Linked Data in Linguistics for NLP and Web Annotation

http://nlp2rdf.org
http://lod2.eu

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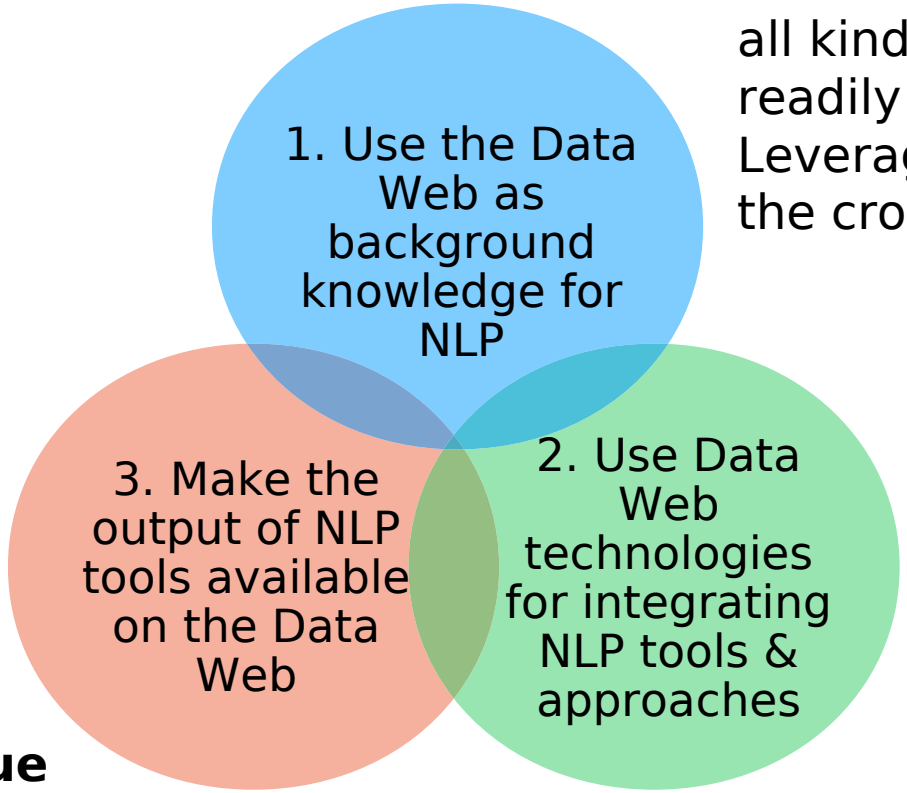
Turning Walled Gardens into Park Networks of Semantic Linguistic Data

How can we leverage the Data Web for natural language processing?

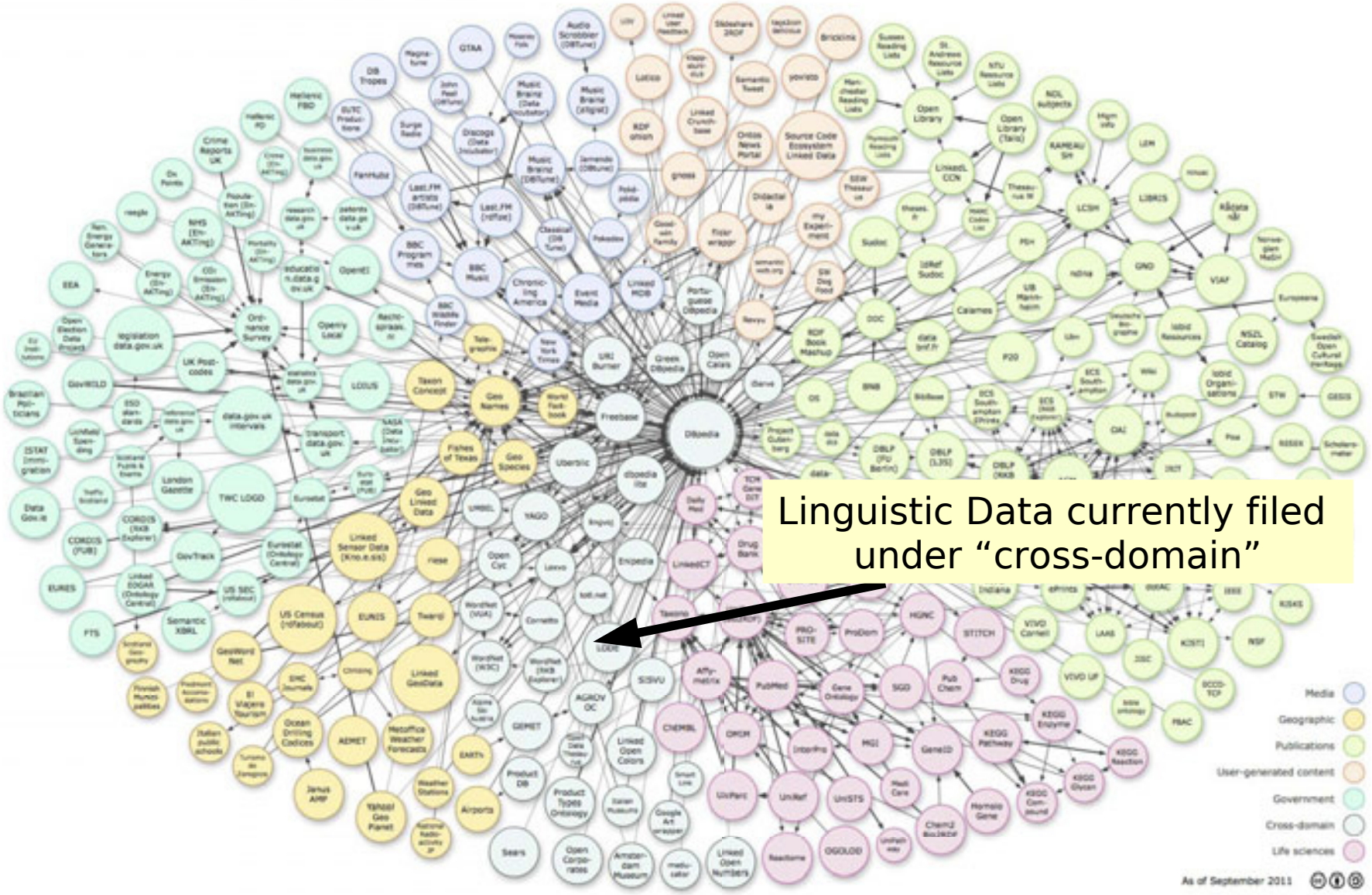
50 Billion facts covering all kinds of domains are readily available
Leverage the wisdom of the crowds



On the Web, by sharing and copying the **value of information increases**

RDF is all about semantic **interoperability**

1. Use the Data Web as background knowledge for NLP



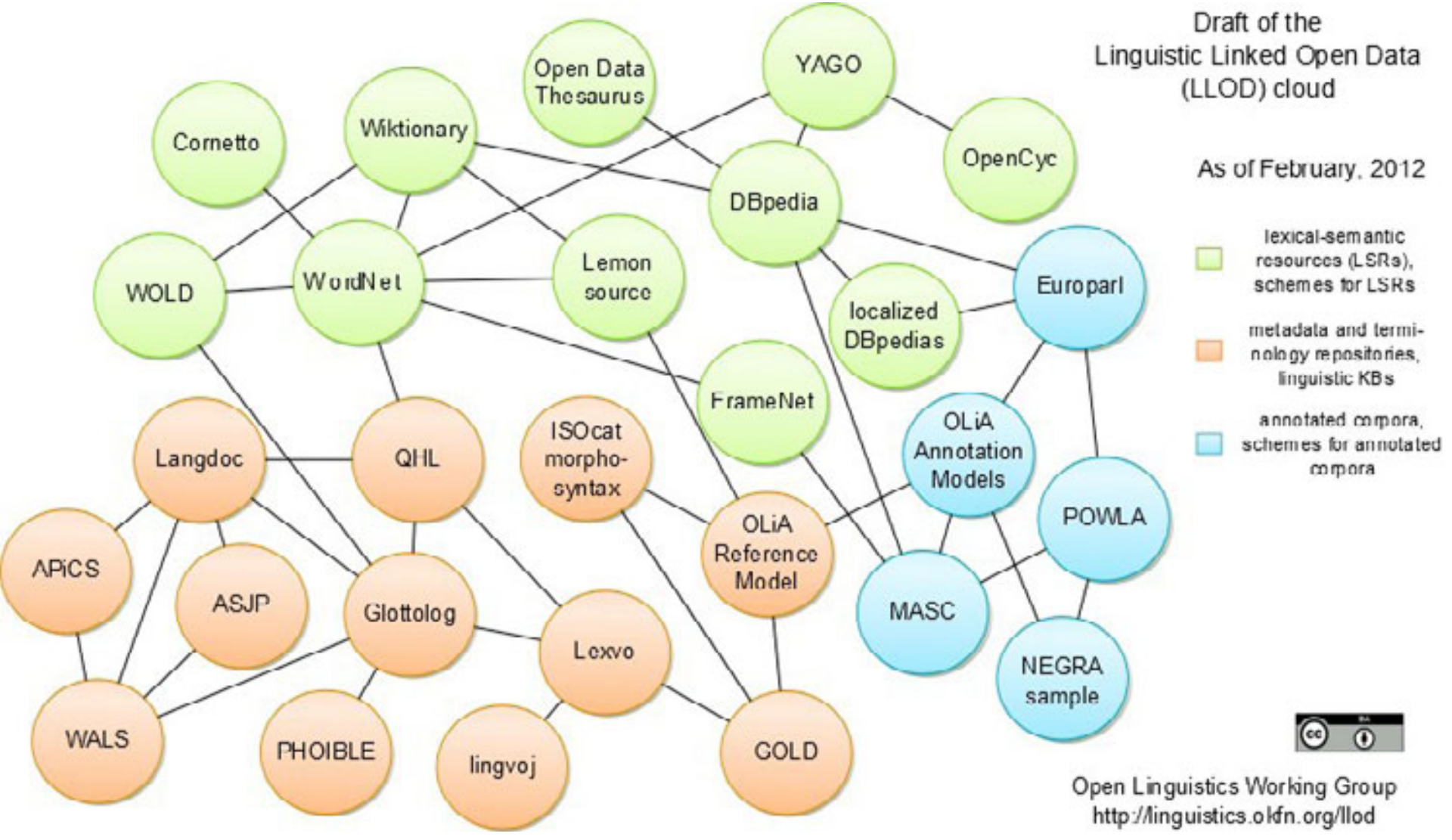
1. Use the Data Web as background knowledge for NLP

Three communities with three resources:

- Working Group for Open Linguistics Data (OWLG)
  - > http://linguistics.okfn.org
- DBpedia Internationalization Committee
  - > http://wiki.dbpedia.org/Internationalization
- Wiktionary2RDF Wrappers
  - > http://dbpedia.org/Wiktionary

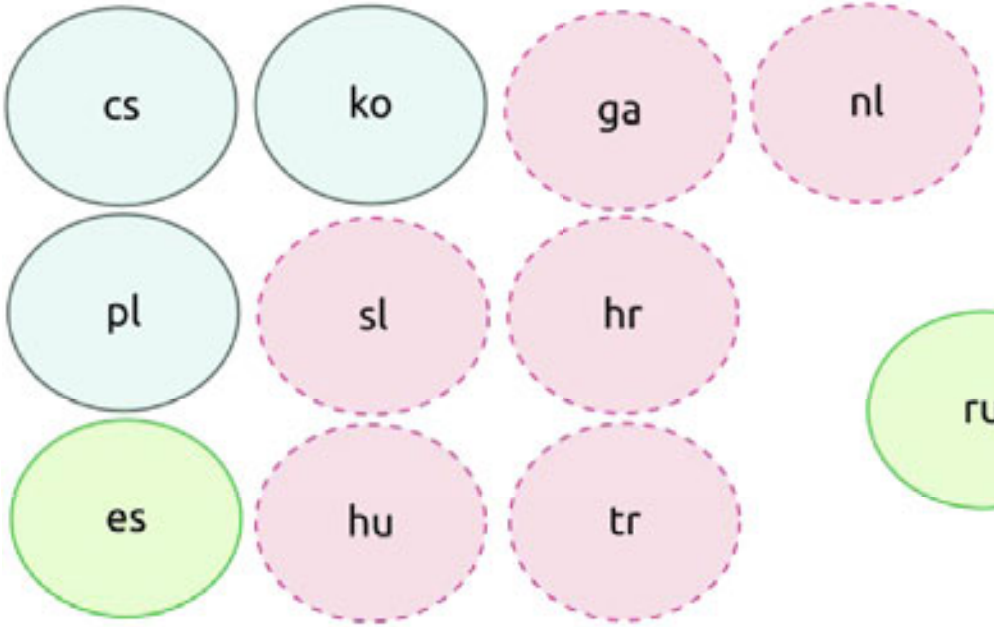
All communities are open, please join!

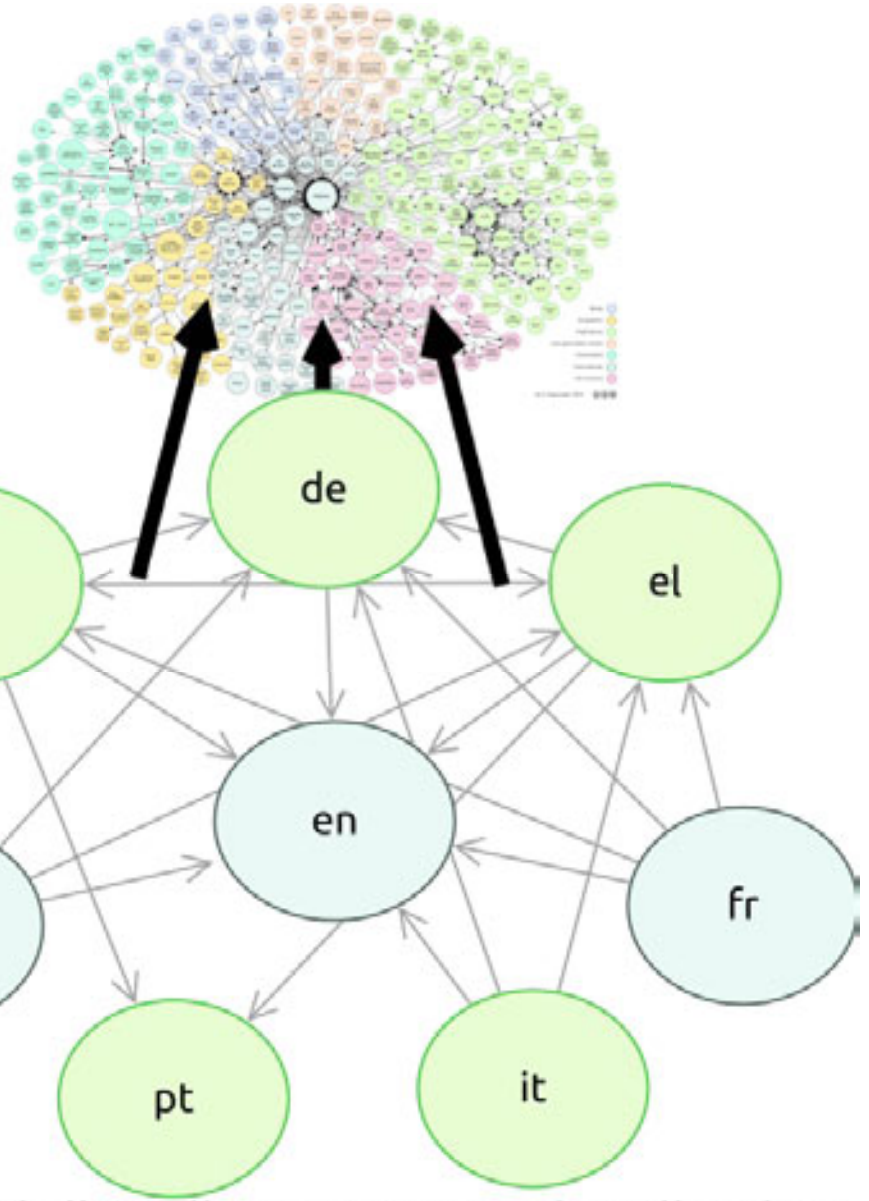
The Linguistic Linked Open Data Cloud



DBpedia Internationalization Committee

List of DBpedia language Chapters (May 2012)





IRI

URI

Non-Dereferencable

DBpedia

http://wiki.dbpedia.org/Internationalization

Wiktionary2RDF – Mediator Wrapper

http://dbpedia.org/Wiktionary

Wiktionary2RDF – Mediator Wrapper

http://dbpedia.org/Wiktionary

2. Use Data Web Technologies for Integrating NLP Tools and Approaches

Golden Hammer Anti-pattern

The question is not **whether** to use RDF and Linked Data, but **when** to use...

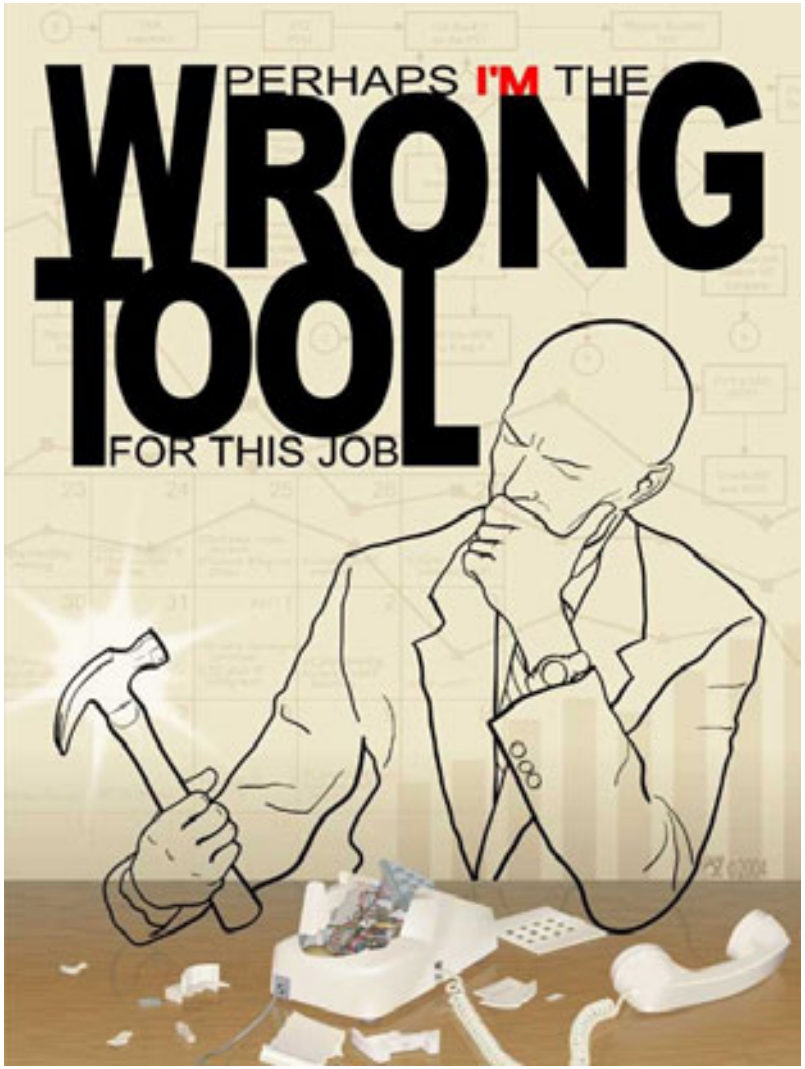
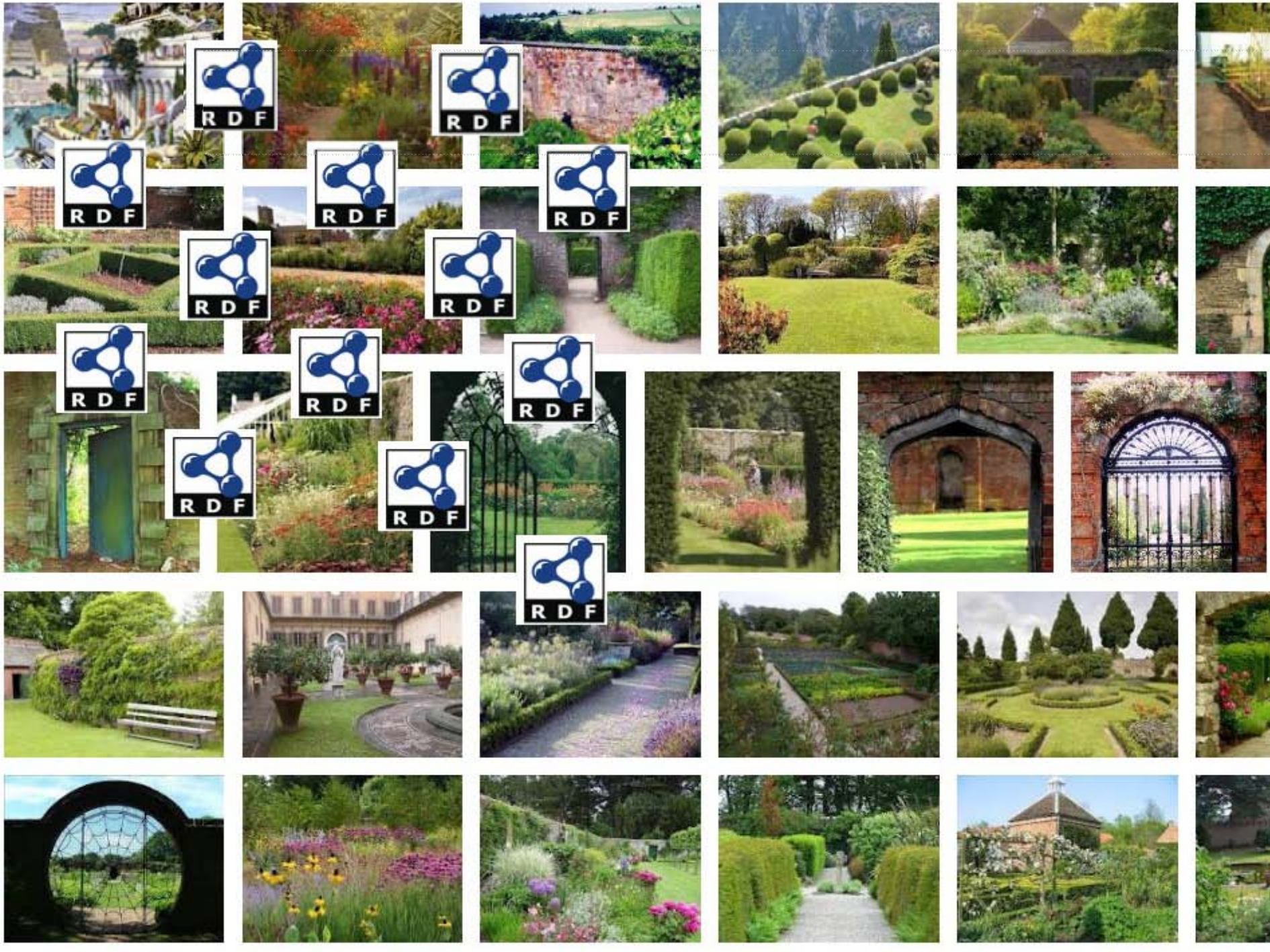


Image from http://pbmo.wordpress.com/2011/09/29/maslows-hammer/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2. Use Data Web Technologies for Integrating NLP Tools and Approaches

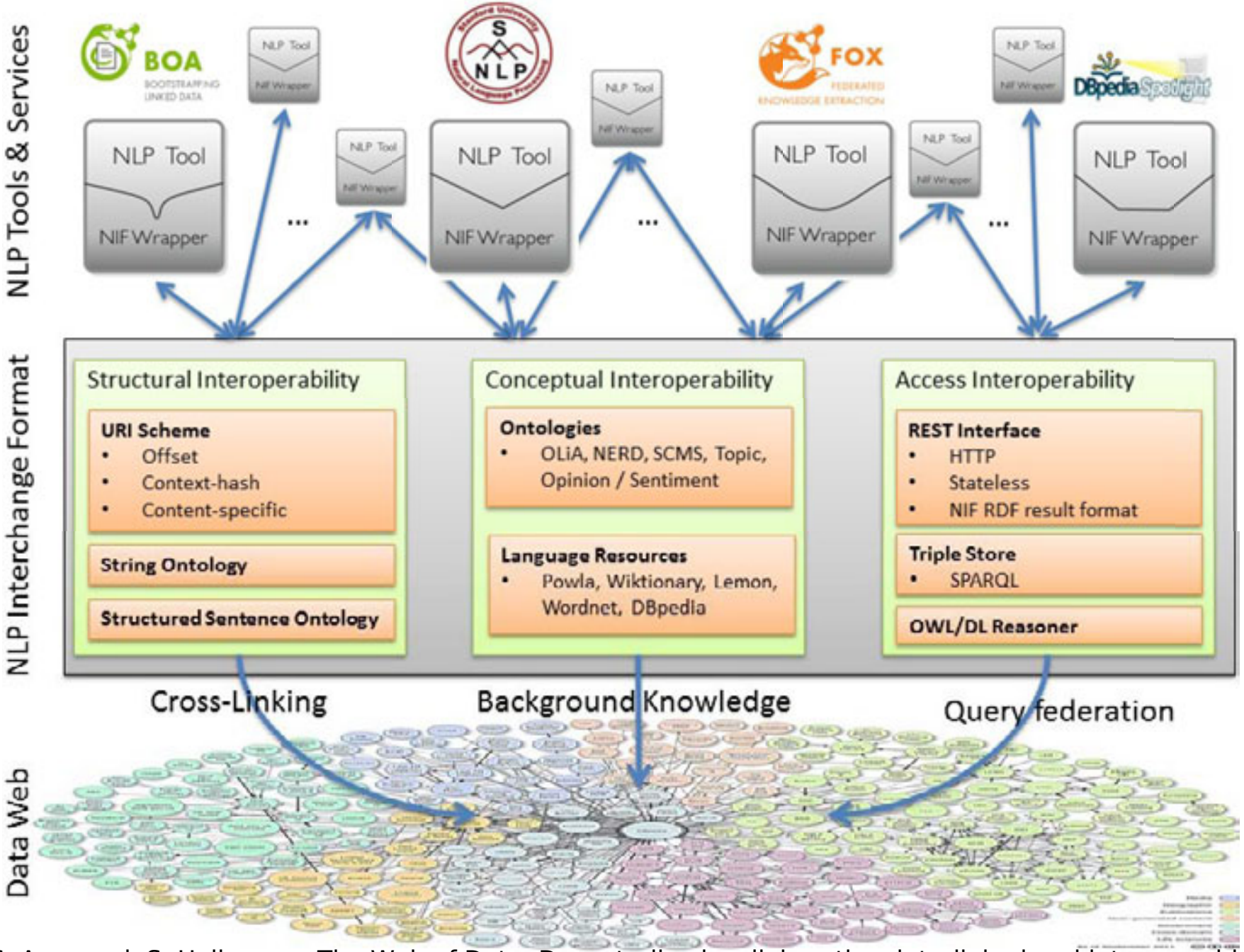
- Ontologies provide (formal) documentation (UML, ERD)
- Structure is easy to understand
- Wide range of RDF tools can be used, e.g. LOD2 Stack
- Indexing and querying as Big Picture possible

2. Use Data Web Technologies for Integrating NLP Tools and Approaches

The NLP Interchange Format (NIF) is an RDF/OWL-based format that aims to achieve interoperability between Natural Language Processing (NLP) tools, language resources and annotations.

- Road map
  - Bootstrapped by LOD2, but a community project
  - First release in September 2011
  - Great resonance
    - Over 50 people joined the mailing list:

      http://lists.okfn.org/mailman/listinfo/open-linguistics
    - First third party implementations and contributions
    - Several project discuss usage
  - Currently setting up advisory board, next draft in July



S. Auer and S. Hellmann: The Web of Data: Decentralized, collaborative, interlinked and interoperable LREC 2012, http://www.lrec-conf.org/proceedings/lrec2012/keynotes/LREC%202012.Keynote%20Speech%201.Soeren%20Auer.pdf

3. Make the Output of NLP Tools available on the Web

Currently there is no standard mechanism to transparently combine the WWW, GGG and NLP

GGG = Giant Global Graph (basically the Web of Data)

see: http://dig.csail.mit.edu/breadcrumbs/node/215

3. Make the Output of NLP Tools available on the Web

http://www.w3.org/DesignIssues/LinkedData.html

Tim Berners-Lee
Date: 2006-07-27, last change: $Date: 2009/06/18 18:24:33 $
Status: personal view only. Editing status: imperfect but published.
Up to Design Issues

Linked Data

The Semantic Web isn't just about putting data on the web. It is about making links, so that a person or machine can explore the web of data. With linked data, when you have some of it, you can find other, related, data.

Like the web of hypertext, the web of data is constructed with documents on the web. However, unlike the web of hypertext, where links are relationships anchors in hypertext documents written in HTML, for data they links between arbitrary things described by RDF,. The URIs identify any kind of object or concept. But for HTML or RDF, the same expectations apply to make the web grow:

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.

Simple. In fact, though, a surprising amount of data isn't linked in 2006, because of problems with one or more of the steps. This article discusses solutions to these problems, details of implementation, and factors affecting choices about how you publish your data.

The four rules

I'll refer to the steps above as rules, but they are expectations of behavior. Breaking them does not destroy anything, but misses an opportunity to make data interconnected. This in turn limits the ways it can later be reused in unexpected ways. It is the unexpected re-use of information which is the value added by the web.

3. Make the Output of NLP Tools available on the Web

Confidence: 0.0

Contextual score: 0.0

Prominence (support): 0

No 'common words'

Default Disambiguation

Show best candidate

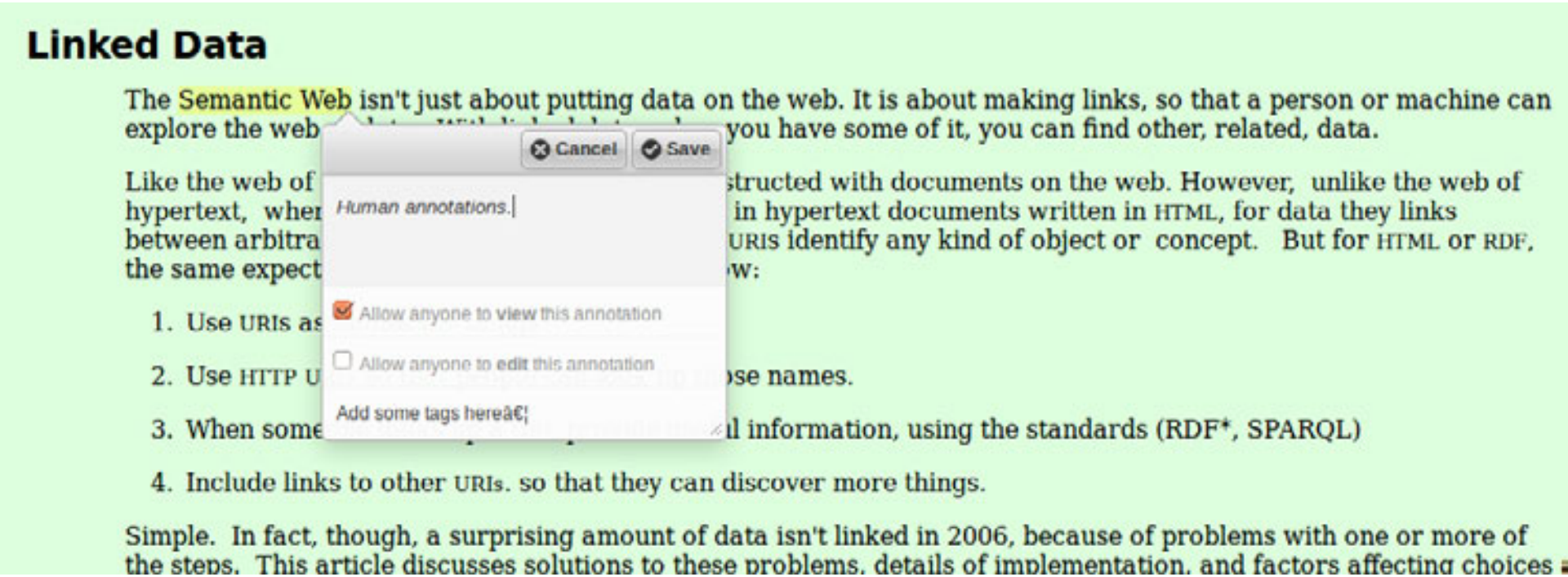
SELECT TYPES... ANNOTATE

The Semantic Web isn't just about putting data on the web. It is about making links, so that a person or machine can explore the web of data. With linked data, when you have some of it, you can find other, related, data.

BACK TO TEXT

http://dbpedia.org/spotlight P. Mendes et. al. DBpedia spotlight: Shedding light on the web of documents. In I-Semantics, 2011

3. Make the Output of NLP Tools available on the Web



http://annotateit.org
http://sourceforge.net/projects/fragmentlinks/

3. Make the Output of NLP Tools available on the Web

NLP Interchange Format (NIF) join the mailing list at:
http://nlp2rdf.org

@PREFIX : http://www.w3.org/DesignIssues/LinkedData.html#

Scheme 1: Offset-Based

offset_717_729
Identifier _ Begin Index _ End Index

```
:offset_717_729
   sso:oen          dbpedia:Semantic_Web  ;
   rev:hasComment   "Hey Tim, good idea that Semantic Web!" .
```

Scheme 2: Context-Hash-Based

hash_10_12_60f02d3b96c55e137e13494cf9a02d06_Semantic%20Web
Identifier _ Context length _ String length _ MD5 Hash _ String
MD5 Hash = md5 (" The (Semantic Web) isn't jus")

```
:hash_10_12_60f02d3b96c55e137e13494cf9a02d06_Semantic%20Web
   sso:oen          dbpedia:Semantic_Web  ;
   rev:hasComment   "Hey Tim, good idea that Semantic Web!" .
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Hellmann et.al.: Towards an Ontology for Representing Strings In: EKAW 2012
http://svn.aksw.org/papers/2012/WWW_NIF/public/string_ontology.pdf

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NLP2RDF page: http://nlp2rdf.org

Thanks for your attention!

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