

# LusTRE: Linked Thesaurus fRamework for Environment

## The Thesaurus Framework and its exploitation for metadata annotation and data discovery

M.De Martino

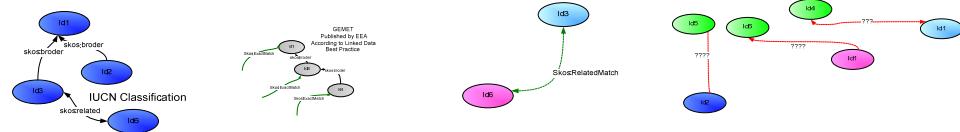
**CNR-IMATI**  
**disy**

Thesaurus Framework as solution to  
the multilingual and multicultural issues in  
the environmental data sharing

- A “common terminology” for the environment to
  - Provide a widely shared concepts
  - Join exploitation of available terminology for different INSPIRE data Theme
  
- A set of services to exploit the Common thesaurus framework
  - To promote uniform data description in metadata provision
  - To improve resource discovery across application and platform

## □ What is going

- Different thesauri have been developed for the Environment
- Thesauri heterogeneity wrt thematic coverage, multilingualism, granularities, popularity in certain communities

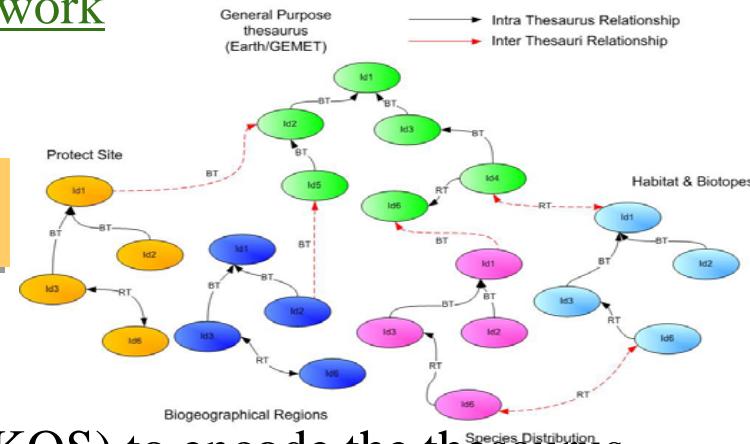


*EARTH    GEMET    THiST    ...*

## □ How to exploit such resources and their heterogeneity ?

- Not only one thesaurus ... integration of different available thesauri
- A open, flexible and easily exploitable framework
- cross walking from a thesaurus to another

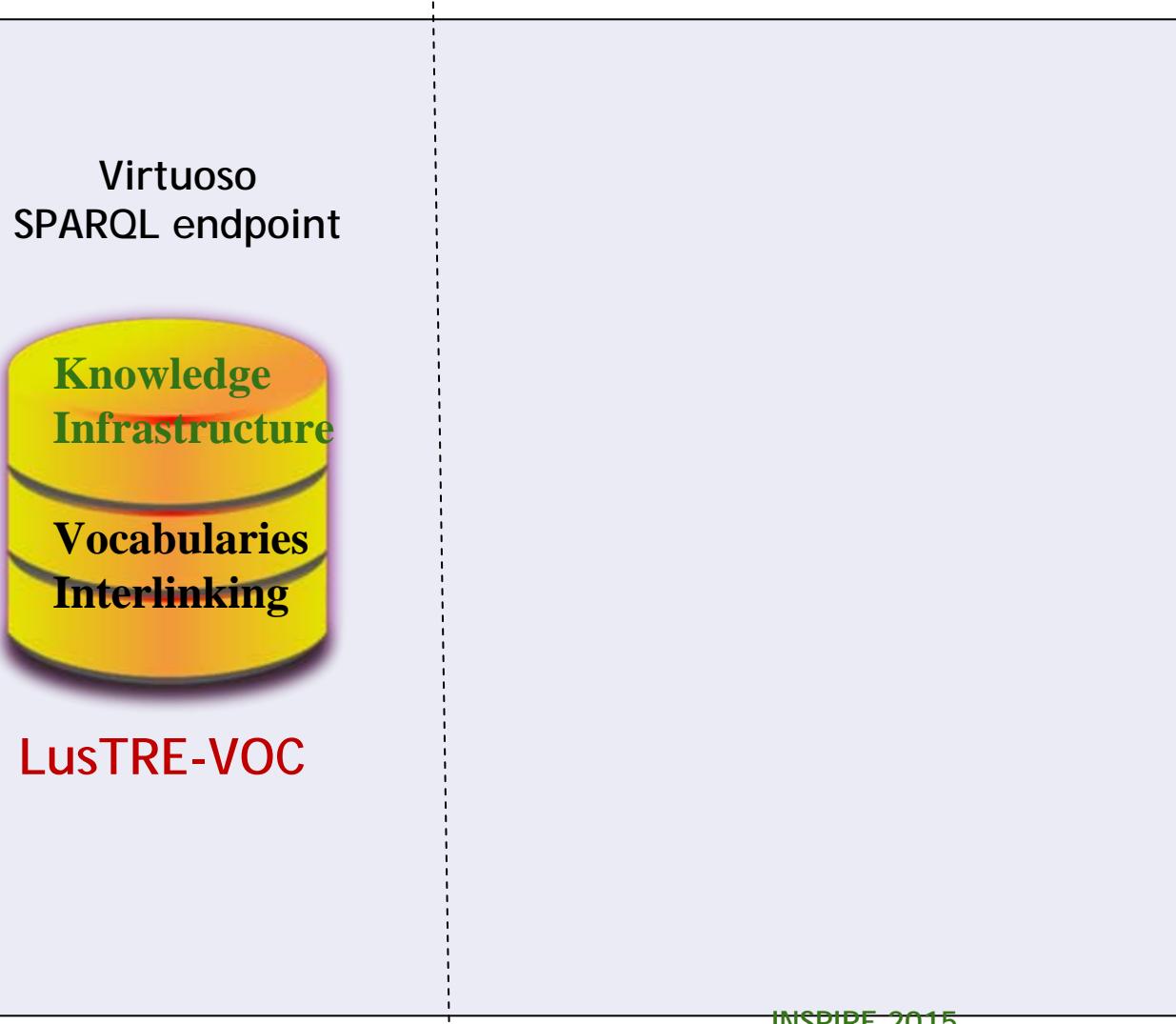
## The Thesaurus Framework



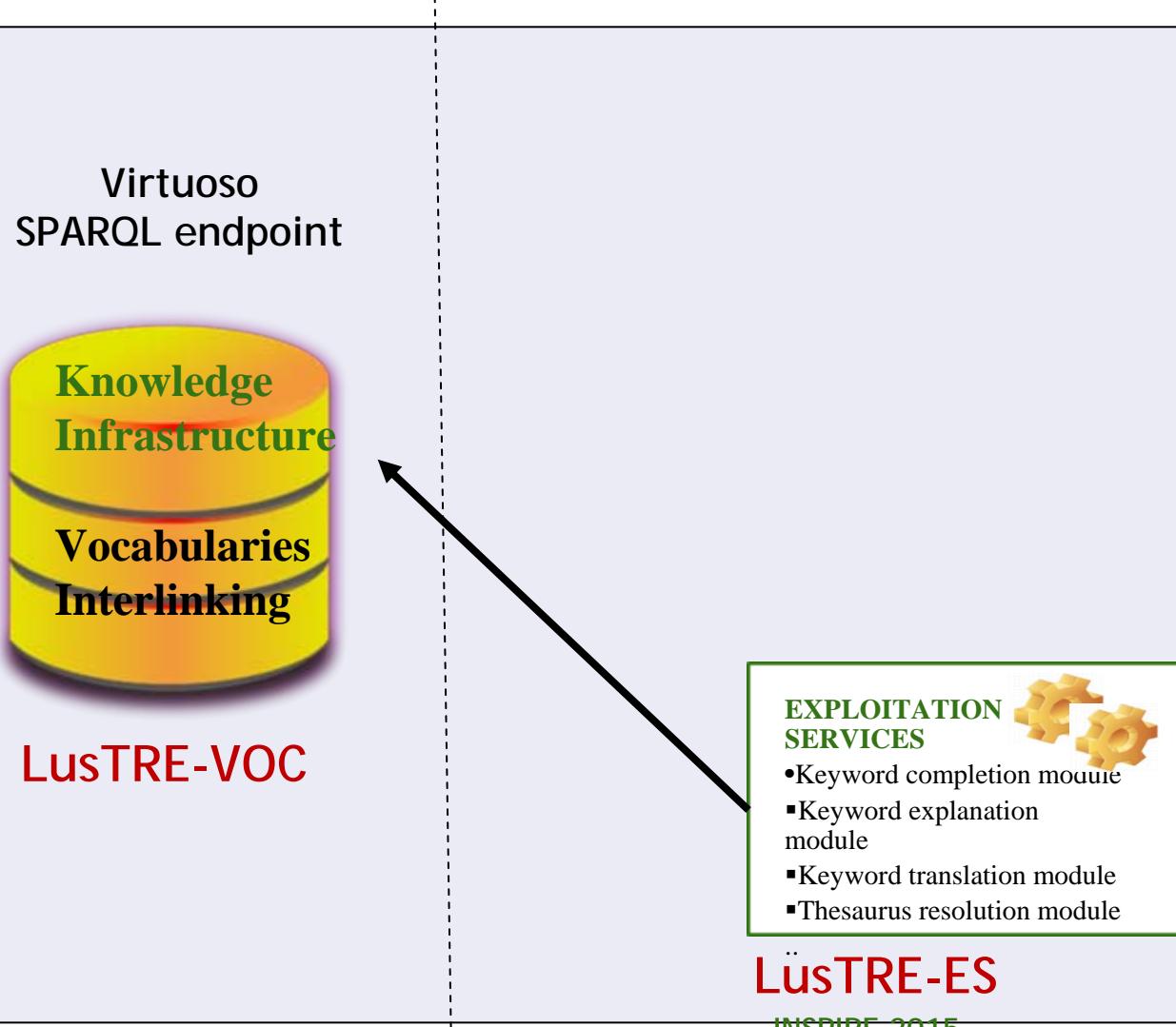
## □ Design Principle

- Simple Knowledge Organization System (SKOS) to encode the thesaurus
- Linked Data best practices to publish the thesaurus

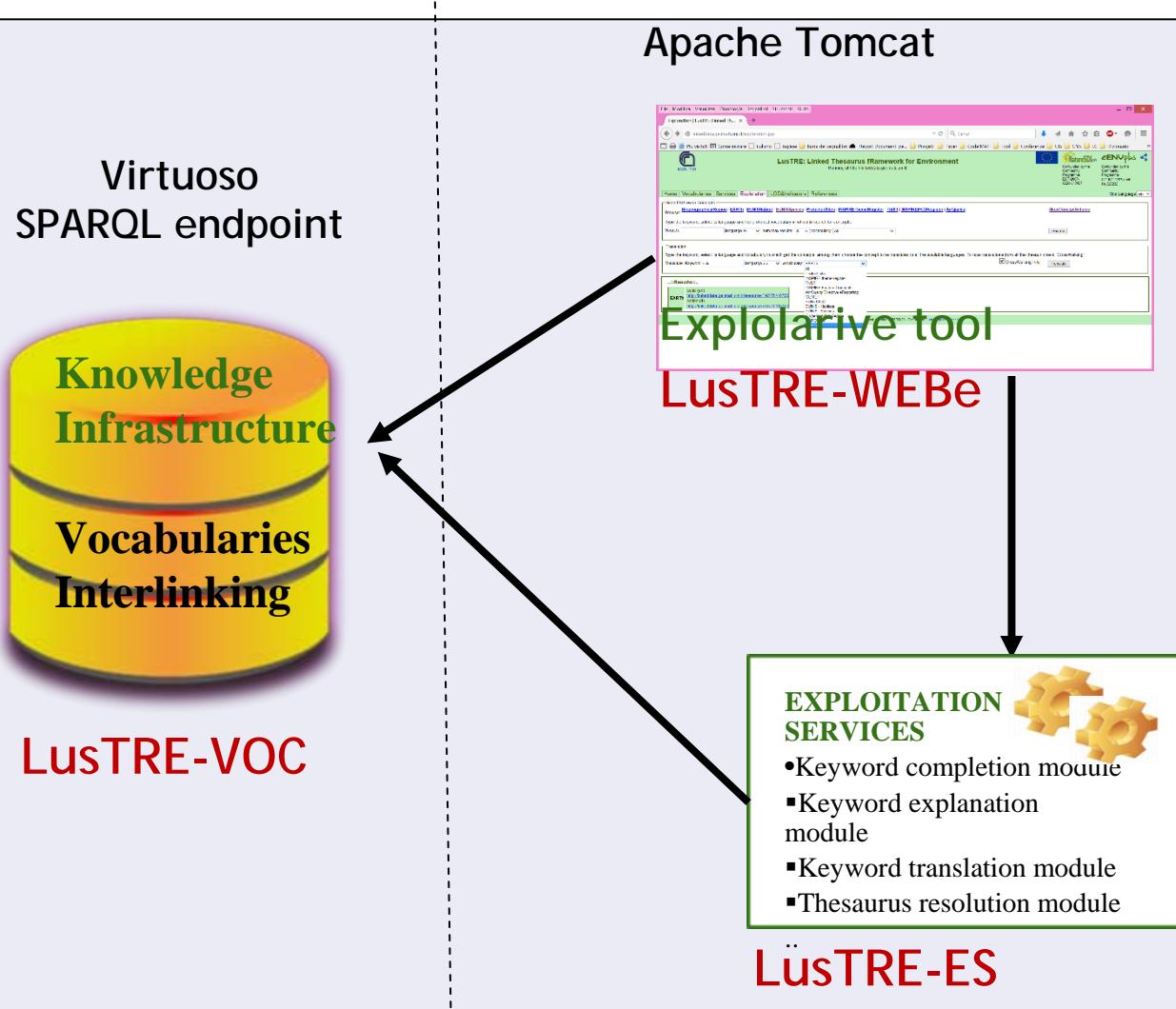
## LusTRE component interactions



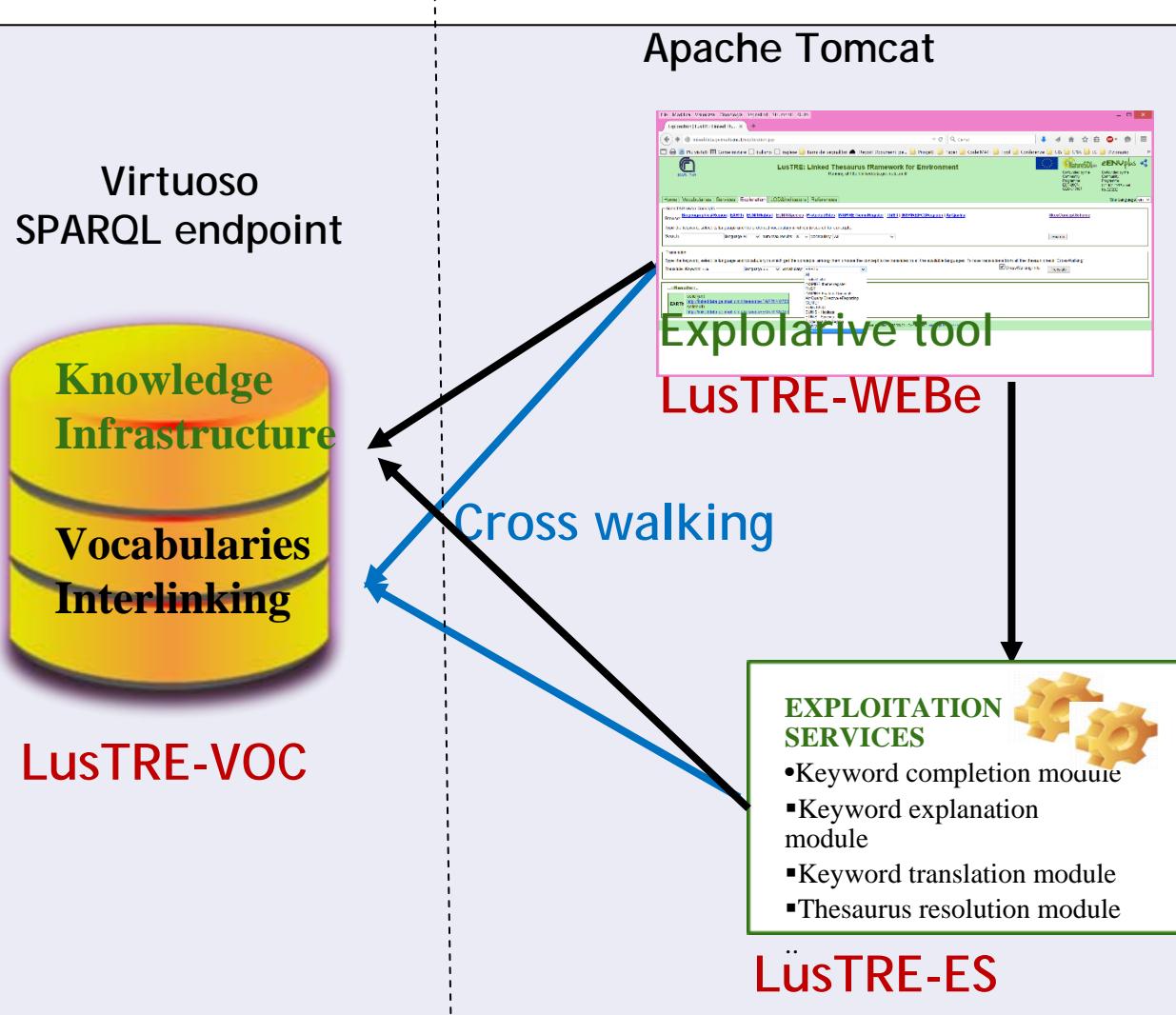
## LusTRE component interactions



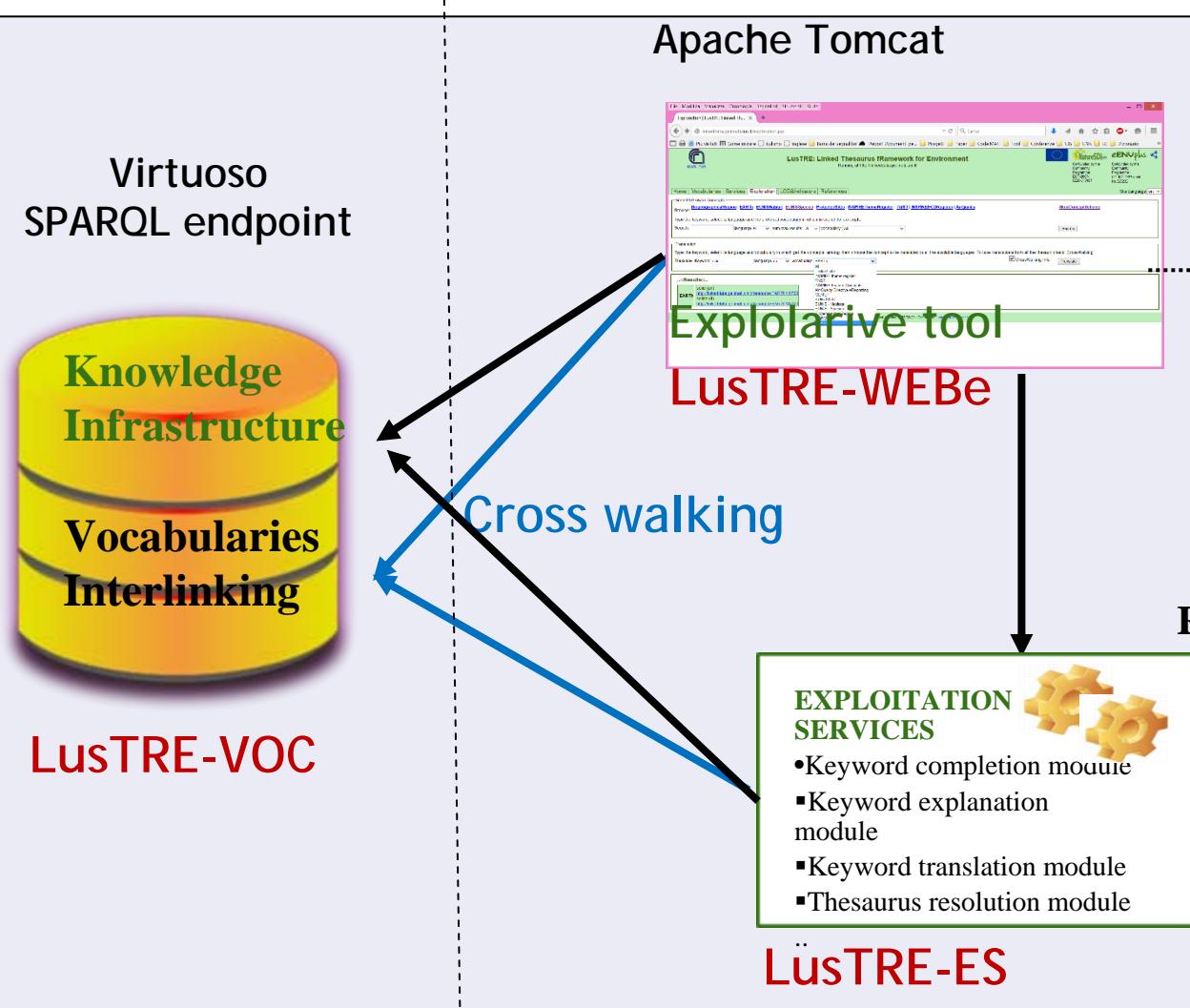
## LusTRE component interactions



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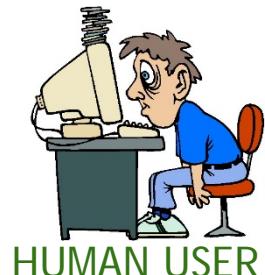


## LusTRE component interactions



### USE CASES

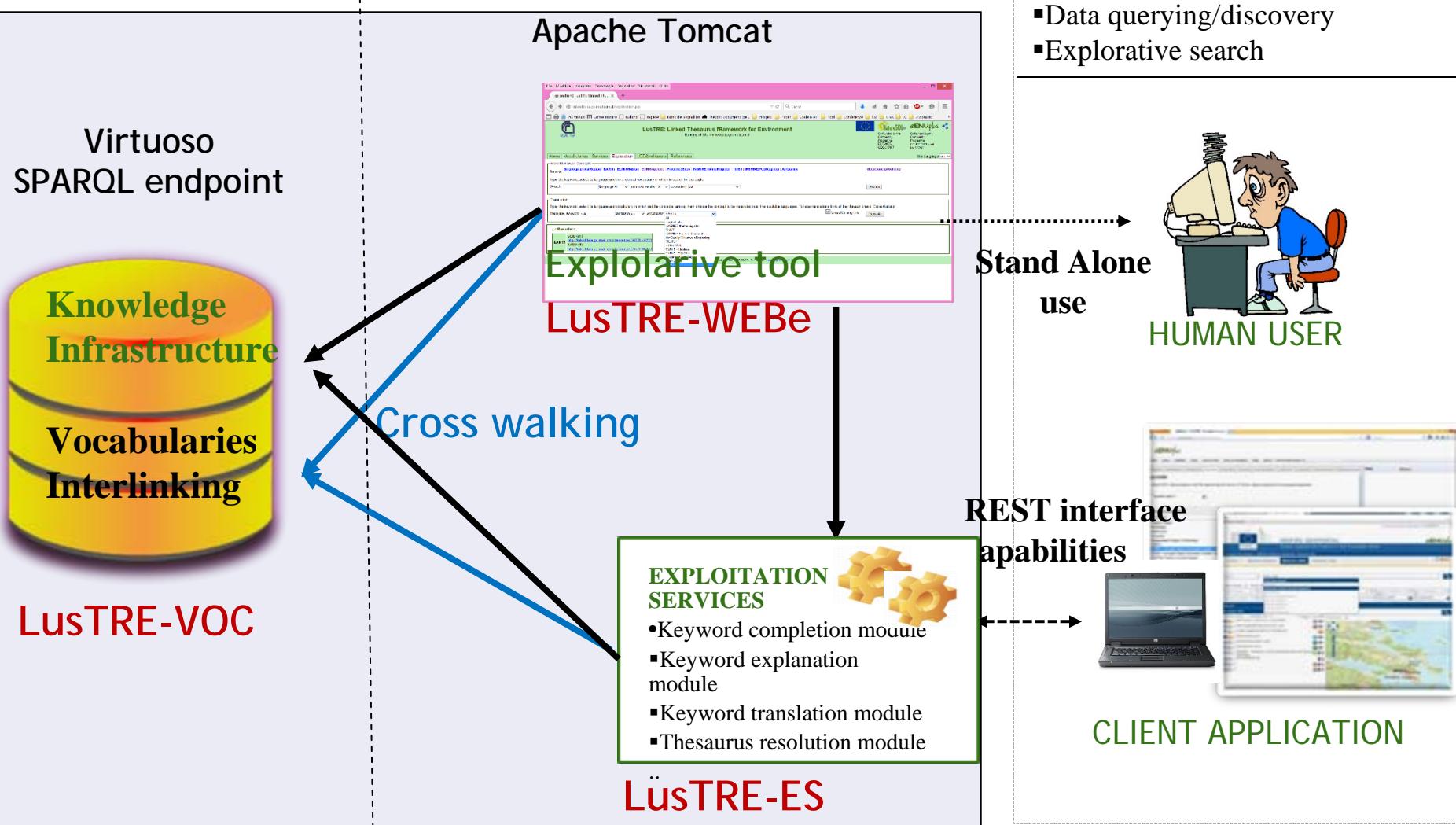
- Metadata creation /compilation
- Data querying/discovery
- Explorative search



**REST interface capabilities**



## LusTRE component interactions



## Knowledge Infrastructure (LuSTRE-VOC)

Expose in Linked Data in LusTRE

Thesauri



THESAURUS

- EARTH
- ThiST
- EUNIS-Species
- EUNIS-Habitat

CodeList



- EEA.Biogeographical Region(*DMEER*)
- IUCN Protected Sites
- INSPIRERegistry: Data Theme
- INSPIRERegistry:Feature ConceptDictionary
- Eionet:AirQuality

Linked Data Vocabulary



LD Vocabularies

- In LusTRE sparql end point
  - GEMET
  - AGROVOC
  - EUROVOC
- In LD CLOUD
  - DBPEDIA
  - Other LD
  - UMTHES
  - CGI Vocabulary



Vocabulary Interlinking

Exploitation Service (LusTRE-ES)

Service modules

- Dummy module (empty response)
- Keyword completion module
- Keyword explanation module
- Keyword translation module
- Thesaurus resolution module
- Semantic explorative search module

### LusTRE-WEBe v1.1 interface

File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto

Exploration | LusTRE: Linked Th... +

linkedata.ge.imati.cnr.it/exploration.jsp

Cerca

Più visitati Come iniziare italiano inglese Barra dei segnalibri Report Documenti per... Progetti Paper CodelMATI Tool Conferenze GIS CNR EC Dizionario

**LusTRE: Linked Thesaurus fRamework for Environment** Running at <http://linkedata.ge.imati.cnr.it/> Co-founded by the Community Programme ECP-2007-GEO-317007 Co-founded by the Community Programme CIP-ICT-PSP grant No 325232

Home Vocabularies Services Exploration LOD&Indicators References Site Language: en

Search&Browse Concepts – [BiogeographicalRegion](#) | [EARTh](#) | [EUNIShabitat](#) | [EUNISSpecies](#) | [ProtectedSites](#) | [INSPIREThemeRegister](#) | [ThIST](#) | [INSPIREIFCDRegister](#) | [AirQuality](#) [SkosConceptScheme](#)

Browse.

Type the keyword, select its language and the preferred vocabulary in which to search for concepts:

Search:  language: All num max results: 25 vocabulary: All

Translation

Type the keyword, select its language and vocabulary in which get the concepts, among them choose the concept to be translated in all the available languages. To take translations from all the thesauri check "CrossWalking".

Translate: Keyword:  language:  vocabulary:   CrossWalking Info

**...:Results::...**

<b>EARTh</b>	solid (en) <a href="http://linkedata.ge.imati.cnr.it/resource/EARTh/40760">http://linkedata.ge.imati.cnr.it/resource/EARTh/40760</a> solid (it) <a href="http://linkedata.ge.imati.cnr.it/resource/EARTh/40760">http://linkedata.ge.imati.cnr.it/resource/EARTh/40760</a>
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All  
 Protect site  
 INSPIRE theme register  
 ThIST  
 INSPIRE Feature Concepts  
 Air Quality Directive eReporting  
 GEMET  
 EUROVOC  
 EUNIS - Habitats  
 EUNIS - Species  
 Biogeographic Region  
 AGROVOC  
**EARTh**

last modified 2015/03/23 - Contact us: [lustre@ge.imati.cnr.it](mailto:lustre@ge.imati.cnr.it)

**Browsing Vocabulary**

The screenshot shows the LusTRE-WEBe v1.1 interface. At the top, there's a navigation bar with links like File, Modifica, Visualizza, Cronologia, Segnalibri, Strumenti, and Aiuto. Below it is a toolbar with various icons. The main content area has a pink header bar with the text "Exploration | LusTRE: Linked Th...". The main page title is "LusTRE: Linked Thesaurus fRamework for Environment" running at <http://linkeddata.ge.imati.cnr.it/>. On the right side, there are logos for IMATI-CNR, NatureSDIplus, and eENVplus, along with text about co-funding by the European Community Programme ECP-2007-GEO-317007 and the CIP-ICT-PSP grant No. 325232. The site language is set to en. The main content area includes sections for "Search&Browse Concepts" (with a red box around the "Browse:" dropdown menu containing "BiogeographicalRegion", "EARTH", "EUNISHabitat", etc.), "Translation" (with a dropdown menu for "Translate: Keyword" and "language: en"), and a results section titled "...:Results:..". The results section shows a table with columns for "EARTH" and "solid (en)" followed by URLs. A tooltip "SkosConceptScheme" is shown above the search bar. The bottom of the page has a footer with the last modified date (2015/03/23) and contact email (lustr@ge.imati.cnr.it).

### Search & Browsing

- ✓ Search for a concept by keyword
- ✓ Browsing the matching concepts

**LusTRE-WEBe v1.1 interface**

**Browsing Vocabulary**

The screenshot shows the LusTRE-WEBe v1.1 interface with a pink header bar. The main content area displays the LusTRE: Linked Thesaurus fRamework for Environment, running at <http://linkeddata.ge.imati.cnr.it/>. The interface includes a navigation menu with Home, Vocabularies, Services, Exploration, LOD&Indicators, and References. A search bar at the top has a red box around it. Below the search bar is a form for "Search & Browse Concepts" with fields for "Search", "language", "num max results", and "vocabulary". A "SkosConceptScheme" link is also present. The "Translation" section allows users to translate concepts between languages. The "Results" section shows a list of terms under the heading "...:Results:..". One entry for "EARTh" is highlighted with a green box, showing its URI (<http://linkeddata.ge.imati.cnr.it/resource/EARTh/40760>) and a link to its solid (en) version (<http://linkeddata.ge.imati.cnr.it/resource/EARTh/40760>). A dropdown menu for "vocabulary" lists various options like All, Protect site, INSPIRE theme register, ThIST, INSPIRE Feature Concepts, Air Quality Directive eReporting, GEMET, EUROVOC, EUNIS - Habitats, EUNIS - Species, Biogeographic Region, AGROVOC, and EARTh, with "EARTh" also highlighted in blue.

### Search & Browsing

- ✓ Search for a concept by keyword
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**LusTRE-WEBe v1.1 interface**

**Browsing Vocabulary**

**Translation**

Search & Browse Concepts

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SkosConceptScheme

BiogeographicalRegion | EARTH | EUNISHabitat | EUNISpecies | ProtectedSites | INSPIREThemeRegister | ThIST | INSPIREIFCDRegister | AirQuality

Translation

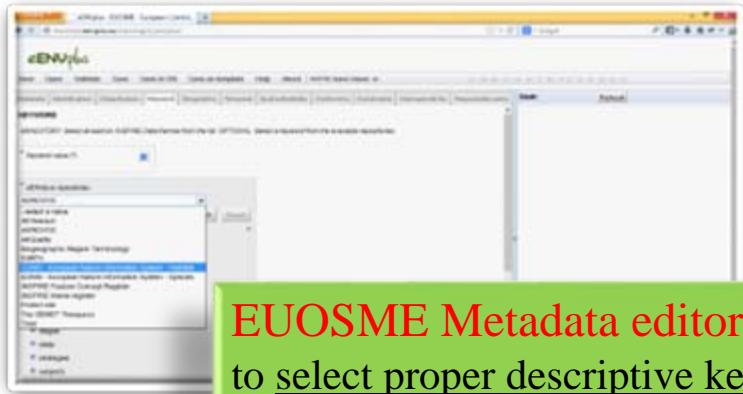
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Translate: Keyword: soli vocabulary: EARTH All  CrossWalking Info

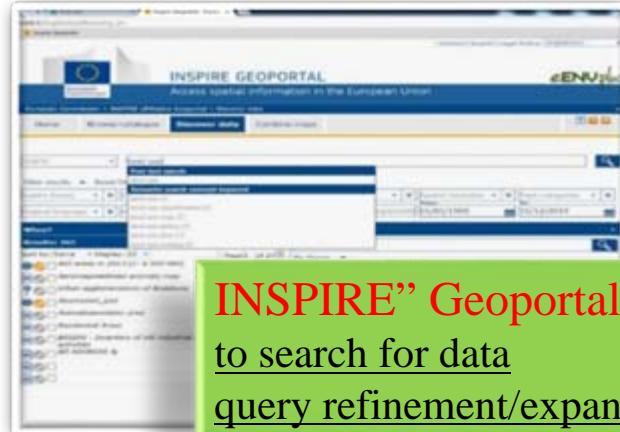
...:Results::

EARTH solid (en) <http://linkeddata.ge.imati.cnr.it/resource/EARTH/40760> solid (it) <http://linkeddata.ge.imati.cnr.it/resource/EARTH/40760>

## □ Metadata Client application



EUOSME Metadata editor  
to select proper descriptive keywords



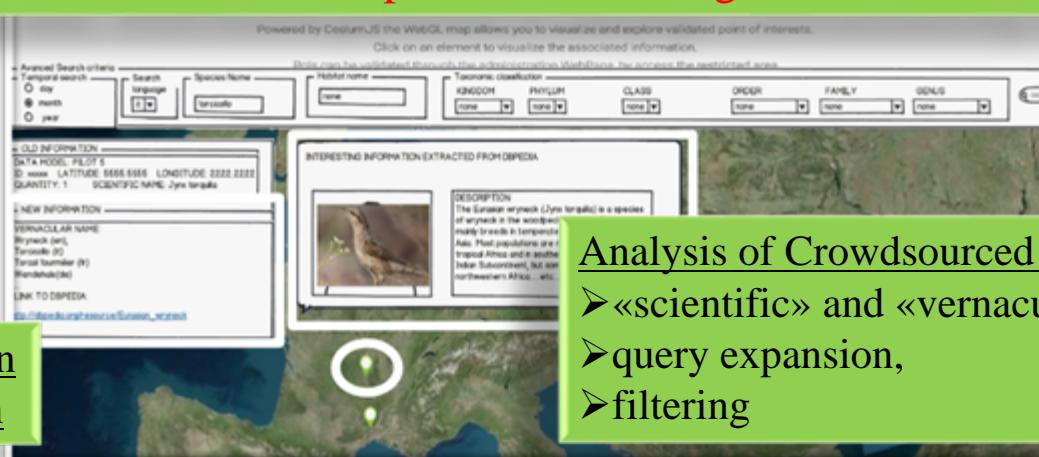
INSPIRE" Geoportal Data  
to search for data  
query refinement/expansion

## □ Data Client application

Mobile and Web-based platform to manage Crowdsourcing data



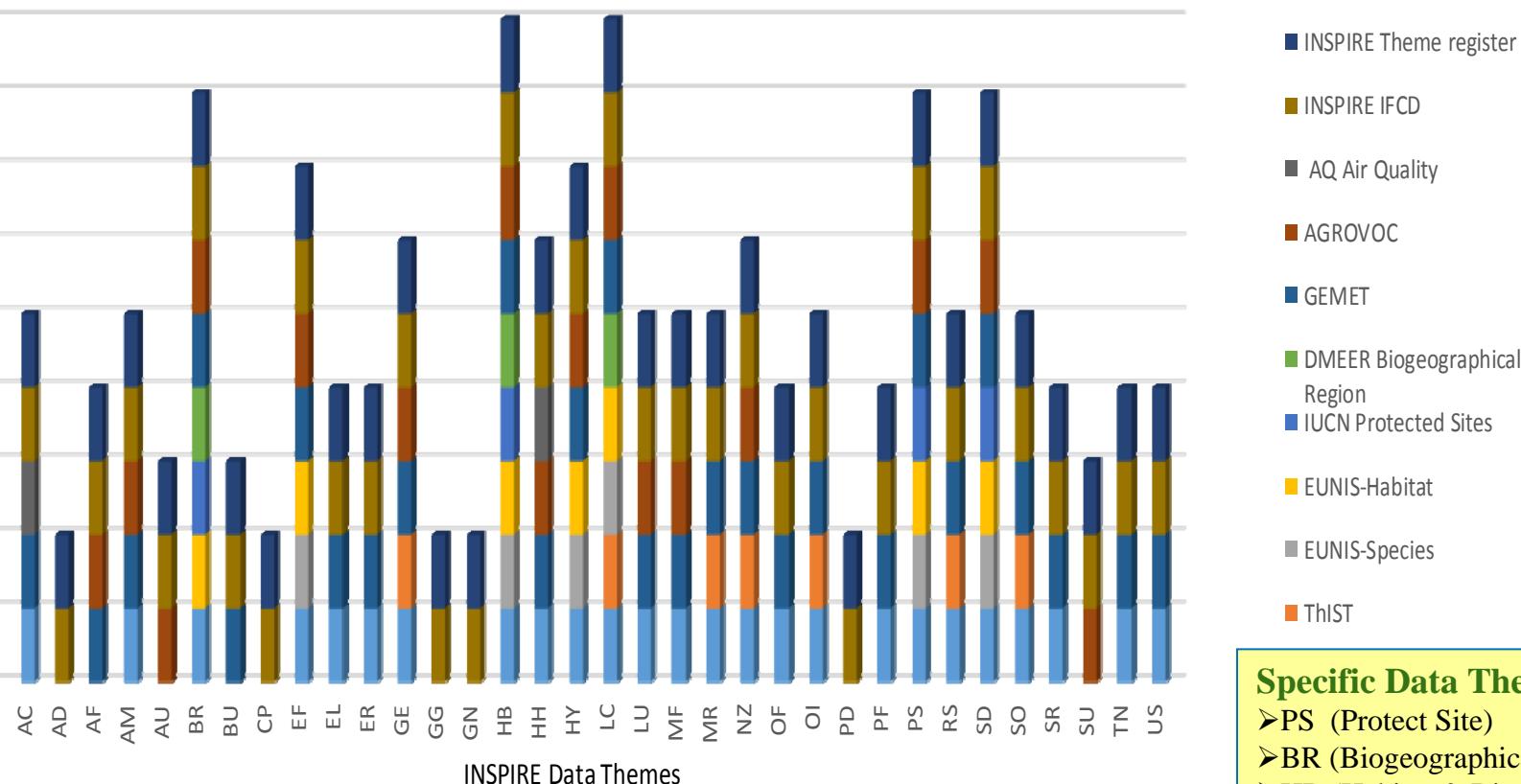
In-situ species observation  
Semantic data Annotation



Analysis of Crowdsourced Species distribution  
➤ «scientific» and «vernacular»,  
➤ query expansion,  
➤ filtering

# LusTRE Indicator

### Distribution of LusTRE Vocabularies respect Data Theme Coverage



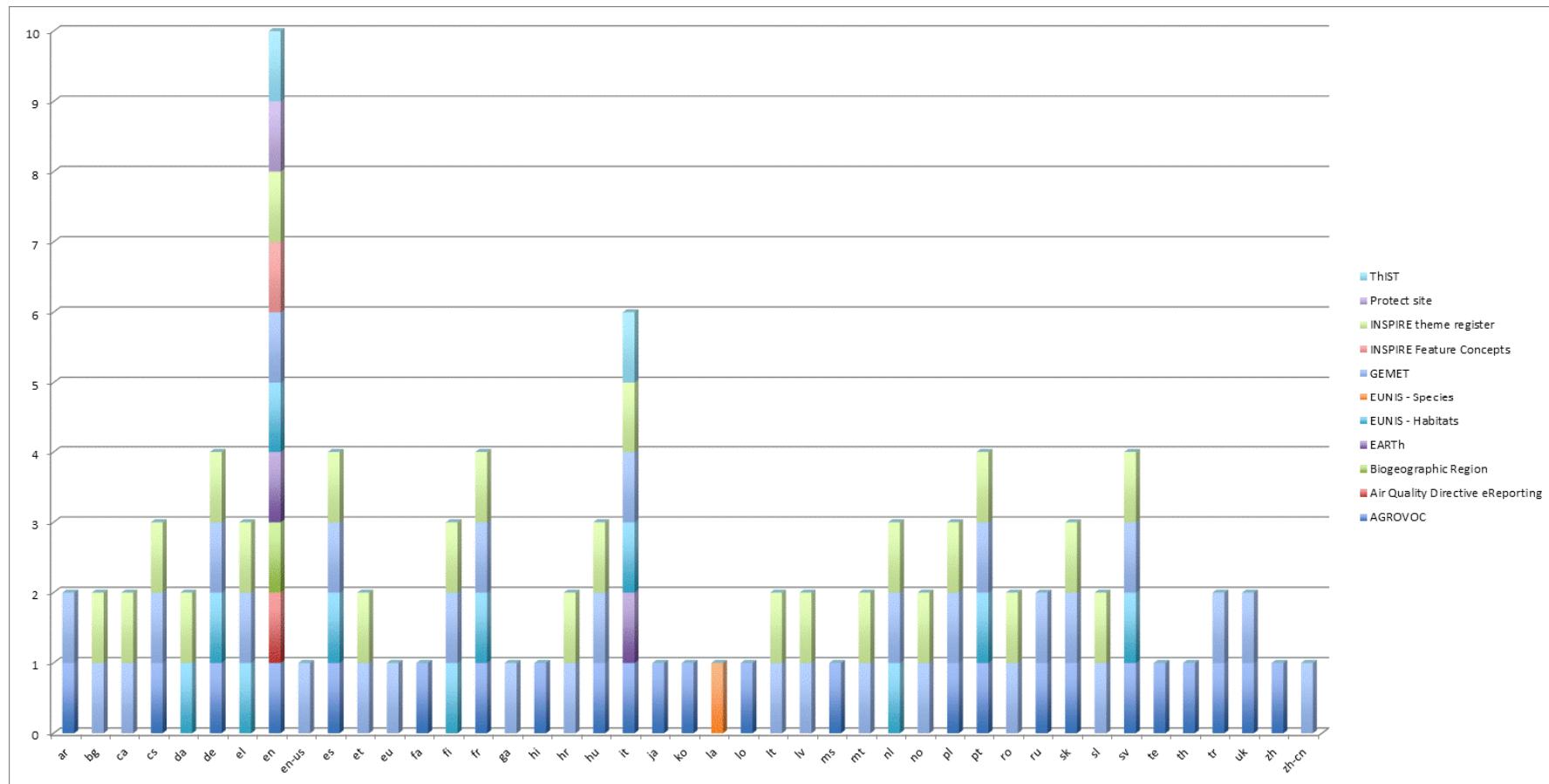
INSPIRE 2015

Lisbon, 25-29 May 2015

#### Specific Data Theme coverage

- PS (Protect Site)
- BR (Biogeographical regions)
- HB (Habitat & Biotope)
- SD (Species Distribution)
- EF (Environmental monitoring facilities)
- SO (Soil)
- AQ (Air Quality)

## Distribution of vocabularies respect their Languages Coverage



**□ log access numbers:**

- 131033 access to LusTRE - period 25 September to 9 December  
3962 access to services - period 4 November to 9 December



**Map of access locations done during December 2014**

## ❑ Outcomes: LusTRE

- ❑ Knowledge Infrastructure for a “common” terminology for “All”
- ❑ Services and exploration tool
  - ❑ to metadata compilation
  - ❑ to data discovery

## ❑ Next release

- ❑ New services LuSTRE-ES: Semantic explorative search with semantic visualization (June)
- ❑ Web Application exploiting LuSTRE to analyze Species crowd sourced data

## ❑ LusTRE available at <http://linkeddata.ge.imati.cnr.it/>

## ■ We invite you to visite

- ✓ LusTRE web site: LusTRE available at:

**<http://linkeddata.ge.imati.cnr.it>**

- ✓ eENVplus showcase at:

**[showcase-eenvplus.eu/](http://showcase-eenvplus.eu/)**

Contact Persons:

Thank for your attention !

CNR-IMATI

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