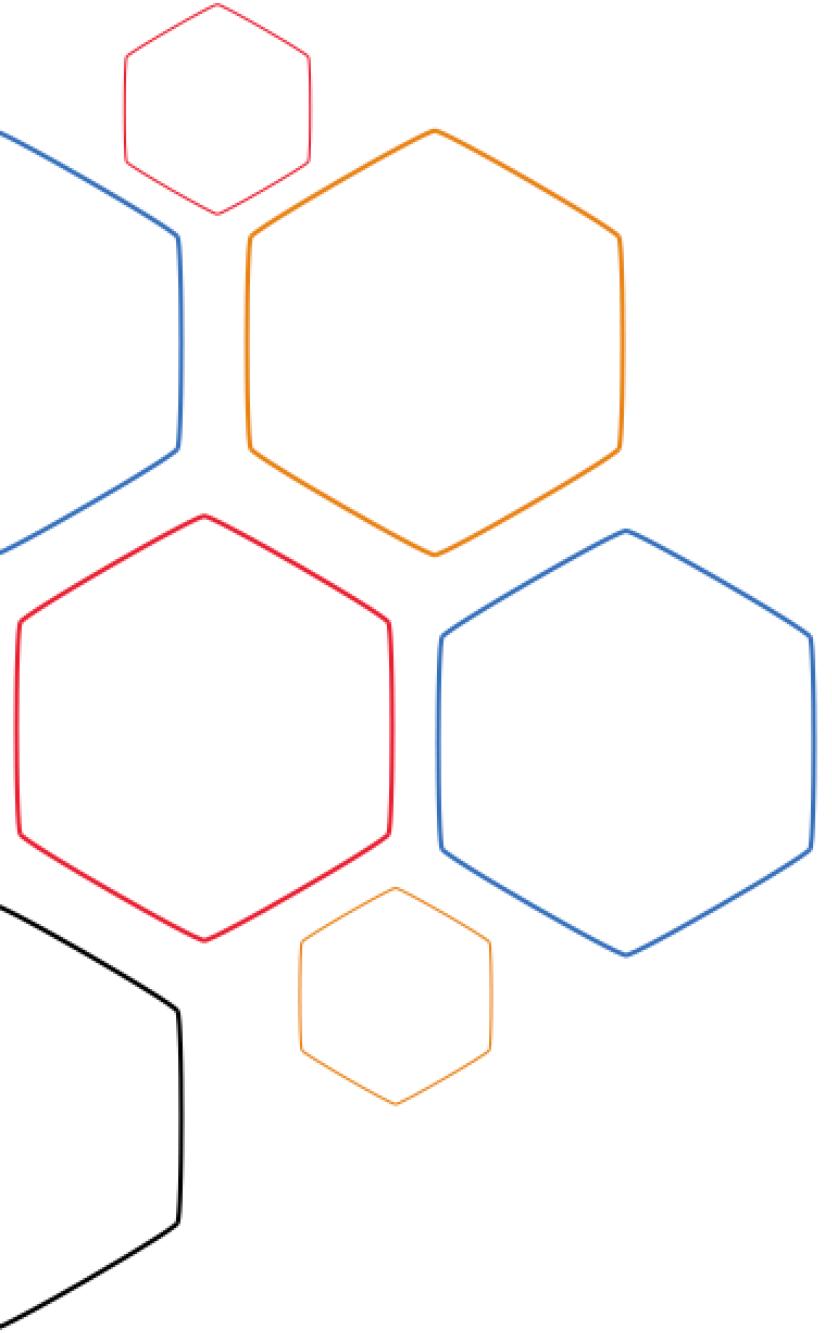




LIRMM



Andon Tchechmedjiev

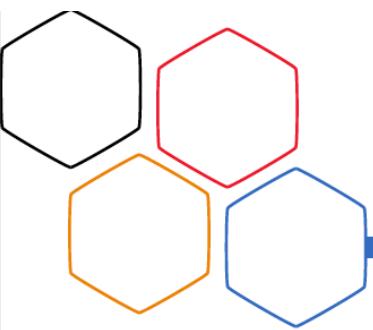
andon.tchechmedjiev@lirmm.fr

Clément Jonquet

jonquet@lirmm.fr

Meetup Montpellier Datascience, 26/10/2017





The 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 co-operation."

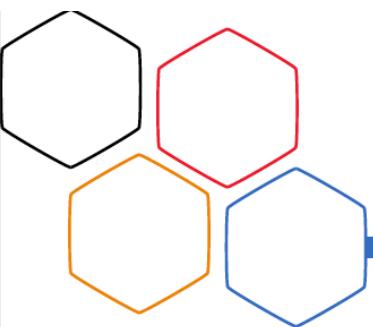
[Berners-Lee *et al*, 2001]





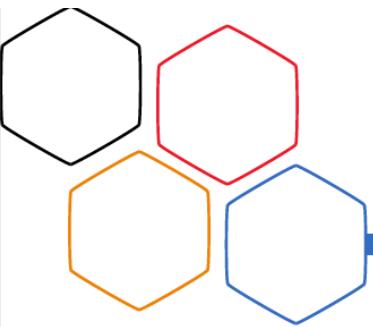
Today's Web

- ➊ Currently most of the Web content is suitable for human use.
- ➋ Typical uses of the Web today are information seeking, publishing, and using, searching for people and products, shopping, reviewing catalogues, etc.
- ➌ Dynamic pages generated based on information from databases but without original information structure found in databases.



Limitations of the Web Search today

- ➊ The Web search results are high recall, low precision.
- ➋ Results are highly sensitive to vocabulary.
- ➌ Results are single Web pages.
- ➍ Most of the publishing contents are not structured to allow logical reasoning and query answering.

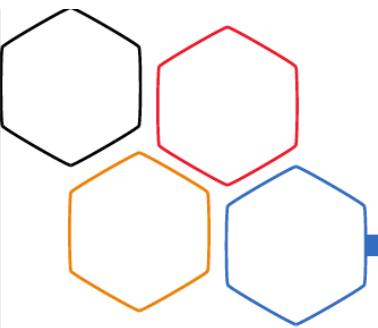


What is a Web of Data?

- ➊ Thinking back a bit... 1994
 - ➊ HTML and URIs
 - ➋ Markup language and means for connecting resources

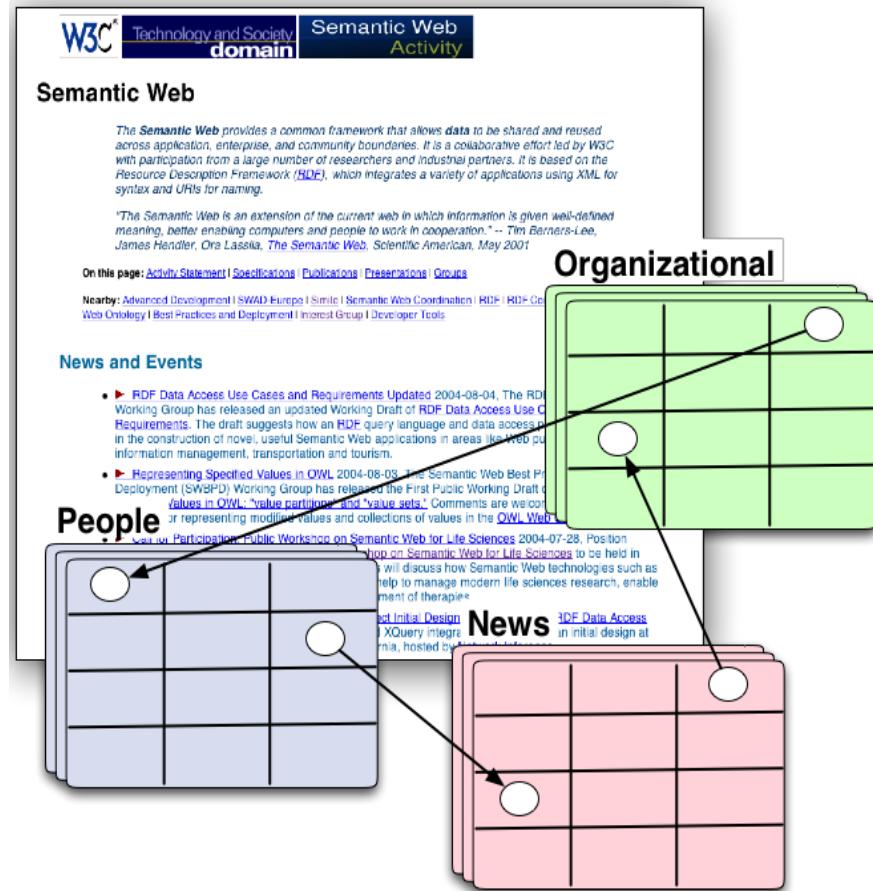
- ➋ Below the file level
 - ➋ Stopped at the text level

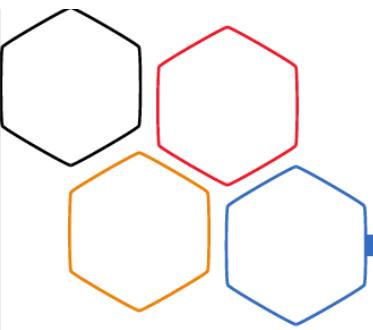
The screenshot shows the W3C homepage with a blue header bar. The main content area features a large image of the W3C logo and the tagline "Leading the Web to Its Full Potential...". Below this, there's a navigation menu with links like "Activities", "Technical Reports", "Site Index", "New Visitors", "About W3C", "Join W3C", and "Contact W3C". A sidebar on the left contains a "W3C A to Z" index with links to various W3C specifications such as Accessibility, Amaya, Annotate, C-HTML, CSS, CSS Validator, Device Independence, DOM, HTML, HTML Tidy, HTML Validator, HTTP, InkML, Internationalization, LaTeX, MathML, Multimodal Interaction, CWI, Patent Policy, PICS, PNG, Privacy and P2P, Quality Assurance (QA), RDF, Semantic Web, SAWI, SOAP, SPARQL, SUDS, SVGL, and X4ML. The central column has a news section about the "26th Internationalization & Unicode Conference" and a "Dead Works! Adapter" workshop. The right side includes a search bar, a "Members" section, and a "Semantic Web Activity" box. A blue arrow points from the text "" to the "Semantic Web" section.



What is a Web of Data? (continued)

- ◆ Now
 - ◆ XML, RDF, OWL and URIs
- ◆ Markup language and means for connecting resources
 - ◆ Below the file level
 - ◆ Below the text level
 - ◆ At the data level





The Syntactic Web

<http://www2002.org>

WWW 2002

THE ELEVENTH INTERNATIONAL WORLD WIDE WEB CONFERENCE

Sheraton Waikiki Hotel
Honolulu, Hawaii, USA
7-11 May 2002

1 LOCATION. 5 DAYS. LEARN. INTERACT.

Registered participants coming from:
Australia · Canada · Chile · Denmark · France · Germany · Ghana · Hong Kong · India · Italy · Ireland · Japan · Malta · New Zealand · The Netherlands · Norway · Singapore · Switzerland · The United States · Vietnam · Zambia

REGISTER NOW

On 7-11 May 2002, Honolulu, Hawaii will provide the backdrop for the Eleventh International World Wide Web Conference. This prestigious series of the International World Wide Web Conference Committee (IW3C²) attracts participants from around the world, and provides a public forum for the World Wide Web Consortium (W3C) through the annual W3C track.

The conference is being organized by the International World Wide Web Conference Committee (IW3C²), the University of Hawaii and the Pacific Telecommunications Council (PTC).

FEATURED SPEAKERS (CONFIRMED)

Tim Berners-Lee, inventor of the World Wide Web and Director of the W3C who now holds the 3Com Founders chair at the Laboratory for Computer Science at the Massachusetts Institute of Technology (MIT).
Richard A. DeMillo, vice president and chief technology officer for Hewlett-Packard Company.
Ian Foster, guru of "Grid Computing" associate Arthur Prize Winner.

Tim Berners-Lee - Netscape

See also

Contents

Short Bio
Before you mail me
Address
Talks, articles &c
Speaking engagements
Press Interviews

Longer Bio
Slider from some talks
Design Issues: web architecture
World Wide Web Consortium
Frequently Asked Questions
Weaving the Web

Tim Berners-Lee

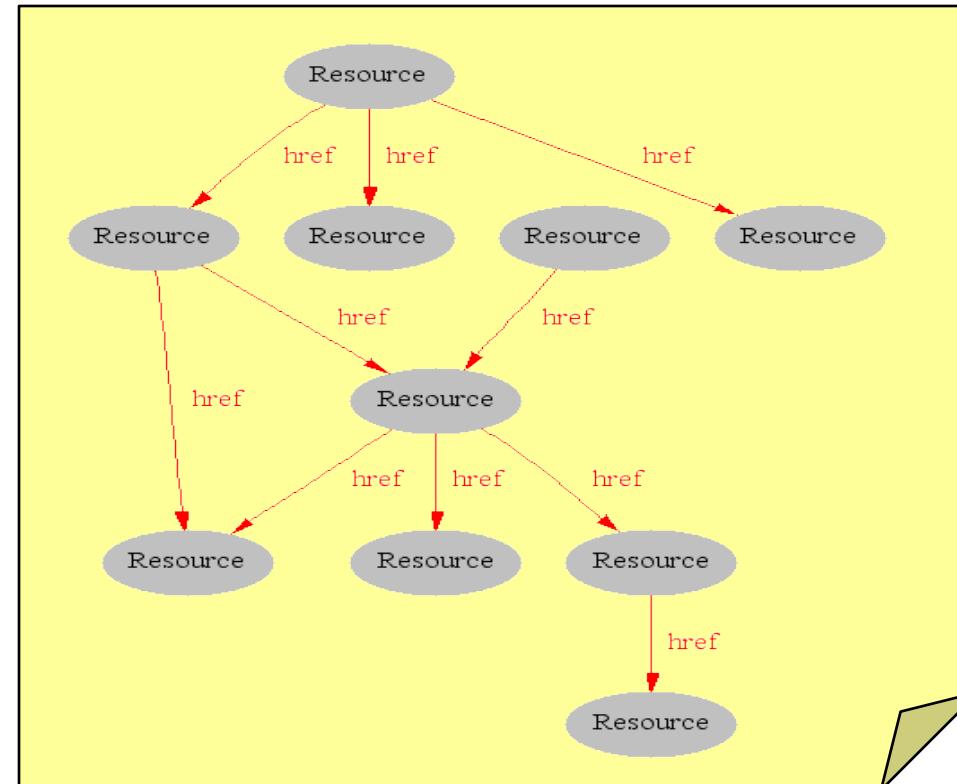
Weaving the Web by Tim Berners-Lee with Mark Weitzman (Harper San Francisco); Hardback; ISBN:0062515861, Abridged audio cassette abridged (ISBN:0694521256) and various other languages.

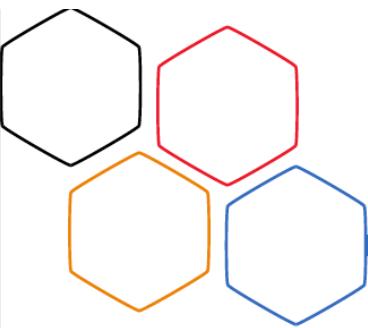
Bio

A graduate of Oxford University, England, Tim now holds the 3Com Founders chair at the Laboratory for Computer Science and Artificial Intelligence (CSAIL) at the Massachusetts Institute of Technology (MIT). He directs the World Wide Web Consortium, an open forum of companies and organizations with the mission to lead the Web to its full potential.

With a background of system design in real-time communications and text processing software development, in 1989 he invented the World Wide Web, an Internet-based hypermedia initiative for global information sharing, while working at CERN, the European Particle Physics Laboratory. He wrote the first web client (browser-eddie) and server in 1990.

Before coming to CERN, Tim worked with Image Computer Systems, of Ferndown, Dorset, England and before that a

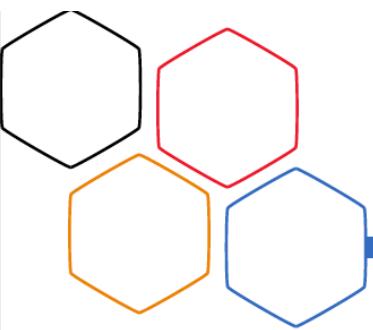




What is the Problem?

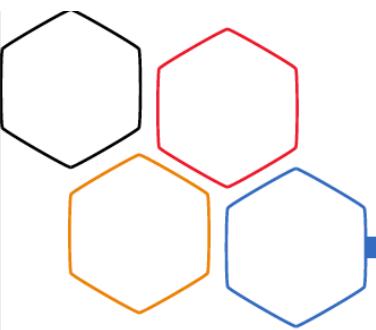
- Consider a typical web page:
- Mark-up consists of:
 - rendering information (e.g., font size and colour)
 - Hyper-links to related content
- Semantic content is accessible to humans but not (easily) to computers...

The screenshot shows the homepage of the Eleventh International World Wide Web Conference (WWW 2002). The header features the URL <http://www2002.org> and the title "WWW 2002". Below the title is the subtitle "THE ELEVENTH INTERNATIONAL WORLD WIDE WEB CONFERENCE". A logo for "WWW HAWAII 2002" is on the left, and a logo for "CONFERENCE ORGANIZERS" (W3C) is on the right. The main content area includes a "REGISTER NOW" button, a section about registered participants from various countries, and a "FEATURED SPEAKERS (CONFIRMED)" section featuring Tim Berners-Lee, Richard A. DeMillo, and Ian Foster.



i.e. the Syntactic Web is...

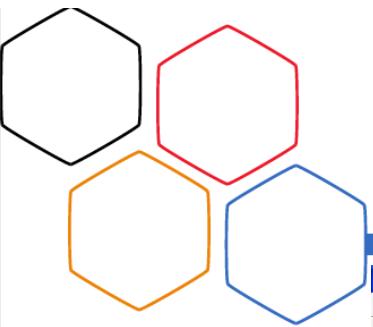
- ➊ A place where
 - ➊ computers do the presentation (easy) and
 - ➋ people do the linking and interpreting (hard).
- ➋ *Why not get computers to do more of the hard work?*



Web 2



[The mind-map pictured above constructed by Markus Angermeier, source Wikipedia]



Web 2.0 and Folksonomies

Flickr - Photo Sharing

Welcome to Flickr - Photo Sharing - Mozilla Firefox

All time most popular tags

flickr

The best way to sort and share y

O star of morning and of liberty! - Henry Wadsworth Longfellow

Main Page - Wikipedia, the free encyclopedia - Mozilla Firefox

29,397 have donated. > Donate now!

You can help Wikipedia change the world!

Welcome to Wikipedia, the free encyclopedia that anyone can edit.

Today's featured article

Cillian Murphy is an Irish film and theatre actor active since 1996. He is often noted by critics for chameleonic performances in diverse roles, as well as for his distinctive blue eyes. A native of Cork, Murphy began his performing career as a rock musician. After touring with a band called "The Blue Aeroplane", he had acting debut in the play "Disco Pigeon". He went on to star in a number of Irish and UK film and stage productions throughout the late 1990s and early 2000s, first coming to international attention in 2003 as the hero in the post-apocalyptic film "28 Days Later". Murphy's best known roles are as villains in two 2005 blockbusters: the "Scarface" superhero film "Batman Begins", and Jackson Ripper in the thriller "Red Eye". Next came two contrasting, widely acclaimed starring roles: his "Golden Globe Award-nominated" performance as

YouTube - Broadcast Yourself - Mozilla Firefox

light live nature park scotland sydney ta vacat

Search Results for "semantic web"

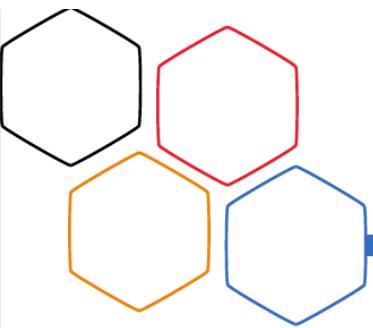
Tim Berners Lee on the Semantic Web

Tim Berners Lee on the Semantic Web

Internet Evolution

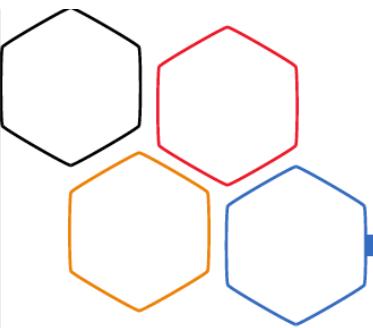
SPARQL query language

The Semantic Web & Social Software



Machine-accessible Content

- The main obstacle to provide better support to Web users is that, at present , the meaning of Web content is not machine accessible.
- Although there are tools to retrieve texts, but when it comes to *interpreting* sentence and extracting useful information for the user, the capabilities of current software are still very limited.



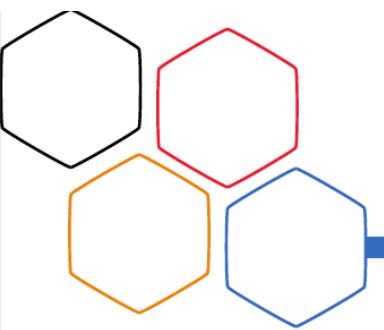
Distinguishing the meaning

- It is simply difficult for machines to distinguish the meaning of:

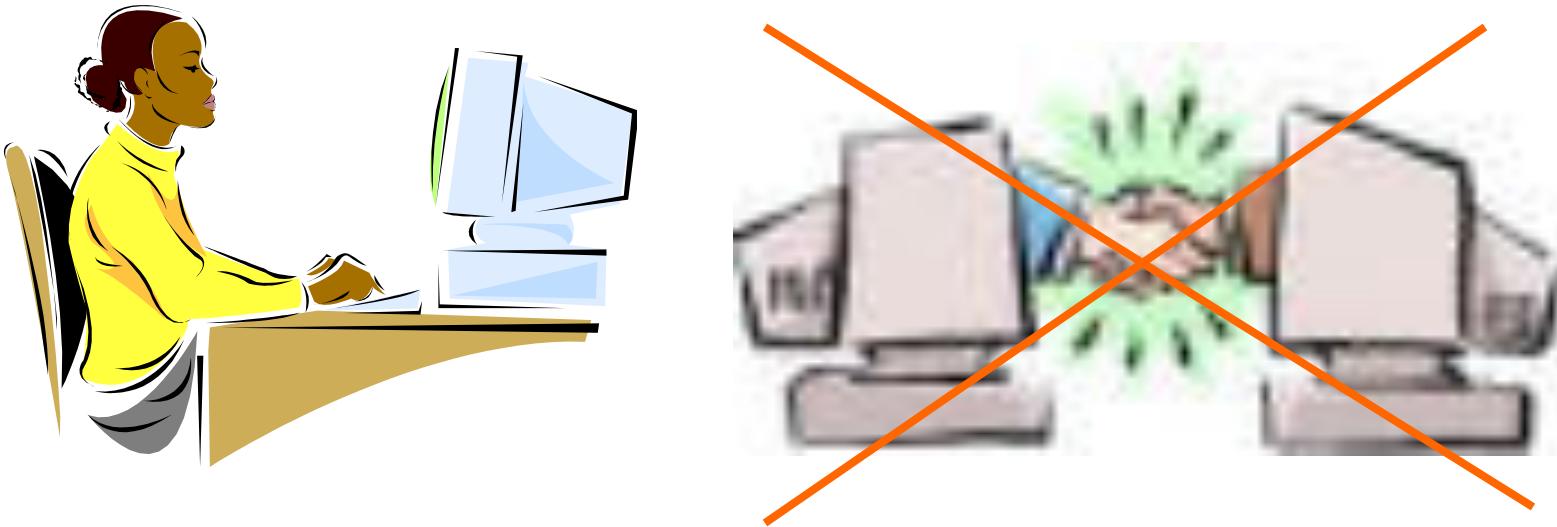
I am a philosopher.

from

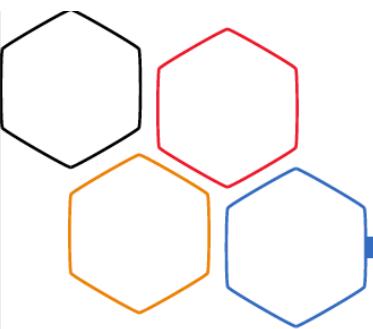
I am a philosopher, you may think. Well,...



...Limitations of the Web today



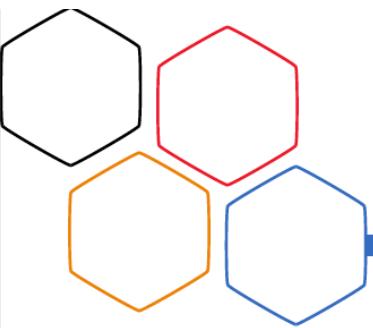
Web activities are mostly focussed on Machine-to-Human, and Machine-to-Machine activities are not particularly well supported by software tools.



How Can the Current Situation be Improved?

- An alternative approach is to represent Web content in a form that is more easily **machine-accessible** and to use intelligent techniques to take advantage of these presentations.





Machine Accessible Meaning

education

在愛戴者熱心奔走之下，華裔名指揮家林克昌根留台灣的可行性又提升了幾分。兩廳院主任李炎、國家音樂廳樂團副團長黃奕明日前親赴林克昌、石聖芳寓所拜會，並提出多場客席邀約。此外，台灣省立交響樂團團長陳澄雄也早早「下訂」，邀請林克昌赴台中霧峰，從八月十日起訓練省交，為期長達一個月。

work

在台灣諸多公家樂團中，陳澄雄是以實際行動表達對林克昌肯定的樂界人士之一，曾多次公開表示對林克昌指揮才華的欽佩，而且幾乎每個樂季都邀請林克昌客席演出。

此外，林克昌上個月赴俄羅斯與頂尖的「俄羅斯國家管絃樂團」灌錄了柴可夫斯基晚期三大交響曲以及「羅密歐與茱麗葉」、「斯拉夫進行曲」、「義大利隨想曲」，最後的DAT母帶也在前兩天寄回台灣。製作人楊忠衡與林克昌試聽之後，都對錄音效果－尤其音質表現感到相當滿意，楊忠衡估計呈現了七分林克昌指揮神韻

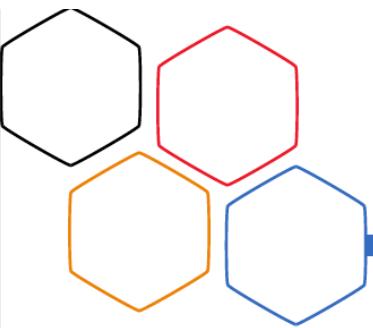
private

俄羅斯國家管絃樂團首席布魯尼日前也讚譽林克昌的指揮藝術有三大特點：一是控制自如的彈性速度；二是強烈的動態對比；三是宛如呼吸歌唱的旋律處理。這些對錄音師而言都構成很大挑戰。俄國錄音師雖然採用多軌混音，但定位、場面都有可觀之處。

林克昌 根留台灣 可能增高

name

CV



XML

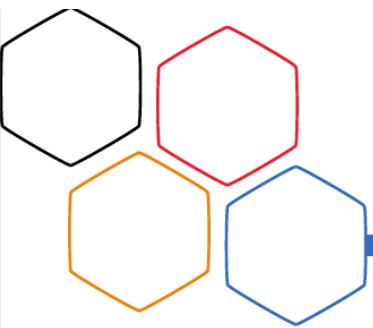
- User definable and domain specific markup

HTML:

```
<h1>Internet and World Wide Web</h1>
  <ul>
    <li>Code: G52IWW</li>
    <li>Students: Undergraduate</li>
  </ul>
```

XML:

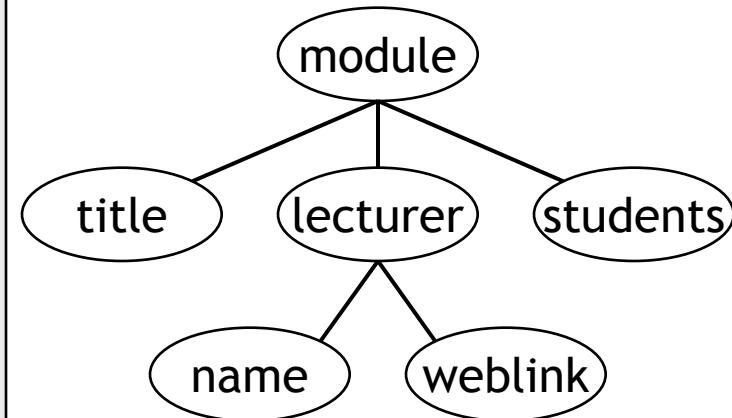
```
<module>
  <title>Internet and World Wide Web</title>
  <code>G52IWW</code>
  <students>Undergraduate</students>
</module>
```



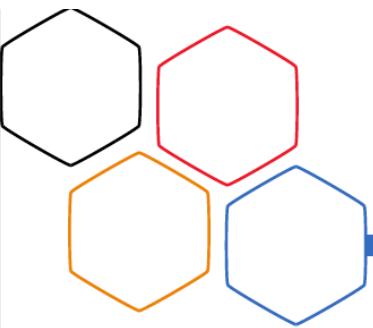
XML: Document = labeled tree

- node = label + contents

```
<module date="...">
    <title>...</title>
    <lecturer>
        <name>...</name>
        <weblink>...</weblink>
    </lecturer>
    <students>...</students>
</module>
```



- DTD: describe the grammar and structure of permissible XML trees



But What about this?

<εδυχατιον>

<ωορκ>

<πριωατε>

林克昌 根留台灣 可能增高

< ναμε >

< X_ζ >

在愛戴者熱心奔走之下，華裔名指揮家林克昌根留台灣的可能性又提升了幾分。兩廳院主任李炎、國家音樂廳樂團副團長黃奕明日前親赴林克昌、石聖芳寓所拜會，並提出多場客席邀約。此外，台灣省立交響樂團團長陳澄雄也早早「下訂」，邀請林克昌赴台中霧峰，從八月十日起訓練省交，為期長達一個月。

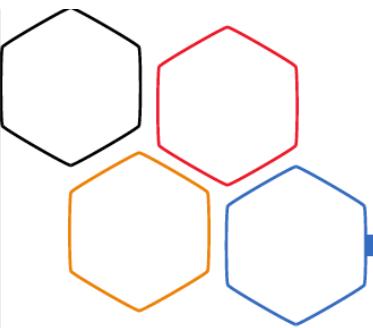
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- ➊ Meaning of XML-Documents is *intuitively* clear
 - ➊ due to "*semantic*" Mark-Up
 - ➊ tags are domain-terms
- ➋ But, computers do not have intuition
 - ➊ tag-names do not provide semantics for machines.
- ⌂ DTDs or XML Schema specify the *structure* of documents, *not* the meaning of the document contents
- ⌃ XML lacks a semantic model
 - ➊ has only a "surface model", i.e. tree

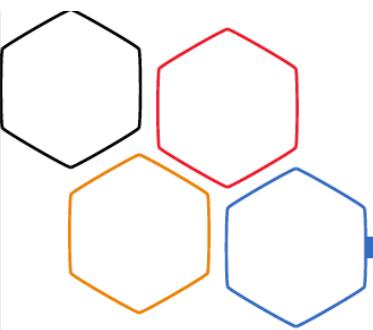


XML: limitations for semantic markup

- ➊ XML representation makes no commitment on:
 - ➊ Domain specific ontological **vocabulary**
 - ➊ Which words shall we use to describe a given set of concepts?
 - ➋ Ontological **modelling primitives**
 - ➊ How can we combine these concepts, e.g. "car is a-kind-of (subclass-of) vehicle"
- ⇒ requires pre-arranged agreement on vocabulary and primitives
- ➋ Only feasible for closed collaboration
 - agents in a small & stable community
 - pages on a small & stable intranet
 - .. not for sharable Web-resources

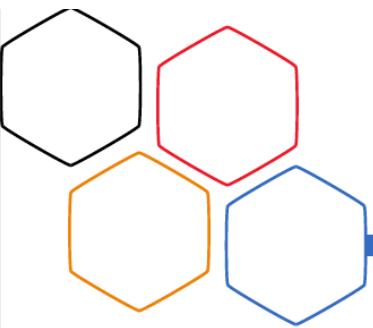


[Davies, 03]



XML is a first step

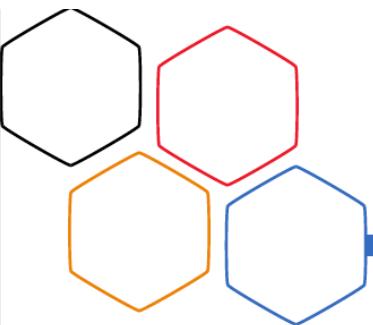
- ➊ Semantic markup
 - ➎ HTML ➔ layout
 - ➎ XML ➔ content
- ➋ Metadata
 - ➎ within documents, not across documents
 - ➎ *prescriptive*, not *descriptive*
 - ➎ No commitment on vocabulary and modelling primitives
- ➌ **RDF** is the next step



Resource Description Framework (RDF)

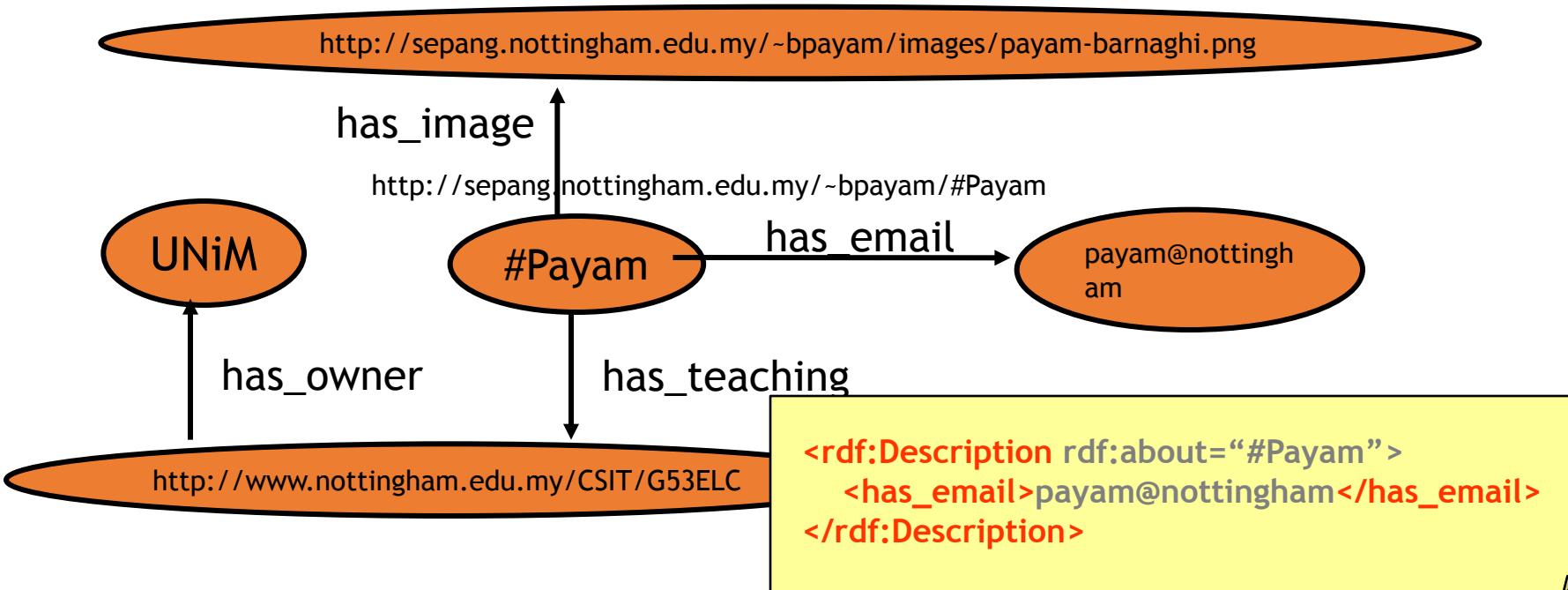


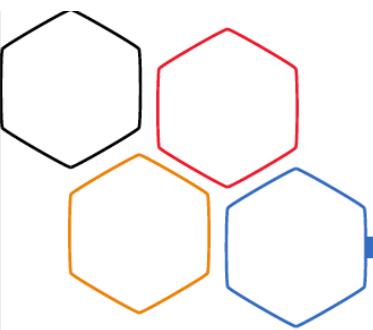
- ➊ A standard of W3C
- ➋ Relationships *between* documents
- ➌ Consisting of triples or sentences:
 - ➍ <subject, property, object>
 - ➎ <“Mozart”, composed, “The Magic Flute” >
- ➏ RDFS extends RDF with standard “ontology vocabulary”:
 - ➐ Class, Property
 - ➑ Type, subClassOf
 - ➒ domain, range



RDF for semantic annotation

- RDF provides metadata about Web resources
- **Object -> Attribute-> Value** triples
- It has an **XML syntax**
- Chained triples form a **graph**





RDF: Basic Ideas

- ➊ Resources

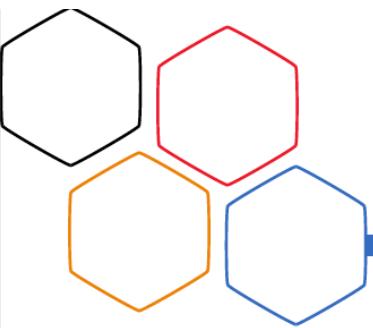
- ➊ Resources
 - ➊ Every resource has a URI (Universal Resource Identifier)
 - ➋ A URI can be a URL (a web address) or a some other kind of identifier;
 - ➋ An identifier does not necessarily enable access to a resources
 - ➋ We can think of a resources as an object that we want to describe it.
 - ➊ Books
 - ➋ Person
 - ➋ Places, etc.



RDF: Basic Ideas

Properties

- Properties are special kind of resources;
- Properties describe relations between resources.
- For example: “written by”, “composed by”, “title”, “topic”, etc.
- Properties in RDF are also identified by URIs.
- This provides a global, unique naming scheme.



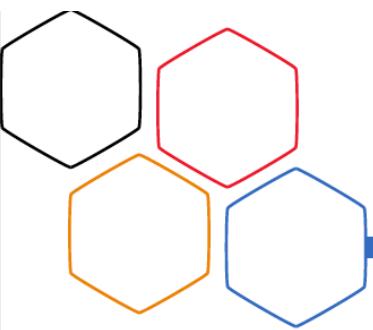
RDF: Basic Ideas

◆ Statements

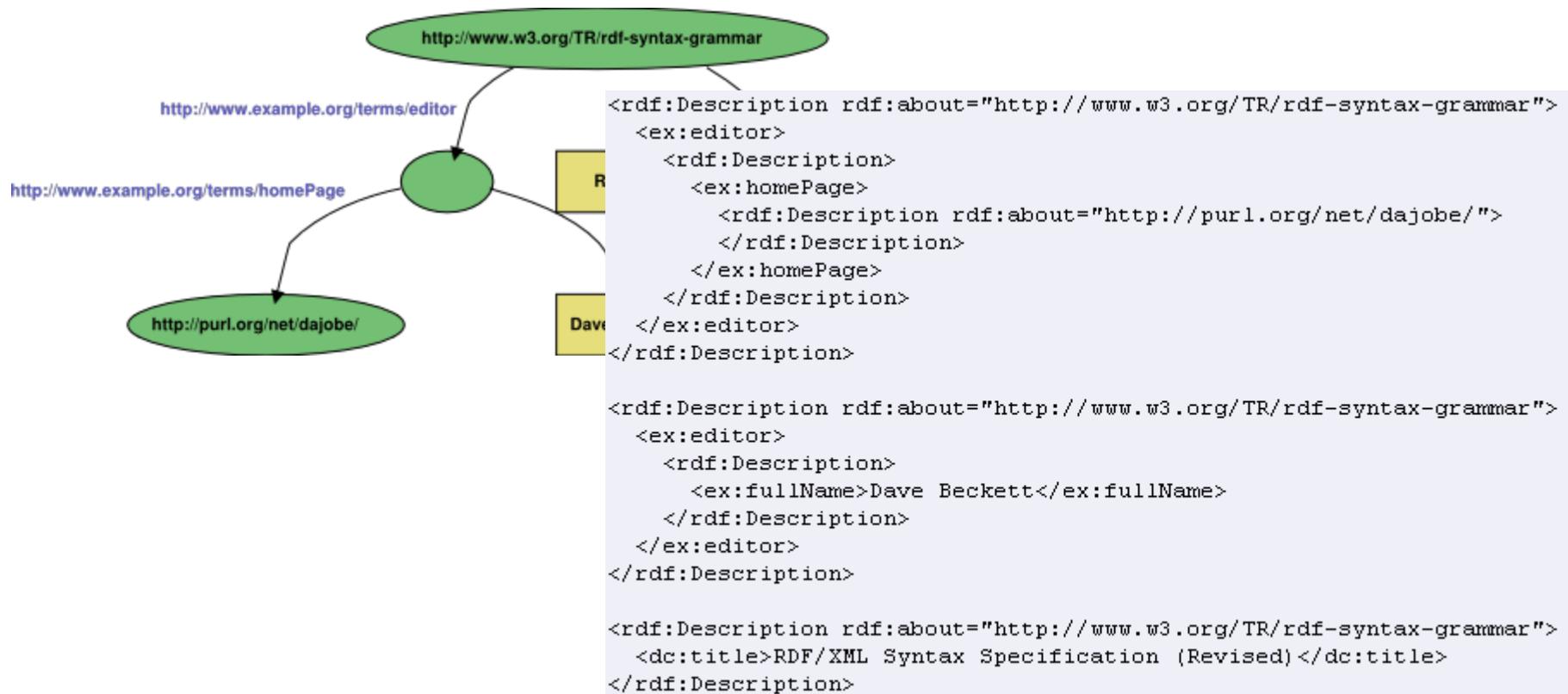
- ◆ A statement is an object-attribute-value triple.
- ◆ It consists of a resources, a property, and a value.

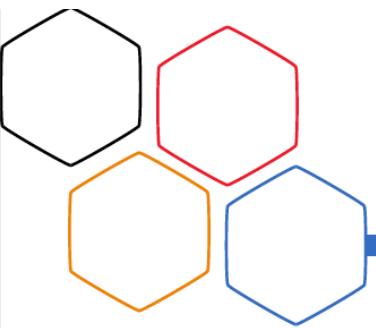
<http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=10140>



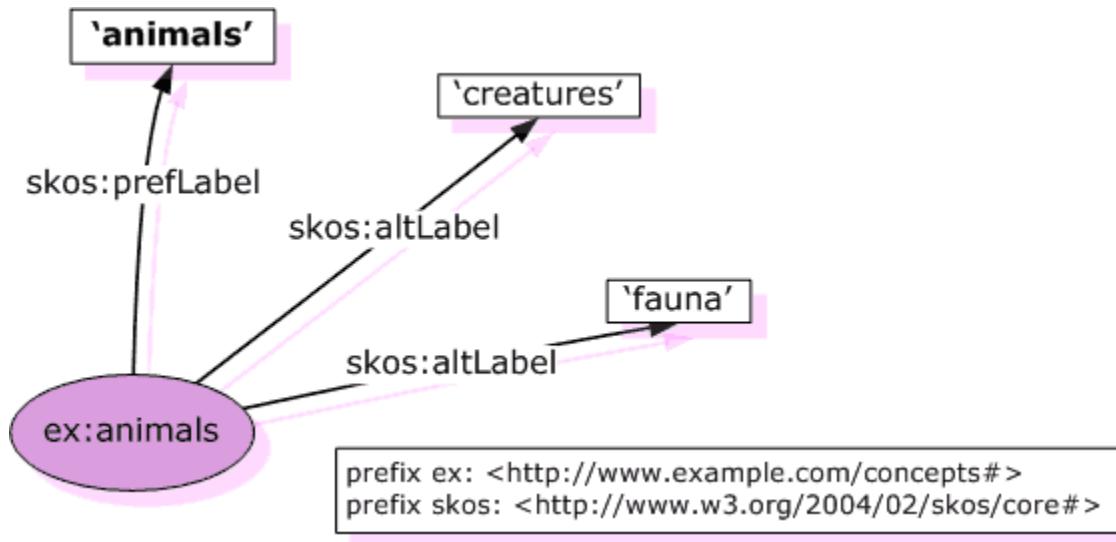


RDF: Example





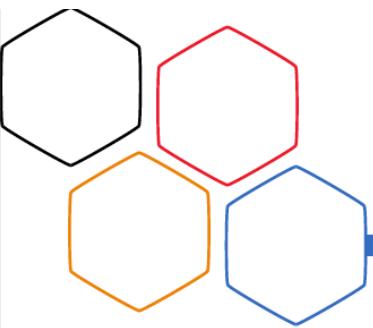
RDF Example



```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:skos="http://www.w3.org/2004/02/skos/core#">

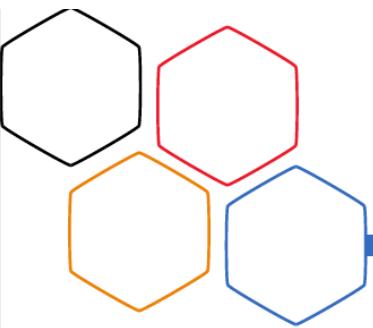
  <skos:Concept rdf:about="http://www.example.com/concepts#animals">
    <skos:prefLabel>animals</skos:prefLabel>
    <skos:altLabel>creatures</skos:altLabel>
    <skos:altLabel>fauna</skos:altLabel>
  </skos:Concept>

</rdf:RDF>
```



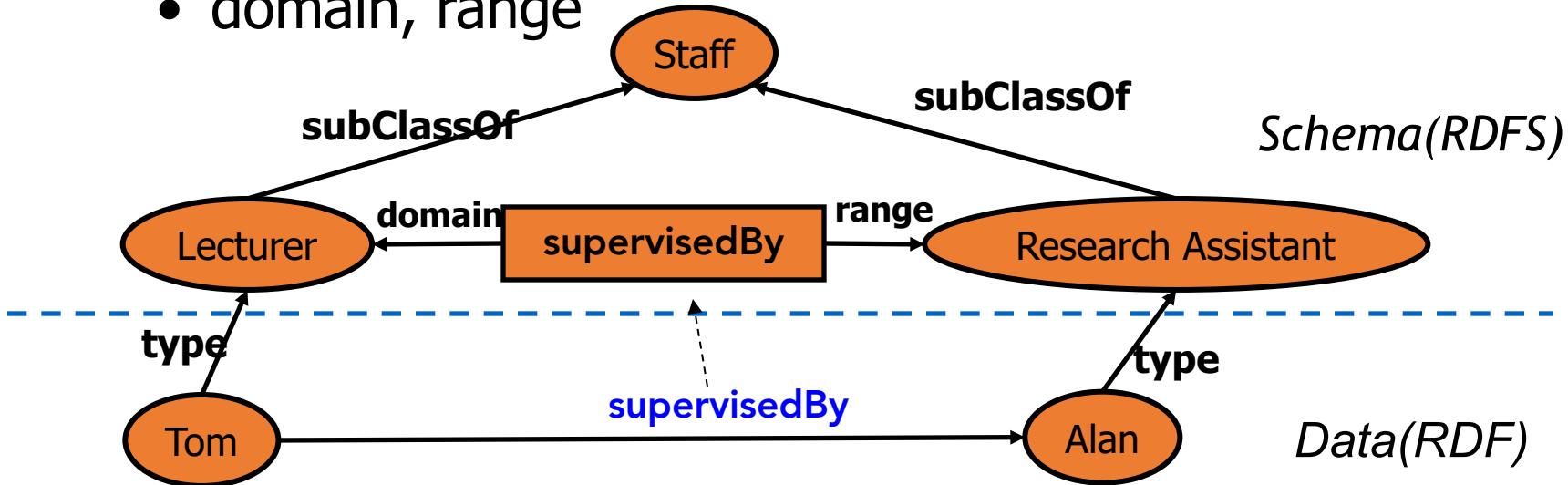
RDF Schema: Basic Ideas

- ◆ RDF is a universal language that enables users to describe their own vocabularies.
- ◆ But, RDF does not make assumption about any particular domain.
- ◆ It is up to user to define this in RDF schema.



What does RDF Schema add?

- Defines **vocabulary** for RDF
- Organizes this vocabulary in a **typed hierarchy**
 - Class, subClassOf, type
 - Property, subPropertyOf
 - domain, range





Conclusions about RDF(S)

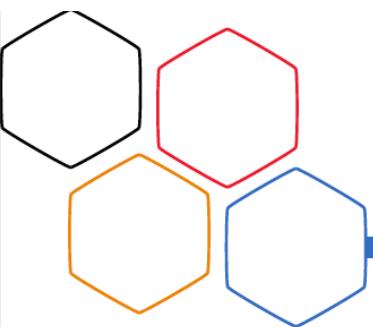
- ➊ Next step up from plain XML:
 - ➊ (small) **ontological commitment** to modeling primitives
 - ➊ possible to define **vocabulary**
- ➋ However:
 - ➊ **no** precisely described meaning
 - ➊ **no** inference model

[Davies, 03]



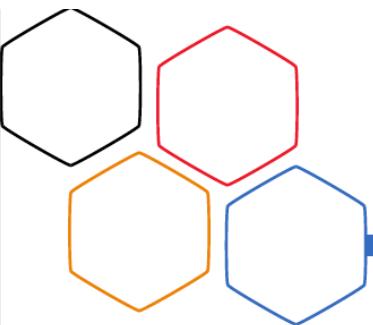
Ontologies

- ◆ The term **ontology** is originated from philosophy. In that context it is used as the name of a subfield of philosophy, namely, the study of the nature of existence.
- ◆ For the Semantic Web purpose:
 - ◆ “**An ontology is an explicit and formal specification of a conceptualisation**”.
(R. Studer)



Ontologies and Semantic Web

- In general, an ontology describes formally a domain of discourse.
- An ontology consists of a finite list of terms and the relationships between the terms.
- The terms denote important concepts classes of objects) of the domain.
- For example, in a university setting, staff members, students, courses, modules, lecture theatres, and schools are some important concepts.

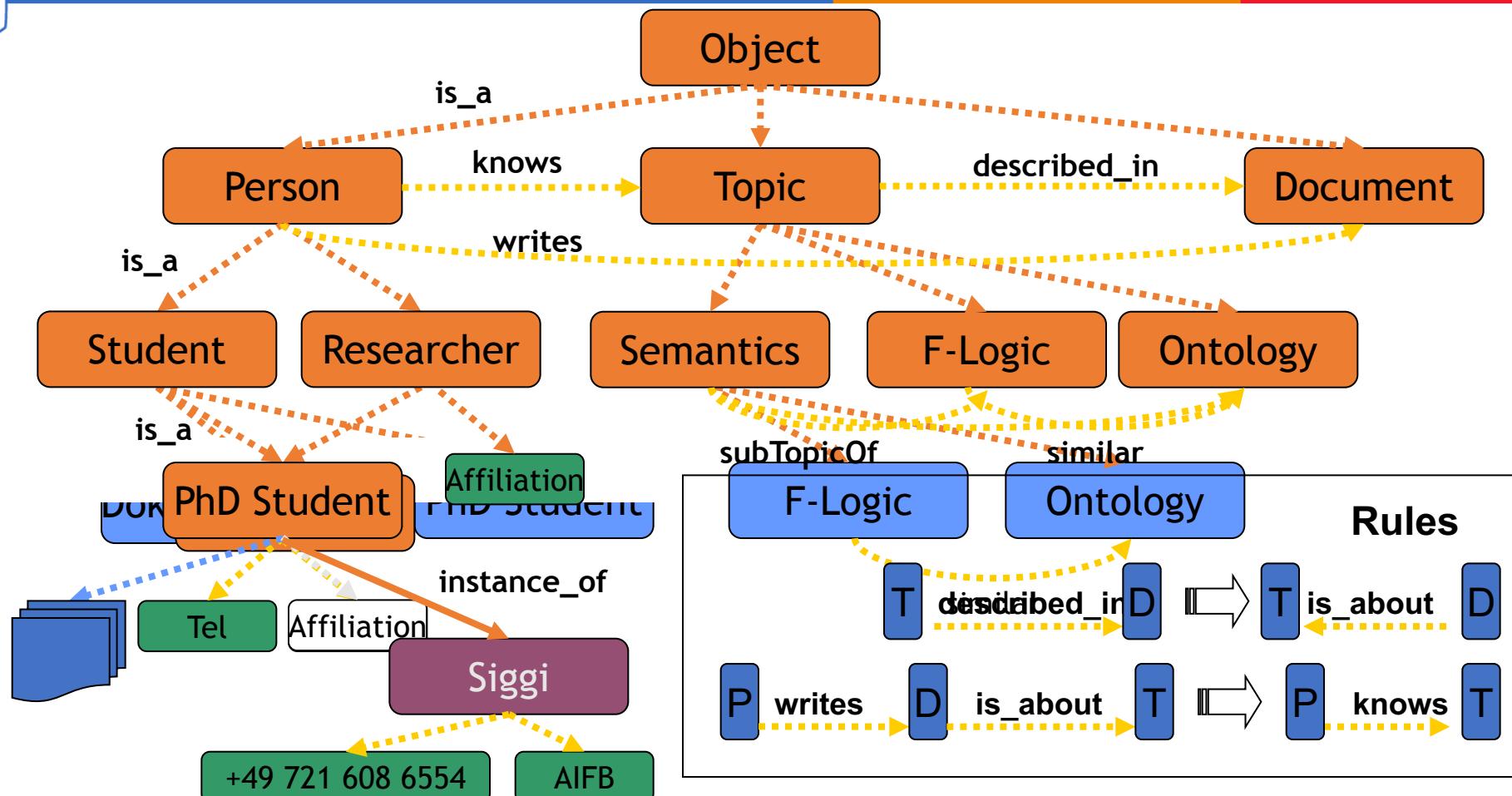


Ontologies and Semantic Web (cont'd)

- ◆ In the context of the Web, ontologies provide a shared understanding of a domain.
- ◆ Such a shared understanding is necessary to overcome the difference in terminology.
- ◆ Ontologies are useful for improving accuracy of Web searches.
- ◆ Web searches can exploit generalization/specialization information.

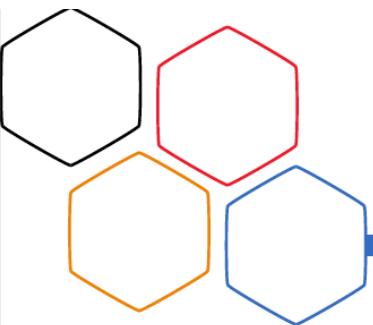


A Sample Ontology



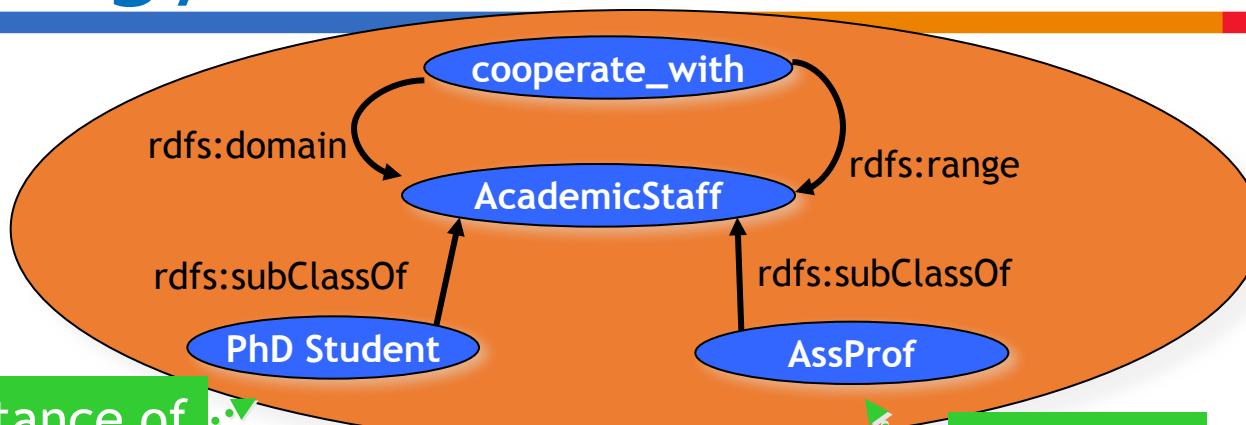
- Major Paradigms: Logic Programming, Description Logic
- Standards: RDF(S); OWL

[Studer et al, 04]



Ontology & Annotation

Ontology



instance of

Anno-
tation

```
<swrc:PhD_Student rdf:ID="sha">
<swrc:name>Siegfried
Handschuh</swrc:name>
<swrc:cooperate_with rdf:resource =
"http://www.aifb.uni-
karlsruhe.de/WBS/sst#sst"/>
```

```
<swrc:AssPr ...
<swrc:name>Steffen Staab
...
</swrc:AssProf>
```

Cooperate_with

Web
Page

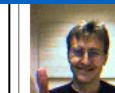


He is working together with
Steffen Staab in the Knowledge
Management Group

Links have explicit meanings!

URL

<http://www.aifb.uni-karlsruhe.de/WBS/sha>



Research:

Semantic Web, Knowledge
Management, Natural Language,

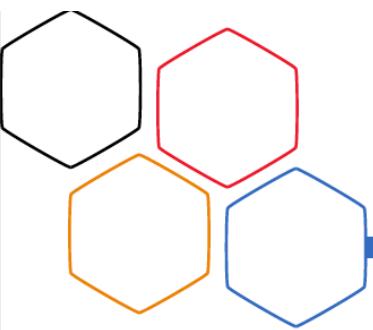
[Studer et al, 04]

<http://www.aifb.uni-karlsruhe.de/WBS/sst>



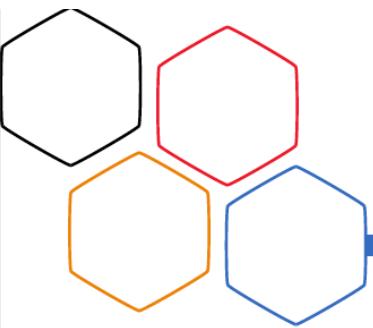
Ontologies (OWL)

- ➊ RDFS is useful, but does not solve all possible requirements
- ➋ Complex applications may want more possibilities:
 - ➌ similarity and/or differences of terms (properties or classes)
 - ➌ construct classes, not just name them
 - ➌ can a program reason about some terms? E.g.:
 - ➍ “if «Person» resources «A» and «B» have the same «foaf:email» property, then «A» and «B» are identical”
 - ➎ etc.
- ➏ This lead to the development of OWL (Web Ontology Language)



Ontology Languages for the Web

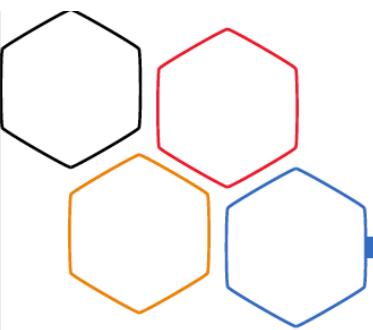
- ◆ RDF Schema is a vocabulary description language for describing properties and classes of RDF resources, with a semantics for generalization hierarchies of such properties and classes.
- ◆ OWL is a richer vocabulary description language for describing properties and classes.



OWL Language

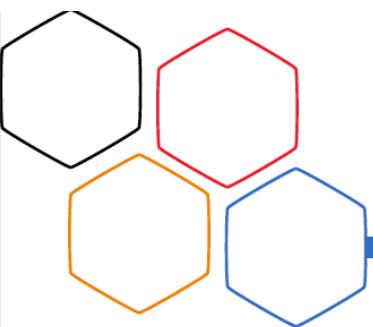
- ➊ OWL is based on Description Logics knowledge representation formalism
- ➋ OWL (DL) benefits from many years of DL research:
 - ➌ Well defined semantics
 - ➌ Formal properties well understood (complexity, decidability)
 - ➌ Known reasoning algorithms
 - ➌ Implemented systems (highly optimised)
- ➌ Three species of OWL
 - ➍ OWL full is union of OWL syntax and RDF
 - ➍ OWL DL restricted to FOL fragment
 - ➍ OWL Lite is “easier to implement” subset of OWL DL
- ➌ OWL DL based on SHIQ Description Logic

[Davies, 03]



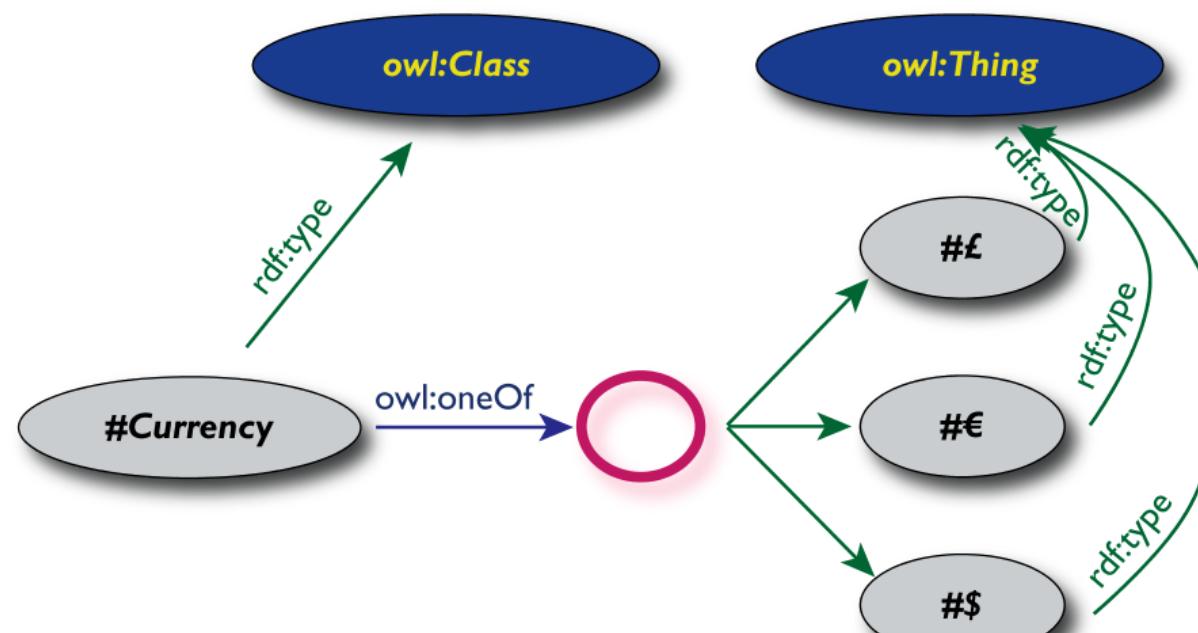
Classes in OWL

- ◆ In RDFS, you can subclass existing classes... that's all.
- ◆ In OWL, you can *construct* classes from existing ones:
 - ◆ enumerate its content
 - ◆ through intersection, union, complement
 - ◆ through property restrictions

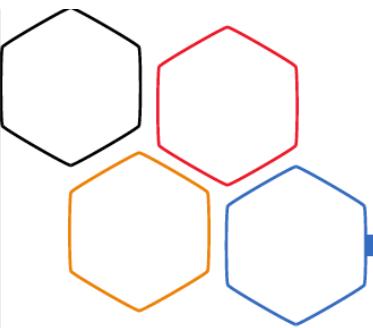


OWL classes can be “enumerated”

The OWL solution, where possible content is explicitly listed:



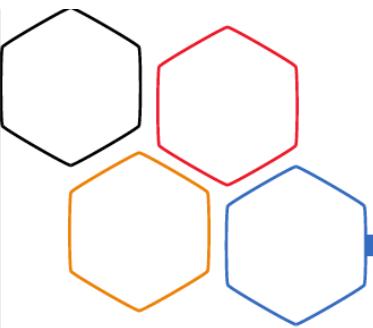
source: Introduction to the Semantic Web, Ivan Herman, W3C



Why develop an ontology?

- ***To make define web resources more precisely and make them more amenable to machine processing***
- To make domain assumptions explicit
 - Easier to change domain assumptions
 - Easier to understand and update legacy data
- To separate domain knowledge from operational knowledge
 - Re-use domain and operational knowledge separately
- A community reference for applications
- To share a consistent understanding of what information means

[Davies, 03]



Ontology and Logic

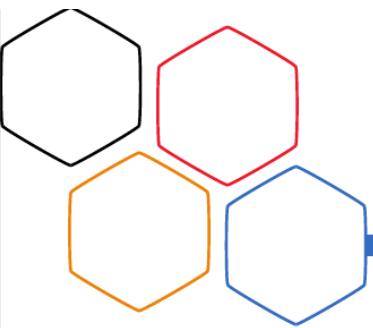
- ➊ Reasoning over ontologies
- ➋ Inferencing capabilities

$X \text{ is author of } Y \Rightarrow Y \text{ is written by } X$

$X \text{ is supplier to } Y; Y \text{ is supplier to } Z \Rightarrow$
 $X \text{ and } Z \text{ are part of the same supply chain}$

Cars are a kind of vehicle;
Vehicles have 2 or more wheels \Rightarrow
Cars have 2 or more wheels

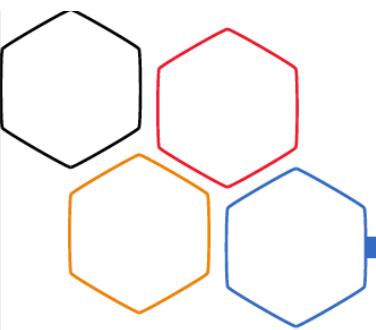
[Davies, 03]



Logic and Inference

- ➊ Logic is the discipline that studies the principles of reasoning
- ➋ Formal languages for expressing knowledge
- ➌ Well-understood formal semantics
 - ➍ Declarative knowledge: we describe what holds without caring about how it can be deduced
- ➎ Automated reasoners can deduce (infer) conclusions from the given knowledge

source: A Semantic Web Primer, Grigoris Antoniou and Frank van Harmelen, MIT Press



An Inference Example

$\text{prof}(X) \rightarrow \text{faculty}(X)$

$\text{faculty}(X) \rightarrow \text{staff}(X)$

$\text{prof}(\text{michael})$

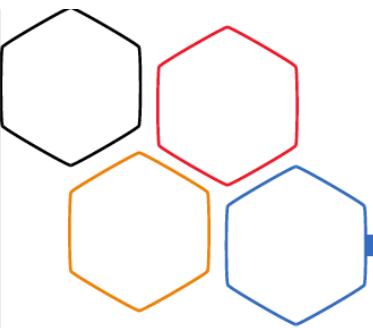
We can deduce the following **conclusions**:

$\text{faculty}(\text{michael})$

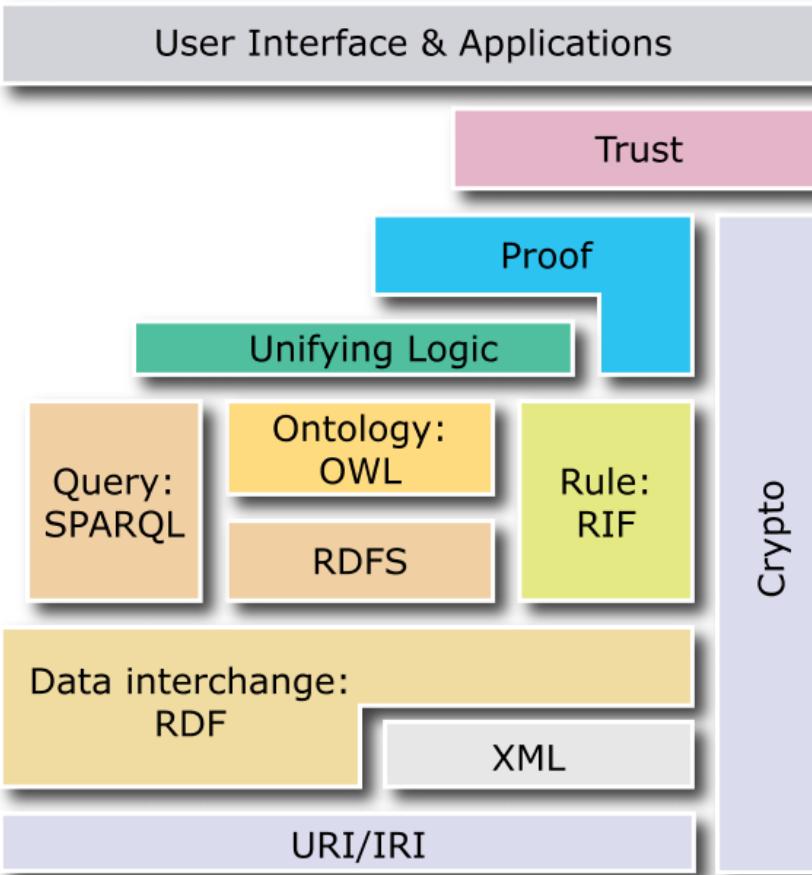
$\text{staff}(\text{michael})$

$\text{prof}(X) \rightarrow \text{staff}(X)$

source: A Semantic Web Primer, Grigoris Antoniou and Frank van Harmelen, MIT Press



Semantic Web Vision



Machine-processable, global
Web standards:

- Assigning unambiguous names ([URI](#))
- Expressing data, including metadata ([RDF](#))
- Capturing ontologies ([OWL](#))
- [Query, rules, transformations, deployment](#), application spaces, logic, proofs, trust (in progress)

[Source: Emerging Web Technologies to Watch, Steve Bratt, W3C]



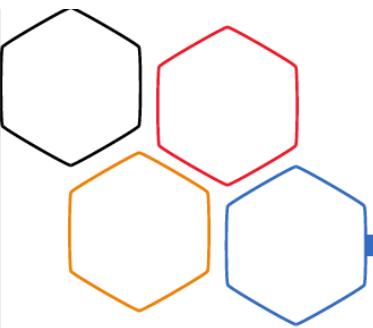
Common ontologies

- Friend of a Friend
- Dublin Core
- SIOC
- SKOS
- UMBEL
- Suggested Upper Merged Ontology
- Geonames
- BIBO



Specialized ontologies

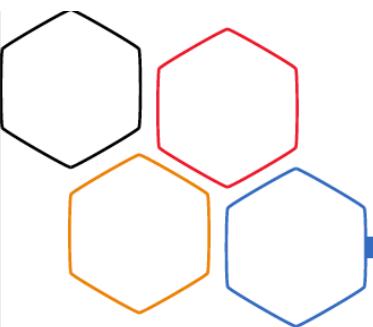
- Gene Ontology
- GOLD (General O. for Linguistic Description)
- Foundational Model of Anatomy
- GoodRelations
- Lexvo
- Ontolex



Semantic Web and AI?

- ➊ No human-level intelligence claims
- ➋ As with today's WWW
 - ➌ large, inconsistent, distributed
- ➌ Requirements
 - ➍ scalable, robust, decentralised
 - ➎ tolerant, mediated
- ➏ Semantic Web will make extensive use of current AI,
 - ➐ any advancement in AI will lead to a better Semantic Web
 - ➑ Current AI is already sufficient to go towards realizing the semantic web vision
- ➒ As with WWW, Semantic Web will (need to) adapt fast

[Davies, 03]

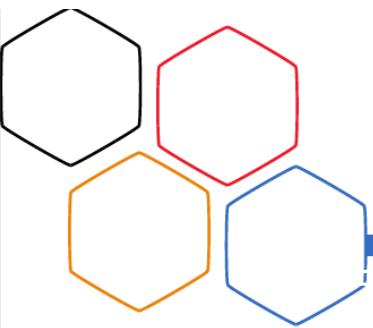


Semantic Web & Knowledge Management

- ◆ Organising knowledge in conceptual spaces according to its meaning.
- ◆ Enabling automated tools to check for inconsistencies and extracting new knowledge.
- ◆ Replacing query-based search with query answering.
- ◆ Defining who may view certain parts of information

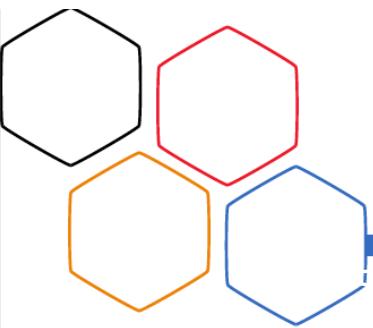


Technical Aspects



Serializing RDF triples

MIME type	Format
<ul style="list-style-type: none">• RDF/XML (<i>.rdf</i>)• Notation3 (<i>.n3</i>)• N-Triples (<i>.nt</i>)• Turtle (<i>.ttl</i>)• JSON-LD• TriG (<i>.trig</i>)• TriX (<i>.trix</i>)	<ul style="list-style-type: none">• <code>application/rdf+xml</code>• <code>text/n3</code>• <code>text/plain</code>• <code>text/turtle</code>



RDF/XML vs TURTLE

RDF/XML

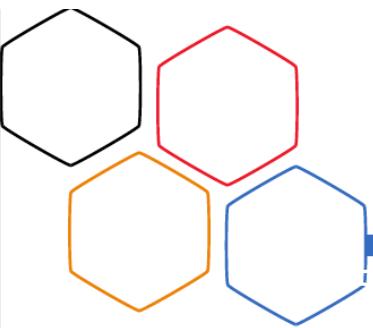
- Difficult to author
- Verbose
- No canonical serialization

TURTLE

- Simple
- Concise
- Has means of further compressing content

```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
           xmlns:contact="http://www.w3.org/2000/10/swap/pim/contact#">
  <contact:Person rdf:about="http://www.w3.org/People/EM/contact#me">
    <contact:fullName>Eric Miller</contact:fullName>
    <contact:mailbox rdf:resource="mailto:em@w3.org"/>
    <contact:personalTitle>Dr.</contact:personalTitle>
  </contact:Person>
</rdf:RDF>
```

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@prefix contact: <http://www.w3.org/2000/10/swap/pim/contact#>.
<http://www.w3.org/People/EM/contact#me>
  rdf:type contact:Person;
  contact:fullName "Eric Miller";
  contact:mailbox <mailto:em@w3.org>;
  contact:personalTitle "Dr.".
```

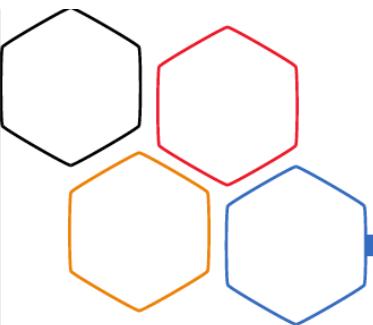


Storing in relational databases

- Mapping tables to triples:
 - D2RQ
 - R2RML
 - Ultrawrap
- Using RDBMS with RDF built-in capabilities
 - Oracle 11g
 - Virtuoso
 - Jena SDB
 - IBM DB2

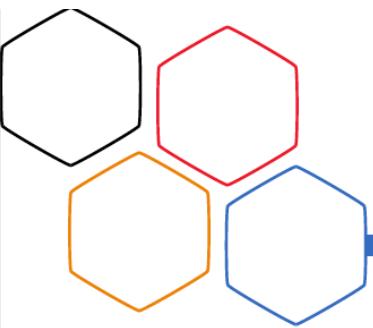


- Using native triple (quad) stores
 - Virtuoso
 - AllegroGraph
 - Blaze Graph (In Memory)
 - BigOWLIM
 - Jena TDB
 - 4store
 - Stardog
 - Dydra



RDF in programming practice

- For example, using Java+ Apache Jena:
 - a “Model” object is created
 - the RDF file is parsed and results stored in the Model
 - the Model offers methods to retrieve:
 - triples
 - (property,object) pairs for a specific subject
 - (subject,property) pairs for specific object
 - etc.
 - the rest is conventional programming...
- Similar tools exist in Python, PHP, etc.



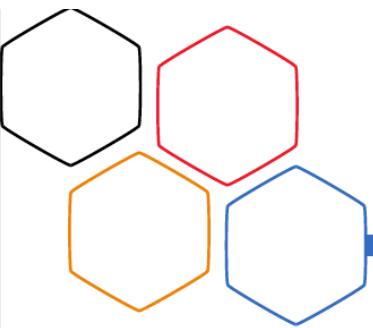
Jena example

```
// create a model
Model model=new ModelMem();
Resource subject=model.createResource("URI_of_Subject")
// 'in' refers to the input file
model.read(new InputStreamReader(in));
StmtIterator iter=model.listStatements(subject,null,null);
while(iter.hasNext()) {
    st = iter.next();
    p = st.getProperty();
    o = st.getObject();
    do_something(p,o);
}
```



RDF data access

- How do I query the RDF data?
 - e.g., how do I get to the DBpedia data?

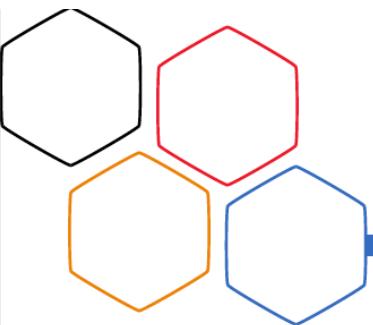


Querying RDF graphs

- Remember the Jena idiom:

```
StmtIterator iter=model.listStatements(subject,null,null);
while(iter.hasNext()) {
    st = iter.next();
    p = st.getProperty(); o = st.getObject();
    do_something(p,o);
```

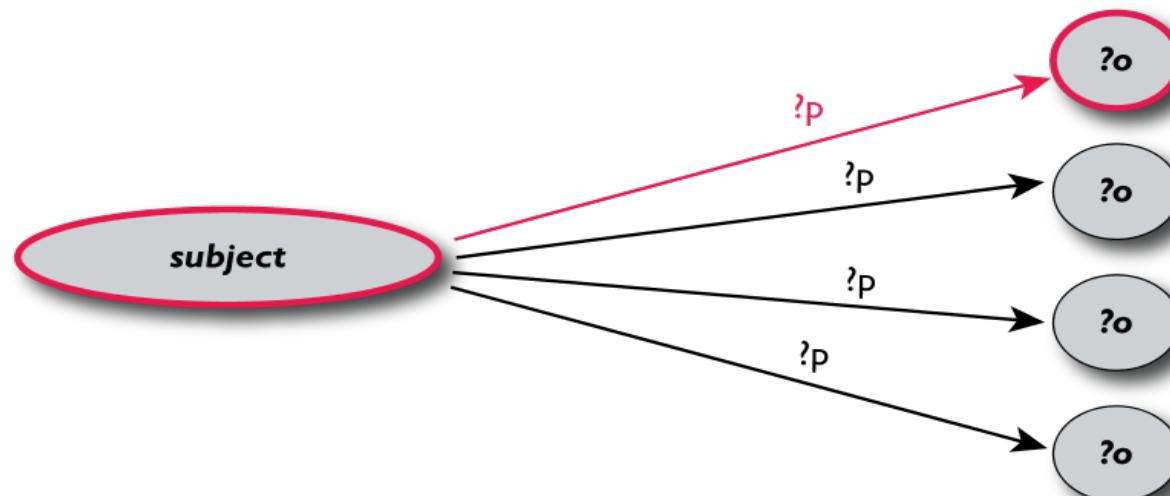
- In practice, more complex queries into the RDF data are necessary
 - something like: “give me the (a,b) pair of resources, for which there is an x such that (x parent a) and (b brother x) holds” (ie, return the uncles)
 - these rules may become quite complex
- The goal of [SPARQL](#) (Query Language for RDF)

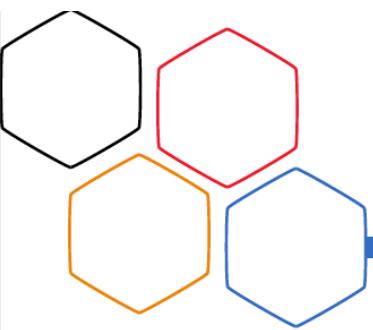


Analyse the Jena example

- The **(subject, ?p, ?o)** is a *pattern* for what we are looking for (with **?p** and **?o** as “unknowns”)

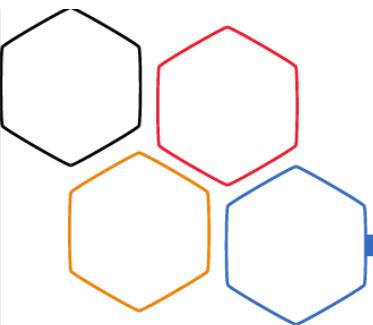
```
StmtIterator iter=model.listStatements(subject,null,null);
while(iter.hasNext()) {
    st = iter.next();
    p = st.getProperty(); o = st.getObject();
    do_something(p,o);
```





General: graph patterns

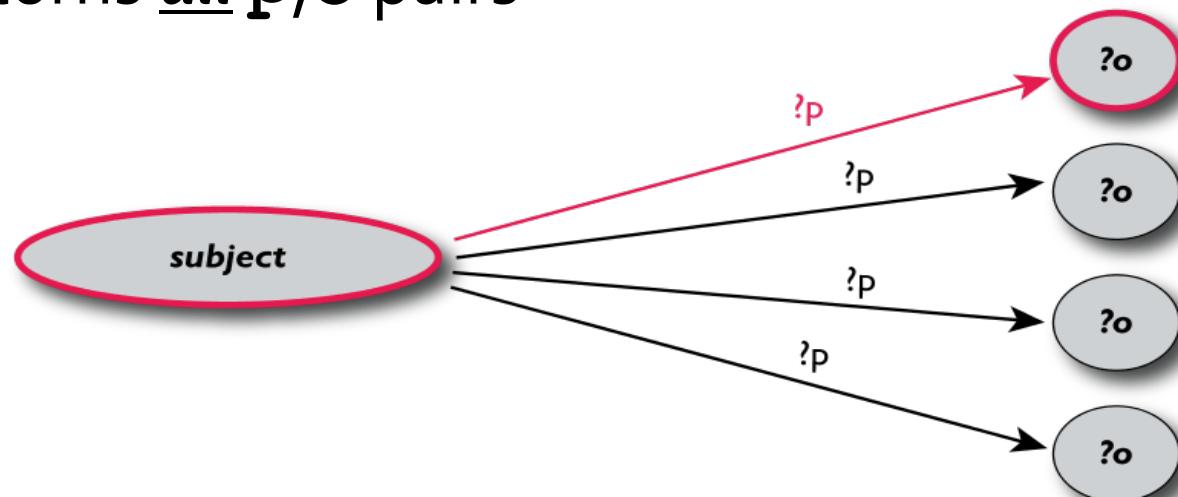
- The fundamental idea: use graph patterns
 - the pattern contains unbound symbols
 - by binding the symbols, subgraphs of the RDF graph are selected
 - if there is such a selection, the query returns bound resources

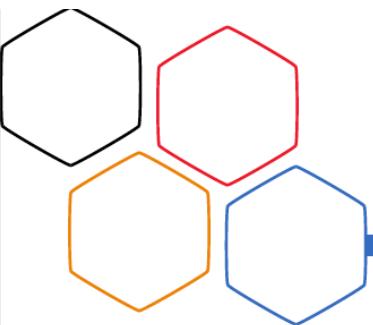


Our Jena example in SPARQL

```
SELECT ?p ?o  
WHERE {subject ?p ?o}
```

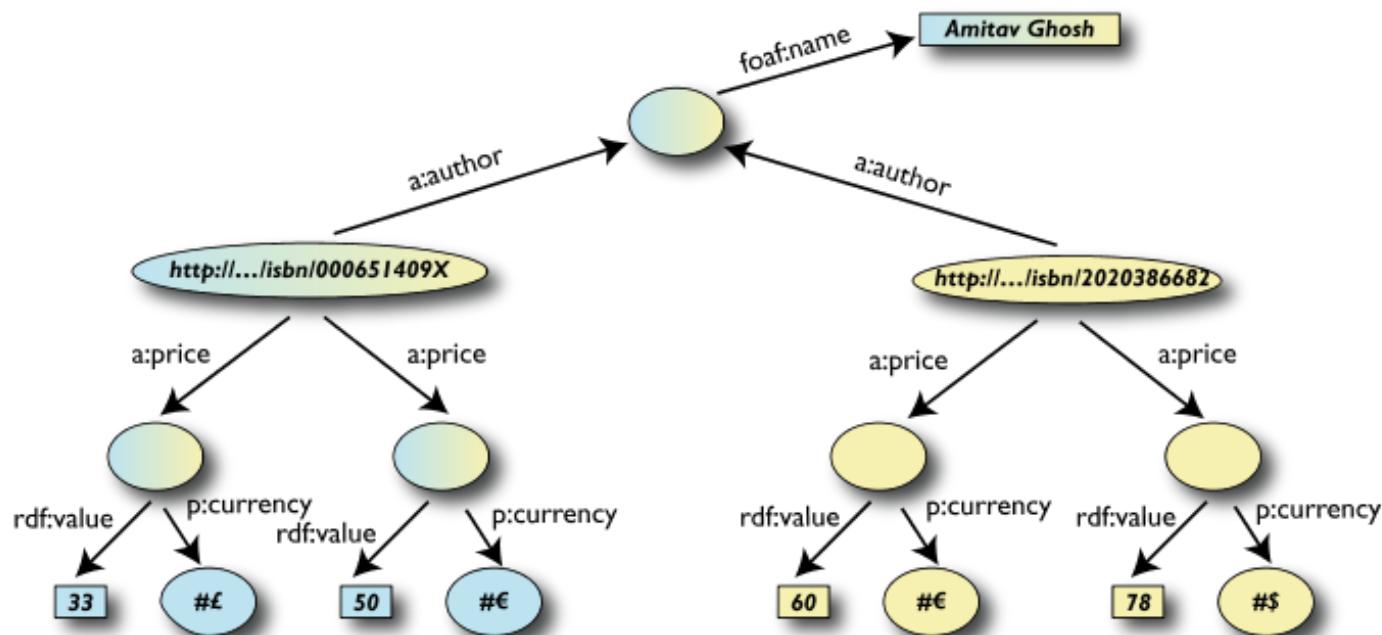
- The triples in **WHERE** define the graph pattern, with **?p** and **?o** “unbound” symbols
- The query returns all p,o pairs

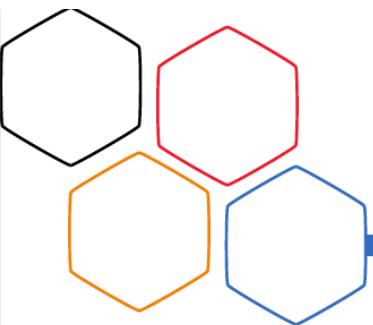




Simple SPARQL example

```
SELECT ?isbn ?price ?currency # note: not ?x!
WHERE {?isbn a:price ?x. ?x rdf:value ?price. ?x p:currency ?currency.}
```



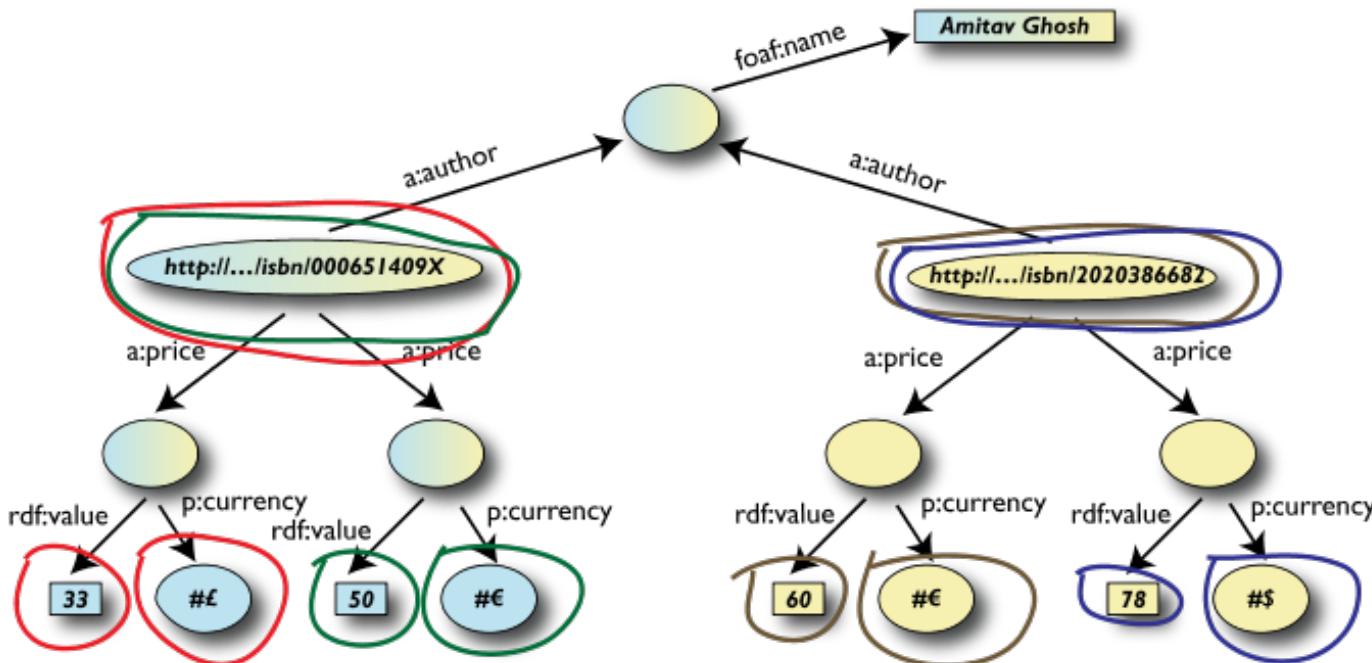


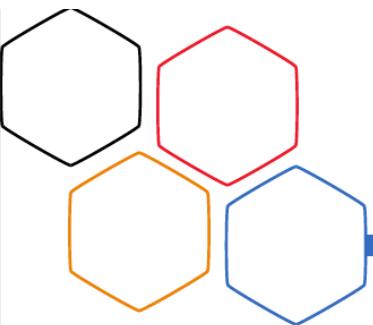
Simple SPARQL example

```
SELECT ?isbn ?price ?currency # note: not ?x!
WHERE {?isbn a:price ?x. ?x rdf:value ?price. ?x p:currency ?currency.}
```

Returns:

`[<..49X>,33,£], [<..49X>,50,€], [<..6682>,60,€], [<..6682>,78,$]`

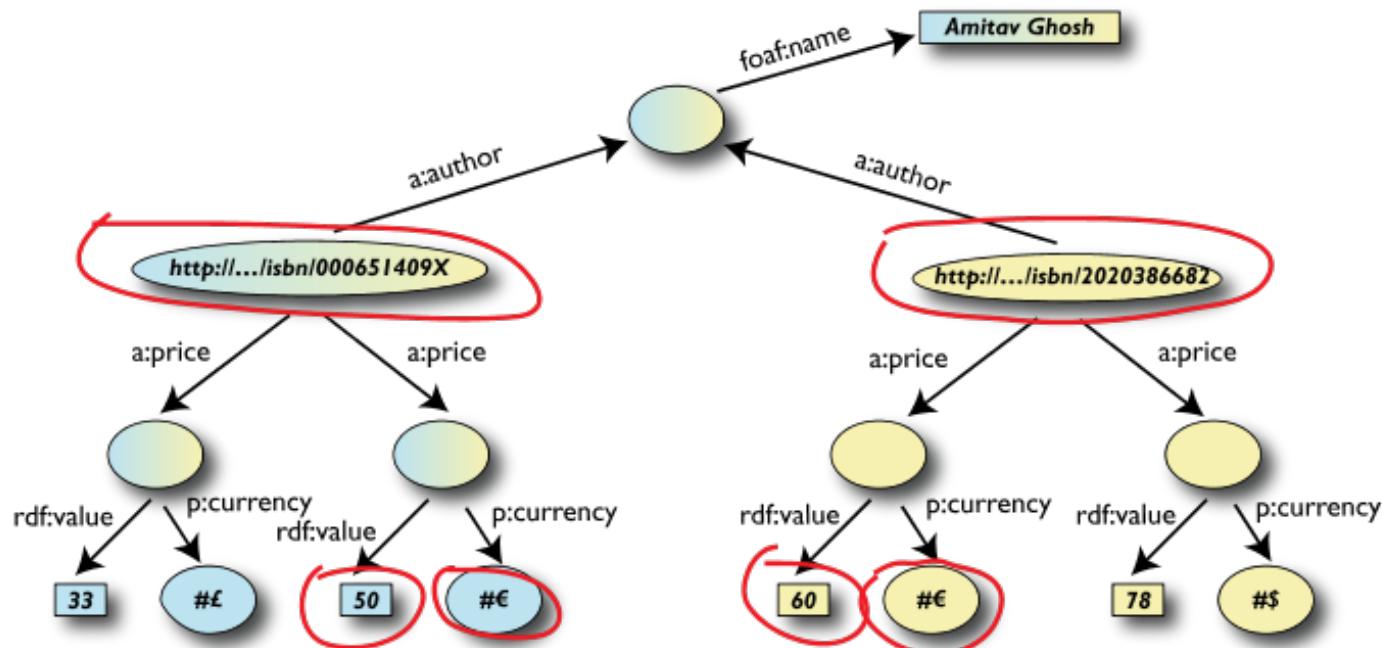


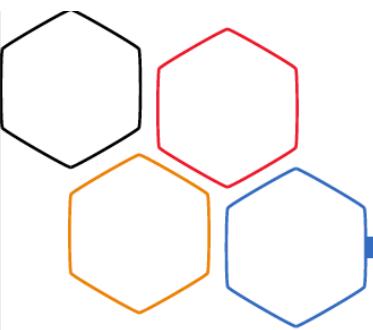


Pattern constraints

```
SELECT ?isbn ?price ?currency # note: not ?x!
WHERE { ?isbn a:price ?x. ?x rdf:value ?price. ?x p:currency ?currency.
        FILTER(?currency == €) }
```

Returns: [[<..409X>,50,€], [<..6682>,60,€]]





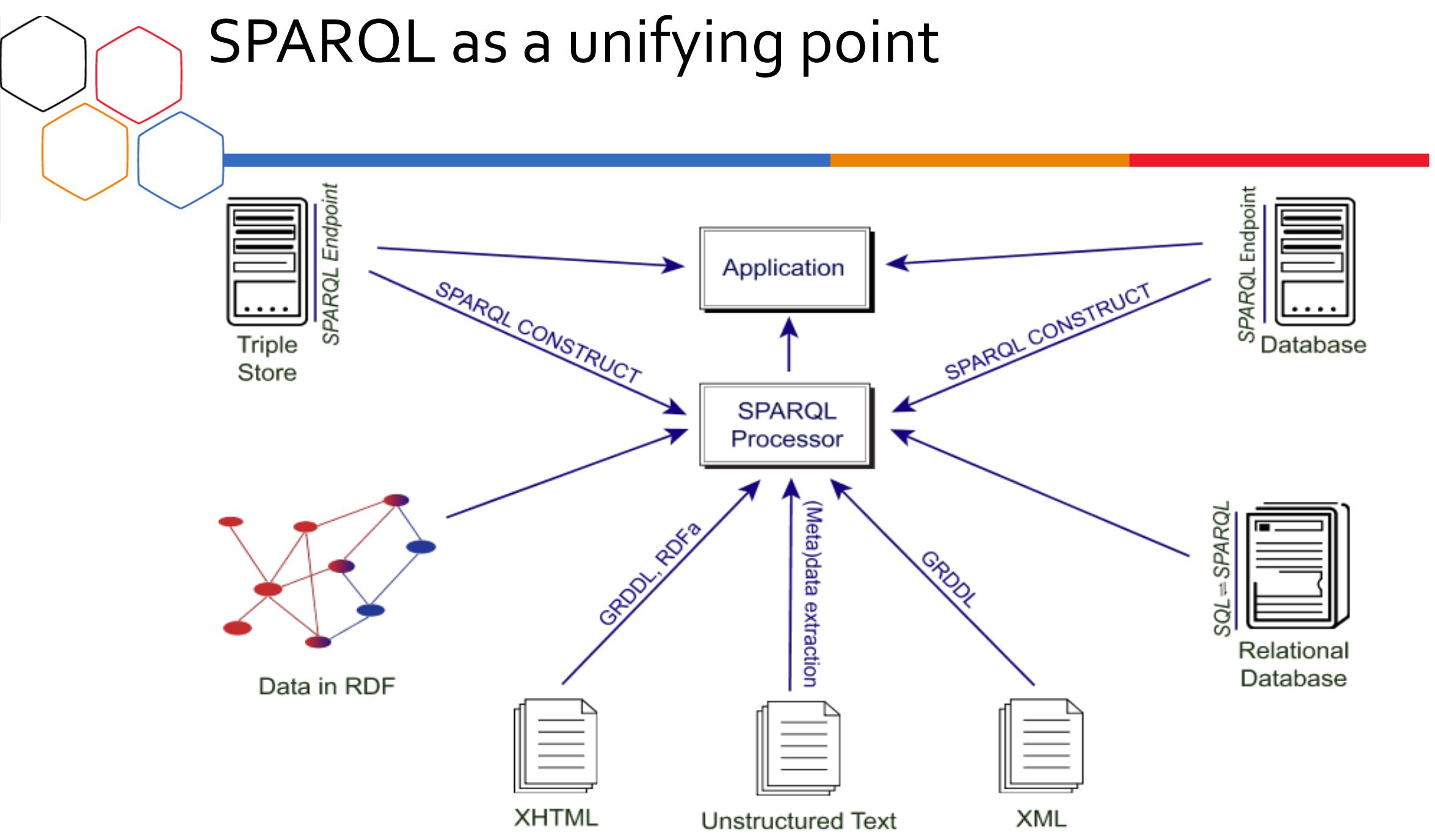
Other SPARQL features

- Limit the number of returned results; remove duplicates, sort them, ...
- Optional branches in the query
- Specify several data sources (via URI-s) within the query (essentially, a merge!)
- Construct a graph combining a separate pattern and the query results
- Use datatypes and/or language tags when matching a pattern



SPARQL usage in practice

- SPARQL is usually used over the network
 - separate documents define the protocol and the result format
 - SPARQL Protocol for RDF with HTTP and SOAP bindings
 - SPARQL results in XML or JSON formats
- Big datasets usually offer “SPARQL endpoints” using this protocol
 - typical example: SPARQL endpoint to DBpedia

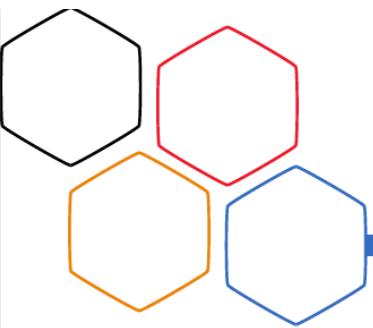




Linked Data



- Goal: “expose” open datasets in RDF
- *Set RDF links among the data items* from different datasets
- Set up query endpoints
- Altogether billions of triples, millions of links...



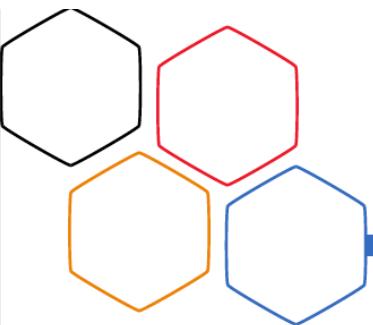
Example data source: DBpedia

- DBpedia is a community effort to
 - extract structured (“infobox”) information from Wikipedia
 - provide a query endpoint to the dataset
 - interlink the DBpedia dataset with other datasets on the Web



UNIVERSITÄT LEIPZIG





Extracting Wikipedia structured data

Amsterdam	
	
The Keizersgracht at dusk	
Location of Amsterdam	
Coordinates:	52°22'23"N 4°53'32"E
Country	Netherlands
Province	North Holland
Government	
- Type	Municipality
- Mayor	Job Cohen ^[1] (PvdA)
- Aldermen	Lodewijk Asscher Carolin Gehrels Tjeerd Herrema Maarten van Poelgeest Marijke Vos
- Secretary	Erik Gerritsen
Area ^{[2][3]}	
- City	219 km ² (84.6 sq mi)
- Land	166 km ² (64.1 sq mi)
- Water	53 km ² (20.5 sq mi)
- Urban	1,003 km ² (387.3 sq mi)
- Metro	1,815 km ² (700.8 sq mi)
Elevation ^[4]	2 m (7 ft)
Population (1 October 2008) ^{[5][6]}	
- City	755,269
- Density	4,459/km ² (11,548.8/sq mi)
- Urban	1,364,422
- Metro	2,158,372
- Demonym	Amsterdamer
Time zone	CET (UTC+1)
- Summer (DST)	CEST (UTC+2)
Postcodes	1011 – 1109
Area code(s)	020
Website: www.amsterdam.nl	

```
@prefix dbpedia <http://dbpedia.org/resource/>.
@prefix dbterm <http://dbpedia.org/property/>.
```

dbpedia:Amsterdam

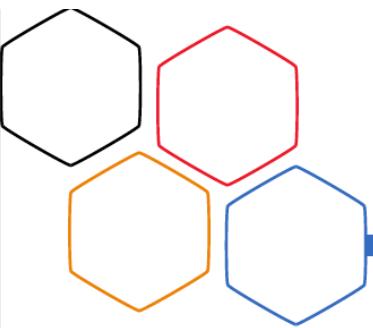
```
dbterm:officialName "Amsterdam" ;
dbterm:longd "4" ;
dbterm:longm "53" ;
dbterm:longs "32" ;
...
dbterm:leaderTitle "Mayor" ;
dbterm:leaderName dbpedia:Job_Cohen ;
```

```
...
dbterm:areaTotalKm "219" ;
```

...

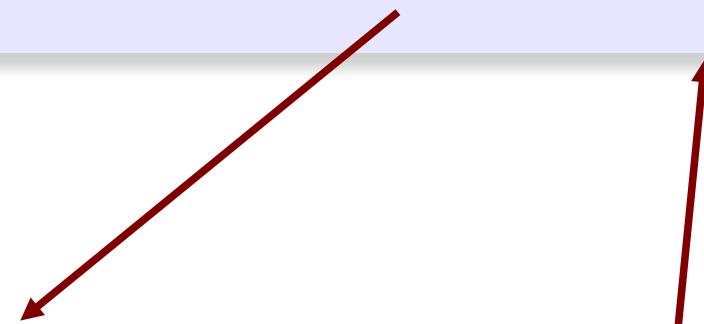
dbpedia:ABN_AMRO

```
dbterm:location dbpedia:Amsterdam ;
...
...
```

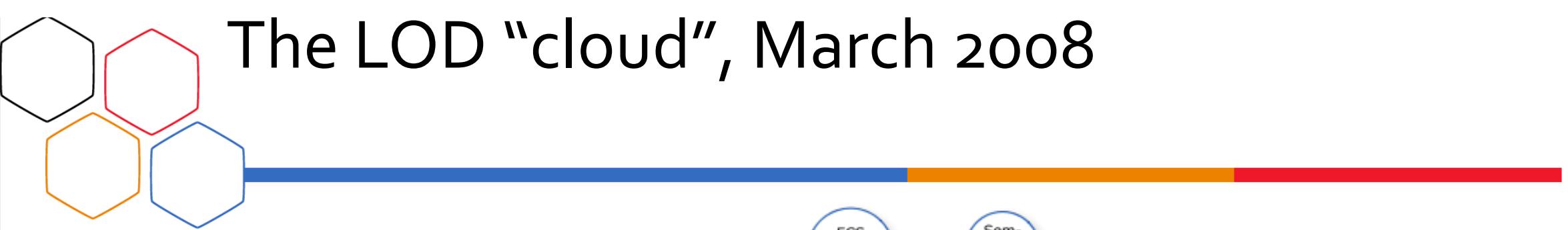


Automatic links among open datasets

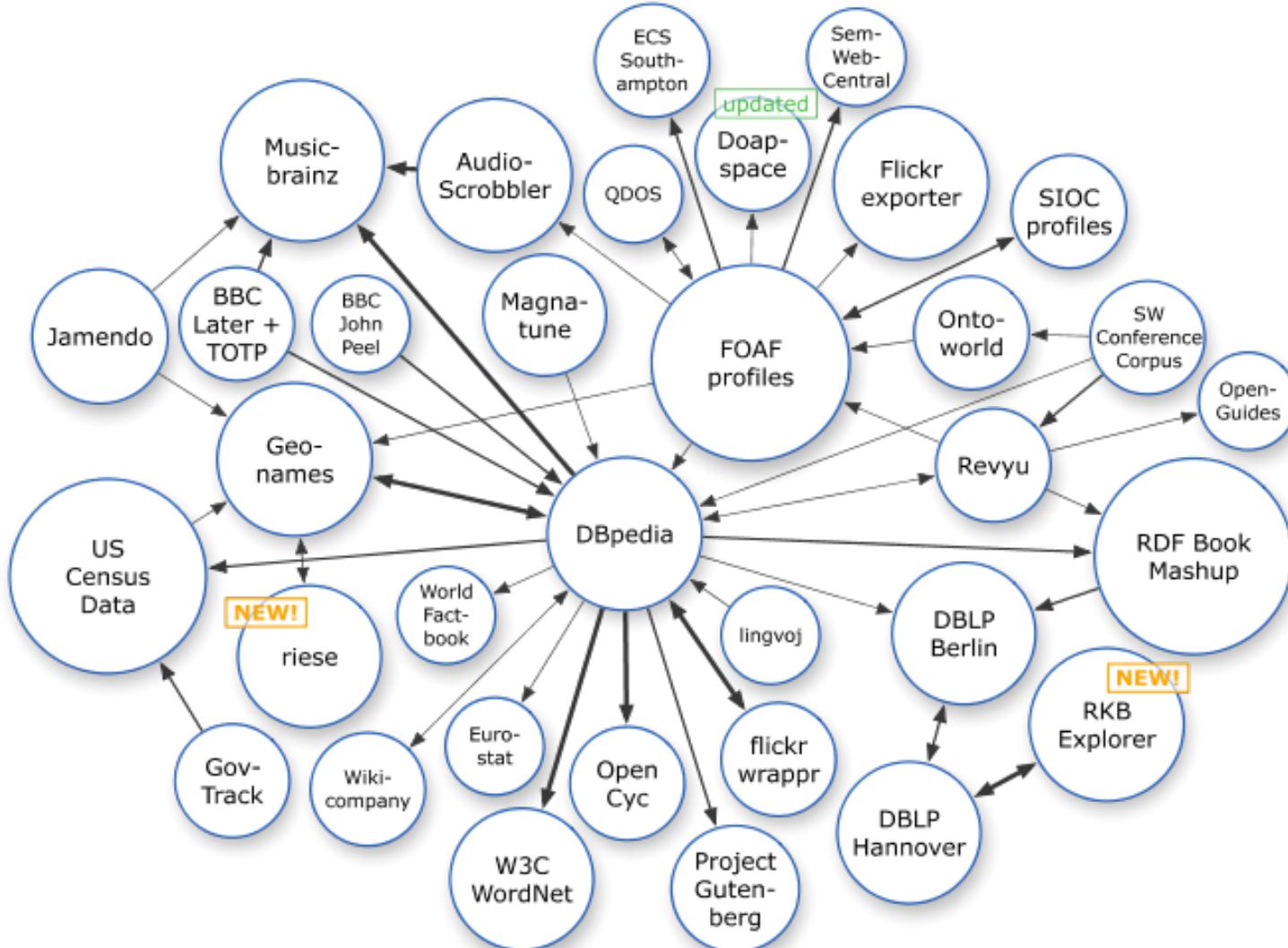
```
<http://dbpedia.org/resource/Amsterdam>
owl:sameAs <http://rdf.freebase.com/ns/...> ;
owl:sameAs <http://sws.geonames.org/2759793> ;
...
```

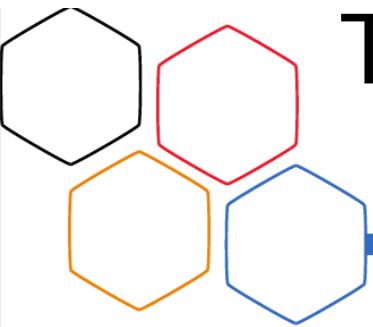


Processors can switch automatically from one to the other...

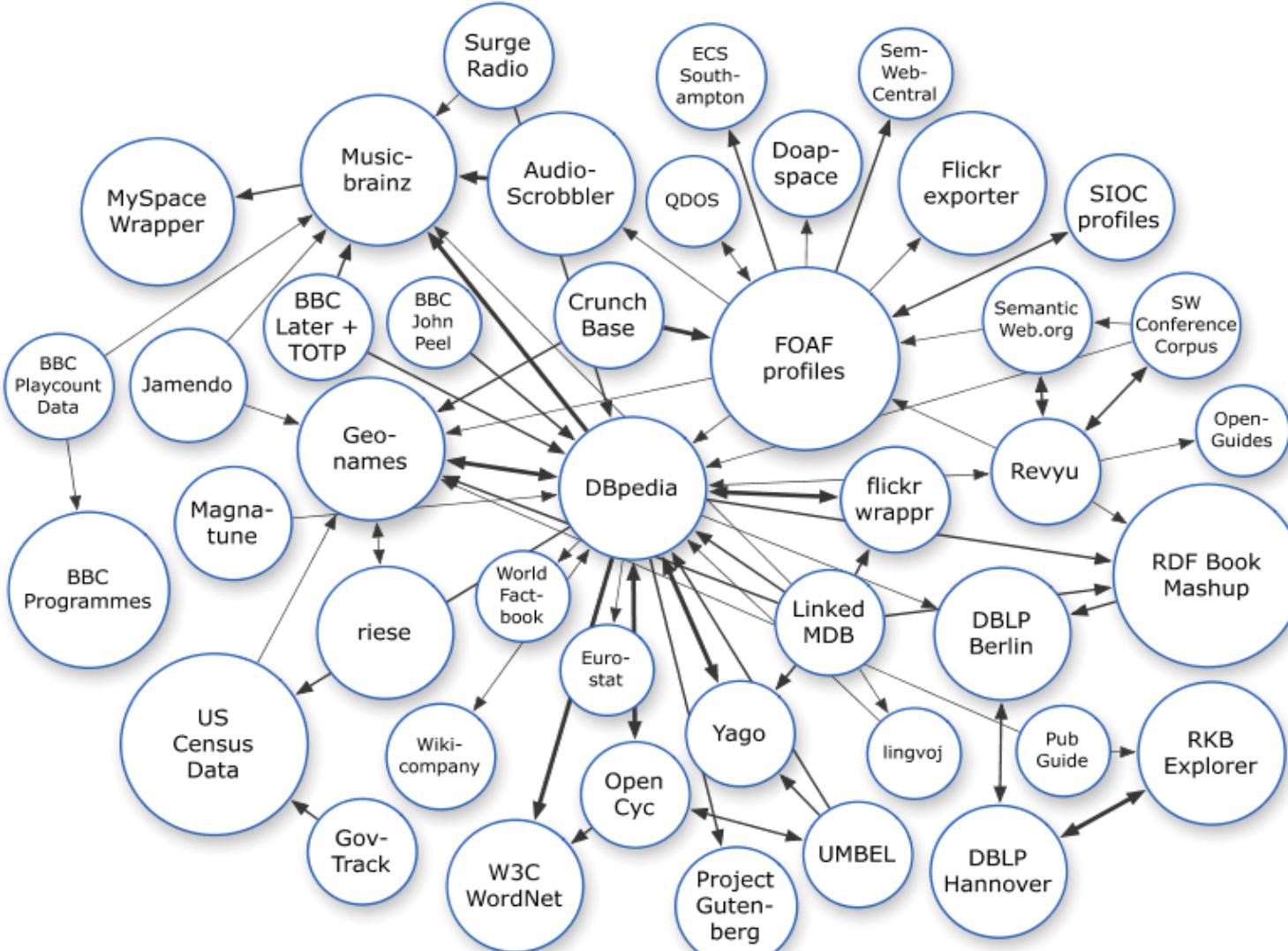


The LOD “cloud”, March 2008

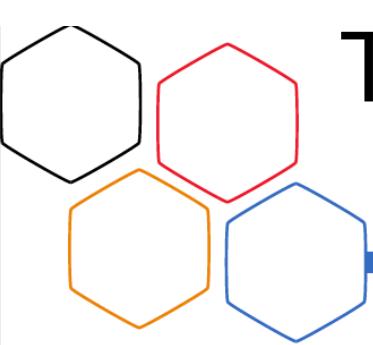




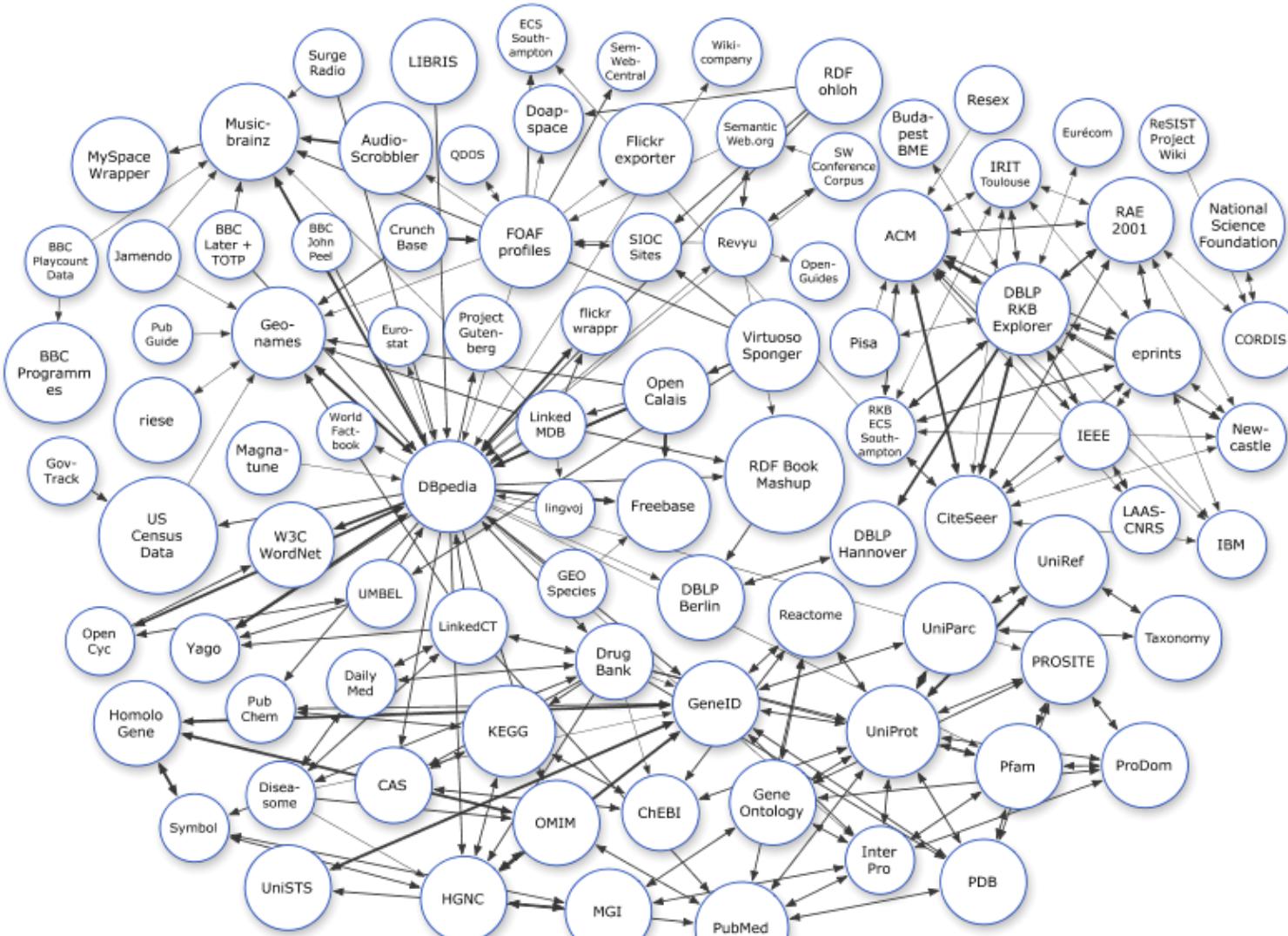
The LOD “cloud”, September 2008



As of September 2008

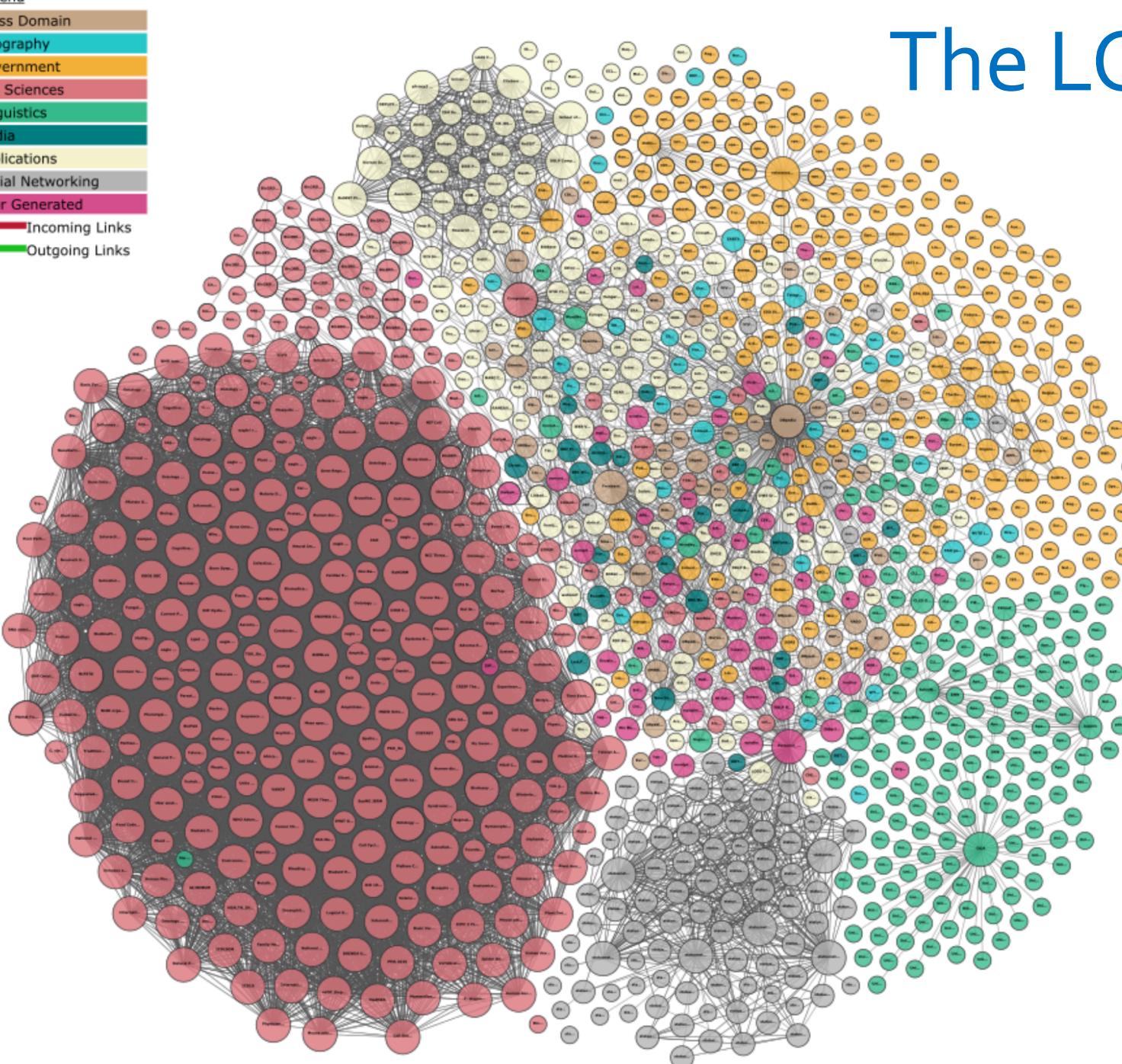


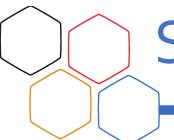
The LOD “cloud”, March 2009



As of March 2009

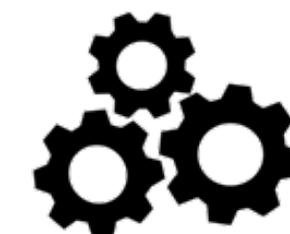
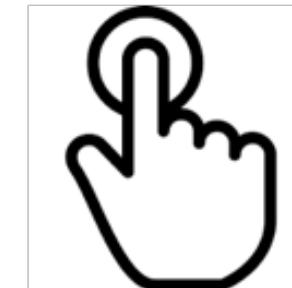
The LOD “cloud”, Today!





To be FAIR, adopt the
Semantic Web standards

F indable A ccessible I nteroperable R eusable



- ➊ Annotate your data with ontology concepts
- ➋ Use persistent URIs from reference ontologies in your datasets
- ➌ Leverage RDF/SPARQL to semantically query the data



BioPortal URMM

Browse Search Mappings Recommender Annotator NCBO Annotator+ Projects

Recently Viewed | Sign In | Help | About | Feedback | [Cite Us](#)

Use BioPortal to access and share French biomedical ontologies and terminologies. You can [create ontology-based annotations for your own text](#), [link your own project that uses ontologies to the description of those ontologies](#), [find and create relations between terms in different ontologies](#), review and comment on ontologies and their components as you [browse them](#). [Sign in to BioPortal](#) to submit a new ontology or ontology-based project, provide comments on ontologies or add ontology mappings.

Current Release: 4.24 (February 2016)

Search all ontologies

Search

[Advanced Search](#)

Find an ontology

Explore

[Browse Ontologies >](#)

Links

[\[API\]](#) [SPARQL](#) [Books](#) [Glossary](#)

Ontology Visits (April 2017)

Dictionnaire médical pour les activités réglementaires en matière de médicaments (MDRFR)	261
Systematized Nomenclature of MEDicine, version française (SNMIFRE)	73
Medical Subject Headings, version française (MSHFR)	63
Classification Internationale des Maladies – 10ème révision (CIM-10)	47
Classification Internationale des Soins Primaires, deuxième édition (CISP-2)	16
More	

Latest Notes

Enlever ce concept ? (MedlinePlus Health Topics)
3 months ago by jonquet
Cela ne semble pas très logique d'avoir la forme singulier de cancer sous la forme pluriel. Cela ...

Langage tag (Ontology of nuclear toxicity)
3 months ago by jonquet
Les langage tag sur cette classe ont l'air d'avoir été inversé.

New Class Proposal: Spécialisation (interventionnelle Non Médicamenteuse)
5 months ago by jonquet

Placement hiérarchique (Interventionnelle Non Médicamenteuse)
5 months ago by jonquet
Je proposerai de l'attacher à Aliment, non ?

Terme vraiment utilis? (MuVo)
11 months ago by jonquet
Est-ce que les patientes parlent vraiment de leur "ovocytes" quand elles parlent de leur grossesse...

Slices

Catalogue et Index des Sites Médicaux Francophones (cismef)
Ontologies importées du NCBO BioPortal (ncbobiop)
French Unified Medical Language System (umls)
Ontologies développées par ou en partenariat avec le LIMICS (limics)

Origine des ontologies

Les ontologies du SIFR BioPortal sont soit:

- extraites en français de l'UMLS (quand une version française existe),
- récupérées automatiquement du NCBO BioPortal (version française des ontologies multilingues),
- chargées directement par les utilisateurs,
- fournies par CISMeF, suite au développement d'un export OWL pour la plateforme HeLoP. Pour obtenir une ontologie ou terminologie au format OWL veuillez contacter CISMeF directement.

Supported by

ANR  MARIE CLAIRE  IBO 

With the collaboration of

NATIONAL CENTER FOR BIOMEDICAL ONTOLOGY  SIFR project  LIRMM 

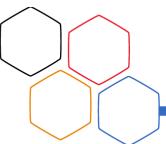
SIFR BioPortal

An open and generic portal for French biomedical ontologies and terminologies

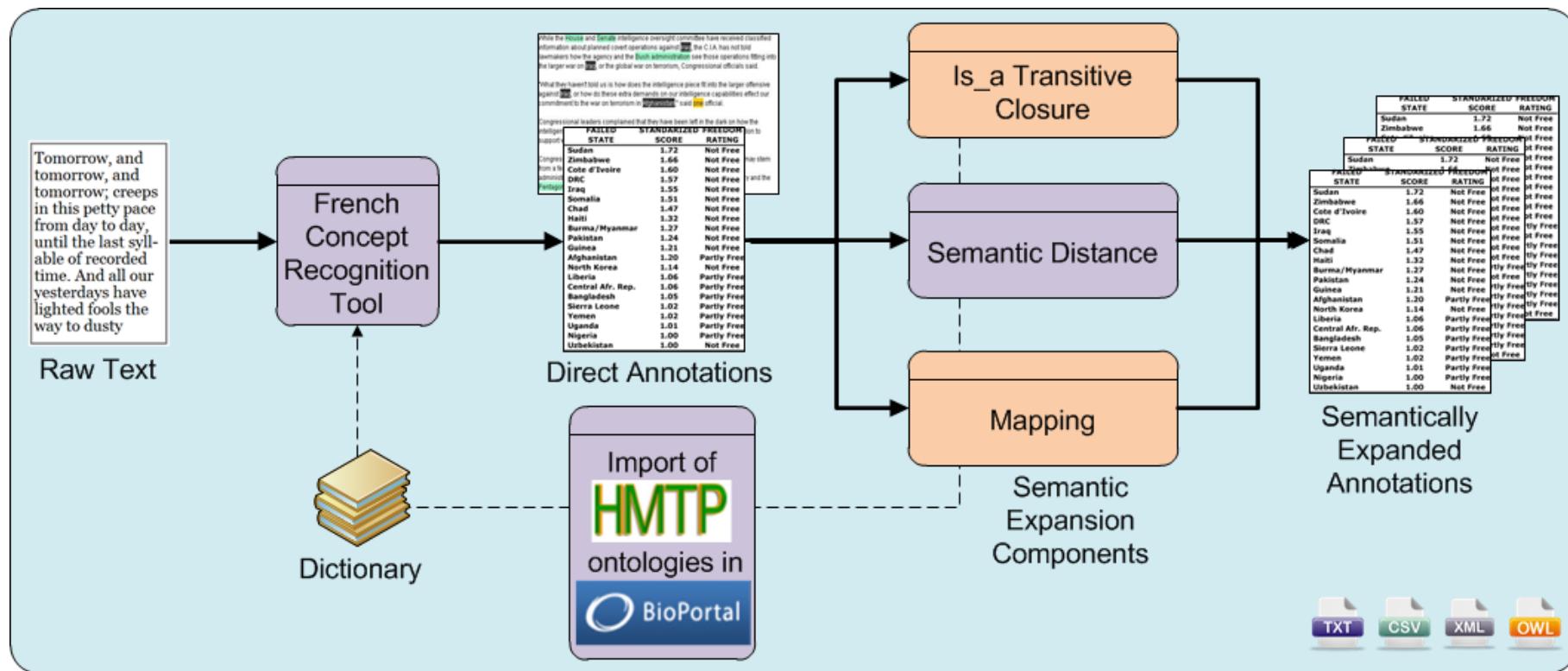
<http://bioportal.lirmm.fr>

80

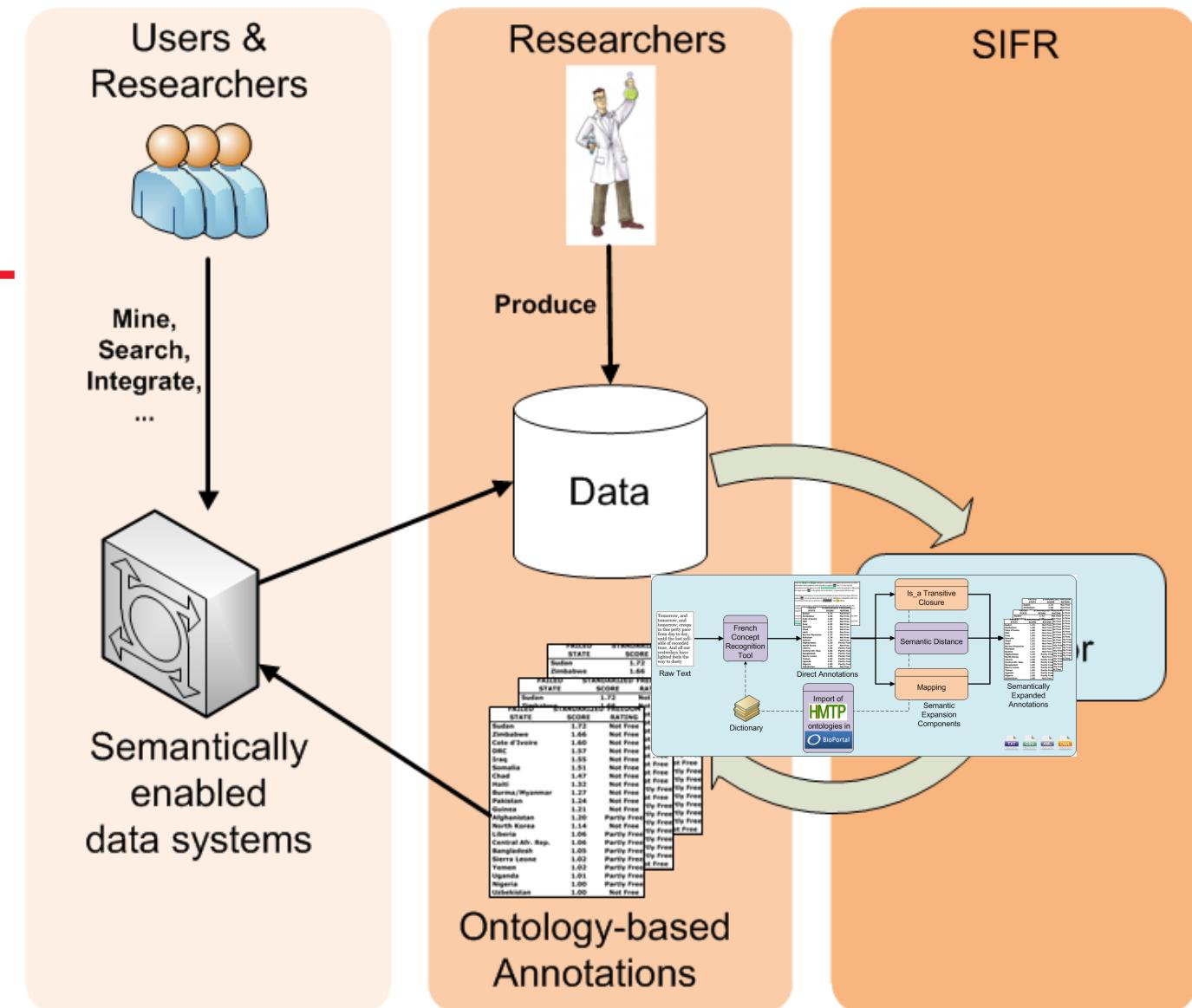
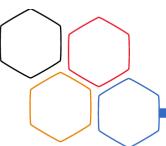
Indexer, fouiller des ressources en français... à l'aide des ontologies



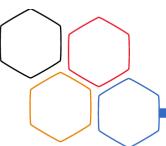
- Développer un **workflow d'annotation sémantique** de données textuelles francophones et l'offrir sous forme de service ouvert et public à la communauté biomédicale française



Permettre la création d'applications qui utilisent la sémantique des ontologies



NCBO Bioportal : A “one stop shop” for Biomedical Ontologies



The screenshot shows the BioPortal homepage. At the top, there are navigation links: BioPortal, Browse, Search, Mappings, Recommender, Annotator, Resource Index, and Projects. Below this is a search bar with a placeholder "Enter term, e.g. Melanoma" and a "Search" button. To the right is another search bar with a placeholder "Enter ontology name, e.g. ICD Thesaurus" and a "Explore" button. The main content area has two sections: "Most Viewed Ontologies (September, 2012)" and "Statistics". The "Most Viewed Ontologies" section lists National Drug File (7025 views), SNOMED Clinical Terms (4430 views), MedDRA (3520 views), International Classification of Diseases (3133 views), and NCI Thesaurus (1332 views). The "Statistics" section provides counts for Ontologies (326), Terms (5,496,375), Resources Indexed (27), Indexed Records (4,566,805), Direct Annotations (2,036,458,468), and Direct Plus Expanded Annotations (15,231,854,602).

- Web repository for biomedical ontologies
 - Make ontologies accessible and usable – abstraction on format, locations, structure, etc.
 - Users can publish, download, browse, search, comment, align ontologies and use them for annotations both online and via a web services API.
 - 400+ ontologies (mainly in English)
 - <http://bioportal.bioontology.org>

● Online support for ontology

- Peer review
- Notes (comments and discussion)
- Versioning
- Mapping
- Search
- Resources
- Annotation
- Recommendation



<http://data.bioontology.org>

Ontology Services

- Search
- Traverse
- Comment
- Download

Mapping Services

- Create
- Upload
- Download

Widgets

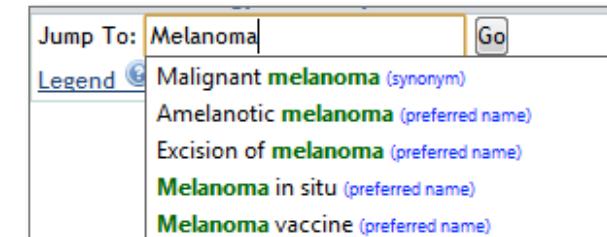
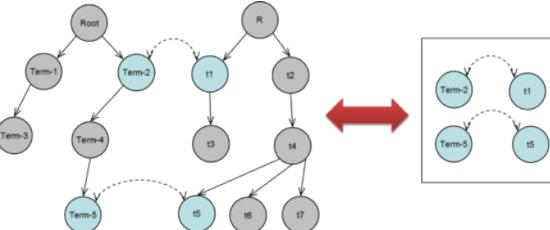
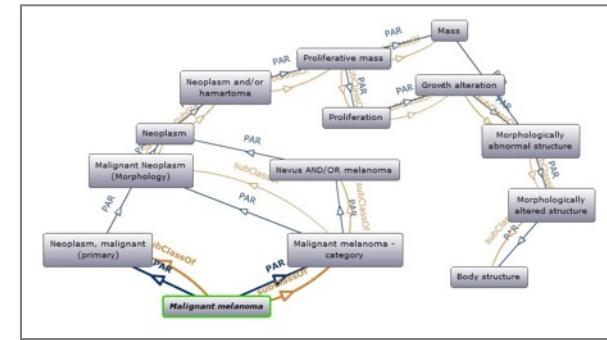
- Tree-view
- Auto-complete
- Graph-view

Annotation

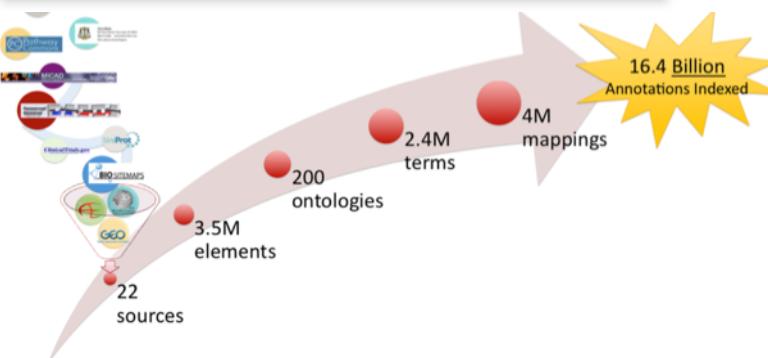
Term recognition

Data Access

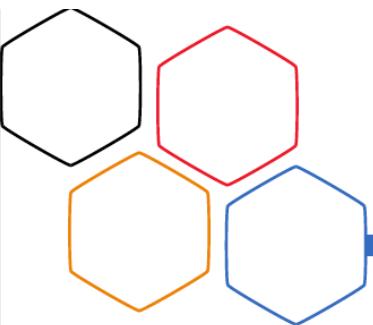
Search “data”
annotated with a
given term



Expression, Expression of bladder, bladder, smooth, bladder, muscle, muscle, smooth muscle, cells, mechanical, mechanical stimulation, stimulation, Chronic, results, bladder overdistension, associated, associated with, with, loss, genes, altered



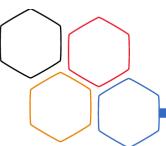
<http://bioportal.bioontology.org>



New element in the French medical informatics environment

- ◆ Open
 - ◆ Anyone can upload content
- ◆ Generic
 - ◆ Any type of content (RRF, SKOS, OBO, OWL)
- ◆ Specific version of the NCBO BioPortal but for French
 - ◆ French labels are used in the web interface and backend indexing for browsing, search and annotation.
- ◆ 24 French biomedical ontologies/terminologies
 - ◆ Extracted from UMLS (4)
 - ◆ Offered by CISMeF – thanks to OWL export (10)
 - ◆ Directly loaded by users (either directly or from the NCBO BioPortal)

Available ontologies & terminologies



Search...

Submit New Ontology

Entry Type

- Ontology (24)
- Ontology View (0)
- CIMI Model (0)
- NLM Value Set (0)

Uploaded in the Last

Category

- Traduction français (10)
- Uniquement français (6)
- Vue français (8)

Group

- CISMEF (10)
- LIMICS (5)
- NCBOBP (8)
- UMLS (10)

Format

- OWL (19)
- SKOS (1)
- UMLS (4)

Ontology Content

- Notes (4)
- Reviews (0)
- Projects (11)
- Summary Only (0)

Natural Language

- German (0)
- English (3)
- French (22)
- Italian (0)
- Portuguese (0)
- Spanish (0)

Formality Levels

- Classification scheme (4)
- Dictionary (2)
- Gazetteer (0)
- Glossary (0)
- List (2)
- Name authority list (0)
- Ontology (8)
- Semantic network (0)
- Subject heading scheme (0)
- Synonym ring (0)
- Taxonomy (0)

Is of Type

- Application Ontology (0)

Dictionnaire médical pour les activités réglementaires en matière de médicaments (MDRFRÉ)

Traduction française de Medical Dictionary for Regulatory Activities Terminology (MedDRA)

Uploaded: 5/4/17

Systematized Nomenclature of MEDICINE, version française (SNMIFRE)

La SNOMED internationale (Systematized Nomenclature of MEDICINE) est une nomenclature pluri-axiale couvrant tous les champs de la médecine et de la dentisterie humaines, ainsi que la médecine animale

Uploaded: 3/16/17

Medical Subject Headings, version française (MSHFRE)

Le MeSH (Medical Subject Headings) est le thésaurus de référence dans le domaine biomédical

Uploaded: 5/3/17

Classification Internationale des Maladies - 10ème révision (CIM-10)

La CIM-10 permet le codage des maladies, des traumatismes et de l'ensemble des motifs de recours aux services de santé

Uploaded: 3/9/17

Classification Internationale des Soins Primaires, deuxième édition (CISP-2)

La CISP-2 permet de classer et coder trois éléments de la consultation de médecine générale, ou plus généralement de soins primaires

Uploaded: 3/20/17

MuEVo (MUEVO)

Vocabulaire multi-expertise (patient/médecin) dédié au cancer du sein

Uploaded: 6/4/16

ONTOPNEUMO (ONTOPNEUMO)

Ontologie de la pneumologie française.

Uploaded: 12/5/16

MedlinePlus Health Topics (MEDLINEPLUS)

MedlinePlus est un site tout public (professionnels, patients, usagers) de la National Library of Medicine (US) proposant de l'information de qualité concernant la santé

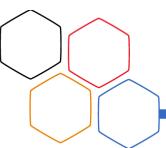
Uploaded: 3/16/17

Terminologie minimale standardisée en endoscopie digestive (MTHMSTFRE)

Traduction française du Metathesaurus Version of Minimal Standard Terminology Digestive Endoscopy (2001)

Uploaded: 1/11/16

projects 1	classes 68,980
projects 1	classes 106,291
projects 1	classes 27,879
classes 745	
notes 1	concepts 306
projects 1	classes 1,153
notes 1	classes 849
classes 1,700	



Complete and standard description of each resource

Details

ACRONYM	MDRFRE
VISIBILITY	Public
DESCRIPTION	Traduction française de Medical Dictionary for Regulatory Activities Terminology (MedDRA). Son but est de fournir une terminologie médicale internationale standardisée qui peut être utilisée pour les communications réglementaires et pour l'évaluation de données appartenant à des produits médicaux destinés à l'humain. MedDRA est donc utilisé pour l'enregistrement, la documentation et le suivi des produits médicaux tout au long du cycle de développement du médicament (des essais cliniques au suivi après mise sur le marché)
STATUS	Production
FORMAT	UMLS
CONTACT	MSSO Help Desk, msohelp@ngc.com
HOME PAGE	http://www.meddra.org
PUBLICATIONS PAGE	https://doi.org/10.2165/00002018-19992020-00002
DOCUMENTATION PAGE	http://www.meddra.org/how-to-use/support-documentation/french
CATEGORIES	Traduction français
GROUPS	French Unified Medical Language System

[Go to the REST API JSON entry](#)

Metrics

NUMBER OF CLASSES:	68980
NUMBER OF INDIVIDUALS:	0
NUMBER OF PROPERTIES:	14
MAXIMUM DEPTH:	3
MAXIMUM NUMBER OF CHILDREN:	250
AVERAGE NUMBER OF CHILDREN:	16
CLASSES WITH A SINGLE CHILD:	70
CLASSES WITH MORE THAN 25 CHILDREN:	388
CLASSES WITH NO DEFINITION:	68763

Visits

[Download as CSV](#)



Additional Metadata

NATURAL LANGUAGE	http://lexvo.org/id/iso639-3/fra
VERSION	2015AA, version 18.0
RELEASE DATE	2015-12-11T00:00:00+00:00
KEYWORDS	produits médicaux, produits pharmaceutiques à usage humain, produits pharmaceutiques, produits biologiques, vaccins
FUNDED BY	International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH)
TRANSLATOR	MedDRA.org
HAS DOMAIN	http://data.bioportal.lirmm.fr/categories/Traduction_français
HAS FORMALITY LEVEL	http://w3id.org/nkos/nkostype#terminology
ONTOLOGY SYNTAX	http://www.w3.org/ns/formats/turtle
DATA DUMP	http://data.bioportal.lirmm.fr/ontologies/MDRFRE/download?download_format=rdf
OPEN SEARCH DESCRIPTION	http://data.bioportal.lirmm.fr/search/ontologies=MDRFRE&q=
URI LOOKUP ENDPOINT	http://data.bioportal.lirmm.fr/search/ontologies=MDRFRE&require_exact_match=true&q=
DEPICTION	http://www.jil.edu.in/blog/wp-content/uploads/2011/12/Presentation1.png
LOGO	http://www.meddra.org/sites/all/themes/meddra_theme/img/logo.png
MORE PERMISSIONS	L'abonnement à MedDRA est disponible gratuitement pour toutes les autorités gouvernementales à travers le monde, alors que les abonnements sont payants, suivant une échelle ascendante liée au chiffre d'affaires des compagnies. Les universitaires et professionnels de santé peuvent également avoir accès à MedDRA gratuitement auprès de la MSSO et pour un coût minime auprès de la JMO.
EXAMPLE IDENTIFIER	http://purl.lirmm.fr/ontology/MDRFRE/10072522
COPYRIGHT HOLDER	International Federation of Pharmaceutical Manufacturers and Associations (IFPMA)
TRANSLATION OF	http://purl.bioontology.org/ontology/MEDDRA
INCLUDED IN DATA CATALOG	http://www.hetop.eu , https://www.nlm.nih.gov/research/umls/sourcerelatedocs/current/MDRFRE , https://bioportal.biocatalog.org/ontologies/MEDDRA

Reviews

[Add your review](#)

No reviews available.

Submissions

SUBMISSION	RELEASE DATE	UPLOAD DATE
2015AA, version 18.0 (Parsed, Indexed, Metrics, Annotator, Error Diff)	12/11/2015	05/04/2017
2016AB (Archived)	12/11/2016	12/11/2015
2015AA (Archived)	05/12/2015	11/23/2015

Views

[Create new view](#)

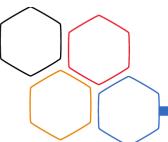
No views available.

Projects Using This Ontology

[Create new project](#)

PROJECT	DESCRIPTION	PEOPLE	INSTITUTION
PracikPharma : Confrontation entre connaissances de l'état de l'art et connaissances extraites de dossiers patients en pharmacogénomique	La pharmacogénomique étudie comment les gènes influent sur la...	Adrien Coulet (adrien.coulet@loria.fr)	LORIA

Search inside ontologies & terminologies



BioPortal LIRMM

Browse Search Mappings Recommender Annotator NCBO Annotator+ Projects

Class Search

Search for a class in multiple ontologies ?

mélanome

Search advanced options

Matches in 6 ontologies

[Mélanome - Medical Subject Headings, version française \(MSHFRE\)](#)
http://purl.lirmm.fr/ontology/MSHFRE/D008545
[details](#) - [visualize](#) - [5 more from this ontology](#)

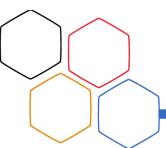
[mélanome - MedlinePlus \(MEDLINEPLUS\)](#)
http://chu-rouen.fr/cismef/MedlinePlus#T321
[details](#) - [visualize](#)

[Mélanome - Dictionnaire médical pour les activités réglementaires en matière de médicaments \(MDRFRE\)](#)
http://purl.lirmm.fr/ontology/MDRFRE/10053571
[details](#) - [visualize](#) - [59 more from this ontology](#)

[mélanome nodulaire - Systematized Nomenclature of MEDicine, version française \(SNMIFRE\)](#)
http://chu-rouen.fr/cismef/SNOMED_int.#M-87213
[details](#) - [visualize](#) - [74 more from this ontology](#)

[Mélanome malin - Terminologie des effets indésirables \(WHO-ARTFRE\)](#)
http://chu-rouen.fr/cismef/WHO-ART#1084_PT
[details](#) - [visualize](#)

[mélanome in situ - Classification Internationale des Maladies - 10ème révision \(CIM-10\)](#)
http://chu-rouen.fr/cismef/CIM-10#D03
[details](#) - [visualize](#) - [6 more from this ontology](#)



Ontology browsing

ONTOPNEUMO

Summary Classes Properties Notes Mappings Widgets

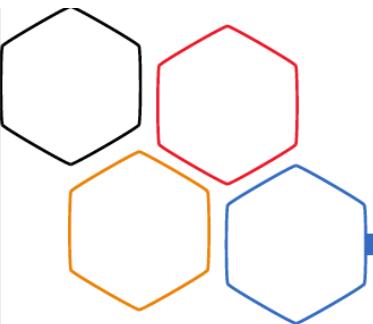
Jump To: []

Details Visualization Notes (0) Class Mappings (5) Access Class JSON

Preferred Name	Diabète
Definitions	Terme generique designant un groupe d'affections caracterisees par une polyurie avec polydipsie. On l'utilise generalement dans le sens de diabète sucre.
ID	http://doe-generated-ontology.com/OntoPneumo#Diabete
definition	Terme generique designant un groupe d'affections caracterisees par une polyurie avec polydipsie. On l'utilise generalement dans le sens de diabète sucre.
hiddenLabel	Diabète Diabète
prefixIRI	OntoPneumo:Diabete
prefLabel	Diabète
subClassOf	pathologie endocrinienne

entity

- objet abstrait
- objet intentionnel
 - changement
 - état
 - EtatPhysique
 - état de santé
 - état interne
 - état pathologique
 - maladie par localisation
 - Connectivite
 - InsuffisanceRenale
 - pathologie endocrinienne
 - Acromégalie
 - Diabète**
 - Hyperthyroïdie
 - Hypoparathyroïdie
 - Hypothyroïdie
 - InsuffisanceSurrenalienne
 - PathologieArticulaire
 - PathologieCardioVasculaire
 - PathologieDermatologique
 - PathologieDigestive
 - PathologieHematologique
 - PathologieNeurologique
 - PathologieNeuroMusculaire
 - PathologieOphthalmoïque
 - PathologieOsseuse
 - PathologiePsychiatrique
 - PathologieRespiratoire
 - Vascularite
 - maladie par processus
 - état physiologique
 - état morphologique
 - objet physique
 - objet idéal



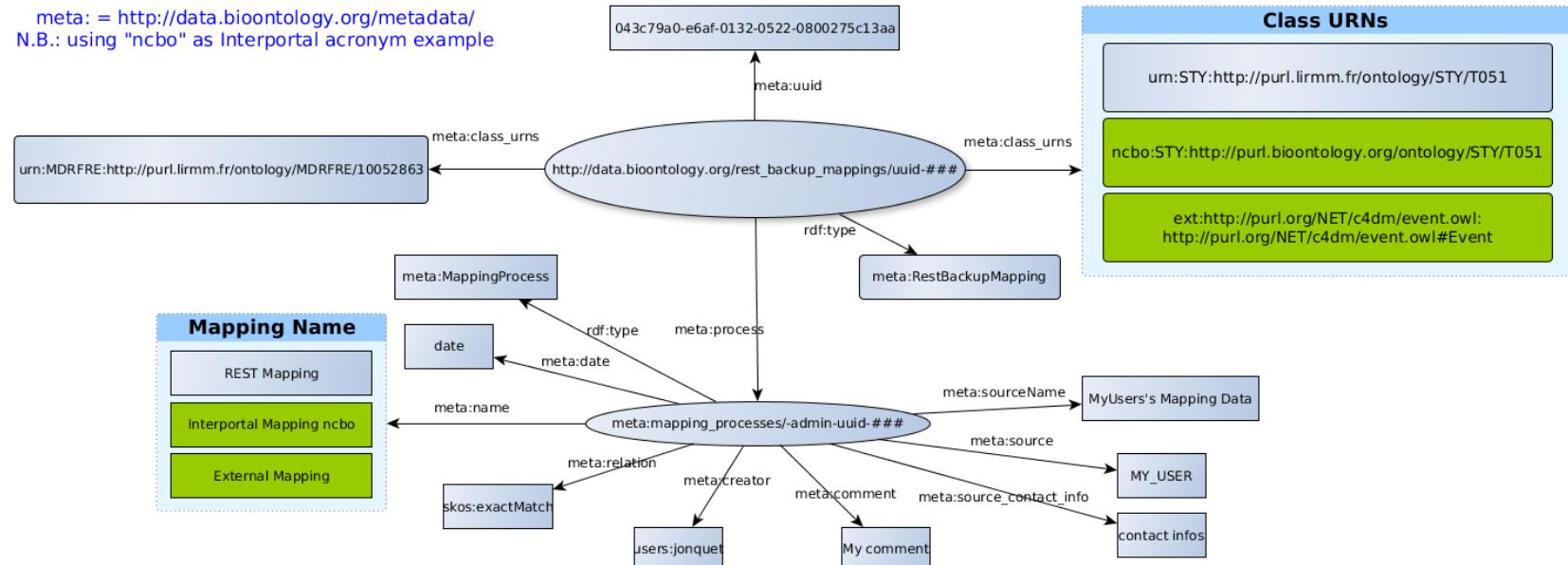
Alignments between ontologies



“Basically, we’re all trying to say the same thing.”

© The New Yorker Collection. All rights reserved.
From The New Yorker Book of Cartoons.

- Automatically generated by the portal
 - From identifiers (URI, CUI)
 - From common label syntax (LOOM)
- Submitted by external users via UI or API
 - Enriched with metadata about the mapping
 - Tag with semantic web properties



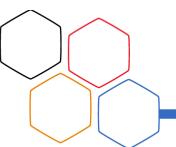
Mappings

Use this page to explore mappings between ontologies that you are interested in. You will also see the mappings when you browse individual ontologies.

Systematized Nomenclature of MEDicine, version française - SNMIFRE (118,523)

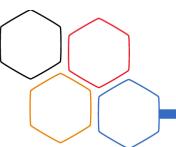
Table Visualization

ONTOLOGY	MAPPINGS
Biologie Hors Nomenclature	49
Classification Internationale des Maladies - 10ème révision	1,653
Classification Internationale des Soins Primaires, deuxième édition	118
Classification Internationale du Fonctionnement, du handicap et de la santé	47
Dictionnaire médical pour les activités réglementaires en matière de médicaments	7,701
Medical Subject Headings, version française	4,951
MedlinePlus	200
NCBO Interportal	102,093
Réseau sémantique UMLS	21
Terminologie des effets indésirables	832
Terminologie minimale standardisée en endoscopie digestive	77



Multilingual alignments

Details	Visualization	Notes (0)	Class Mappings (3)
Preferred Name	Prothèse		
ID	http://purl.lirmm.fr/ontology/MTHMSTFRE/MT140126		
cui	C0525024		
notation	MT140126		
prefLabel	Prothèse		
tui	T061		
Details	Visualization	Notes (0)	Class Mappings (3)
Create New Mapping Create New External Mapping			
Internal mappings			
MAPPING TO	ONTOLOGY	SOURCE	RELATION
Implantation de prothèse	Medical Subject Headings, version française	CUI	
Mise en place de prothèse	Dictionnaire médical pour les activités réglementaires en matière de médicaments	CUI	
Interportal mappings			
MAPPING TO	ONTOLOGY	SOURCE	RELATIONS
Prosthesis	http://bioportal.bioontology.org/ontologies/MSTDE	REST	skos:exactmatch gold:freetranslation



Ontology recommandation

BioPortal LIRMM

Browse Search Mappings Recommender Annotator NCBO Annotator+ Projects

Ontology Recommender
Get recommendations for the most relevant ontologies based on an excerpt from a biomedical text or a list of keywords [?](#)

Input
 Text Keywords (separated by commas)

Output
 Ontologies Ontology sets

insert sample input

Le **mélanome** est un **cancer de la peau** ou des muqueuses, développé aux dépens des **mélanocytes** (tumeur mélanocytaire). Son siège initial est la **peau** dans l'immense majorité des cas. Il existe toutefois des mélanomes de l'œil (**mélanome** choroidien), des muqueuses (**bouche, canal anal, vagin**), et plus rarement encore des organes internes. En dépit de ce que son nom suggère, un **mélanome** n'est pas toujours foncé : 5 % environ des mélanomes nodulaires sont « achromiques » (de la **couleur** normale de la **peau** chez les personnes autres qu'à **peau** noire). On parle parfois de « **mélanome malin** » : il s'agit alors d'un pléonème, le **mélanome** n'étant jamais **bénin**.

advanced options

Edit Input

Recommended ontologies

POS.	ONTOLOGY	FINAL SCORE	COVERAGE SCORE	ACCEPTANCE SCORE	DETAIL SCORE	SPECIALIZATION SCORE	ANNOTATIONS	HIGHLIGHT ANNOTATIONS
1	MSHFRE	75.8	74.4	89.0	43.4	100.0	15	<input checked="" type="checkbox"/>
2	MDRFRE	57.1	49.8	100.0	23.5	74.5	7	<input type="checkbox"/>
3	MEDLINEPLUS	49.3	38.9	77.1	38.1	70.8	6	<input type="checkbox"/>
4	CIM-10	43.6	28.0	78.7	52.6	56.8	6	<input type="checkbox"/>
5	SNMIFRE	32.5	18.8	80.4	37.3	29.9	8	<input type="checkbox"/>
6	WHO-ARTFRE	23.0	10.9	80.0	19.0	14.3	1	<input type="checkbox"/>

Ontology Recommender

Get recommendations for the most relevant ontologies based on an excerpt from a biomedical text or a list of keywords [?](#)

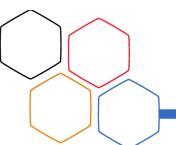
Input Text Keywords (separated by commas)**Output** Ontologies Ontology sets[insert sample input](#)

Le **mélanome** est un **cancer de la peau** ou des muqueuses, développé aux dépens des **mélanocytes** (tumeur mélanocytaire). Son siège initial est la **peau** dans l'immense majorité des cas. Il existe toutefois des mélanomes de l'œil (**mélanome** choroidien), des muqueuses (**bouche**, **canal anal**, **vagin**), et plus rarement encore des organes internes. En dépit de ce que son nom suggère, un **mélanome** n'est pas toujours foncé : 5 % environ des mélanomes nodulaires sont « achromiques » (de la **couleur** normale de la **peau** chez les personnes autres qu'à **peau** noire). On parle parfois de « **mélanome malin** » : il s'agit alors d'un pléonasme, le **mélanome** n'étant jamais **bénin**.

[advanced options](#)[Edit Input](#)

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6	WHO-ARTFRE	23.0	10.9	80.0	19.0	14.3	1	<input type="checkbox"/>



Community feedback

BioPortal LIRMM

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MuEVo

Summary Classes Properties Notes Mappings Widgets Edit ontology information Add submission

Notes [Add comment](#) [Add proposal](#) [Subscribe to notes emails](#)

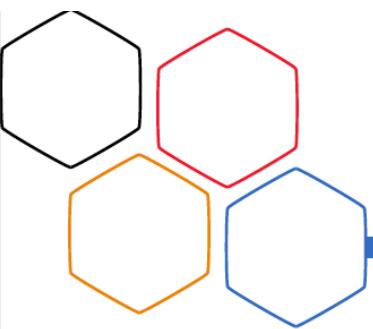
Show entries

SUBJECT	AUTHOR	TYPE	CLASS
Terme vraiment utilisé?	jonquet	Comment	ovocyte

Showing 1 to 1 of 1 entries

[First](#) [Previous](#) [1](#) [Next](#) [Last](#)

Powered by NCBO BioPortal [Release Notes](#)



Projects using ontologies

BioPortal **LIRMM** Browse Search Mappings Recommender Annotator NCBO Annotator+ Projects Recently Viewed ▾ Sign In Help Feedback

Projects

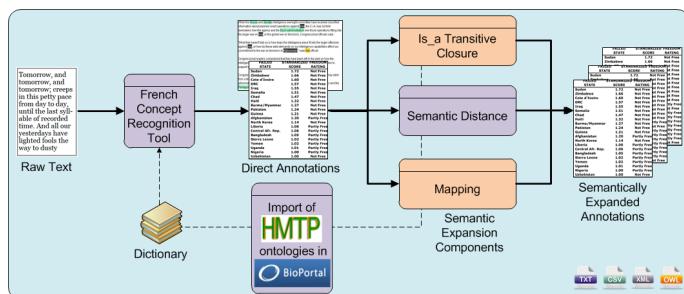
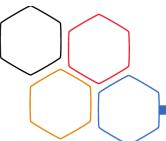
Browse the ontology-based projects in the community: Each project description is linked to SIFR BioPortal ontologies that the project uses. Use the 'Add Project' link to add your ontology-based project to this list and to link it to SIFR BioPortal ontologies. Your project will then appear on the pages that list the details for the ontologies that you selected. We also invite you to review ontologies that you used in your project.

[Create New Project](#)

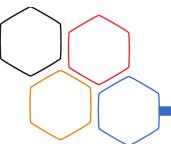
PROJECT	DESCRIPTION	CONTACTS	INSTITUTIONS	ONTOLOGIES
Indexation Sémantique de Ressources biomédicales Francophones Home Page ↗	Le projet SIFR s'intéresse aux questions scientifiques et techniques liées à la construction de services à base d'ontologies et de terminologies biomédicales pour l'indexation, la fouille et la recherche de données biomédicales françaises.	Clément Jonquet	LIRMM (Université de Montpellier & CNRS)	0



A new out-of-the-shelf tool for annotating French biomedical text



- ➊ Originally built out of the NCBO Annotator [Jonquet et al. 2009]
- ➋ Recognize and identify ontology concepts in text
- ➌ Use knowledge inside the ontologies to expand the annotations (synonyms, is-a hierarchy, mappings)
- ➍ Web service and easy interface
 - ➎ Open access
 - ➏ Easily interoperable with other software (REST API)
 - ➐ Standard format for annotations e.g., JSON-LD ou RDF
 - ➑ Easily parametrable



For a given text

Annotator

The SIFR BioPortal Annotator processes text submitted by users, recognizes relevant ontology terms in the text and returns the annotations to the user. Use the interface below to submit any button to see what it does.

Le mélanome est un cancer de la peau ou des muqueuses, développé aux dépens des mélanocytes (tumeur mélanocytaire). Son siège initial est la peau dans l'immense majorité des cas. Il existe toutefois des mélanomes de l'œil (mélanome choroïdien), des muqueuses (bouche, canal anal, vagin), et plus rarement encore des organes internes. En dépit de ce que son nom suggère, un mélanome n'est pas toujours foncé : 5 % environ des mélanomes nodulaires sont « achromiques » (de la couleur normale de la peau chez les personnes autres qu'à peau noire). On parle parfois de « mélanome malin » : il s'agit alors d'un pléonasme, le mélanome n'étant jamais bénin.

SIFR
project

insert sample text

Ontology filters	Matching parameters	NegEx / ConText
<p>Select Ontologies</p> <p>MSHFRE x ONTOLURGENCES x MEDLINEPLUS x SNMIFRE x</p> <p>clear selection select from list</p> <p>Select UMLS Semantic Types ? Type here to select UMLS semantic types</p> <p>Select UMLS Semantic Groups ? Anatomie (ANAT) x Maladies (DISO) x</p>	<p><input checked="" type="checkbox"/> Match Longest Only</p> <p><input type="checkbox"/> Match Partial Words</p> <p><input type="checkbox"/> Include Mappings</p> <p><input type="checkbox"/> Exclude Numbers</p> <p><input type="checkbox"/> Exclude Synonyms</p> <p><input type="checkbox"/> Lemmatize (beta)</p>	<p><input type="checkbox"/> Detect negation ?</p> <p><input type="checkbox"/> Detect experiencer ?</p> <p><input type="checkbox"/> Detect temporality ?</p>

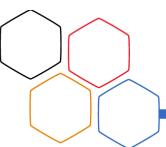
Include Ancestors Up To Level:

None ▾

Include Score:

cvalue ▾

Get Annotations



You get the annotations

CLASS filter	ONTOLOGY filter	TYPE filter	UMLS SEM TYPE	CONTEXT	MATCHED CLASS filter	MATCHED ONTOLOGY filter	SCORE
cancer de la peau	MedlinePlus Health Topics	direct		... est un cancer de la peau ou des muqueuses, ...	cancer de la peau	MedlinePlus Health Topics	13.288
Tumeurs cutanées	Medical Subject Headings, version française	direct		... est un cancer de la peau ou des muqueuses, ...	Tumeurs cutanées	Medical Subject Headings, version française	12.000
Mélanome	Medical Subject Headings, version française	direct		Le mélanome est un cancer ...	Mélanome	Medical Subject Headings, version française	5.585
Mélanome	Medical Subject Headings, version française	direct		Le mélanome est un cancer de la peau ou des muqueuses, développé aux dépens des mélanocytes (tumeur mélanocytaire). ... de l'œil (mélanome choroidien), des muqueuses ...	Mélanome	Medical Subject Headings, version française	5.585
Mélanome	Medical Subject Headings, version française	direct		Le mélanome est un cancer de la peau ou des muqueuses, développé aux dépens des mélanocytes (tumeur mélanocytaire). Son siège initial est la peau dans l'immense majorité des cas. Il existe toutefois des mélanomes de l'œil (mélanome choroidien), des muqueuses (bouche, canal anal, vagin), et plus rarement encore des organes internes. ... suggère, un mélanome n'est pas toujours ...	Mélanome	Medical Subject Headings, version française	5.585
Mélanome	Medical Subject Headings, version française	direct		Le mélanome est un cancer de la peau ou des muqueuses, développé aux dépens des mélanocytes (tumeur mélanocytaire). Son siège initial est la peau dans l'immense majorité des cas. Il existe toutefois des mélanomes de l'œil (mélanome choroidien), des muqueuses (bouche, canal anal, vagin), et plus rarement encore des organes internes. En dépit de ce que son nom suggère, un mélanome n'est pas toujours foncé : 5 % environ des mélanomes nodulaires sont « achromiques » (de la couleur normale de la peau chez les personnes autres qu'à peau noire). ... de « mélanome malin » ; il ...	Mélanome	Medical Subject Headings, version française	5.585
Mélanome	Medical Subject Headings, version française	direct		Le mélanome est un cancer de la peau ou des muqueuses, développé aux dépens des mélanocytes (tumeur mélanocytaire). Son siège initial est la peau dans l'immense majorité des cas. Il existe toutefois des mélanomes de l'œil (mélanome choroidien), des muqueuses (bouche, canal anal, vagin), et plus rarement encore des organes internes. En dépit de ce que son nom suggère, un mélanome n'est pas toujours foncé : 5 % environ des mélanomes nodulaires sont « achromiques » (de la couleur normale de la peau chez les personnes autres qu'à peau noire). ... pléonasmie, le mélanome n'étant jamais bénin.	Mélanome	Medical Subject Headings, version française	5.585
mélanome	MedlinePlus Health Topics	direct		Le mélanome est un cancer ...	mélanome	MedlinePlus Health Topics	5.322
mélanome	MedlinePlus Health Topics	direct		Le mélanome est un cancer de la peau ou des muqueuses, développé aux dépens des mélanocytes (tumeur mélanocytaire). ... de l'œil (mélanome	mélanome	MedlinePlus Health Topics	5.322



New features for clinical text

Le patient ne montre aucun signe de fièvre. Son père a déjà eu de l'arthrose. Il a des antécédents de dépression.

Select Ontologies

clear selection
select from list

Select UMLS Semantic Groups [?](#)

Detect negation [?](#)

Detect experiencer [?](#)

Detect temporality [?](#)

CLASS filter	ONTOLOGY filter	TYPE filter	UMLS SEM TYPE	CONTEXT	MATCHED CLASS filter	MATCHED ONTOLOGY filter	NEGATION	EXPERIENCER	TEMPORALITY
Fièvre	Medical Subject Headings, version francaise	direct		... signe de fièvre . Son père a ...	Fièvre	Medical Subject Headings, version francaise	NEGATED	PATIENT	RECENT
Arthrose	Medical Subject Headings, version francaise	direct		... eu de l'arthrose . Il a des ...	Arthrose	Medical Subject Headings, version francaise	AFFIRMED	OTHER	RECENT
Dépression	Medical Subject Headings, version francaise	direct		... antécédents de dépression .	Dépression	Medical Subject Headings, version francaise	AFFIRMED	PATIENT	HISTORICAL