



# Knowledge Graphs

## Lecture 3 – Querying Knowledge Graphs with SPARQL

### Excursion 4: Wikidata Knowledge Graph

**Prof. Dr. Harald Sack**

FIZ Karlsruhe – Leibniz Institute for Information Infrastructure

AIFB – Karlsruhe Institute of Technology

**Autumn 2023**



**FIZ Karlsruhe**

Leibniz-Institut für Informationsinfrastruktur

### 3.1 How to Query RDF(S)

Excursion 3: DBpedia Knowledge Graph

**Excursion 4: Wikidata Knowledge Graph**

### 3.2 Complex Queries with SPARQL

### 3.3 More Complex SPARQL Queries

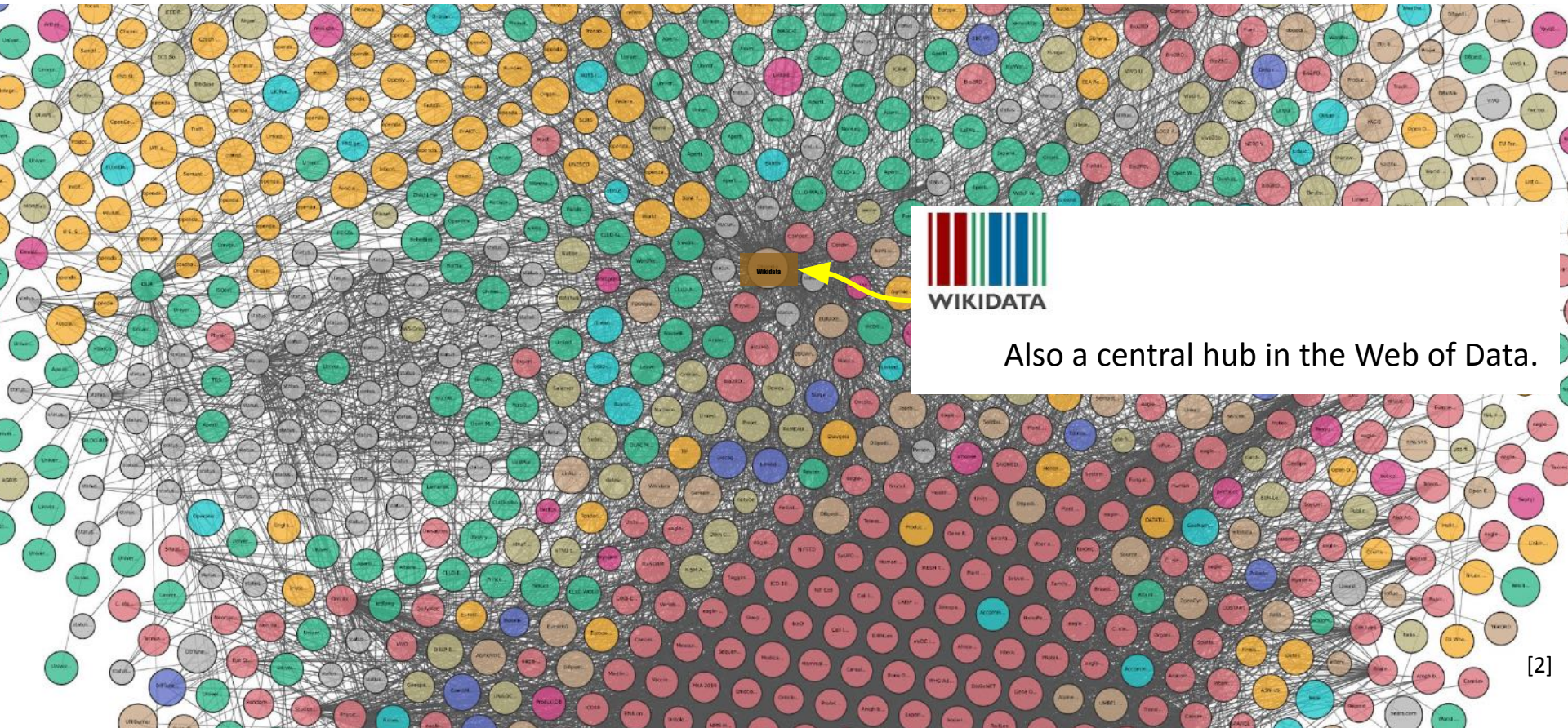
### 3.4 SPARQL Sub-Select and Property Paths

### 3.5 SPARQL is more than a Query Language

### 3.6 Quality Assurance with SHACL Constraints



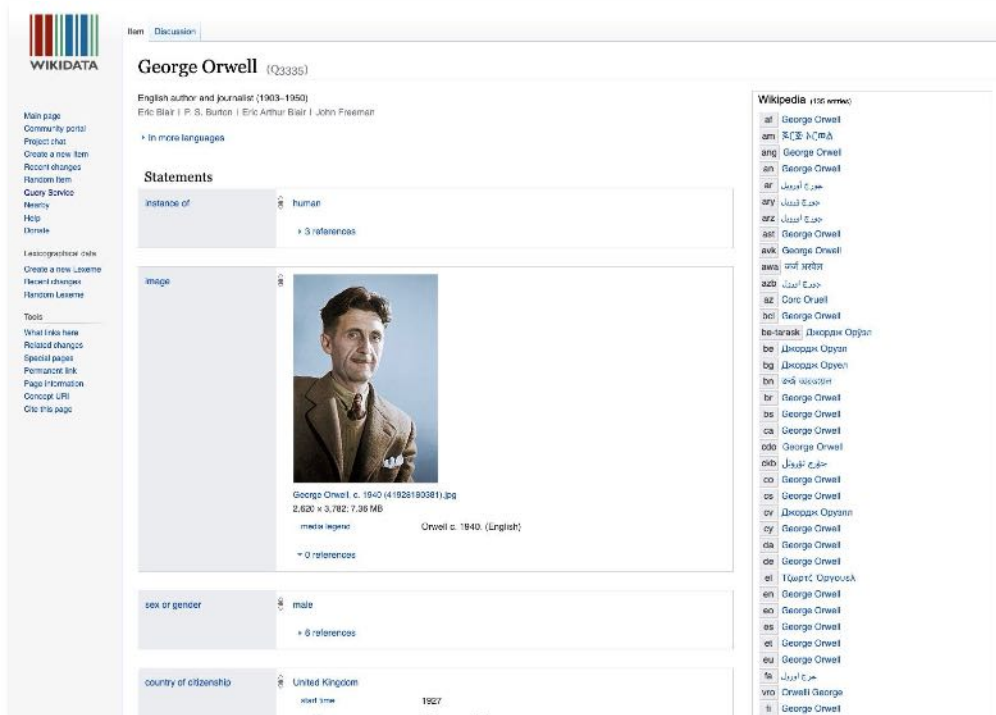
# Wikidata and the Web of Data



Also a central hub in the Web of Data.

# What is Wikidata?

Collaboratively edited structured data (knowledge graph)  
operated by the Wikimedia Foundation (started in 2012).



<https://www.wikidata.org/wiki/Q3335>

- > 101M entities (*Feb 2023*)
  - > 10.4M persons
  - > 2.7M populated places
  - > 5.1M architectural structures
  - > 1.1M events
  - > 1.2M chemical compounds
  - > 350K movies
  - > 230K books
  - > 8.4M astronomical objects
  - > 22.5M scholarly articles
- > 14B triples
- ~ 24K active users

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



George Orwell

(Q3335)

Identifier

English author and journalist (1903–1950)

Eric Blair | P. S. Burton | Eric Arthur Blair | John Freeman

• In more languages

## Statements

instance of	human
	• 3 references

image



George Orwell, c. 1940 (41628160361).jpg  
2,620 × 3,782; 7.36 MB

media legend      Orwell c. 1940. (English)

• 0 references

property

sex or gender

male

value

country of citizenship	United Kingdom
start time	1927
end time	21 January 1950
	• 0 references
	United Kingdom of Great Britain and Ireland
end time	1927
start time	25 June 1903 <i>Gregorian</i>
end cause	succession of states
	• 0 references

qualifiers


## Wikipedia

- af George Orwell
- am Զորեկ Մուսկ
- ang George Orwell
- an George Orwell
- ar جورج أورويل
- ary جورج اورويل
- arz جورج أورويل
- ast George Orwell
- avk George Orwell
- awa गीत गीत
- azb جورج اورويل
- az Corc Orwell
- bcl George Orwell
- be-tarask| Джордж Оруэл
- be Джордж Оруэл
- bg Джордж Оруел
- bn জর্জ ওরুয়েল
- br George Orwell
- bs George Orwell
- ca George Orwell
- odo George Orwell
- ckb جورج ئورويل
- eo George Orwell
- cs George Orwell
- cv Джордж Оруэлл
- cy George Orwell
- da George Orwell
- de George Orwell
- el Τζωρτζ Όργουελ
- en George Orwell
- eo George Orwell
- es George Orwell
- et George Orwell
- eu George Orwell
- fa جورج اوریل
- vro Orwell George
- fi George Orwell
- frf George Orwell
- fr George Orwell
- fy George Orwell
- ga George Orwell
- gd George Orwell
- gl George Orwell
- gom George Orwell
- gv George Orwell
- hak George Orwell
- he ג'ורג' אורוול

statements

<https://www.wikidata.org/wiki/Q3335>

# Wikidata SPARQL Endpoint

 Wikidata Query Service
 Examples
Help
More tools
Query Builder
English

```

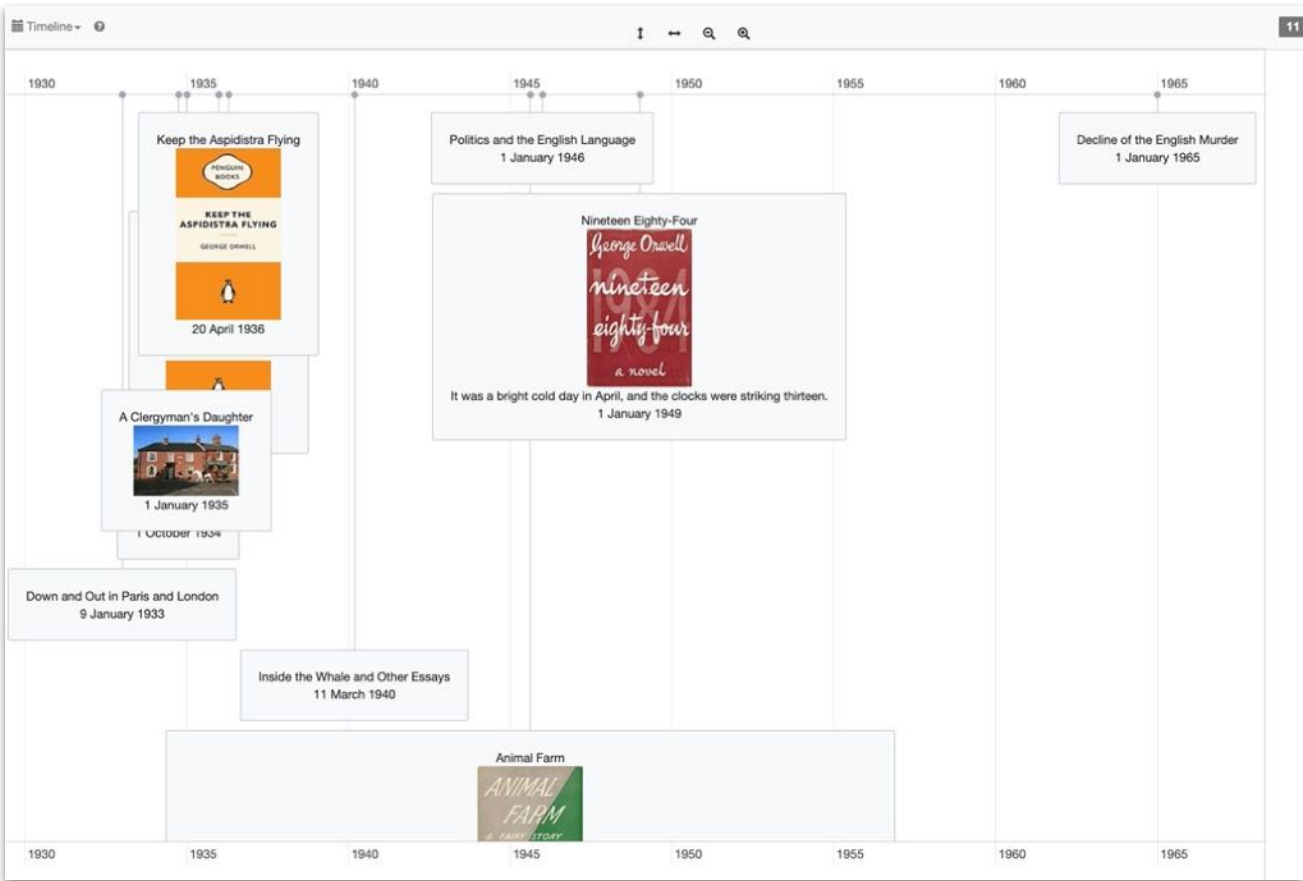
1 SELECT ?booksLabel ?date ?firstline WHERE {
2   wd:Q208460 wdt:P50 ?author . # 1984 :author ?author
3   ?books wdt:P50 ?author ;      # ?books :author ?author
4     wdt:P31 wd:Q7725634 ; # ?books :instanceOf :LiteraryWork
5     wdt:P577 ?date .      # ?books :publicationDate ?date
6   OPTIONAL {?books wdt:P1922 ?firstline .} # ?books :firstLine ?firstline
7   SERVICE wikibase:label { bd:serviceParam wikibase:language "en". } #get English labels
8 }
    
```

Table
11 results in 629 ms
</> Code
Download
Link

booksLabel	date	line
Nineteen Eighty-Four	1 January 1949	It was a bright cold day in April, and the clocks were striking thirteen.
Shooting an Elephant	1 January 1936	
Keep the Aspidistra Flying	1 January 1936	
Keep the Aspidistra Flying	20 April 1936	
Down and Out in Paris and London	9 January 1933	
Animal Farm	17 August 1945	Mr. Jones, of the Manor Farm, had locked the hen-houses for the night, but was too drunk to remember to shut the pop-holes.

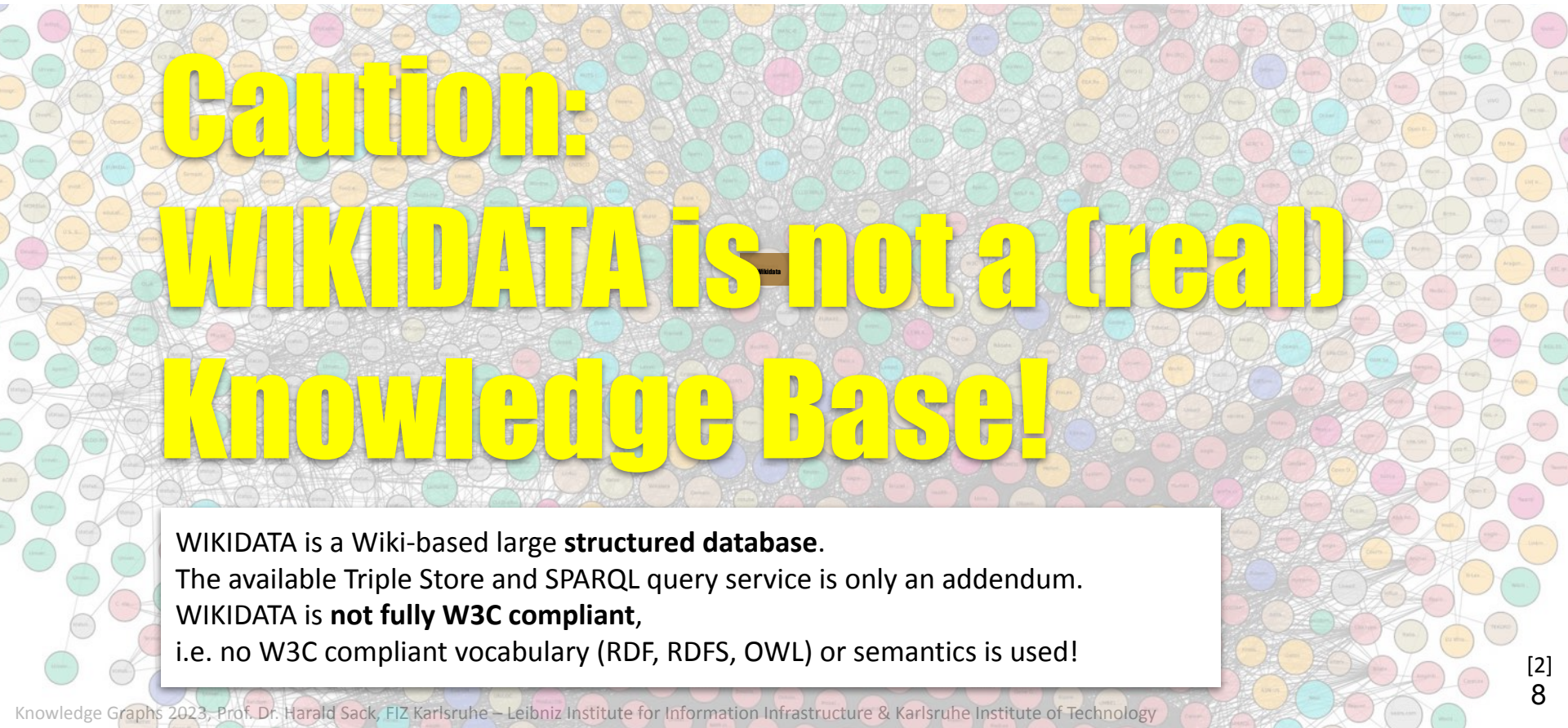
[Wikidata example SPARQL query](#)

# Wikidata Visualizations



[Wikidata example SPARQL query](#)

# Wikidata is not a Knowledge Base



**Caution:**  
**WIKIDATA is not a (real)**  
**Knowledge Base!**

WIKIDATA is a Wiki-based large **structured database**.  
The available Triple Store and SPARQL query service is only an addendum.  
WIKIDATA is **not fully W3C compliant**,  
i.e. no W3C compliant vocabulary (RDF, RDFS, OWL) or semantics is used!





# Complex Queries with SPARQL

Next Lecture...

## Bibliographic References:

Aidan Hogan, Ali Ismayilov, Dimitris Kontokostas, Sören Auer, Jens Lehmann, and Sebastian Hellmann (2018), [Wikidata through the eyes of DBpedia](https://doi.org/10.3233/SW-170277). Semant. web 9, 4 (2018), 493–503. <https://doi.org/10.3233/SW-170277>

## Picture References:

- [1] “Charlton Heston is shouting in despair depicted in a dystopian city street scene clearly exhibiting the consequences of both unchecked population growth on society and the hoarding of resources by a wealthy minority in the style of a 1960s pulp cover.” , created via ArtBot, Deliberate, 2023, [CC-BY-4.0], <https://tinybots.net/artbot>
- [2] The Linked Open Data Cloud, lod-cloud.net, [CC-BY], <https://lod-cloud.net/clouds/lod-cloud.svg>
- [3] “A dystopian city street scene clearly exhibiting the consequences of both unchecked population growth on society and the hoarding of resources by a wealthy minority in the style of a 1960s pulp cover.” , created via ArtBot, Deliberate, 2023, [CC-BY-4.0], <https://tinybots.net/artbot>