

Knowledge Graphs

Lecture 3 - Querying RDFS with SPARQL

Excursion 3: Wikidata Knowledge Graph

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Leibniz-Institut für Informationsinfrastruktur

Knowledge Graphs

Lecture 3: Querying RDF(S) with SPARQL

3.1 How to Query RDF(S)

Excursion 2: DBpedia Knowledge Graph

Excursion 3: Wikidata Knowledge Graph

3.2 Complex Queries with SPARQL

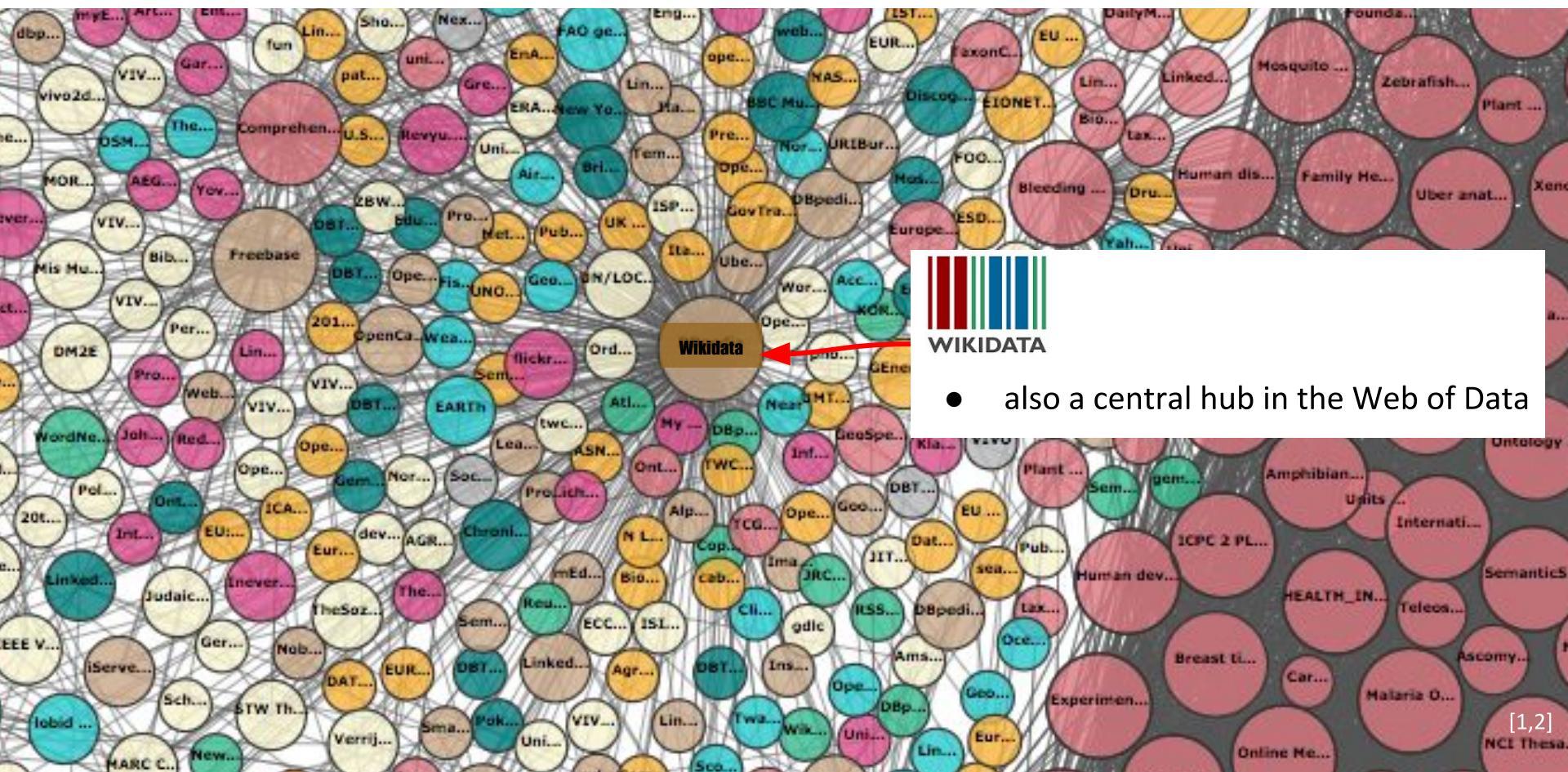
3.3 More Complex SPARQL Queries

3.4 SPARQL Subqueries and Property Paths

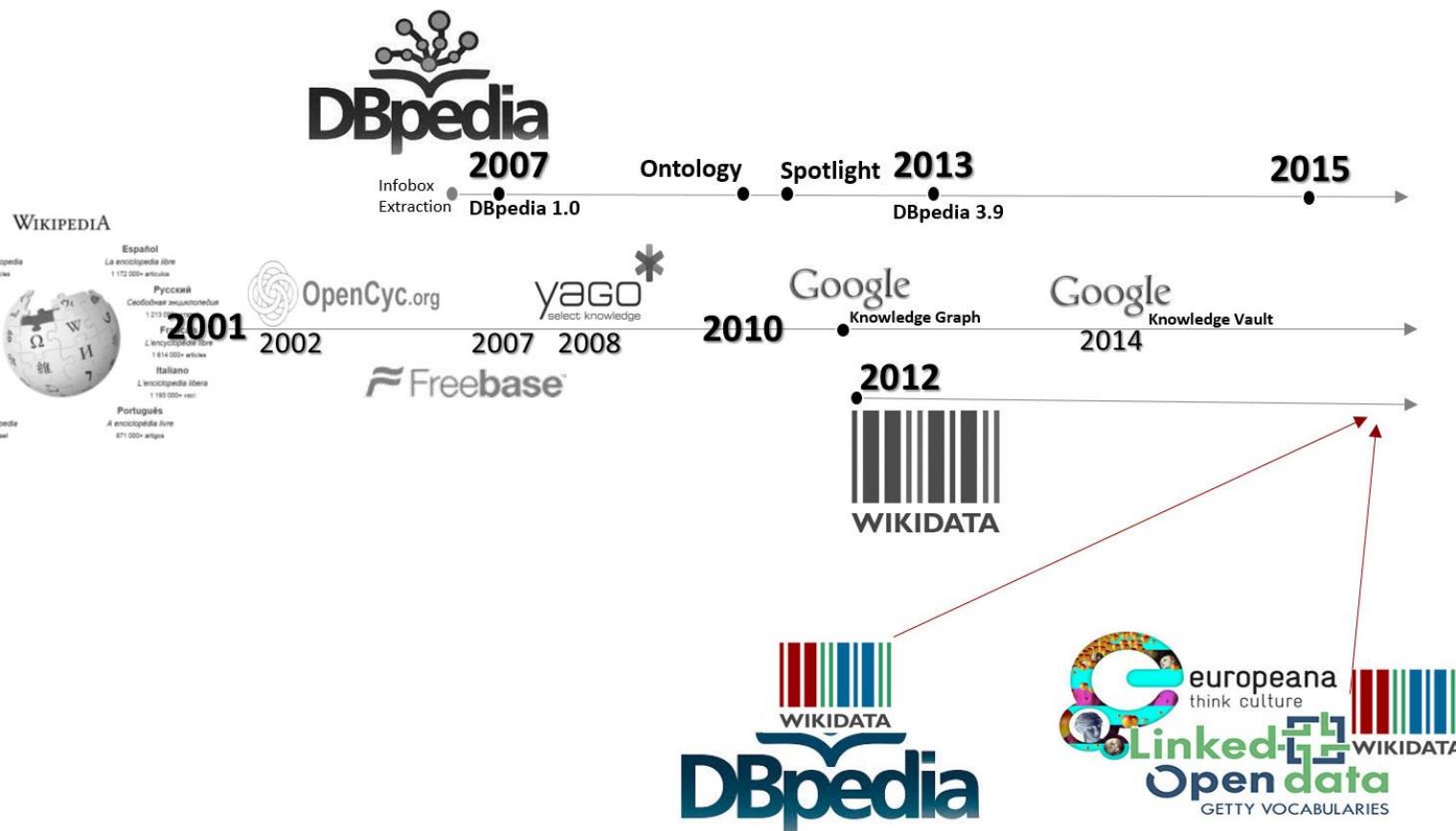
3.5 RDF Databases

3.6 SPARQL is more than a Query Language

Wikidata and the Web of Data



Knowledge Bases Timeline



Wikidata

Collaboratively edited knowledge base operated by the Wikimedia Foundation (started in 2012)

The screenshot shows the Wikidata item page for Harald Sack (Q30078997). The page title is "Harald Sack (Q30078997)". Below the title, it says "Semantic Web researcher". There are three statements listed:

- instance of**: human (edit, + add reference, + add)
- sex or gender**: male (edit, + add reference, + add)
- given name**: Harald (edit, + add reference, + add)

Each statement row includes a "0 references" link.

- > 71M entities *March 2020*
 - > 6.4M persons
 - > 1.9M populated places
 - > 3M architectural structures
 - > 3.9M events
 - > 1.2M chemical compounds
 - > 300K movies
 - > 4.6 astronomical objects
 - > 22.5M scholarly articles
- > 1.1B edits
- > 24K active users

<https://www.wikidata.org/>

Wikidata

Identifier: Joseph Fourier (Q8772)

French mathematician and physicist
Jean-Baptiste Joseph Fourier

Statements

- property**: instance of → **value**: human (with 2 references)
- property**: sex or gender → **value**: male (with 5 references)
- property**: country of citizenship → **value**: Kingdom of France
 - qualifiers**: start time → 21 March 1768 Gregorian
 - qualifiers**: end time → 21 September 1792 Gregorian
- property**: country of citizenship → **value**: French First Republic
 - qualifiers**: start time → 21 September 1792 Gregorian
 - qualifiers**: end time → 18 May 1804 Gregorian

statements<https://www.wikidata.org/wiki/Q8772>

Wikidata - SPARQL Query Service

Wikidata Query Service Examples Help More tools English

```

1 PREFIX wd: <http://www.wikidata.org/entity/>
2 PREFIX wdt: <http://www.wikidata.org/prop/direct/>
3 PREFIX wikibase: <http://wikiba.se/ontology#>
4 PREFIX p: <http://www.wikidata.org/prop/>
5 PREFIX ps: <http://www.wikidata.org/prop/statement/>
6 PREFIX pq: <http://www.wikidata.org/prop/qualifier/>
7 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
8 PREFIX bd: <http://www.bigdata.com/rdf#>
9
10 SELECT * WHERE {
11 wd:Q8772 ?p ?o .
12 }
13
14

```

410 results in 255 ms Code Download Link Search

p	o
p:P3348	wds:Q8772-0A747FEE-0C56-4F7D-A4E9-393C1DEFC9C7
p:P3430	wds:Q8772-92AF2C0F-B612-4144-B30C-25D188B6DB9D
p:P3956	wds:Q8772-C026DB09-28EF-47EB-94D3-AE40C18CD9E7
p:P3965	wds:Q8772-6F450B3C-5B0F-4784-81D7-7D34E6125BED
p:P4081	wds:Q8772-4CF313F4-B901-44F4-84FB-7D75E7B86137
p:P4717	wds:Q8772-51a83fb7-4058-769c-14ef-9d5d3383c382
p:P5373	wds:Q8772-639f1e5-4cb2-2c36-4ac3-cba141e10a6
p:P5375	wds:Q8772-F19C7340-2264-496A-A698-BD97D553B612
p:P5587	wds:Q8772-F028A8DB-3A5E-44DA-B295-6CCEE5859865
p:P5731	wds:Q8772-10503179-65E3-4060-90F2-D7B7E0C82955
wikibase:identifiers	48

[SPARQL query 1](#)
[SPARQL query 2](#)

Wikidata - More sophisticated SPARQL Queries

Wikidata Query Service Examples Help More tools

English

```

1 #defaultView:Timeline
2 PREFIX dct: <http://purl.org/dc/terms/>
3 PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
4 PREFIX dbo: <http://dbpedia.org/resource/Category:>
5 PREFIX dbo: <http://dbpedia.org/ontology/>
6
7 SELECT DISTINCT ?wditem ?wditemLabel ?date ?image WHERE {
8   SERVICE <http://dbpedia.org/sparql> { #Select from Dbpedia
9     ?item dct:subject|dct:subject|skos:broader|dct:subject|skos:broader dbo:Environmentalists ; #Select all from Wikipedia Category "Environmentalists" or its subcategories
10    owl:sameAs ?wditem FILTER regex (?wditem, "wikidata.org") . #draw the connection to Wikidata
11  }
12  SERVICE <https://query.wikidata.org/sparql> { #Select from Wikidata
13    ?wditem wdt:P106 wd:Q82955 # the subject must have the occupation (P106) Politician (Q82955)
14    ?wditem wdt:P569 ?date FILTER NOT EXISTS {?wditem wdt:P570 ?date2} . # select the birthdate (P569) of still living (not P570) Politicians
15    ?wditem wdt:P18 ?image . # Select an image (P18), if available
16    ?wditem rdfs:label ?wditemLabel FILTER (LANG(?wditemLabel)="en") . #Labels should be taken in English
17  }
18 } ORDER BY ?date

```

12:58:57 PM
WMT+2, Jun 17, 2019
Data updated
an hour ago

Timeline ▾ 507 results in 75 ms Code Download Link



Which (living)
politicians are
environmentalists ?

SPARQL query

Complex Queries with SPARQL

Next Lecture...

Picture References:

- [1] The Linked Open Data Cloud, lod-cloud.net, [CC-BY]
<https://lod-cloud.net/clouds/lod-cloud.svg>
- [2] Wikidata Logo, Planemad, [Public Domain]
<https://commons.wikimedia.org/wiki/File:Wikidata-logo-en.svg>
- [3] Andrea Huang, A preliminary study on Wikipedia Dbpedia and Wikidata, SlideShare [CC_BY_SA 4.0]
<https://www.slideshare.net/andreasinica/a-preliminary-study-on-wikipedia-dbpdeia-and-wikidata>
- [4] Ernst Haeckel, Kunstformen der Natur (1904), plate 1: Phaeodaria, [Public Domain]
https://commons.wikimedia.org/wiki/File:Haeckel_Phaeodaria_1.jpg