

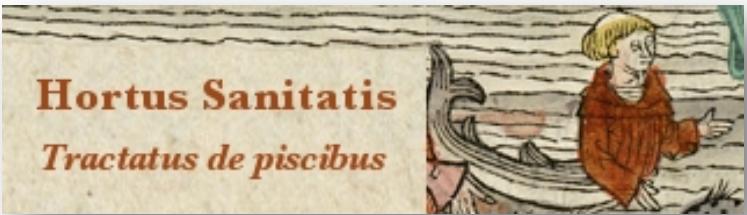


Publier, Lier et Utiliser TAXREF dans le Web de Données

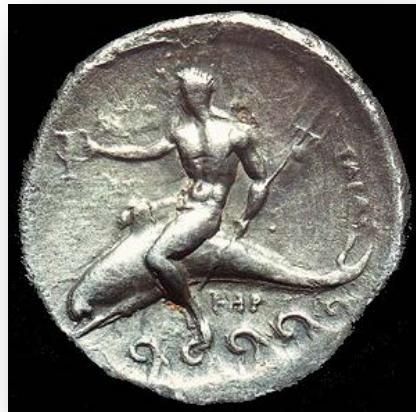
C. Callou, C. Faron-Zucker, O. Gargominy, C. Martin, F. Michel, J. Montagnat, S. Tercerie, M. Tounsi, F. Vest



Introduction



"Delphinus frater hominis
dicitur, quia moribus humanis
quodammodo assimilatur."

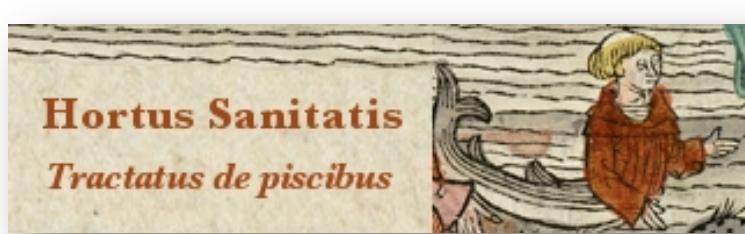


"Taras, riding dolphin"
Tarento, South of Italy.
302-281 BC(?)

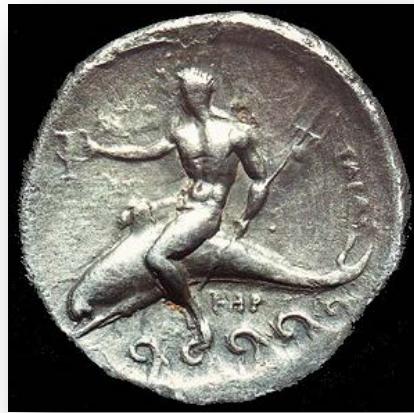


Modern zoological reference
Cetacea, Delphinidae,
Delphinus...

Introduction



"Delphinus frater hominis
dicitur, quia moribus humanis
quodammodo assimilatur."



"Taras, riding dolphin"
Tarento, South of Italy.
302-281 BC(?)



TAXREF

INPN Inventaire
National du
Patrimoine
Naturel

Modern zoological reference
Cetacea, Delphinidae,
Delphinus...

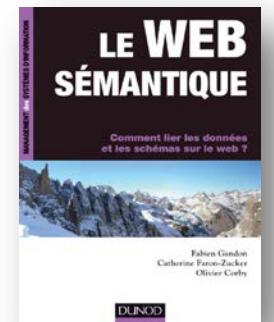
Semantic Web

“The Semantic Web is an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation.”

Tim Berners-Lee et al. 2001.

- Use URIs to identify a piece of data, an abstract resource...
- Use RDF to represent data: directed labeled graphs
 - “Subject predicate object”
- Define and use vocabularies (RDFS, OWL)
 - Classes, properties, inheritance

```
@prefix dc: <http://purl.org/dc/elements/1.1/>.  
<http://inria.fr/ex/websem.html>  
    dc:author <http://ns.inria.fr/catherine.faron>;  
    dc:theme "Semantic Web".
```

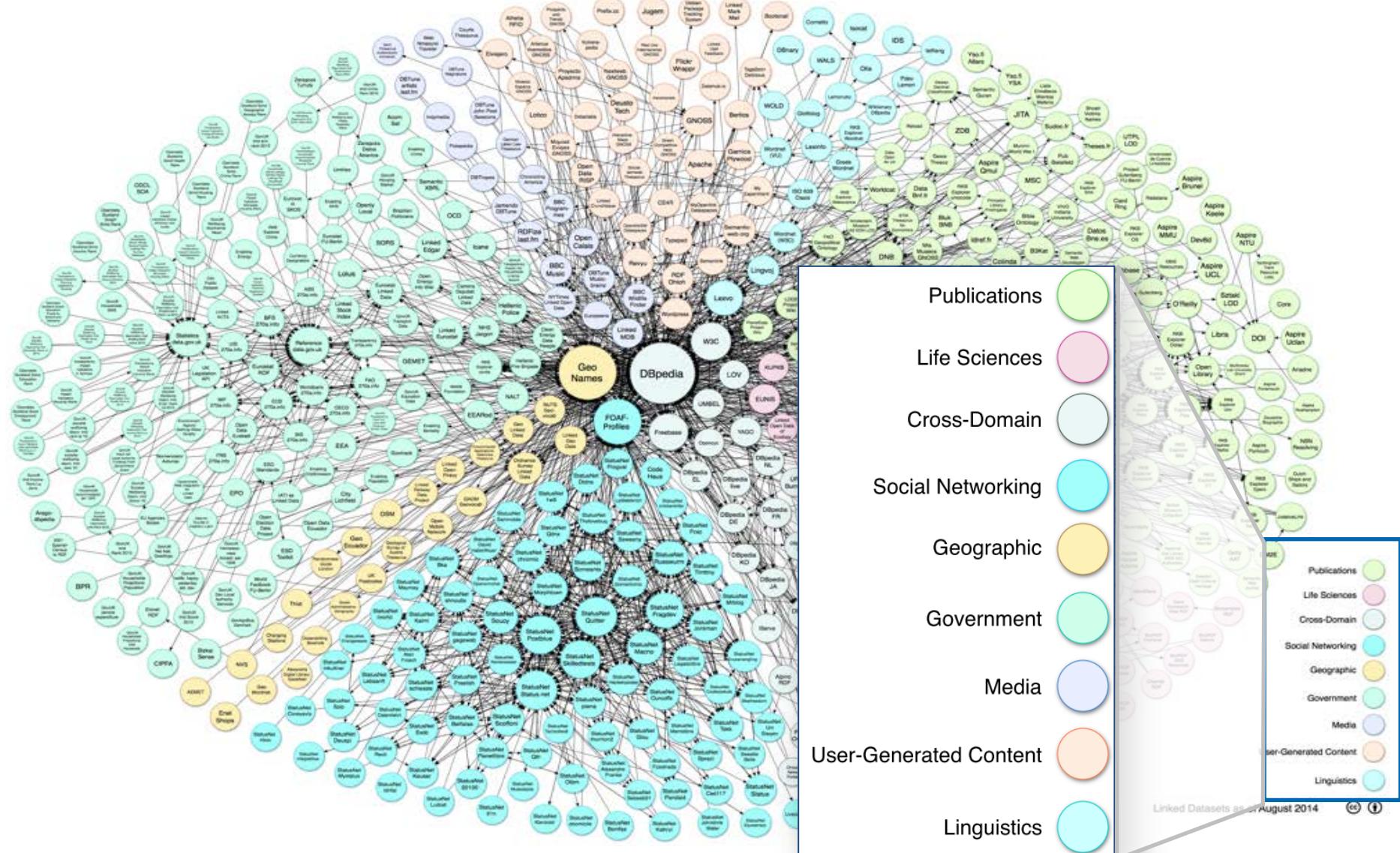


Linked Data rules

1. Use URIs as names for things
2. Use HTTP URIs so that people can look up those names
3. When someone looks up a URI, provide useful information, using the standards (RDF*, SPARQL)
4. Include links to other URIs, so that they can discover more things



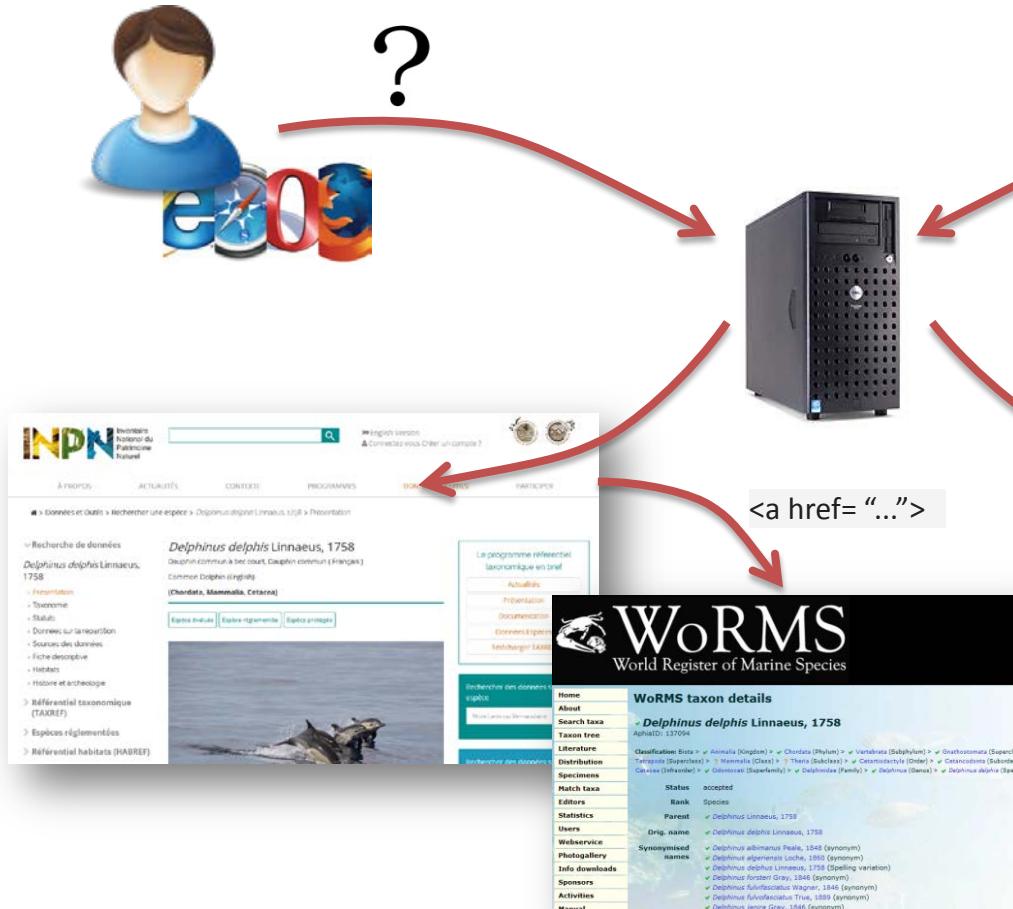
Linked Open Data



From TAXREF to the Web of Data

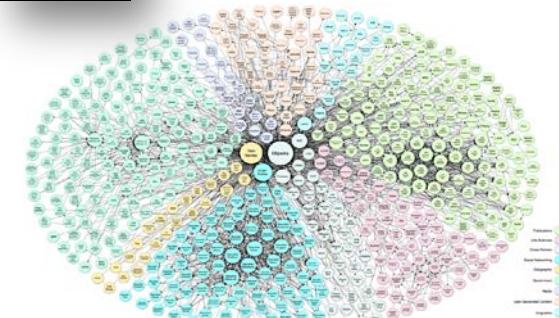
Enable use by linked-data based applications

<http://inpn.mnhn.fr/taxref/label/60878>



<http://inpn.mnhn.fr/taxref/label/60878>

skos:closeMatch,
skos:relatedMatch,
owl:sameAs,
rdfs:seeAlso, ...



From TAXREF to the Semantic Web

CD_NOM : Unique identifier of the scientific name

CD_SUP : Identifier of the upper taxon in the classification

CD_REF : Identifier of the reference taxon

RANG : taxonomical rank

1	REGNE	PHYLUM	CLASSE	ORDRE	FAMILLE	GROUP1	GROUP2_INP	CD_NOM	CD_TAXS	CD_REF	RANG	LB_NOM		LB_AUTEUR	NOM_COMPLET	NOM_COMP	NOM_
189650	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	186227	186224	186227	FM	Delphinidae		Gray, 1821	Delphinidae Gray, 1821	Delphinidae	Delphi
189651	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	535142	186227	535142	GN	Cephalorhynchus		Gray, 1846	Cephalorhynchus Gray, 1846	Cephalorhynchus	Cepha
189652	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	535143	535142	535143	ES	Cephalorhynchus commersonii	(Lacépède, 1804)	Cephalorhynchus	Cephalorhynchus	Cephalo	
189653	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589259	535142	535143	ES	Cephalorhynchus commersoni	Yanez, 1948	Cephalorhynchus	Cephalorhynchus	Cepha	
189654	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	586998	535142	535143	ES	Delphinus commersonii	(Lacépède, 1804)	Delphinus comm	Delphinus comm	Delphinu	
189655	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	577923	535142	535143	ES	Lagenorhynchus burmeisteri	Moreno, 1892	Lagenorhynchus	Lagenorhynchus	Cepha	
189656	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	586999	535142	535143	ES	Lagenorhynchus floweri	Moreno, 1892	Lagenorhynchus	Lagenorhynchus	Cepha	
189657	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	577966	535142	535143	ES	Phocoena commersonii	Lesson, 1827	Phocoena comm	Phocoena	Cepha	
189658	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	191591	186227	191591	GN	Delphinus	Linnaeus, 1758	Delphinus Linnae	Delphinu	Delphi	
189659	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	361079	191591	361079	ES	Delphinus capensis	Gray, 1828	Delphinus capen	Delphinu	Delphi	
189660	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589323	191591	361079	ES	Delphinus bairdi	Norris & Prescott, 1961	Delphinus bairdi	Delphinu	Delphi	
189661	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	60880	191591	361079	ES	Delphinus bairdii	Dall, 1873	Delphinus baird	Delphinu	Delphi	
189662	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589339	191591	361079	ES	Delphinus dussumieri	Blanford, 1891	Delphinus dussu	Delphinu	Delphi	
189663	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589370	191591	361079	ES	Delphinus frithii	Blyth, 1859	Delphinus frithii	Delphinu	Delphi	
189664	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589383	191591	361079	ES	Delphinus longirostris	G. Cuvier, 1829	Delphinus longir	Delphinu	Delphi	
189665	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589385	191591	361079	ES	Delphinus major	Gray, 1866	Delphinus major	Delphinu	Delphi	
189666	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589394	191591	361079	ES	Delphinus microps	Burmeister, 186	Delphinus micro	Delphinu	Delphi	
189667	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589395	191591	361079	ES	Delphinus moorei	Gray, 1866	Delphinus moore	Delphinu	Delphi	
189668	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589415	191591	361079	ES	Delphinus sao	Gray, 1850	Delphinus sao Gr	Delphinu	Delphi	
189669	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	669537	361079	669537	SSES	Delphinus capensis tropicalis	Jefferson & Van Thiel, 1955	Delphinus capen	Delphinu	Delphi	
189670	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	60878	191591	60878	ES	Delphinus delphis	Linnaeus, 1758	Delphinus delph	Delphinu	Delphi	
189671	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589316	191591	60878	ES	Delphinus albimanus	Peale, 1848	Delphinus albim	Delphinu	Delphi	
189672	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589319	191591	60878	ES	Delphinus algeriensis	Loche, 1860	Delphinus algeri	Delphinu	Delphi	
189673	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	551374	191591	60878	ES	Delphinus delphus	Linnaeus, 1758	Delphinus delph	Delphinu	Delphi	
189674	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589344	191591	60878	ES	Delphinus forsteri	Gray, 1846	Delphinus forste	Delphinu	Delphi	
189675	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589368	191591	60878	ES	Delphinus fulvifasciatus	Wagner, 1846	Delphinus fulvifa	Delphinu	Delphi	
189676	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589369	191591	60878	ES	Delphinus fulvofo	True, 1889	Delphinus fulvof	Delphinu	Delphi	

From TAXREF to the Semantic Web

How to transition from this representation...

1	REGNE	PHYLUM	CLASSE	ORDRE	FAMILLE	GROUP1_GROUP2_INP	CD_NOM	CD_TAXID	CD_REF	RANG	LB_NOM	LB_AUTEUR	NOM_COMPLET	NOM_COMP_NOM	
189650	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	186227	186224	186227	FM	Delphinidae	Gray, 1821	Delphinidae Gra Delphinidae Delphi	
189651	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	535142	186227	535142	GN	Cephalorhynchus	Gray, 1848	Cephalorhynchus < >Cephalori Cepha	
189652	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	535143	535142	535143	ES	Cephalorhynchus commersonii	(Lacépède, 1804)	Cephalorhynchus < >Cephalori Cepha	
189653	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589259	535142	535143	ES	Cephalorhynchus commersoni	Yanez, 1948	Cephalorhynchus < >Cephalori Cepha	
189654	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	586998	535142	535143	ES	Delphinus commersonii	Lacépède, 1804	Delphinus comm >>Delphin: Cepha	
189655	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	577923	535142	535143	ES	Lagenorhynchus burmeisteri	Moreno, 1892	Lagenorhynchus < >Lagenorh: Cepha	
189656	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	586999	535142	535143	ES	Lagenorhynchus floweri	Moreno, 1892	Lagenorhynchus < >Lagenorh: Cepha	
189657	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	577966	535142	535143	ES	Phocoena commersonii	Lesson, 1827	Phocoena comm >>phocoen: Cepha	
189658	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	191591	186227	191591	GN	Delphinus	Linnaeus, 1758	Delphinus Linna >>Delphin: Delphi	
189659	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	361079	191591	361079	ES	Delphinus capensis	Gray, 1828	Delphinus capen >>Delphin: Delphi	
189660	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589323	191591	361079	ES	Delphinus bairdi	Norris & Prescott, 1868	Delphinus bairdi >>Delphin: Delphi	
189661	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	60880	191591	361079	ES	Delphinus bairdii	Dall, 1873	Delphinus bairdi >>Delphin: Delphi	
189662	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589339	191591	361079	ES	Delphinus dussumieri	Blanford, 1891	Delphinus dussu >>Delphin: Delphi	
189663	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589370	191591	361079	ES	Delphinus frithii	Blyth, 1859	Delphinus frithii >>Delphin: Delphi	
189664	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589383	191591	361079	ES	Delphinus longirostris	G. Cuvier, 1829	Delphinus longir >>Delphin: Delphi	
189665	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589385	191591	361079	ES	Delphinus major	Gray, 1866	Delphinus major >>Delphin: Delphi	
189666	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589394	191591	361079	ES	Delphinus micros	Burmeister, 1865	Delphinus micro >>Delphin: Delphi	
189667	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589395	191591	361079	ES	Delphinus moorei	Gray, 1866	Delphinus moor >>Delphin: Delphi	
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189670	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	60878	191591	60878	ES	Delphinus delphis	Linnaeus, 1758	Delphinus delph >>Delphin: Delphi	
189671	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589316	191591	60878	ES	Delphinus albimanus	Peale, 1848	Delphinus albim >>Delphin: Delphi	
189672	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589319	191591	60878	ES	Delphinus algeriensis	Loche, 1860	Delphinus algeri >>Delphin: Delphi	
189673	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	551374	191591	60878	ES	Delphinus delphis	Linnaeus, 1758	Delphinus delph >>Delphin: Delphi	
189674	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589344	191591	60878	ES	Delphinus forsteri	Gray, 1848	Delphinus forste >>Delphin: Delphi	
189675	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589368	191591	60878	ES	Delphinus fulvifasciatus	Wagner, 1846	Delphinus fulvif >>Delphin: Delphi	
189676	Animalia	Chordata	Mammalia	Cetacea	Delphinidae	Chordés	Mammifères	589369	191591	60878	ES	Delphinus fulvofuscatus	True, 1889	Delphinus fulvo >>Delphin: Delphi	

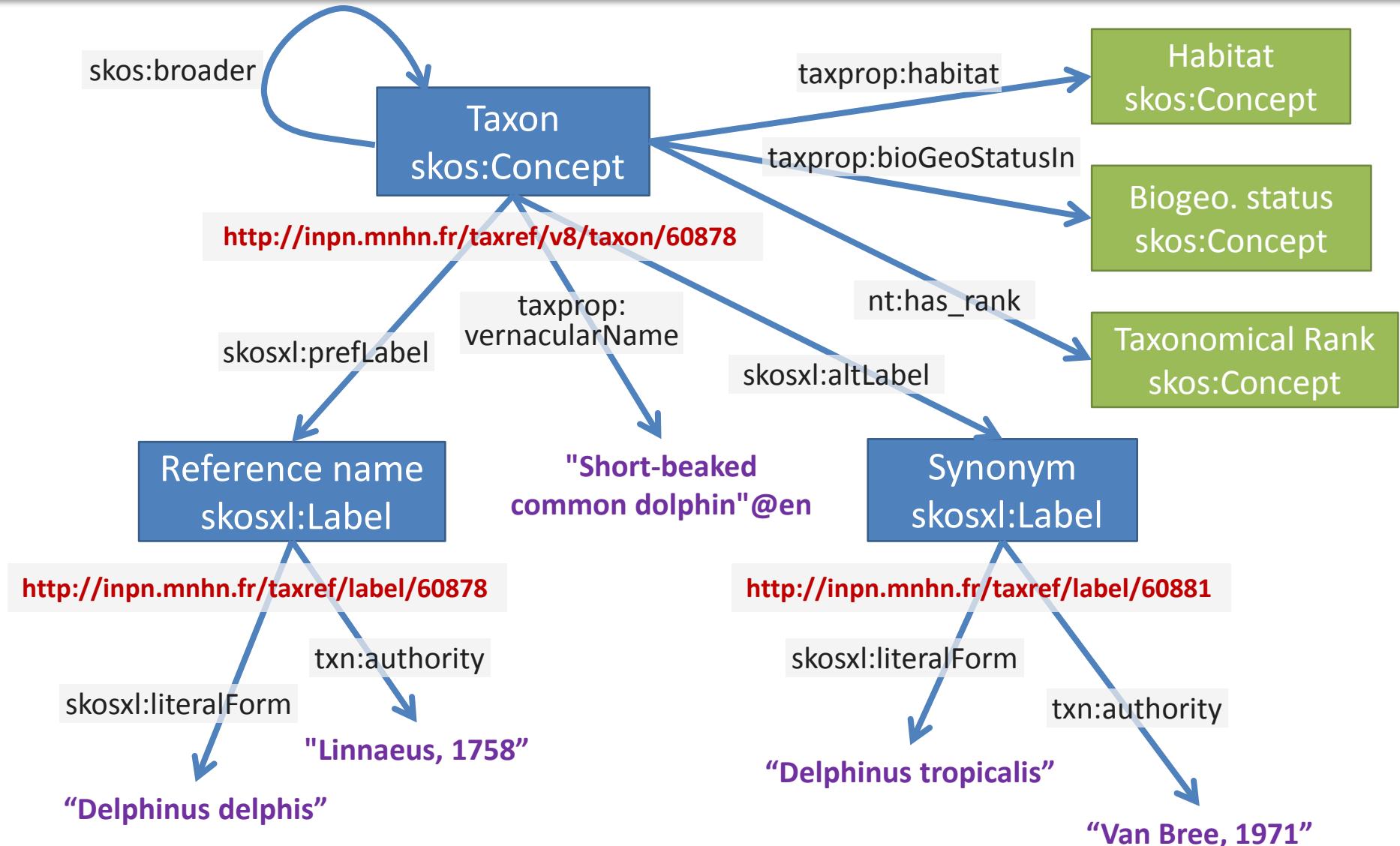
...to a Thesaurus exploitable as a **semantic reference** using SW technologies?

SKOS: Simple Knowledge Organization System

W3C RDF-based standard to represent controlled vocabularies: **glossary, taxonomy, thesaurus...**

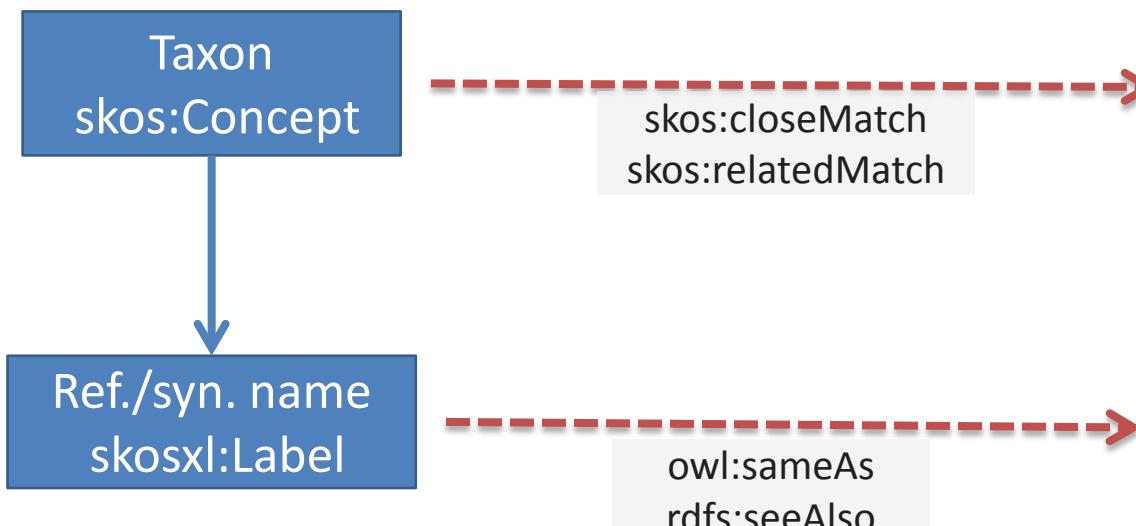
Goal: Bridge the gap between existing KOS and the Semantic Web and Linked Data.

TAXREF SKOS Modelling

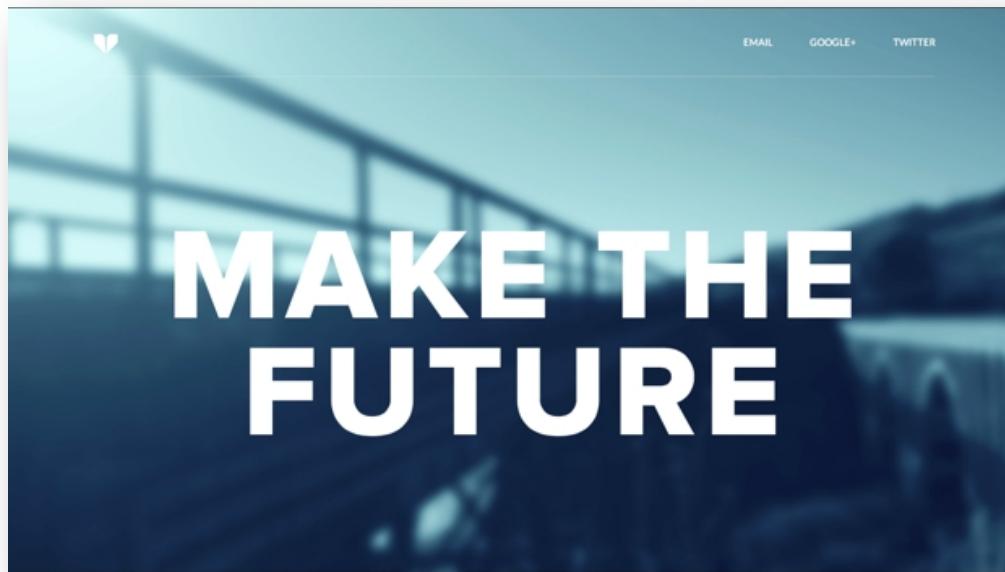


On-going work

Automatic discovery of links with well-adopted open data sets



Perspectives and on-going works



TAXREF-SKOS is just an **enabler** for further use...

Next steps:

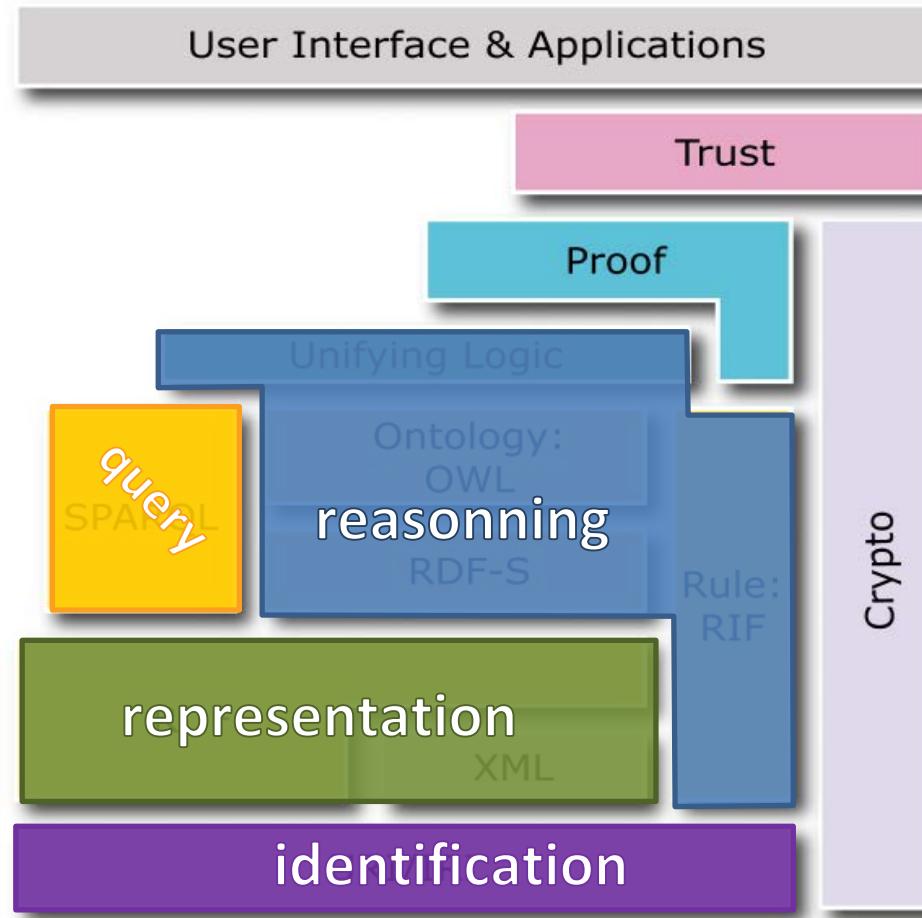
- Expose your datasets as Linked Data using TAXREF-SKOS
- Develop TAXREF-based applications that enable searching through the Linked Open Data
- ...

Thank you!



Backup slides

Standards of the Semantic Web



RDF/SPARQL @ French national inst. of statistics



The DataLift logo features a stylized 3D cube composed of green, orange, and pink faces, with a vertical bar above it. The word "DataLift" is written in a bold, sans-serif font next to the cube.

Institut national de la statistique
et des études économiques

Mesurer pour comprendre

SPARQL endpoint

Description du nœud <<http://id.insee.fr/geo/departement/971>>

Rechercher dans

Sujet	Prédicat	Objet
http://id.insee.fr/geo/departement/971	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://rdf.insee.fr/def/geo#Departement
http://id.insee.fr/geo/departement/971	http://www.w3.org/2002/07/owl#sameAs	http://data.ign.fr/id/geofla/departement/971
http://id.insee.fr/geo/departement/971	http://www.w3.org/2002/07/owl#sameAs	http://nuts.geovocab.org/id/FRA10
http://id.insee.fr/geo/departement/971	http://www.w3.org/2002/07/owl#sameAs	http://fr.dbpedia.org/resource/Guadeloupe
http://id.insee.fr/geo/departement/971	http://rdf.insee.fr/def/demo#population	http://id.insee.fr/demo/populationLegale/departement/971/2010
http://id.insee.fr/geo/departement/971	http://rdf.insee.fr/def/demo#population	http://id.insee.fr/demo/populationLegale/departement/971/2011
http://id.insee.fr/geo/departement/971	http://rdf.insee.fr/def/demo#population	http://id.insee.fr/demo/populationLegale/departement/971/2012
http://id.insee.fr/geo/departement/971	http://rdf.insee.fr/def/geo#subdivisionDe	http://id.insee.fr/geo/region/01

RDF/SPARQL @ French National Library (BnF)

Charles Perrault (1628-1703)



Pays : France
Langue : français
Sexe : masculin
Naissance : Paris, 12-01-1628
Mort : Paris, 16-05-1703

Note : Homme de lettres, conteur, membre de l'Académie française (1671). - Contrôleur général de la Surintendance des bâtiments du roi. - Les contes ont été publiés en 1697 sous le nom de son fils : Perrault d'Armancour

Domiciles :

Littérature :

Outils

- [Imprimer la page](#)
- [Exporter en PDF](#)
- [Signaler un problème sur la page](#)

Citer la page

Permalien: <http://data.bnfr.ark:/12148/cb119>



Télécharger les données

- [Télécharger en RDF](#)
 - [Télécharger en JSON](#)
- Le Web sémantique dans data.bnfr.fr

RDF/SPARQL @ French National Library (BnF)



Charles Perrault (1628-1703)

Pays :

France

```
<rdf:Description rdf:about="http://data.bnf.fr/ark:/12148/cb119192165#foaf:Person">
  <foaf:familyName>Perrault</foaf:familyName>
  <bnf-onto:firstYear rdf:datatype="http://www.w3.org/2001/XMLSchema#integer">1628</b...
  <foaf:gender>male</foaf:gender>
  <rdagroup2elements:dateOfBirth rdf:resource="http://data.bnf.fr/date/1628//"/>
  <owl:sameAs rdf:resource="http://dbpedia.org/resource/Charles_Perrault"/>
  <bio:death>1703-05-16</bio:death>
  <rdagroup2elements:placeOfBirth>Paris</rdagroup2elements:placeOfBirth>
  <owl:sameAs rdf:resource="http://viaf.org/viaf/34461426"/>
  <foaf:depiction rdf:resource="http://gallica.bnf.fr/ark:/12148/bpt6k1020573.thumbnail"/>
  <rdagroup2elements:fieldOfActivityOfThePerson rdf:resource="http://dewey.info/class/80...
  <rdagroup2elements:dateOfDeath rdf:resource="http://data.bnf.fr/date/1703//"/>
  <rdf:type rdf:resource="http://xmlns.com/foaf/0.1/Person"/>
  <foaf:birthday>01-12</foaf:birthday>
  <foaf:depiction rdf:resource="http://gallica.bnf.fr/ark:/12148/bpt6k6154661t.thumbnail"/>
```

Publish Linked Open Data on the Web

