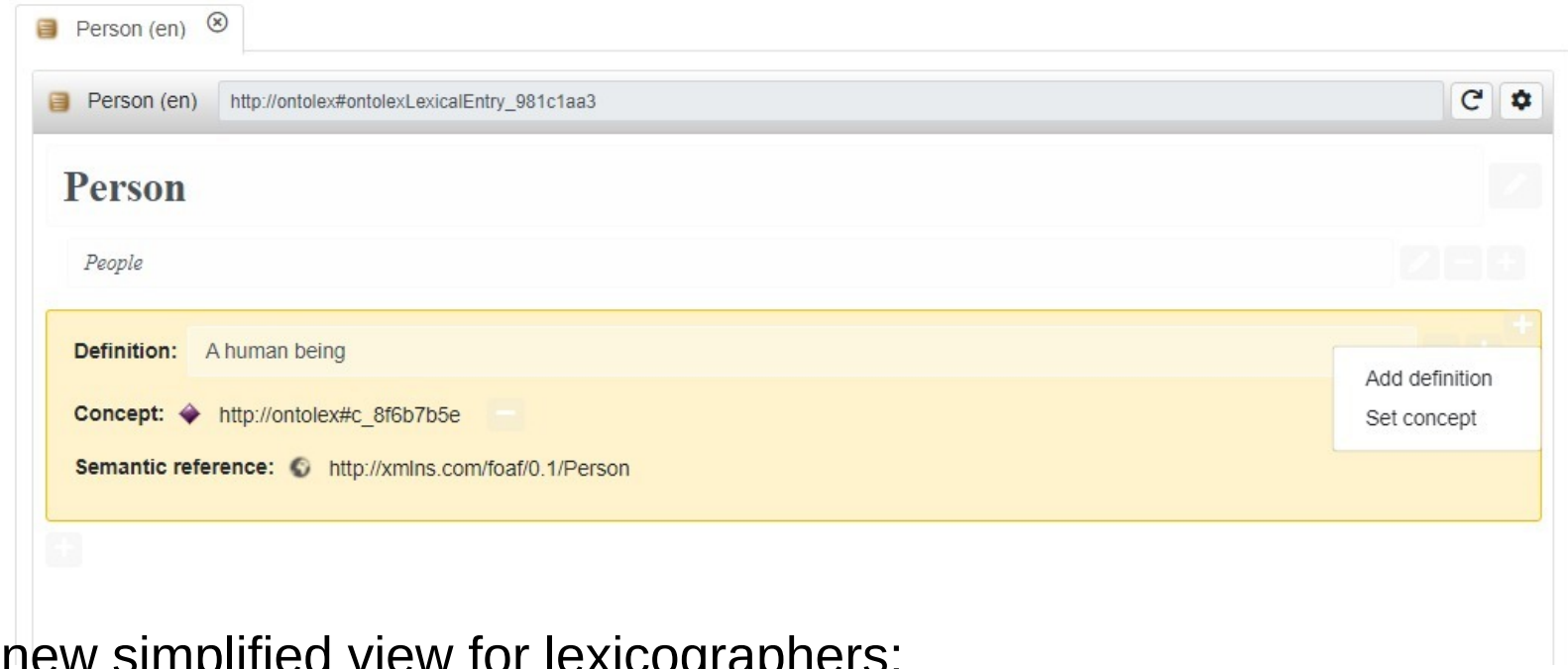


Simplified Views: Terminologist View

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



Simplified Views: The Lexicographer View



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

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DATASET ALIGNMENT IN VB3

Dataset Alignment: an Introduction

Ontology[1] Alignment (aka Ontology Matching, Ontology Mapping) defines the task of discovering and assessing alignments between ontologies

[1] 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 betweem 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
  - Focus on transformation rather than matching (prior to SPARQL)
- 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 citizes. A de-facto standard and interchange format
- Integrated Mapping Environments (within editors), e.g. PoolParty or Topbraid Enterprise Data Governance

Knowledge Engineering 18(3), 251-264 (January 2007)

Rethinking Alignment Support

There is a lack of omnicomprehensive solutions, embracing alignment mainteance at large, including all possible means to develop, ingest and maintan alignments

Capitalizing on past approaches, we developed a fully-fledged Alignment Environment within our popular Collaborative Environment for Management of Ontologies, Thesauri, Lexicons (and now Alignments ;-)) VocBench

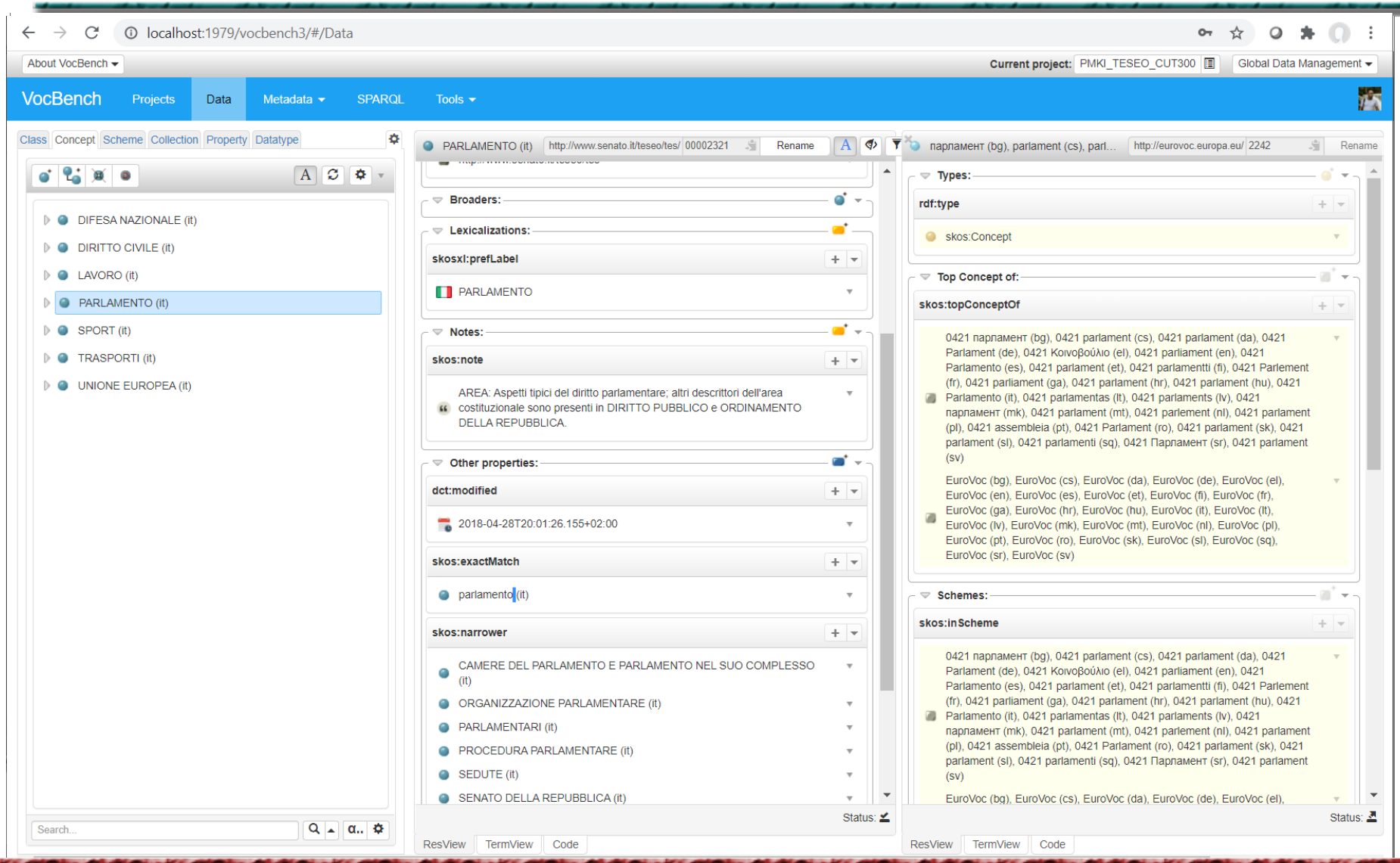
Alignment Support at Large

Not a single entry point for alignment development

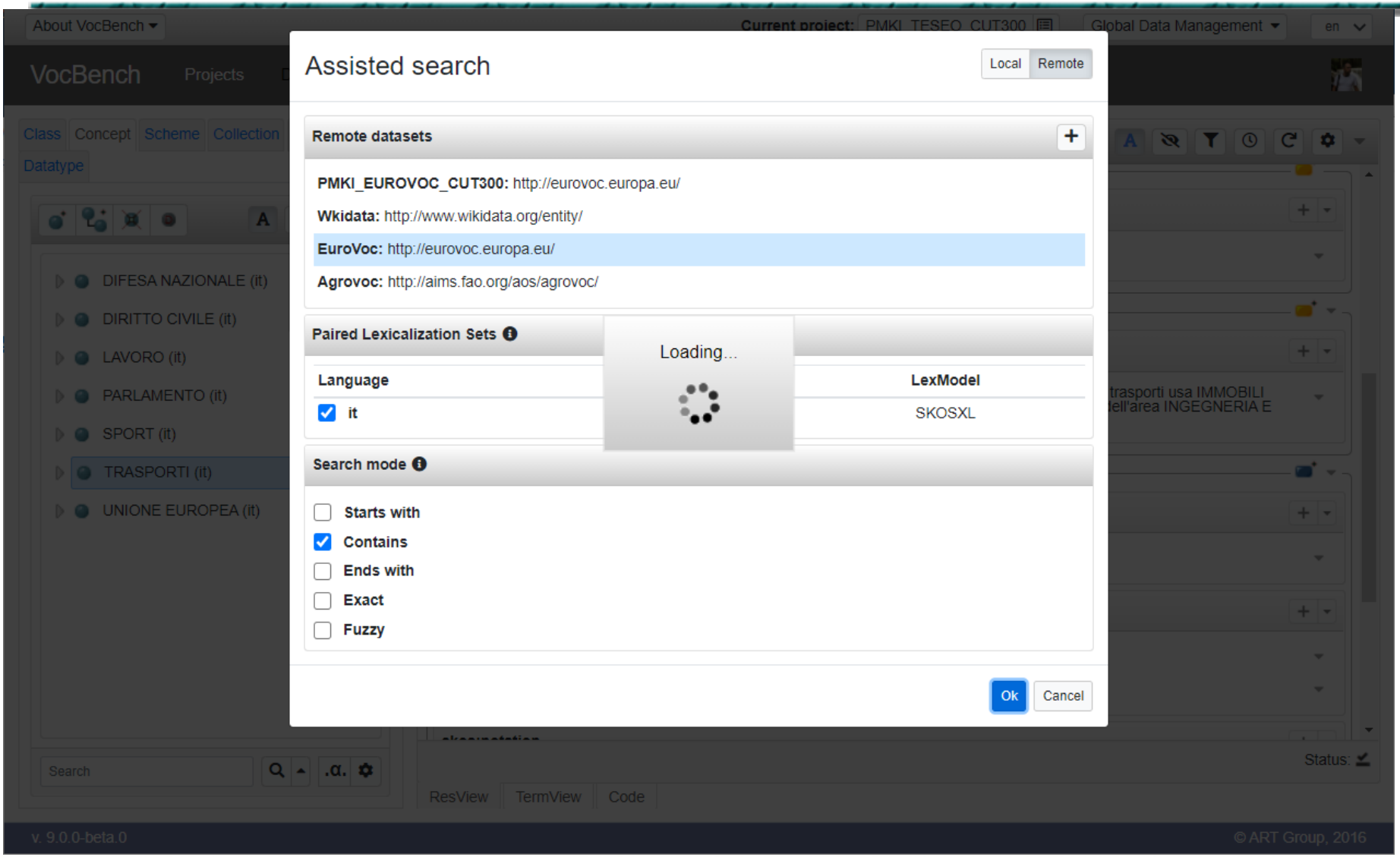
Alignment is a pervasive aspect appearing in diverse points of the UX

- 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

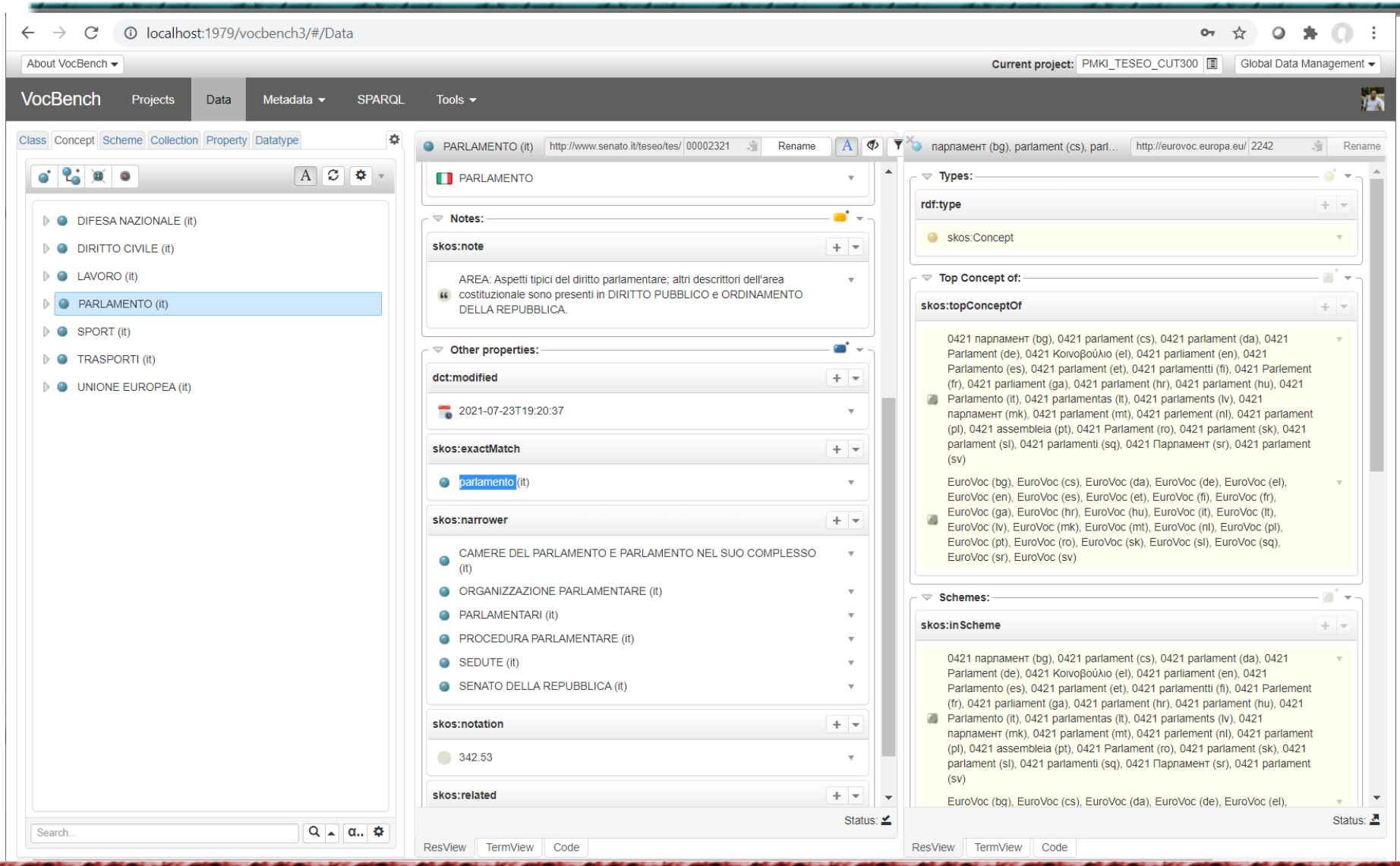
Alignment from within the Resource View (1)



Alignment from within the Resource View (2)



Alignment from within the Resource View (3)



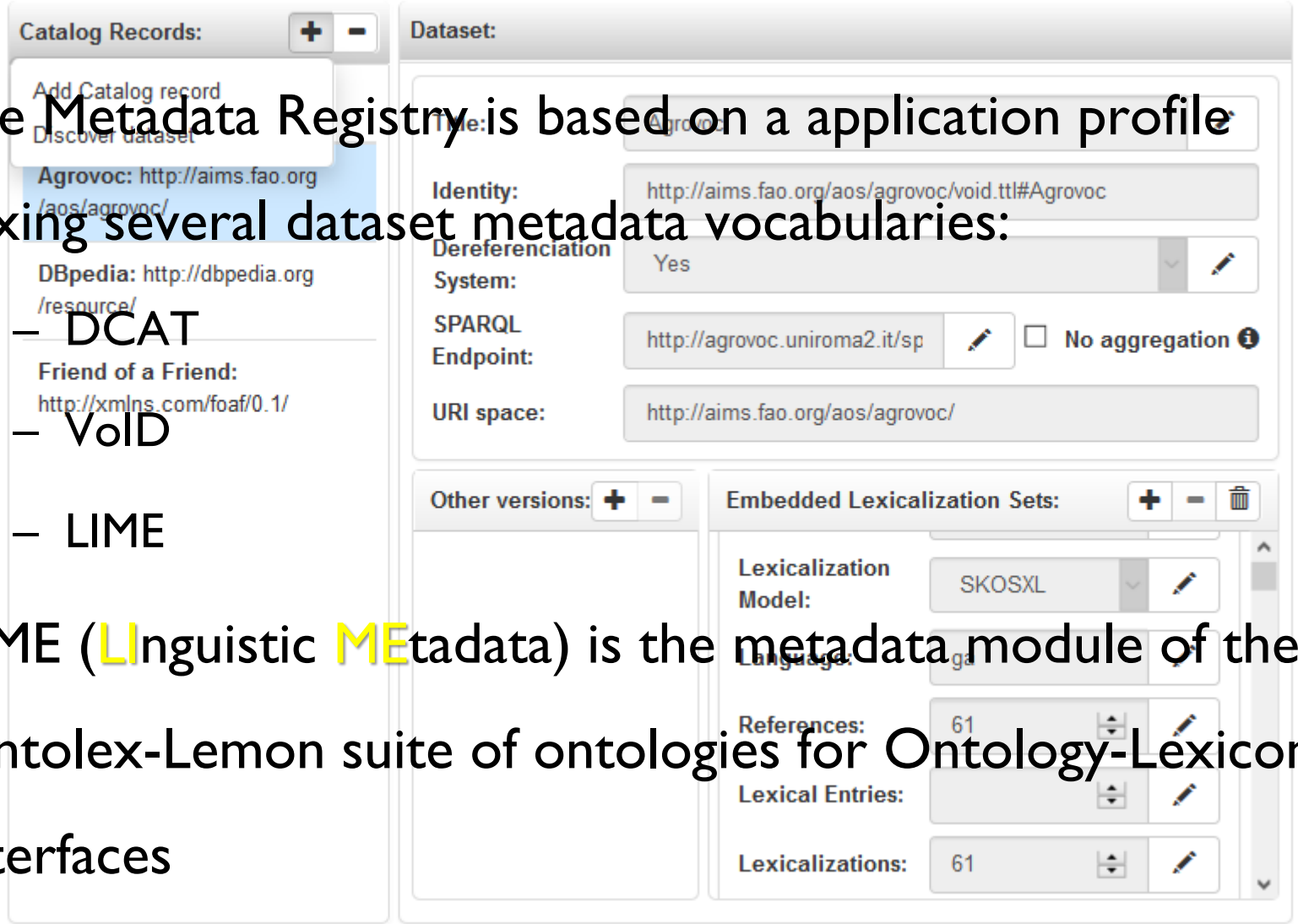
Dataset Metadata Exploitation

- 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
- VoID
- LIME

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

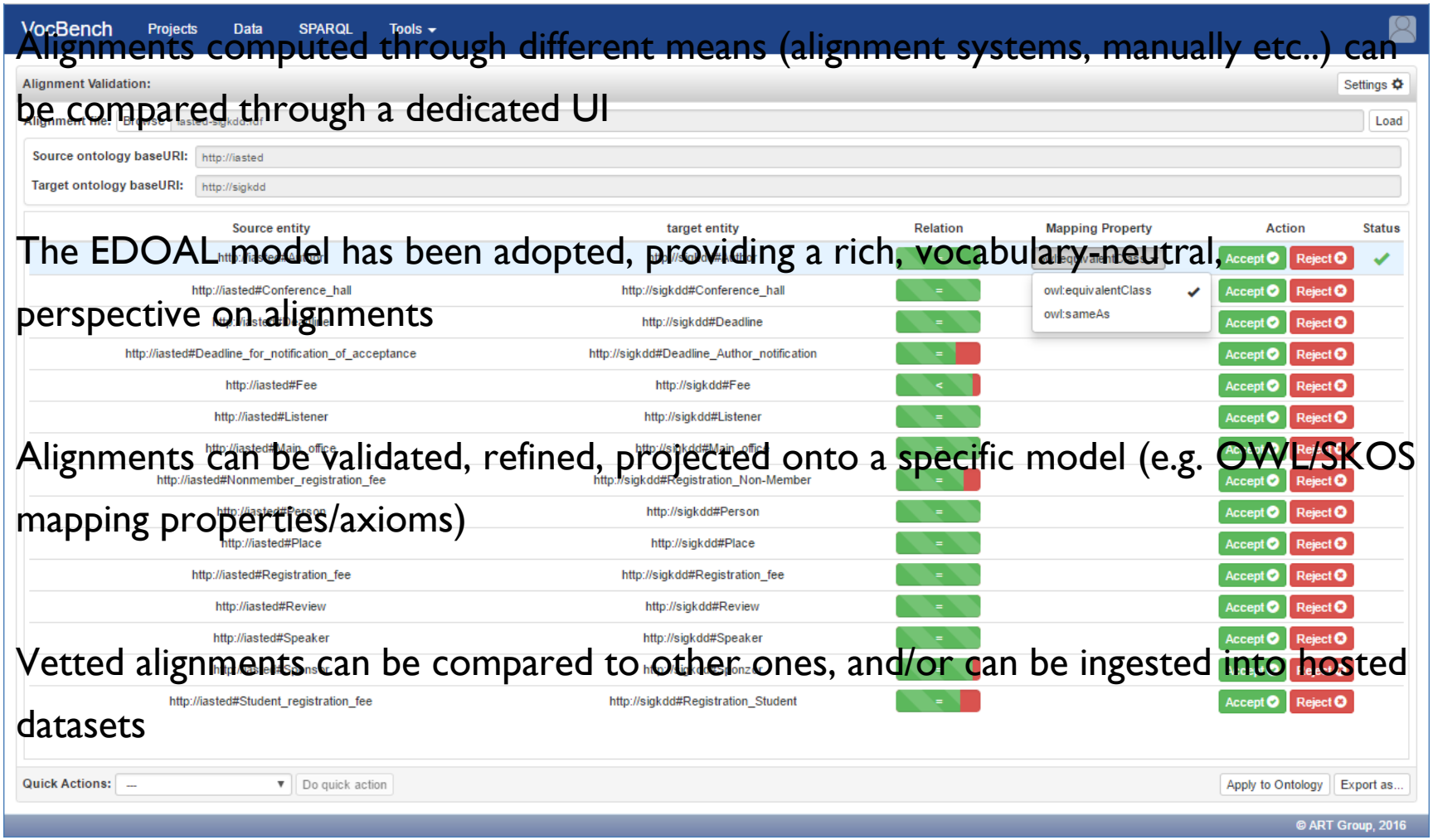
Alignment Validation

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

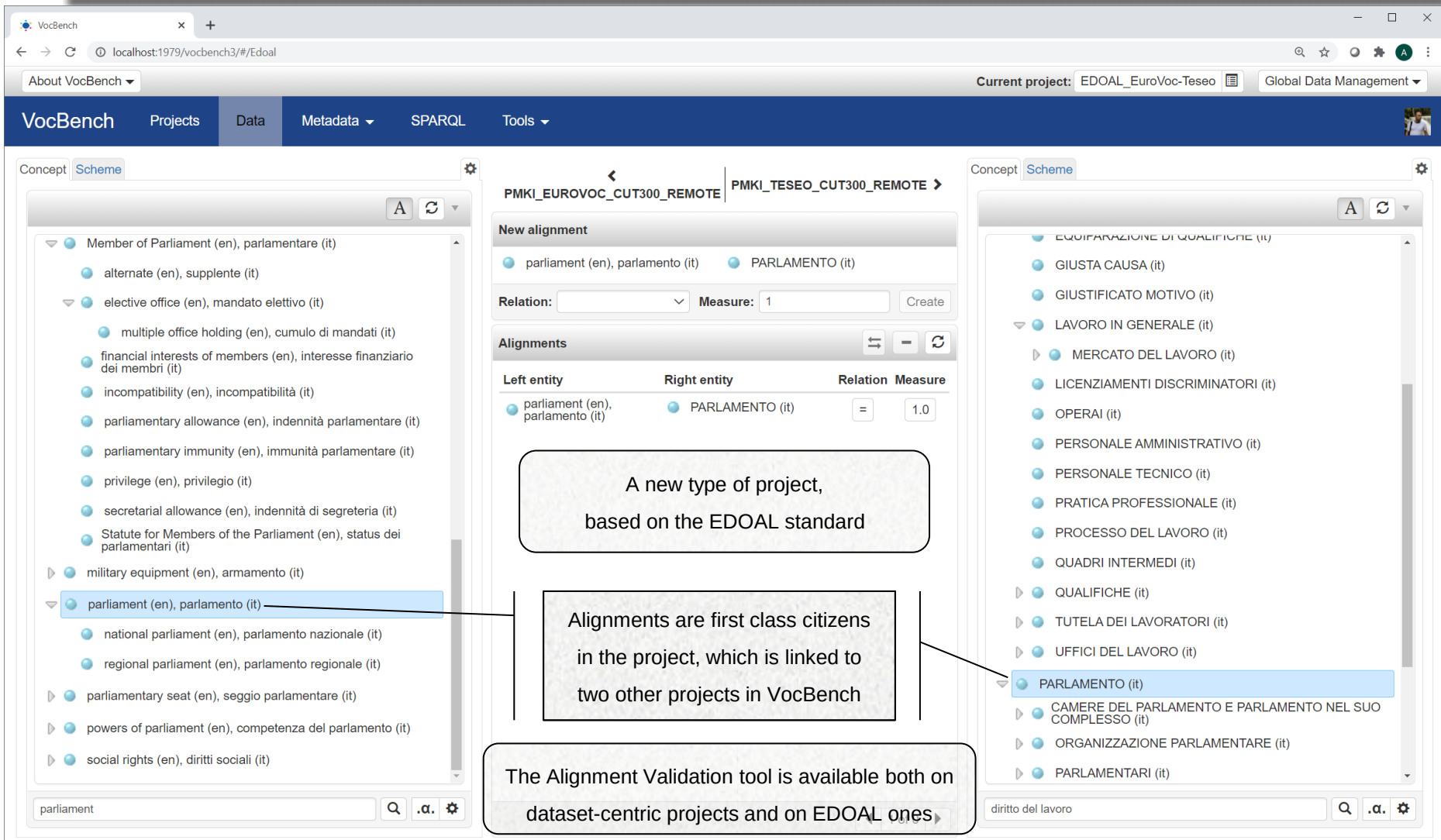
The EDOAL model has been adopted, providing a rich, vocabulary-neutral, perspective on alignments

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



EDOAL Projects



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…

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Semantic/Linguistic Coordination

Hi, I'm Merlin the Wizard. I see you are a Genie, so i suppose we can talk about magic*

Oh yes, I like talking about magic. My reference ontology for magic is: Xxxxx/magic.owl

Erm…sorry, mine is: YYYY/mania.owl

Mmm…I just speak arabian, and I'm able to express some of my ideas in a very simple english (Freelang, automatic translation with 23% coverage of ontology concepts)

Well, ok, what's your language(s)?

actually I'm a good english speaker (ontology natively filled with english terms)

That's great, I can summon a familiar of mine who is a good english speaker (a Wordnet 2.1 resource agent) and I've just found on the yellow pages an english/arabian translator (Dict english/arabian dictionary Semantic Web Service), maybe they can help us a bit…

*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

Università di Roma Tor Vergata

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*)

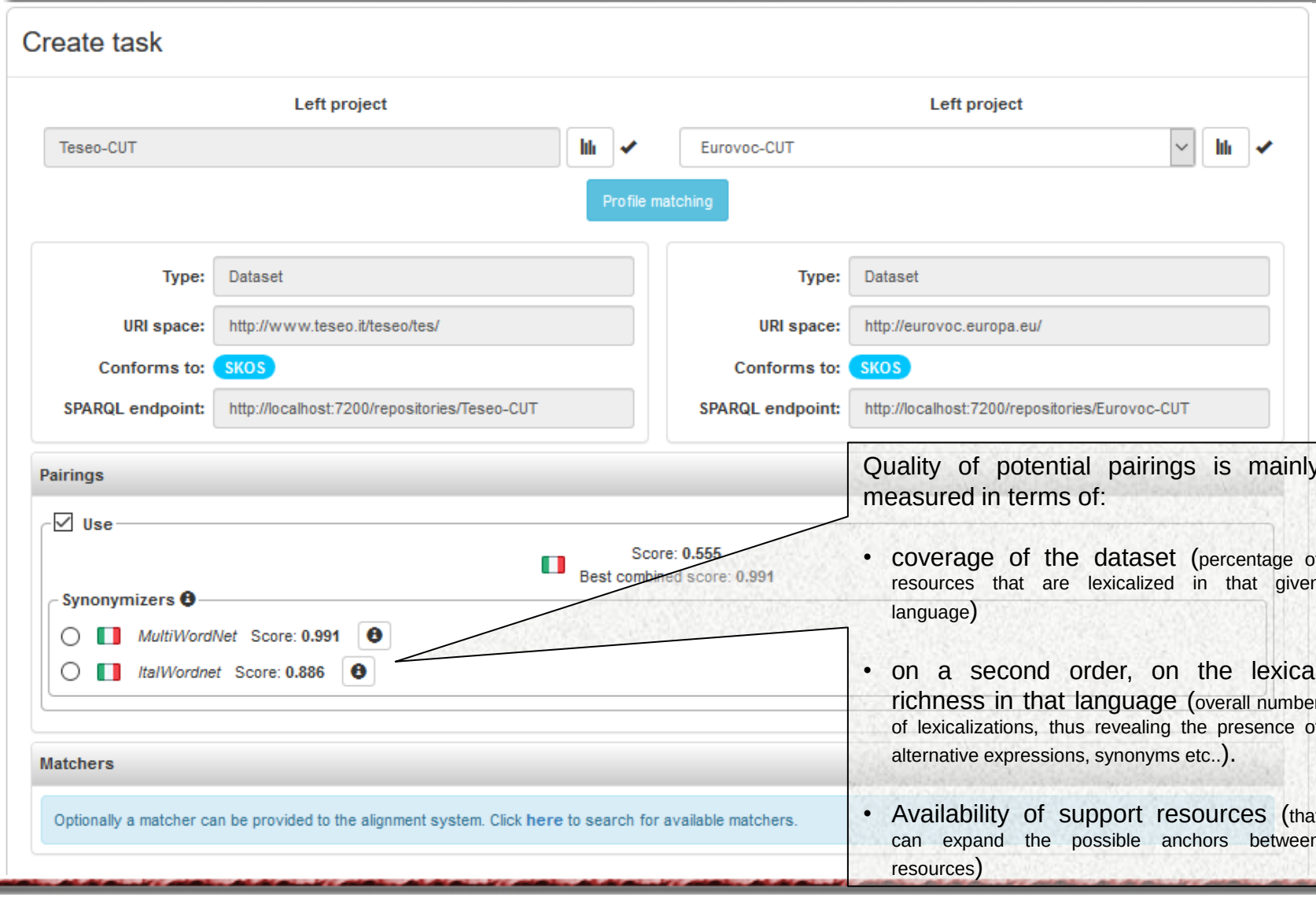
Possible suggested pairings between lexicalization sets (supported by *synonymizers*, *translators* etc..) and summarized into a score

Semantic/Linguistic Coordination

…and, in VocBench,

what the user sees…

Semantic/Linguistic Coordination



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)

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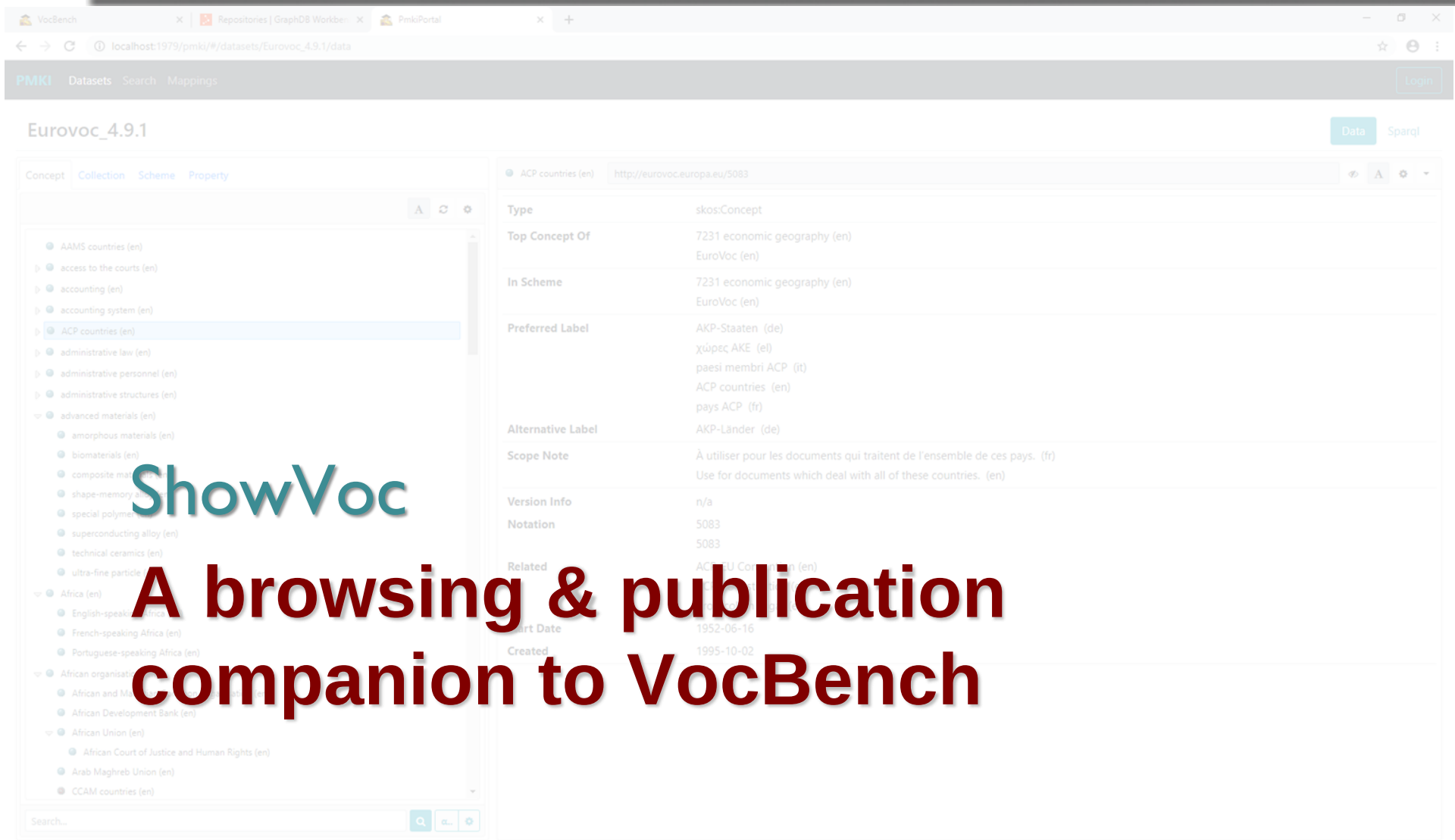

ShowVoc

A browsing & publication companion to VocBench

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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.

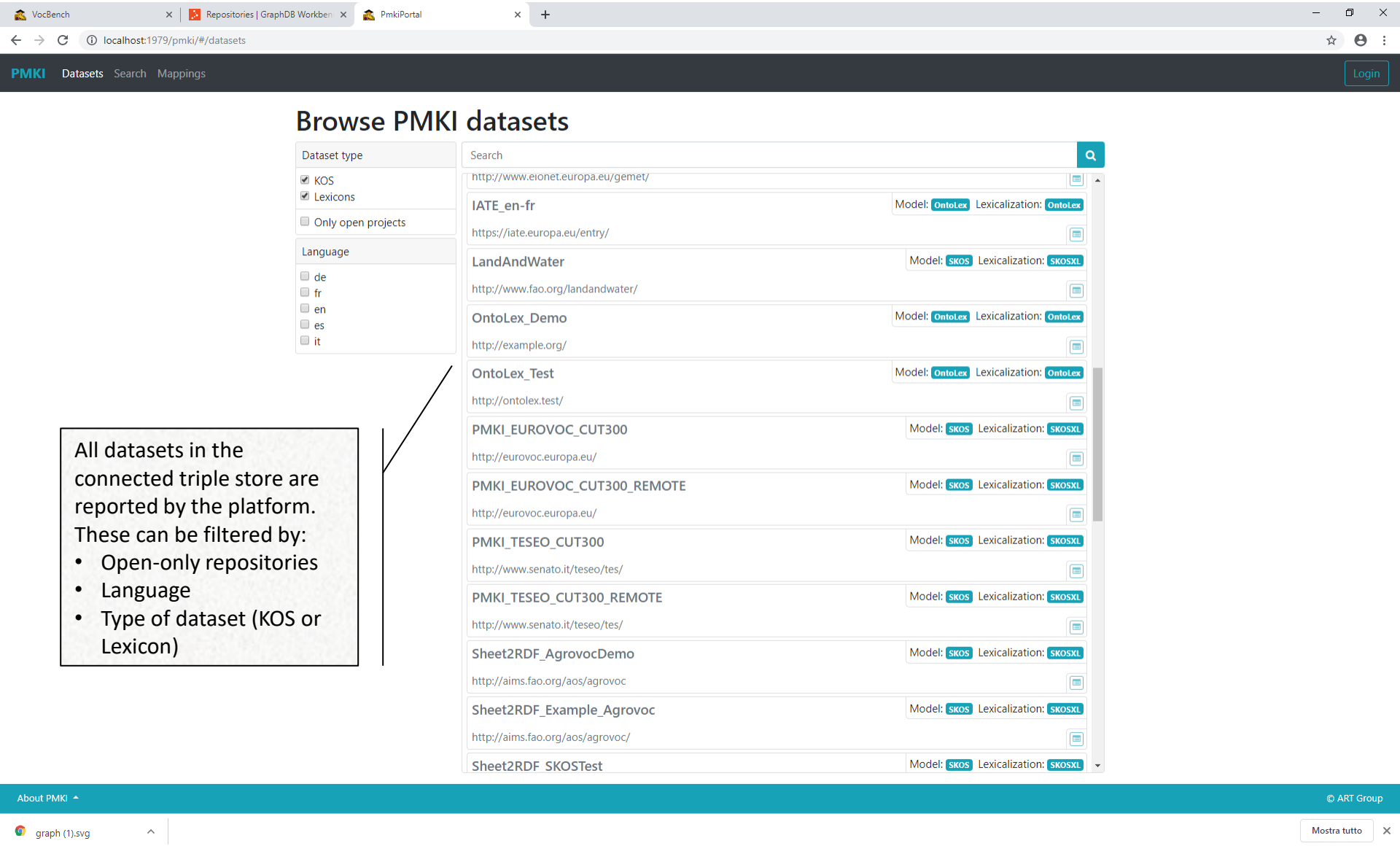
- Besides browsing UX, the system features capabilities oriented at showing datasets as whole resources

- 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

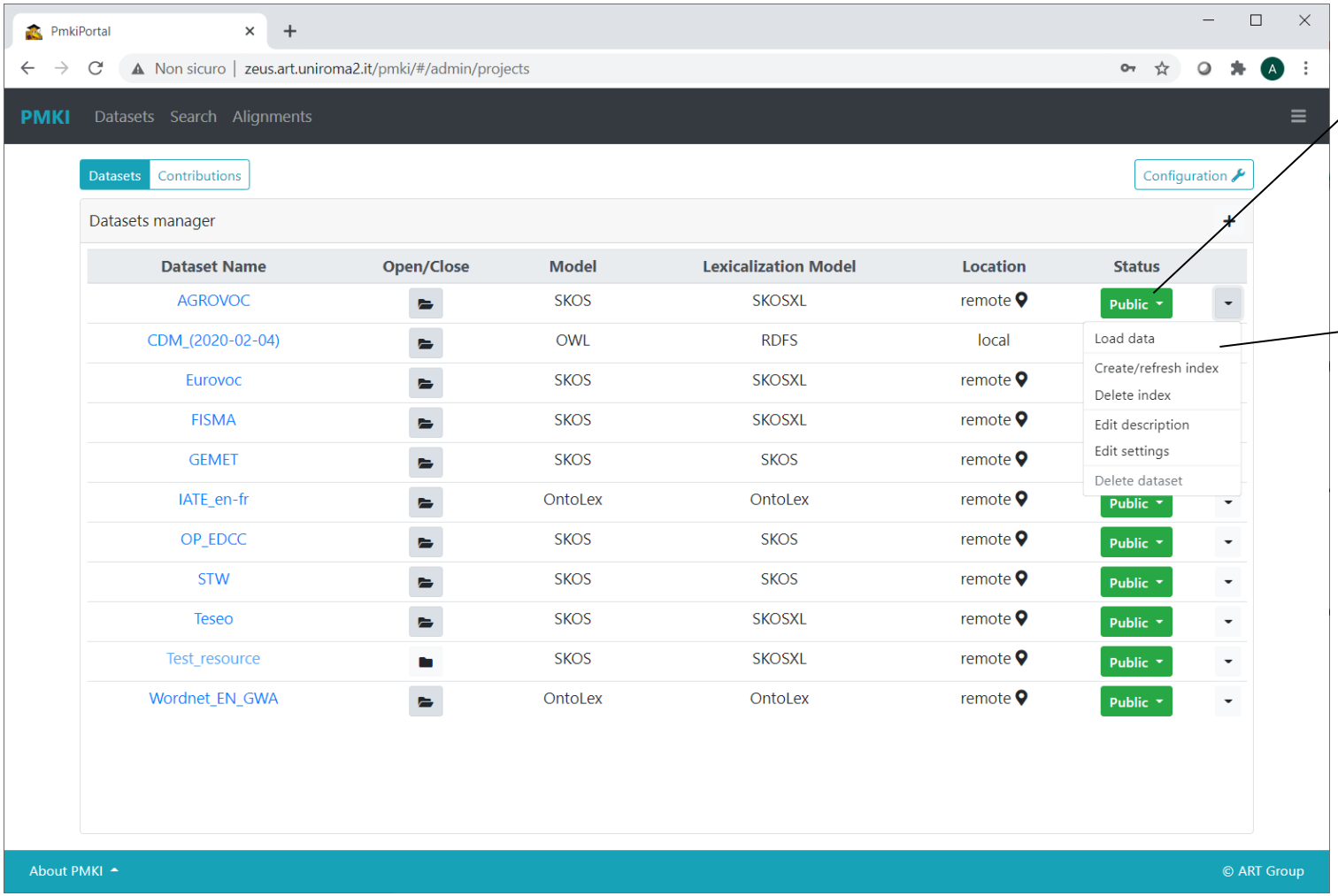
Dataset List View



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)

Administrator Dashboard

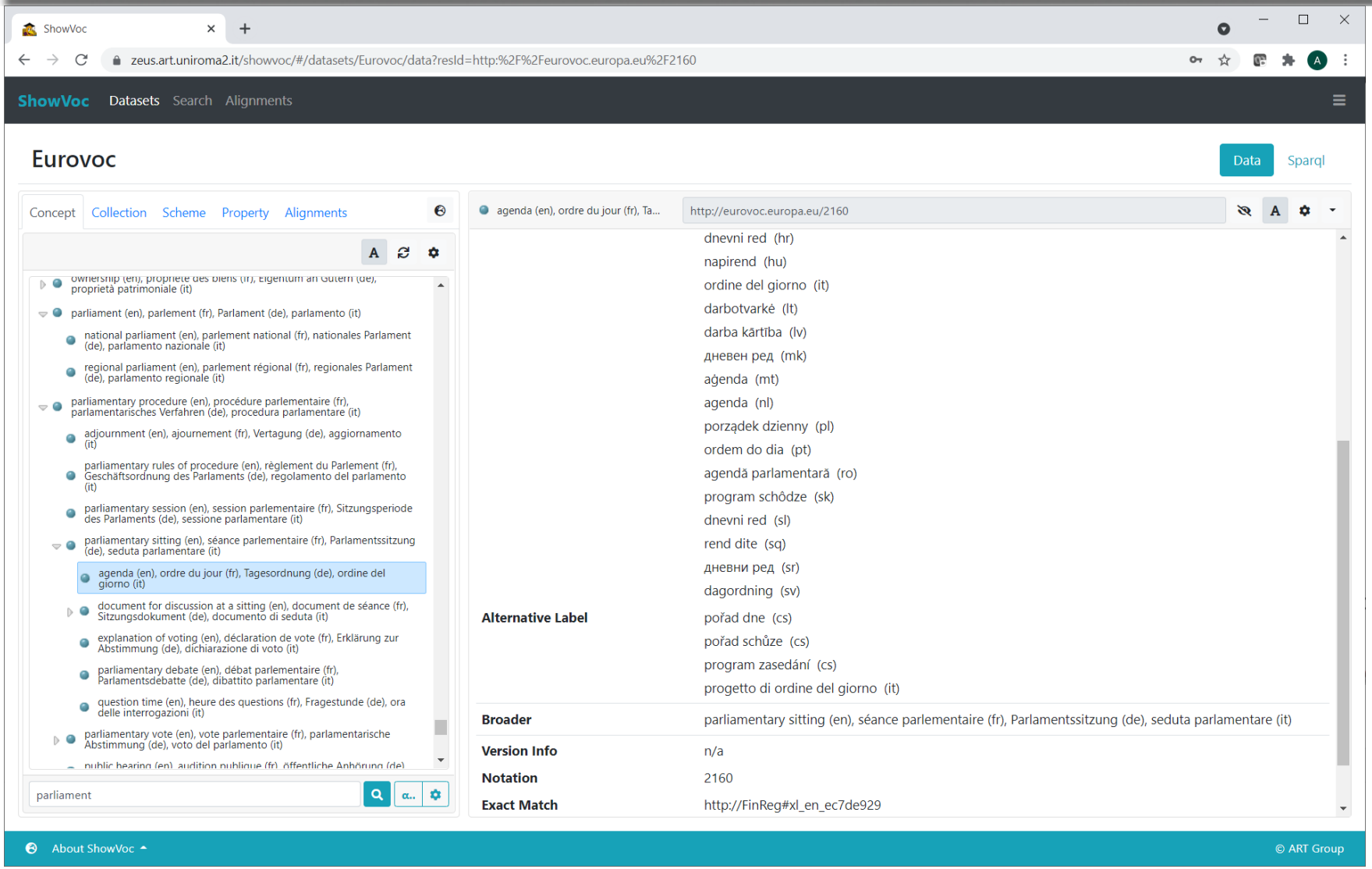


The status can be:

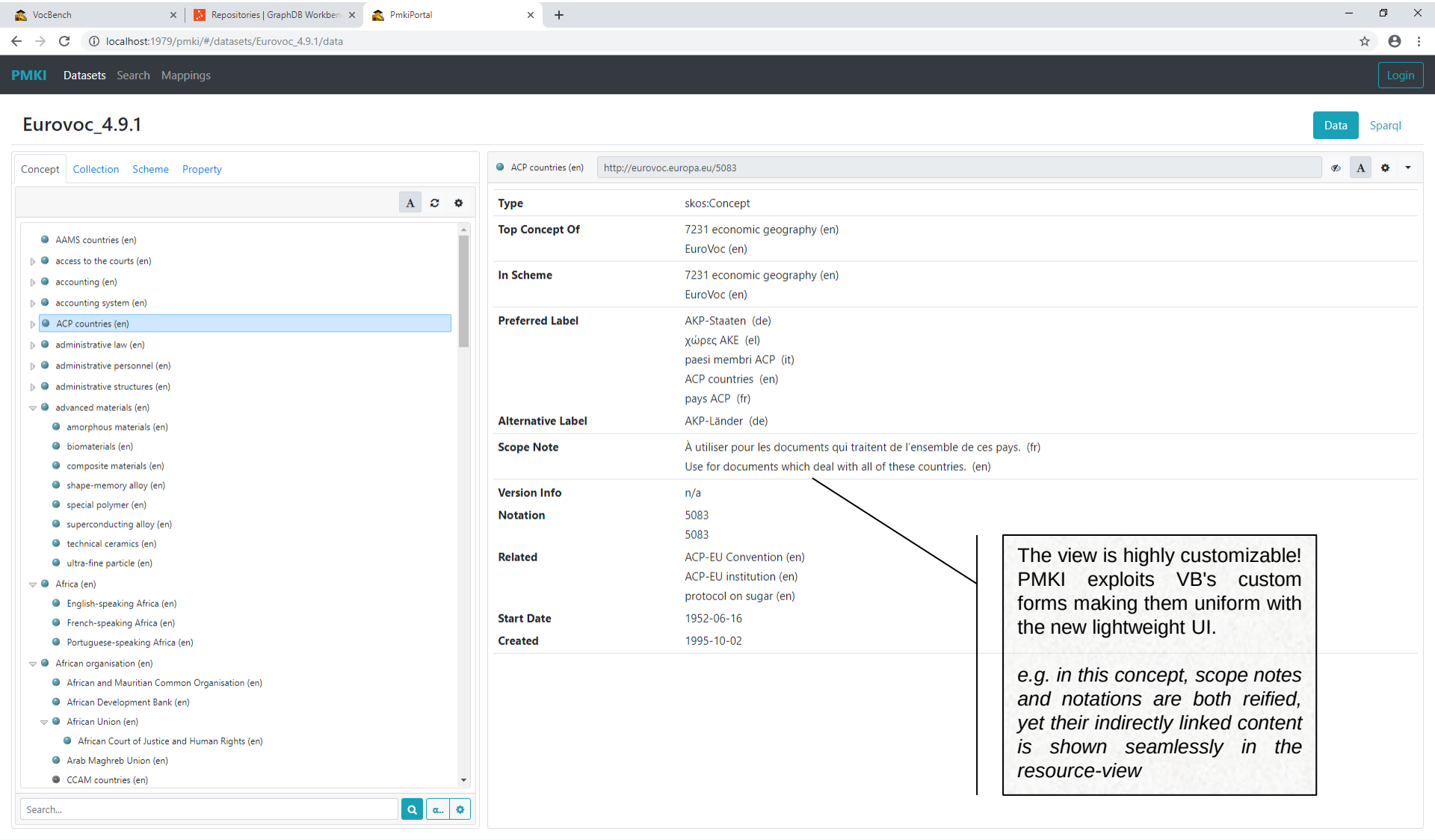
- pristine
- staging
- public

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

Browsing Datasets (1)



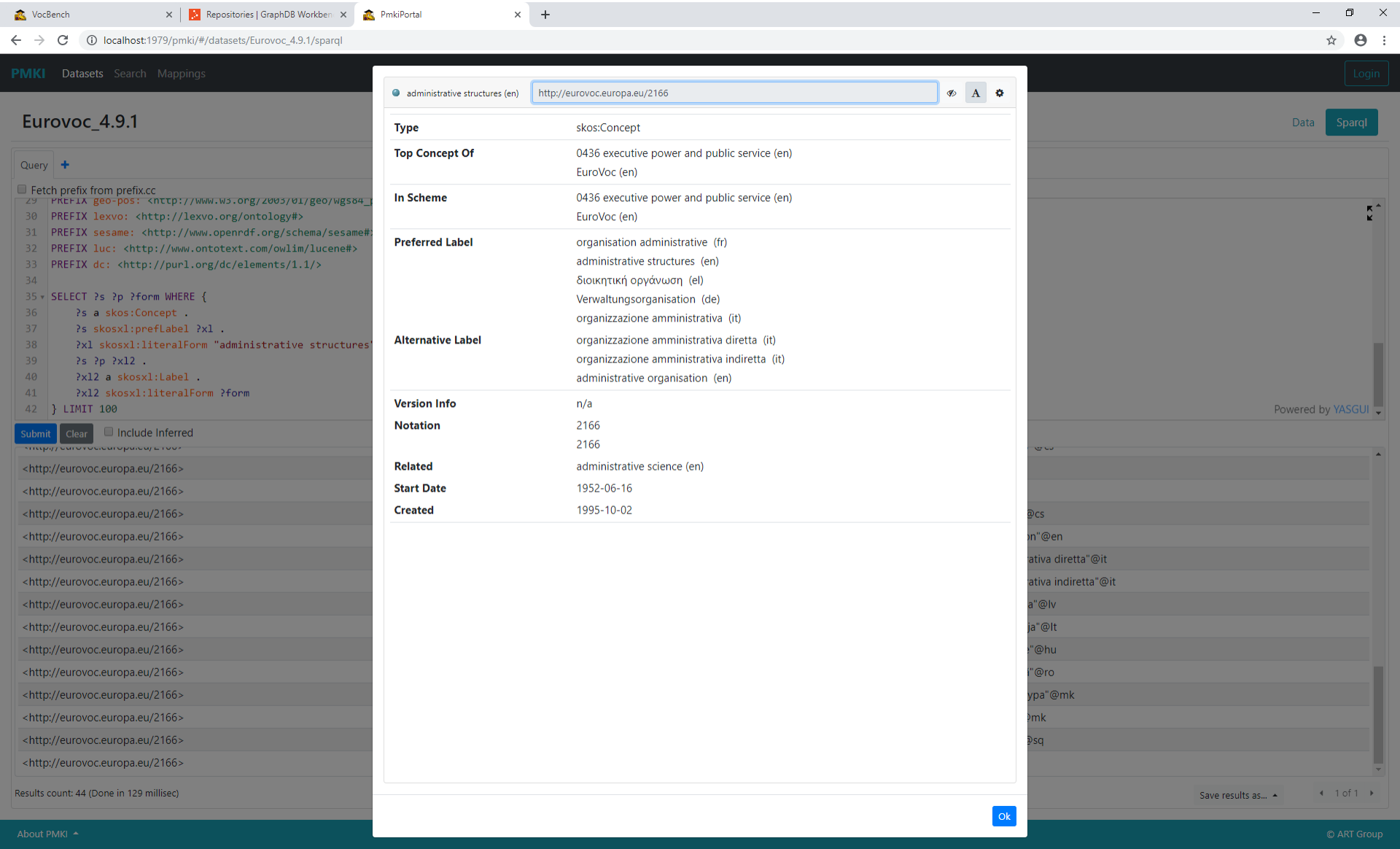
Browsing Datasets (2)



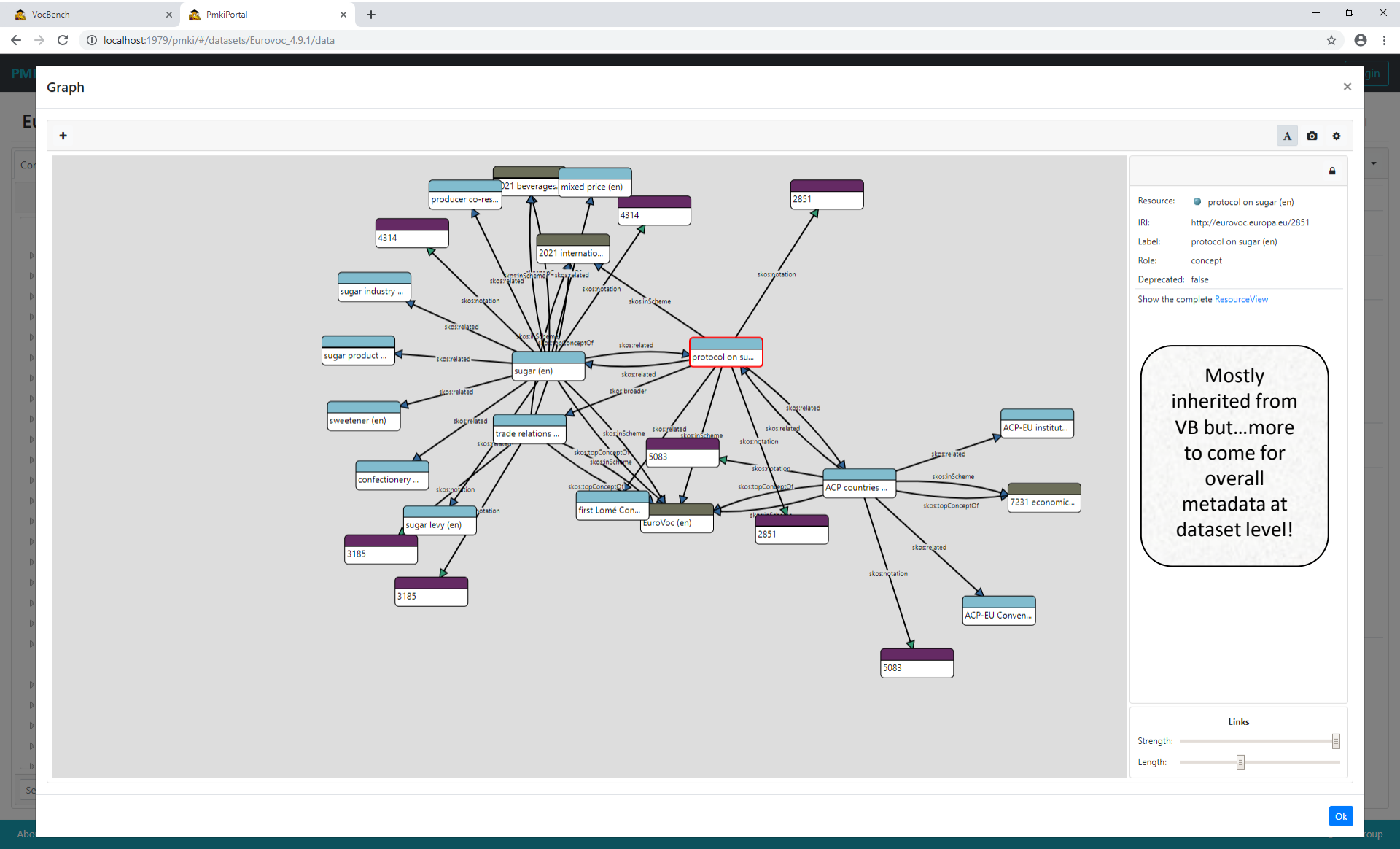
The view is highly customizable! PMKI exploits VB's custom forms making them uniform with the new lightweight UI.

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

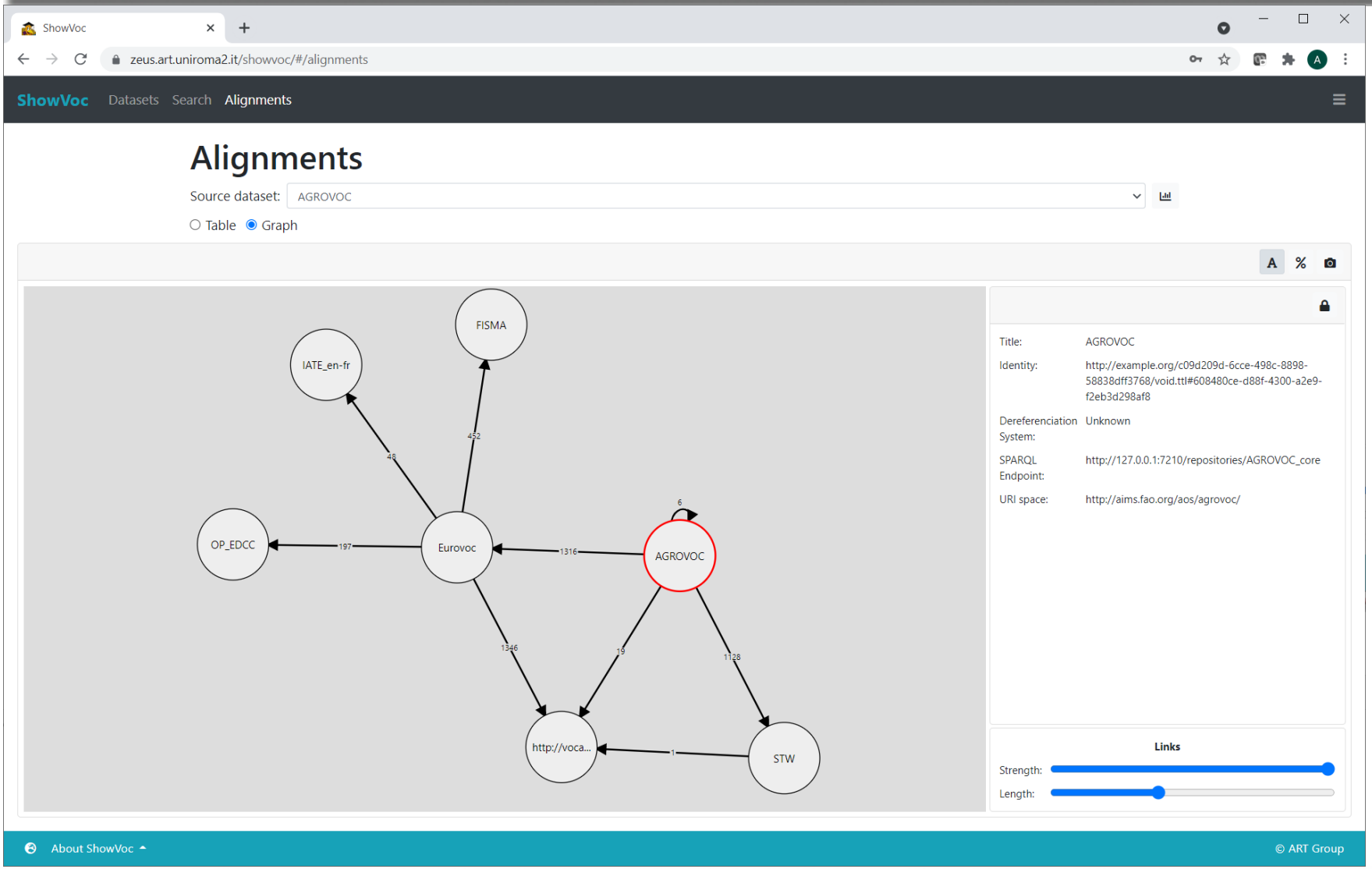
SPARQL querying in ShowVoc



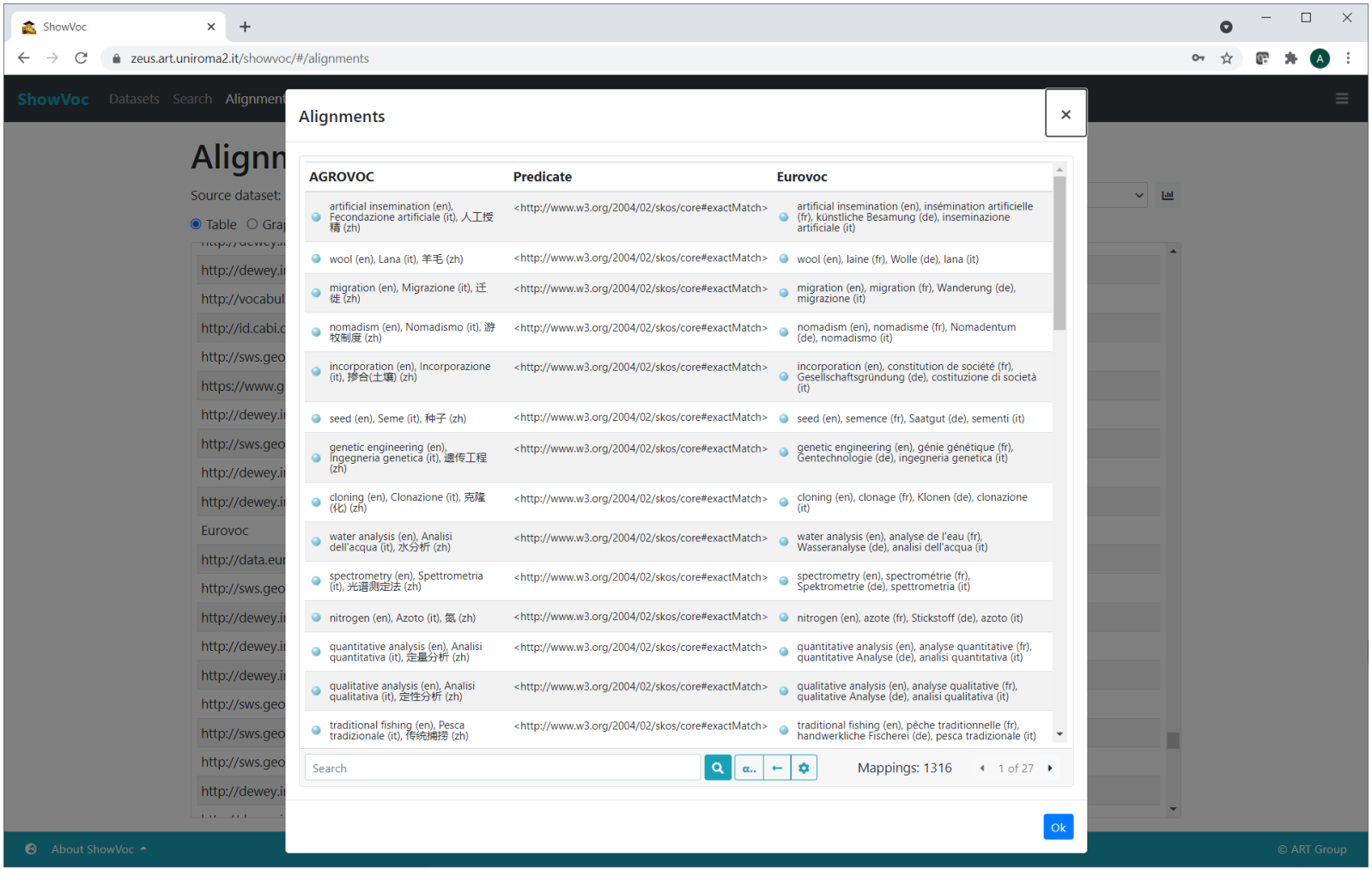
ShowVoc Graph View



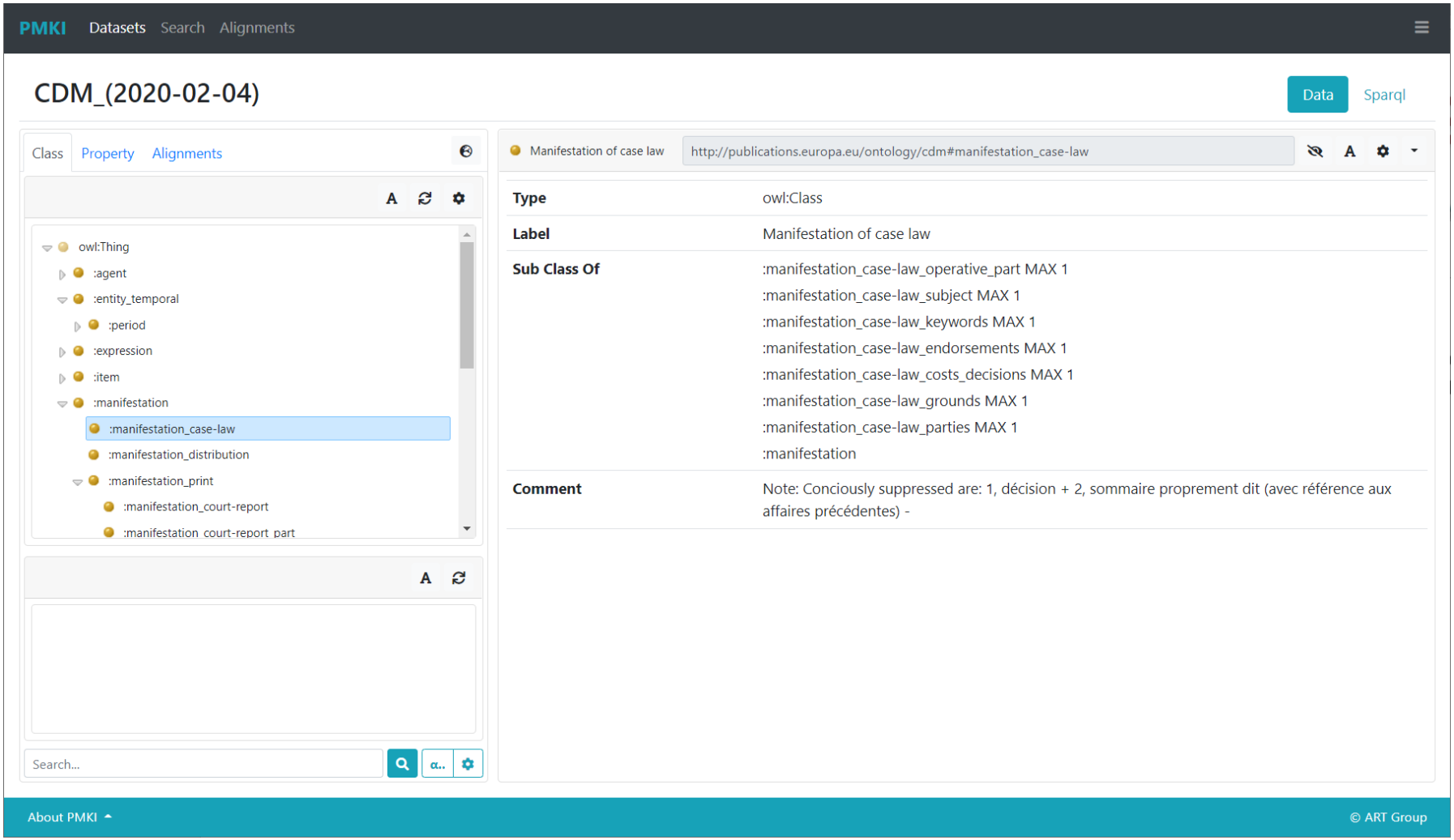
Browsing Alignments (1)



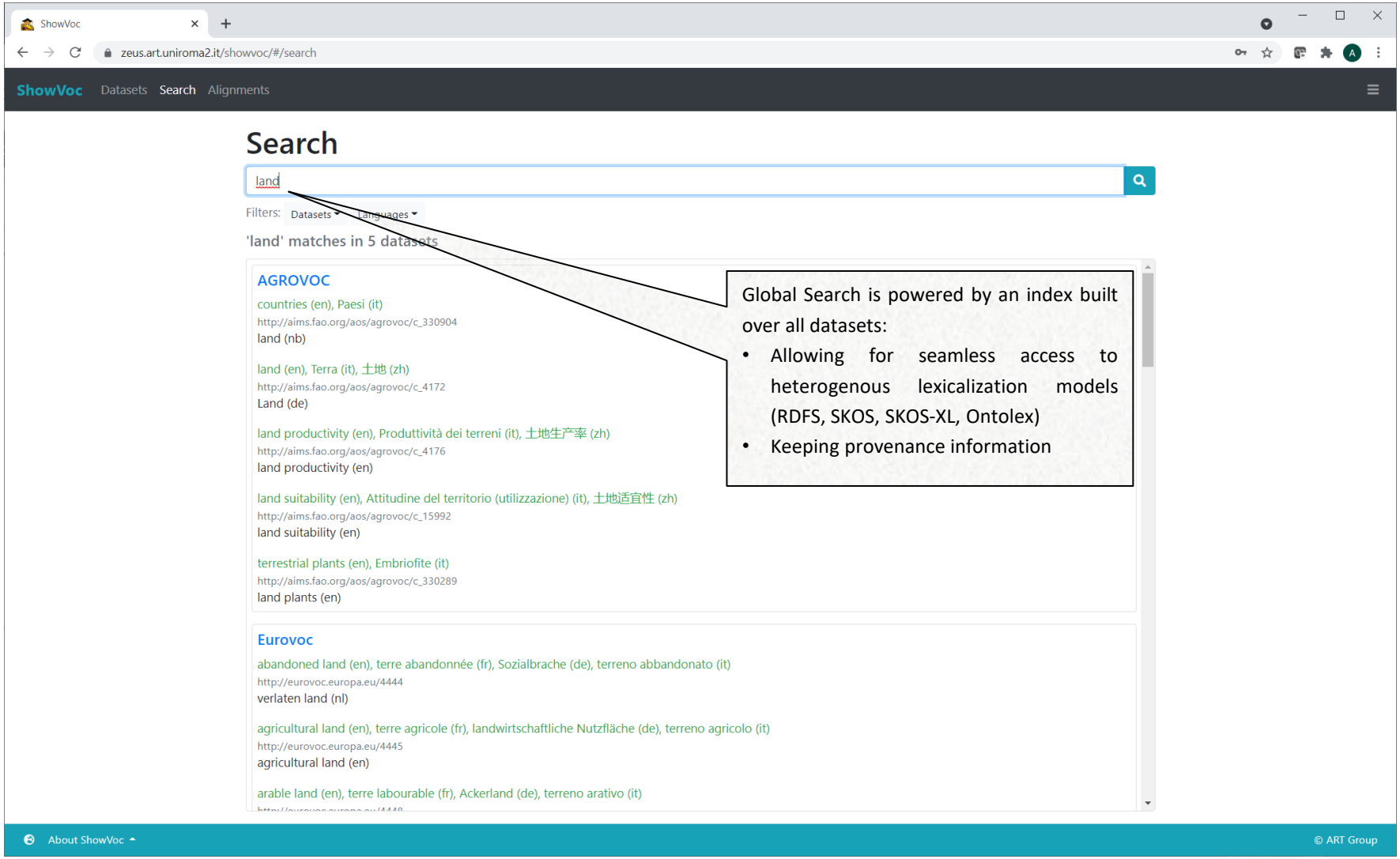
Browsing Alignments (2)



Support for OWL Ontologies



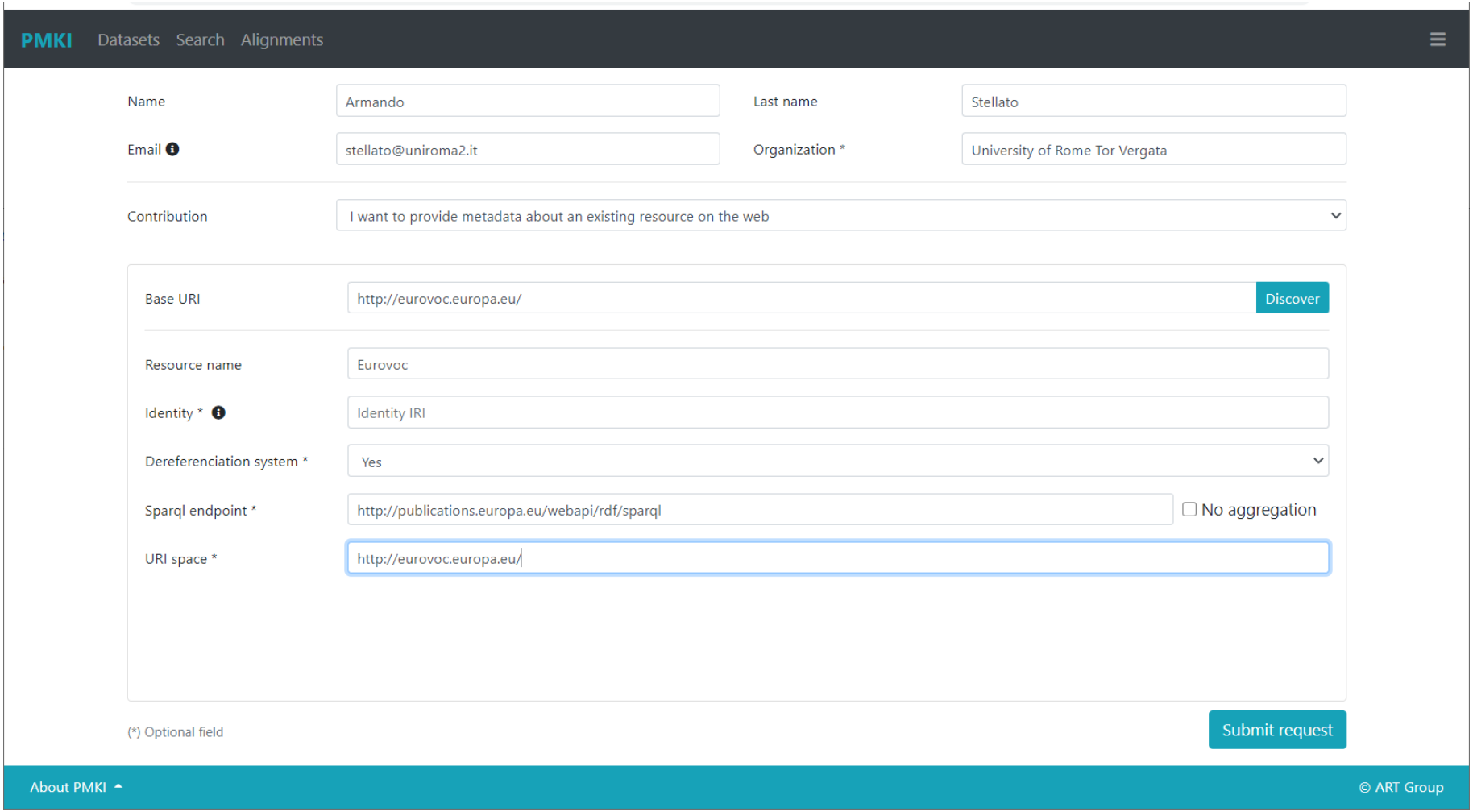
Global Search



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",…}
```

Contributors' Page

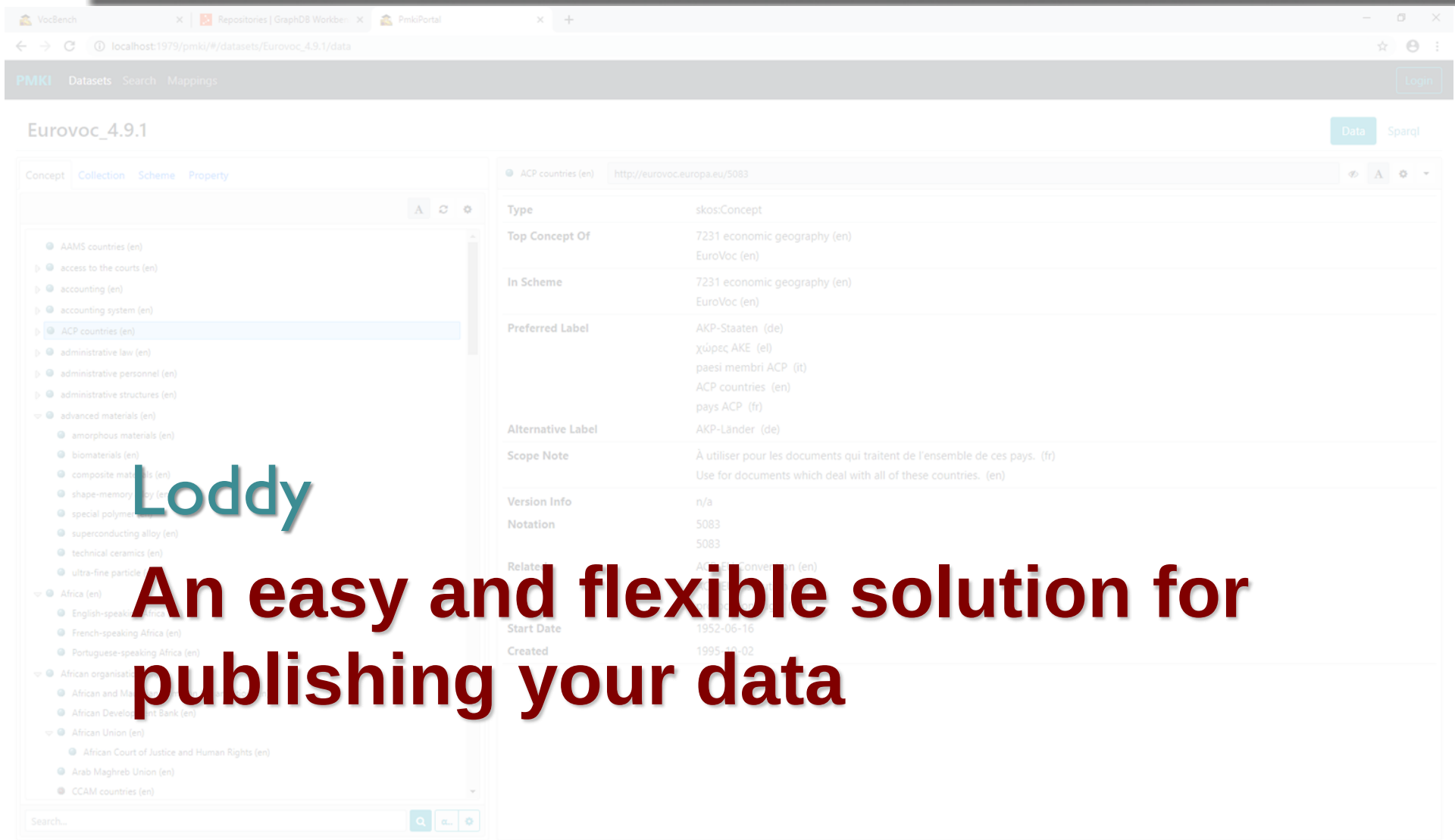


ShowVoc: Where do I find it?

ShowVoc has been publicly released to the community…

…just today!

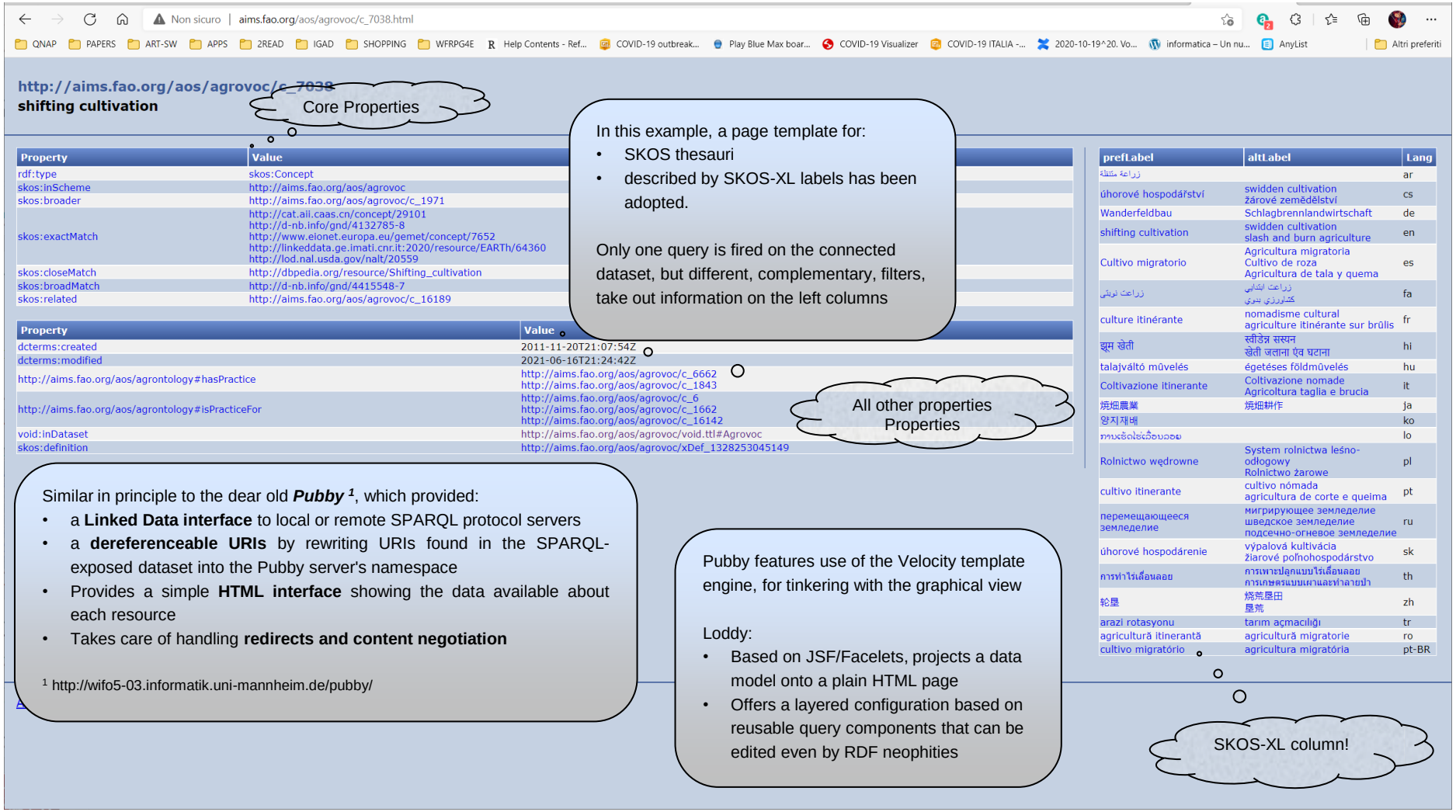
http://showvoc.uniroma2.it

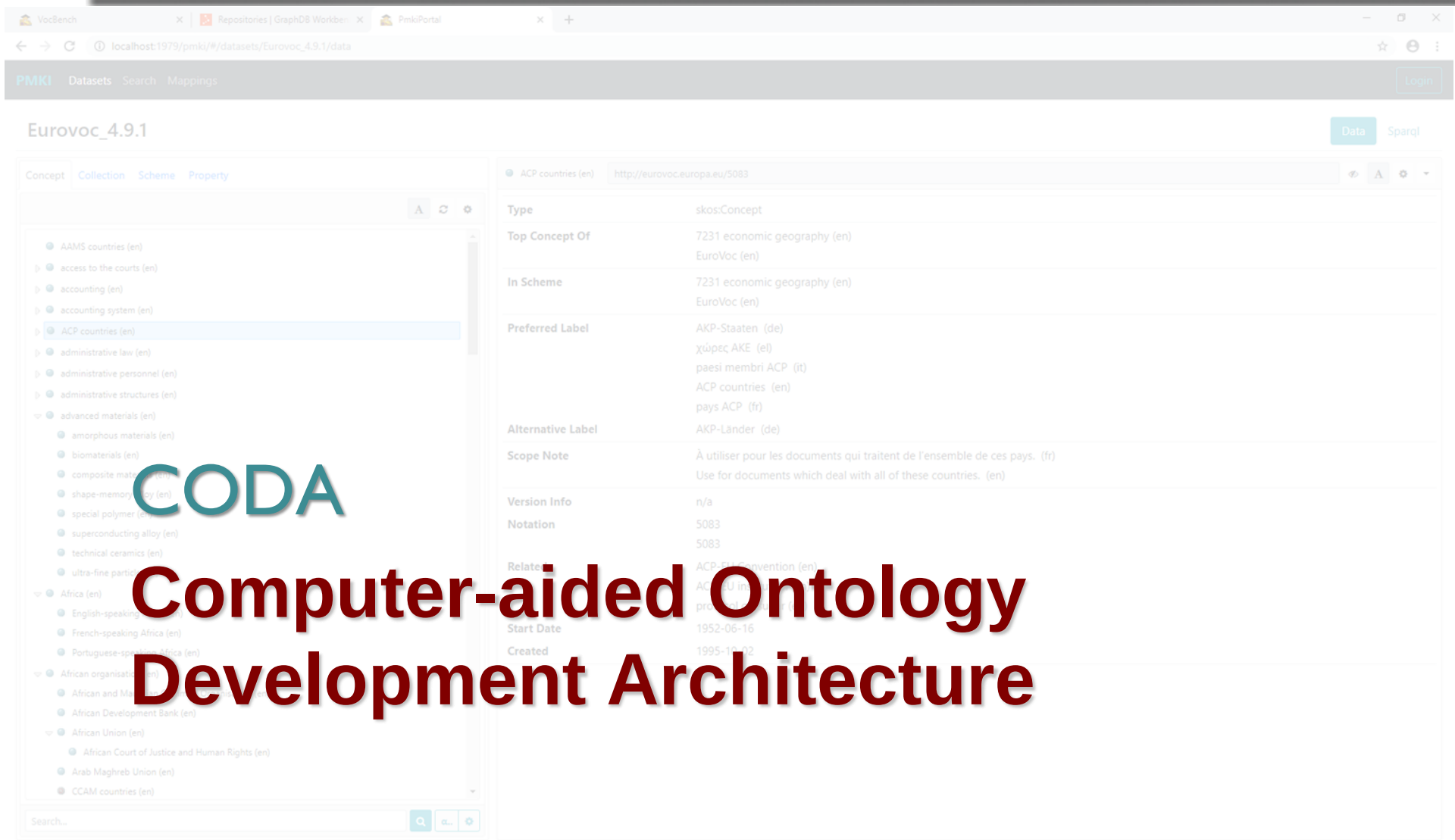


Loddy

An easy and flexible solution for publishing your data

Loddy


Non sicuro | aims.fao.org/aos/agrovoc/c_7038.html
http://aims.fao.org/aos/agrovoc/c_7038
shifting cultivation
Core Properties
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
Property
Value
rdf:type
skos:Concept
skos:inScheme
http://aims.fao.org/aos/agrovoc
skos:broader
http://aims.fao.org/aos/agrovoc/c_1971
skos:exactMatch
http://cat.aii.caas.cn/concept/29101
http://d-nb.info/gnd/4132785-8
http://www.eionet.europa.eu/gemet/concept/7652
http://linkeddata.ge.imati.cnr.it:2020/resource/EARTh/64360
http://lod.nal.usda.gov/nalt/20559
skos:closeMatch
http://dbpedia.org/resource/Shifting_cultivation
skos:broadMatch
http://d-nb.info/gnd/4415548-7
skos:related
http://aims.fao.org/aos/agrovoc/c_16189
Property
Value
dcterms:created
2011-11-20T21:07:54Z
dcterms:modified
2021-06-16T21:24:42Z
http://aims.fao.org/aos/agrontology#hasPractice
http://aims.fao.org/aos/agrovoc/c_6662
http://aims.fao.org/aos/agrovoc/c_1843
http://aims.fao.org/aos/agrontology#isPracticeFor
http://aims.fao.org/aos/agrovoc/c_6
http://aims.fao.org/aos/agrovoc/c_1662
http://aims.fao.org/aos/agrovoc/c_16142
void:inDataset
http://aims.fao.org/aos/agrovoc/void.ttl#Agrovoc
skos:definition
http://aims.fao.org/aos/agrovoc/xDef_1328253045149
All other properties
Properties
prefLabel
altLabel
Lang
زراعة متنقلة
ar
úhorové hospodářství
swidden cultivation
žárové zemědělství
cs
Wanderfeldbau
Schlagbrennlandwirtschaft
de
shifting cultivation
swidden cultivation
slash and burn agriculture
en
Cultivo migratorio
Agricultura migratoria
Cultivo de roza
Agricultura de tala y quema
es
زراعت ایتایی
کشاورزی بنوی
fa
culture itinérante
nomadisme cultural
agriculture itinérante sur brûlis
fr
झूम खेती
स्वीडेन सस्यन
खेती जलाना एंव घटाना
hi
talajváltó mûvelés
égetéses földmûvelés
hu
Coltivazione itinerante
Coltivazione nomade
Agricoltura taglia e brucia
it
焼畑農業
焼畑耕作
ja
양지재배
ko
ການເຮັດໄຮ່ເລື່ອນລອຍ
lo
Rolnictwo wędrowne
System rolnictwa leśno-odłogowy
Rolnictwo żarowe
pl
cultivo itinerante
cultivo nómada
agricultura de corte e queima
pt
перемещающееся земледелие
мигрирующее земледелие
шведское земледелие
подсечно-огневое земледелие
ru
úhorové hospodárenie
výpalová kultivácia
žiarové poľnohospodárstvo
sk
การทำไร่เลื่อนลอย
การเกษตรแบบเผาและทำลายป่า
th
轮垦
烧荒垦田
垦荒
zh
arazi rotasyonu
tarım açmacılığı
tr
agricultură itinerantă
agricultură migratorie
ro
cultivo migratório
agricultura migratória
pt-BR
SKOS-XL column!
Similar in principle to the dear old Pubby [1], which provided:
• a Linked Data interface to local or remote SPARQL protocol servers
• a dereferenceable 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
[1] 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 neophities



CODA

Computer-aided Ontology Development Architecture

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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

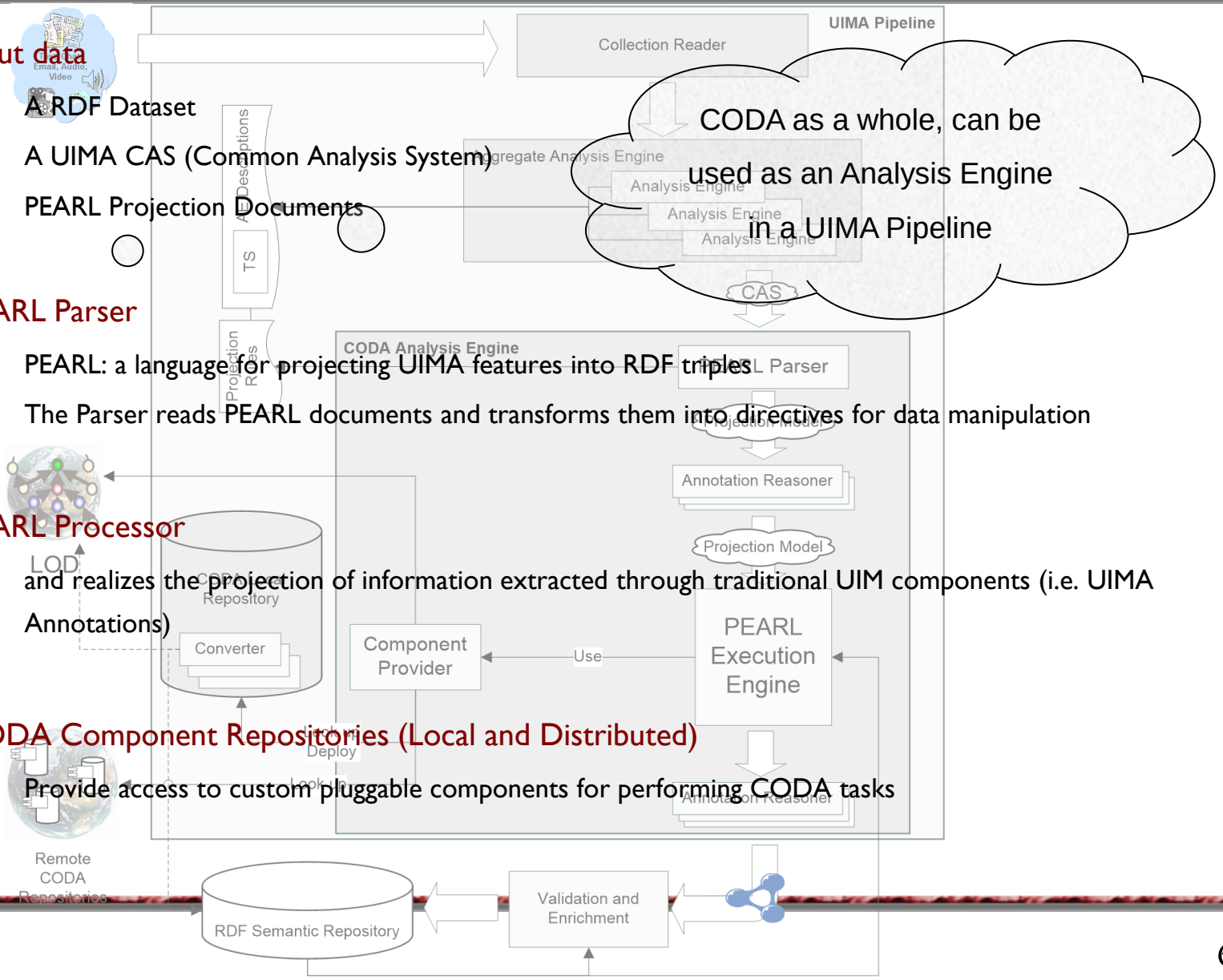
CODA Project Objectives

- 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 Analysis Engine

- Input data
  - A RDF Dataset
  - A UIMA CAS (Common Analysis System)
  - PEARL Projection Documents
- PEARL Parser
  - PEARL: a language for projecting UIMA features into RDF triples
  - The Parser reads PEARL documents and transforms them into directives for data manipulation
- PEARL Processor
  - and realizes the projection of information extracted through traditional UIM components (i.e. UIMA Annotations)
- CODA Component Repositories (Local and Distributed)
  - Provide access to custom pluggable components for performing CODA tasks



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 unhortodox 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

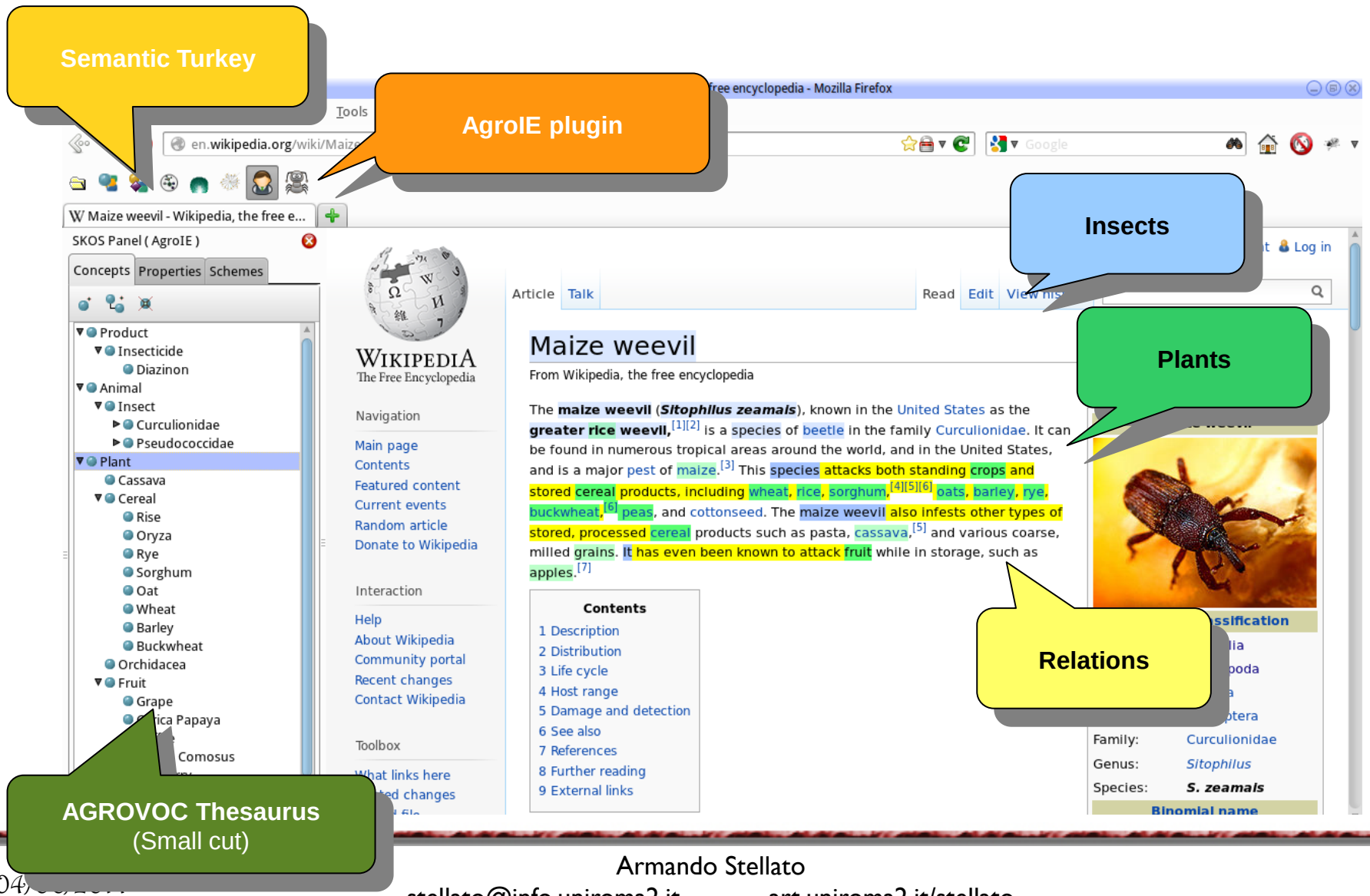
…and a look ahead on tomorrow

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.

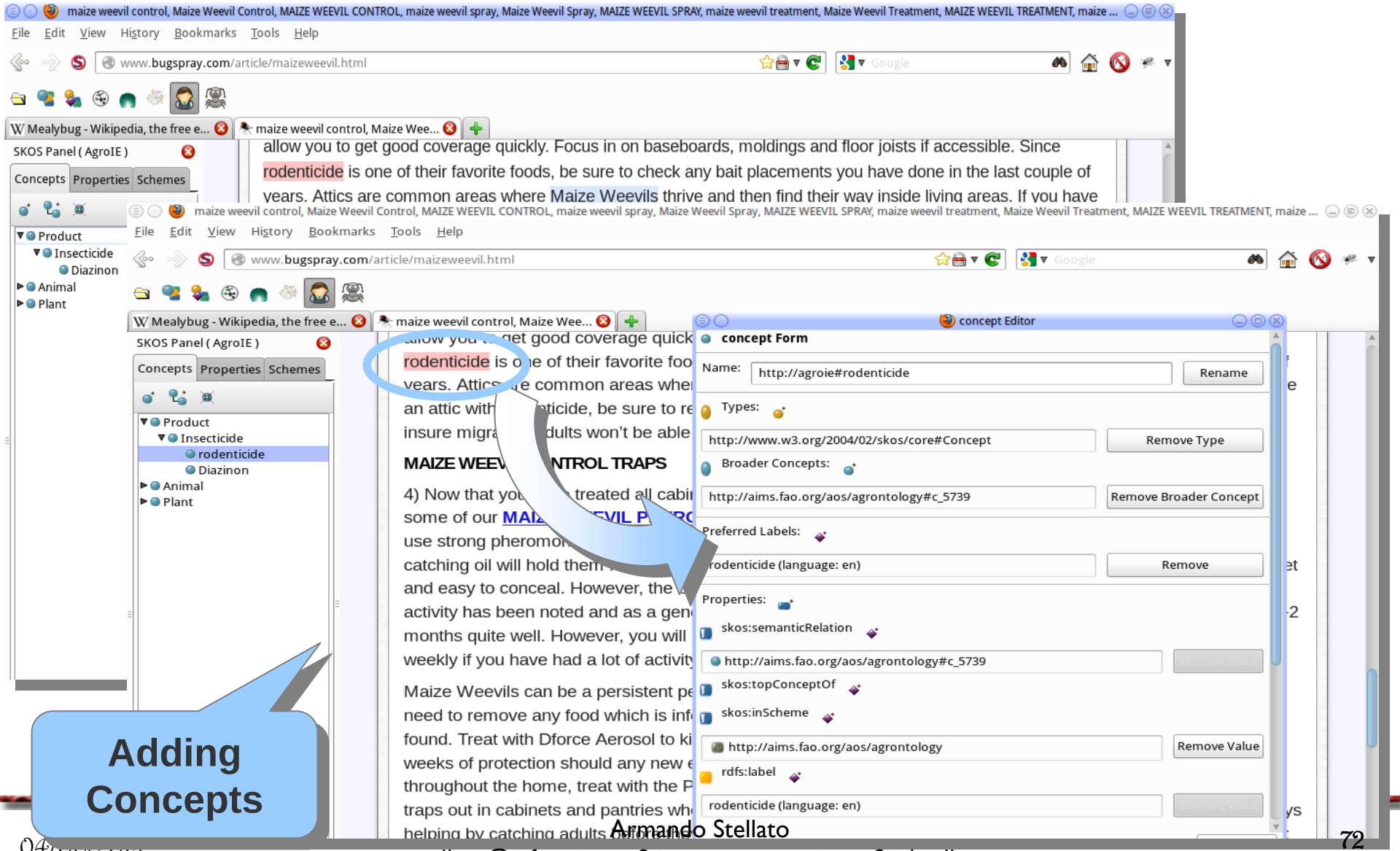
This platform could be put at the hands of user, allowing them to work from VocBench, seamlessly moving in between processed content and acquired knowledge

Showcase – Annotation with AgroIE

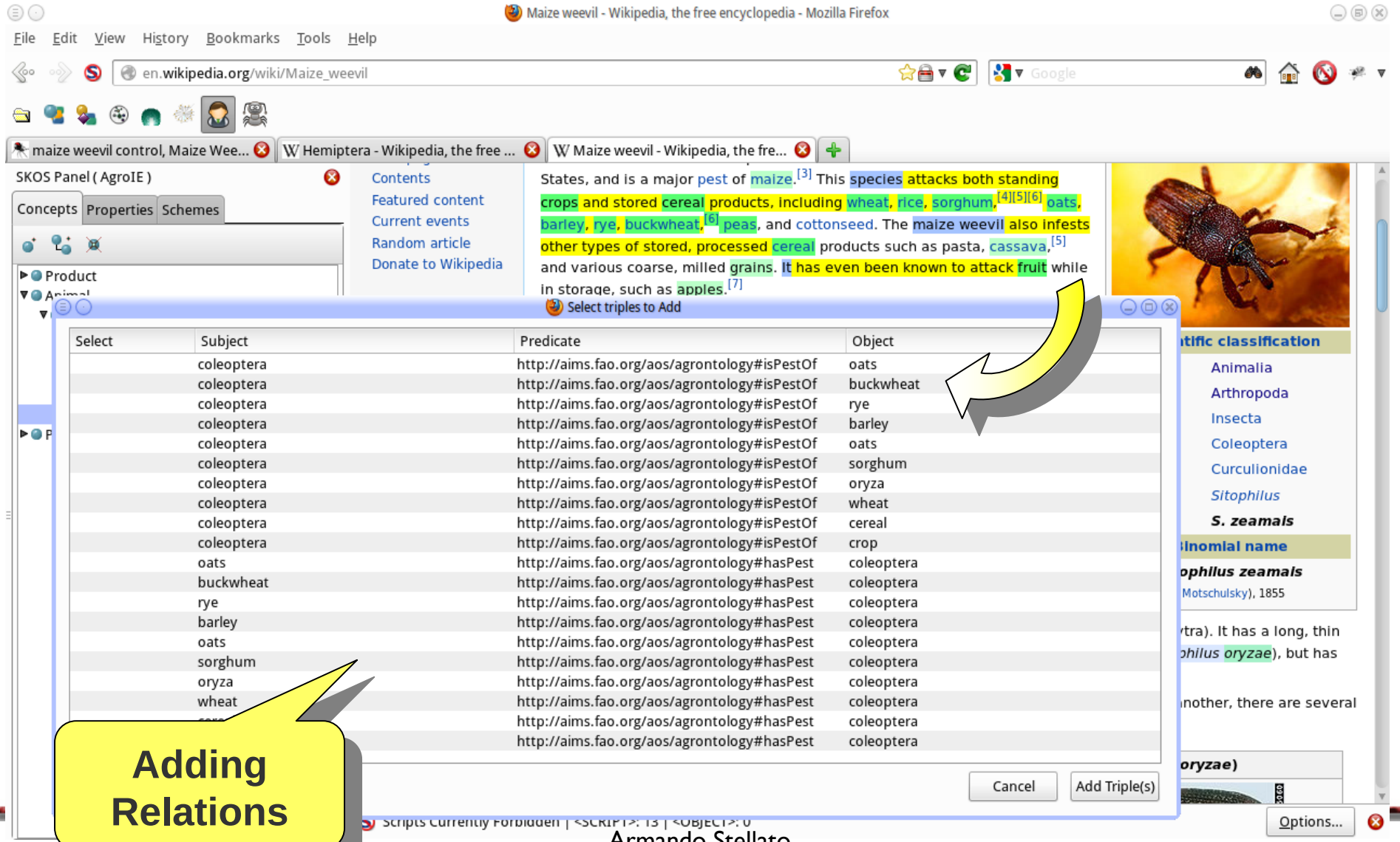
Università di Roma
Artificial Intelligence at Roma Tor Vergata



Showcase - Ontology Enrichment (1)



Showcase - Ontology Enrichment (2)



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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!"

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