

**CC7220-1**

**LA WEB DE DATOS**

**PRIMAVERA 2020**

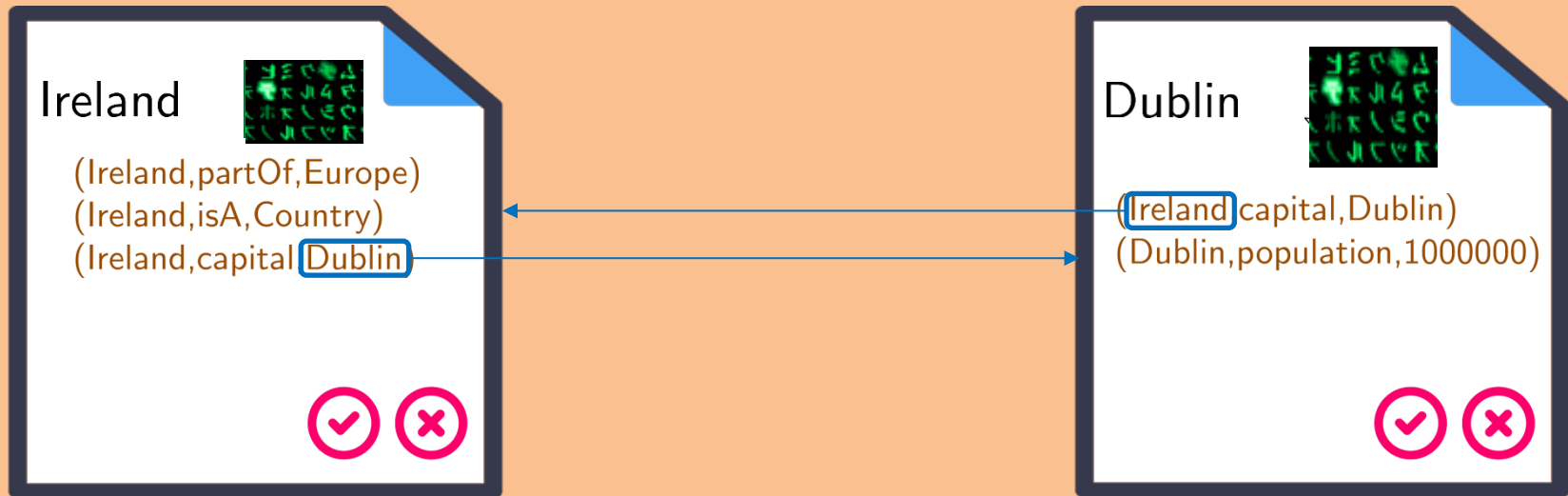
**LECTURE 12: CONCLUSION**

Aidan Hogan

aidhog@gmail.com

## SEMANTIC WEB: DATA, LOGIC, QUERY, LINKS, VALIDATION

## DATA:



LOGIC:  $(b, \text{capital}, a) \rightarrow (a, \text{partOf}, b)$   
 $(a, \text{partOf}, b), (b, \text{partOf}, c) \rightarrow (a, \text{partOf}, c)$

QUERY:  $(x, \text{partOf}, y)?$

OUTPUT:  $\{(x \mapsto \text{Ireland}, y \mapsto \text{Europe}),$   
 $(x \mapsto \text{Dublin}, y \mapsto \text{Ireland}),$   
 $(x \mapsto \text{Dublin}, y \mapsto \text{Europe})\}$

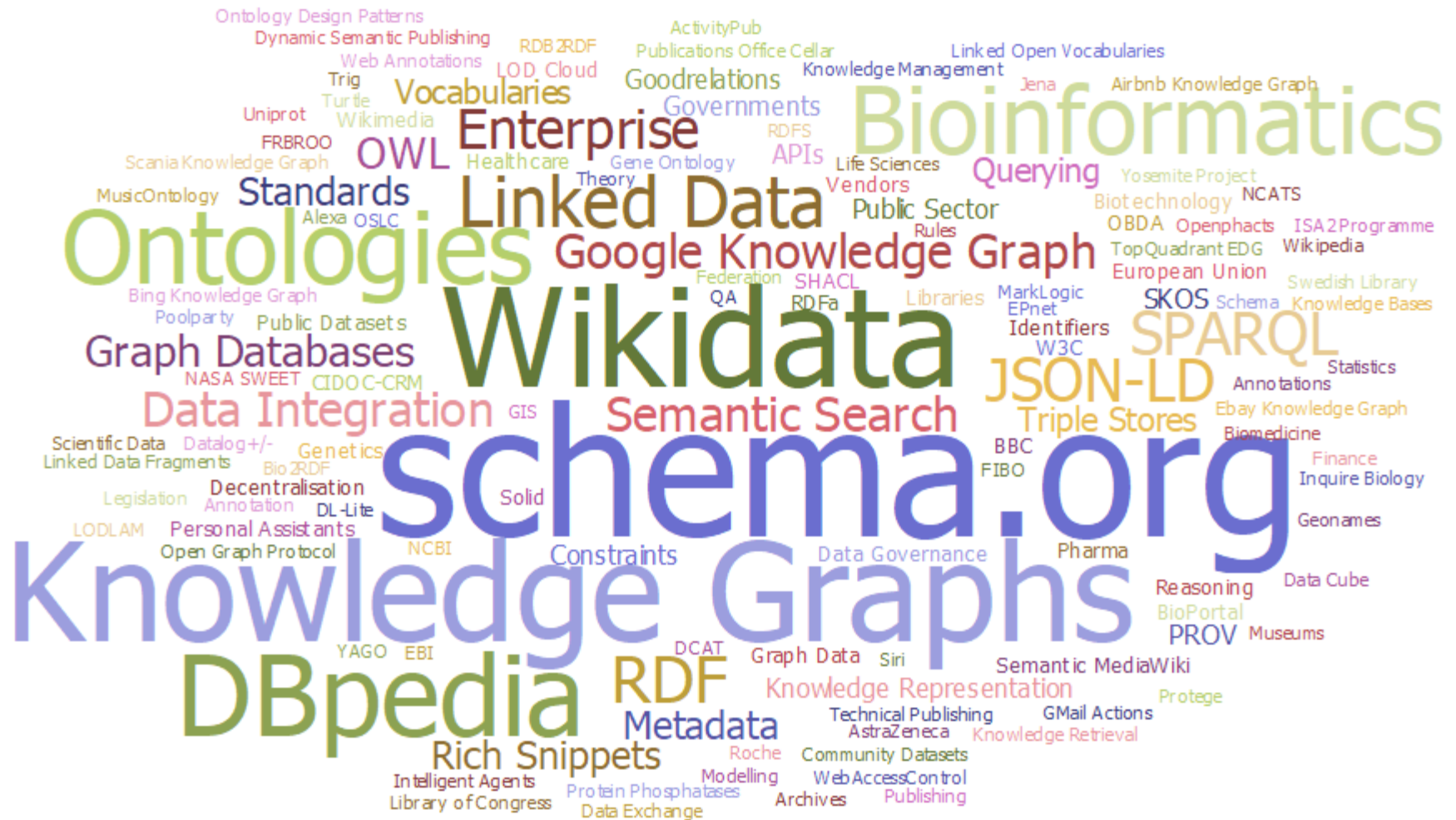




TAKING OFF

Hannover

# SUCCESS STORIES





Main Page

Discussion

Read

View source

View history

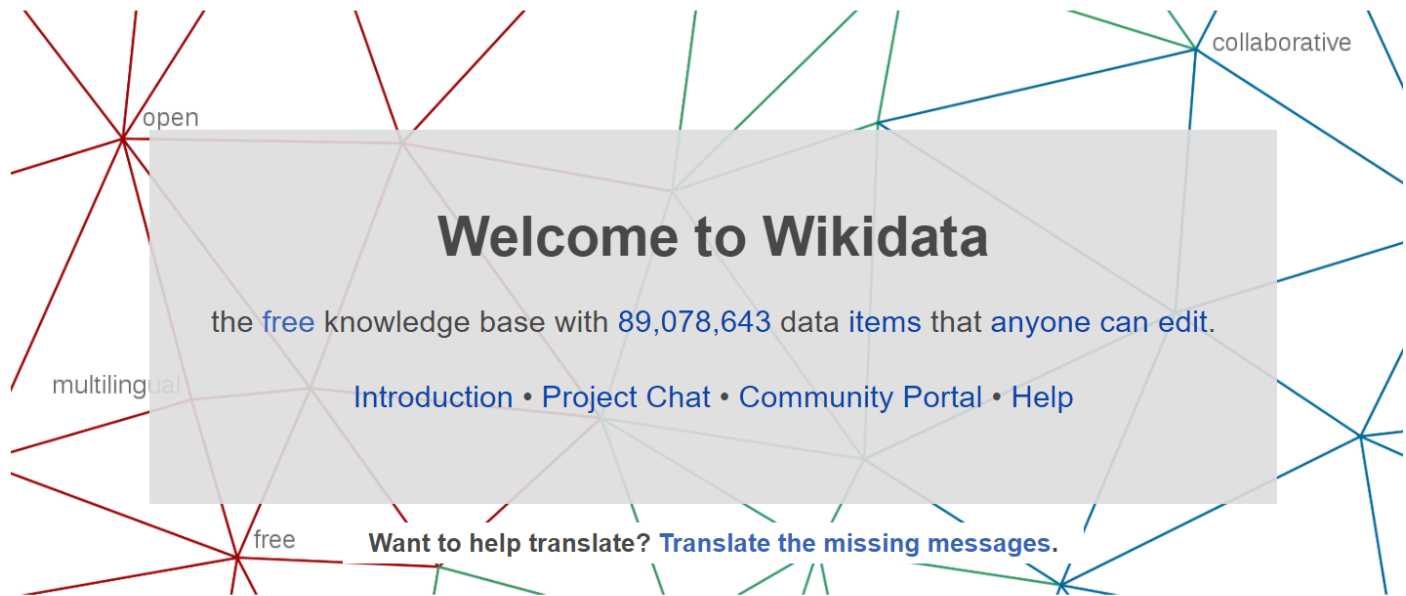
Search Wikidata



- Main page
- Community portal
- Project chat
- Create a new Item
- Create a new Lexeme
- Recent changes
- Random Item
- Query Service
- Nearby
- Help
- Donate

Tools

- What links here
- Related changes
- Special pages



**Welcome to Wikidata**

the **free** knowledge base with **89,078,643** data items that anyone can edit.

[Introduction](#) • [Project Chat](#) • [Community Portal](#) • [Help](#)

**Want to help translate? [Translate the missing messages.](#)**

open

collaborative

multilingual

free

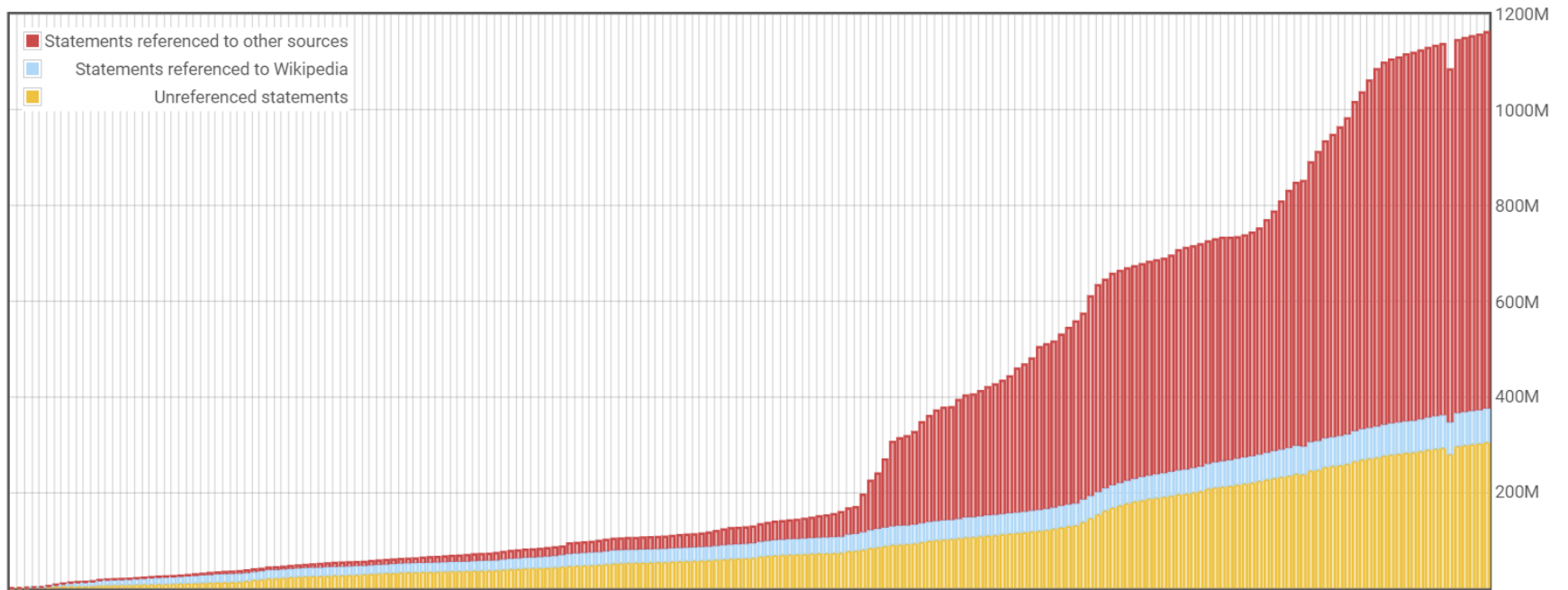


Welcome!



Learn about data

# WIKIDATA





# GOOGLE'S RICH SNIPPETS ...



The screenshot shows a Google search for "lemon meringue" in a browser window. The search results page displays "About 2,920,000 results (0.35 seconds)". Three rich snippets are visible, each featuring a small image of the pie, a title, a URL, a star rating, and a brief description of the recipe.

**Grandma's Lemon Meringue Pie Recipe - Allrecipes.com**  
allrecipes.com/recipe/15093/grandmas-lemon-meringue-pie/ ▾  
★★★★★ Rating: 4.6 - 1,625 reviews - 40 min - 298 cal  
This pie is thickened with cornstarch and flour in addition to egg yolks, and contains no milk." ... To Make **Lemon** Filling: In a medium saucepan, whisk together 1 cup sugar, flour, cornstarch, and salt. Stir in water, **lemon** juice and **lemon** zest.

**Ultimate lemon meringue pie | BBC Good Food**  
www.bbcgoodfood.com/recipes/3482/ultimate-lemon-meringue-pie ▾  
★★★★★ Rating: 4.6 - 182 votes - 3 hr 15 min - 480 cal  
For the pastry, put the flour, butter, icing sugar, egg yolk (save the white for the **meringue**) and 1 tbsp cold water into a food processor. ... While the pastry bakes, prepare the filling: mix the cornflour, sugar and **lemon** zest in a medium saucepan. ... Try some of our other lemony treats ...  
Lemon meringue pie · Little lemon meringue pies · Ultimate meringue

**Classic Lemon Meringue Pie recipe from Betty Crocker**  
www.bettycrocker.com/.../lemon-meringue.../8f991b88-55b0-4740-b12c... ▾

On the right side of the page, there is a vertical sidebar with a large image of a lemon meringue pie and the text "Lemon meringue pie, usually se a crust usually lemon custard topping. Wikipi ▾".

# GOOGLE'S KNOWLEDGE PANEL



The image shows a screenshot of a Google search for "sully prudhomme". The search results on the left include links to Wikipedia (English and Spanish), Biographical, and NNDB. The Knowledge Panel on the right features a grid of portraits, the name "Sully Prudhomme", his profession "Poet", a biographical summary, and key facts such as his birth and death dates, books, and awards. It also includes a "People also search for" section with portraits of Leconte de Lisle, Theodor Mommsen, Frédéric Mistral, Paul Verlaine, and Gabriel Fauré.

**Sully Prudhomme - Wikipedia, the free encyclopedia**  
[https://en.wikipedia.org/wiki/Sully\\_Prudhomme](https://en.wikipedia.org/wiki/Sully_Prudhomme)  
René François Armand (Sully) Prudhomme was a French poet and essayist. He was the first ever winner of the Nobel Prize in Literature in 1901. Born in Paris ...  
Early life · Writing · Nobel Prize · Death

**Sully Prudhomme - Wikipedia, la enciclopedia libre**  
[https://es.wikipedia.org/wiki/Sully\\_Prudhomme](https://es.wikipedia.org/wiki/Sully_Prudhomme) · Translate this page  
René François Armand (Sully) Prudhomme también conocido como Sully Prudhomme (París, Francia, 16 de marzo de 1839 - Châtenay-Malabry, Francia, 6 de ...

**Sully Prudhomme - Biographical - Nobelprize.org**  
[www.nobelprize.org/nobel\\_prizes/literature/laureates/1901/prudhomme-bio.html](http://www.nobelprize.org/nobel_prizes/literature/laureates/1901/prudhomme-bio.html)  
Rene Francois Armand Prudhomme (1839-1907) was the son of a French shopkeeper. ... Sully Prudhomme was a member of the «Conference La Bruyère», ...

**Sully Prudhomme - Nobelprize.org**  
[https://www.nobelprize.org/nobel\\_prizes/literature/laureates/1901/](https://www.nobelprize.org/nobel_prizes/literature/laureates/1901/)  
The Nobel Prize in Literature 1901 was awarded to Sully Prudhomme "in special recognition of his poetic composition, which gives evidence of lofty idealism, ...

**Sully Prudhomme | French poet | Britannica.com**  
<https://www.britannica.com/biography/Sully-Prudhomme>  
Sully Prudhomme, pseudonym of René-François-Armand Prudhomme (born March 16, 1839, Paris—died Sept. 7, 1907, Châtenay, France) French poet who ...

**Sully Prudhomme - NNDB.com**  
[www.nndb.com/people/297/000098003/](http://www.nndb.com/people/297/000098003/)  
It was at this moment that the small circle of which Leconte de Lisle was the center were preparing the Parnasse, to which Sully Prudhomme contributed several ...

**Sully Prudhomme | Definition of Sully Prudhomme by Merriam-Webster**

**Sully Prudhomme**  
Poet

René François Armand Prudhomme was a French poet and essayist. He was the first ever winner of the Nobel Prize in Literature in 1901.  
[Wikipedia](#)

**Born:** March 16, 1839, Paris, France  
**Died:** September 6, 1907, Châtenay-Malabry, France  
**Books:** [Les vaines tendresses](#)  
**Awards:** [Nobel Prize in Literature](#)

**People also search for** [View 10+ more](#)

[Leconte de Lisle](#) [Theodor Mommsen](#) [Frédéric Mistral](#) [Paul Verlaine](#) [Gabriel Fauré](#)



SCHEMA.ORG

YAHOO!

Google

 Microsoft

Yandex

Schema.org

Documentation

Schemas

About



## Welcome to Schema.org

Schema.org is a collaborative, community activity with a mission to create, maintain, and promote schemas for structured data on the Internet, on web pages, in email messages, and beyond.

Schema.org vocabulary can be used with many different encodings, including RDFa, Microdata and JSON-LD. These vocabularies cover entities, relationships between entities and actions, and can easily be extended through a well-documented extension model. Over 10 million sites use Schema.org to markup their web pages and email messages. Many applications from Google, Microsoft, Pinterest, Yandex and others already use these vocabularies to power rich, extensible experiences.

Founded by Google, Microsoft, Yahoo and Yandex, Schema.org vocabularies are developed by an open community process, using the [public-schemaorg@w3.org](mailto:public-schemaorg@w3.org) mailing list and through [GitHub](#).

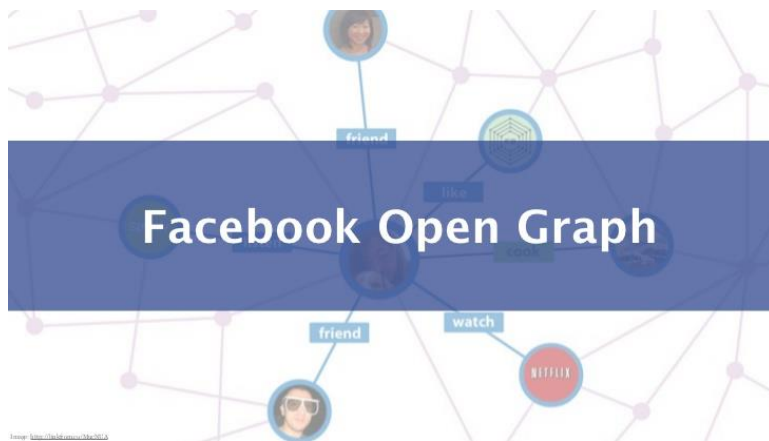
A shared vocabulary makes it easier for webmasters and developers to decide on a schema and get the maximum benefit for their efforts. It is in this spirit that the founders, together with the larger community have come together - to provide a shared collection of schemas.

We invite you to [get started!](#)

View our blog at [blog.schema.org](http://blog.schema.org) or see [release history](#) for version 11.01.

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# FACEBOOK'S OPEN GRAPH



IMDb

16 hrs · 🌐

The latest trailer for "Game of Thrones" is out, and contains so many fantastic details that we don't even know where to begin. Take a look: <http://imdb.to/1KXLPFJ>



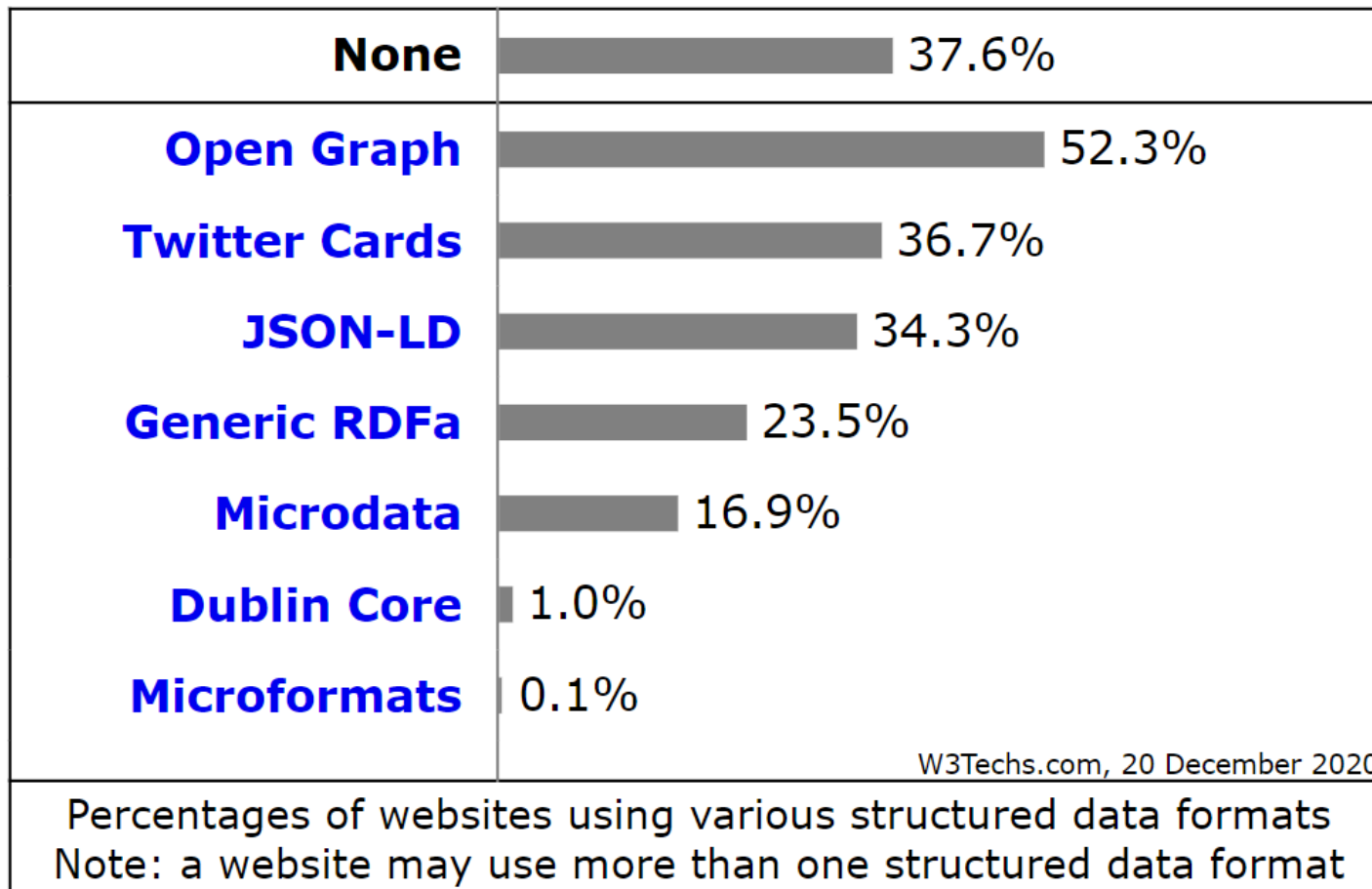
"Game of Thrones": The Wheel

"I'm not going to stop the wheel. I'm going to break the wheel."

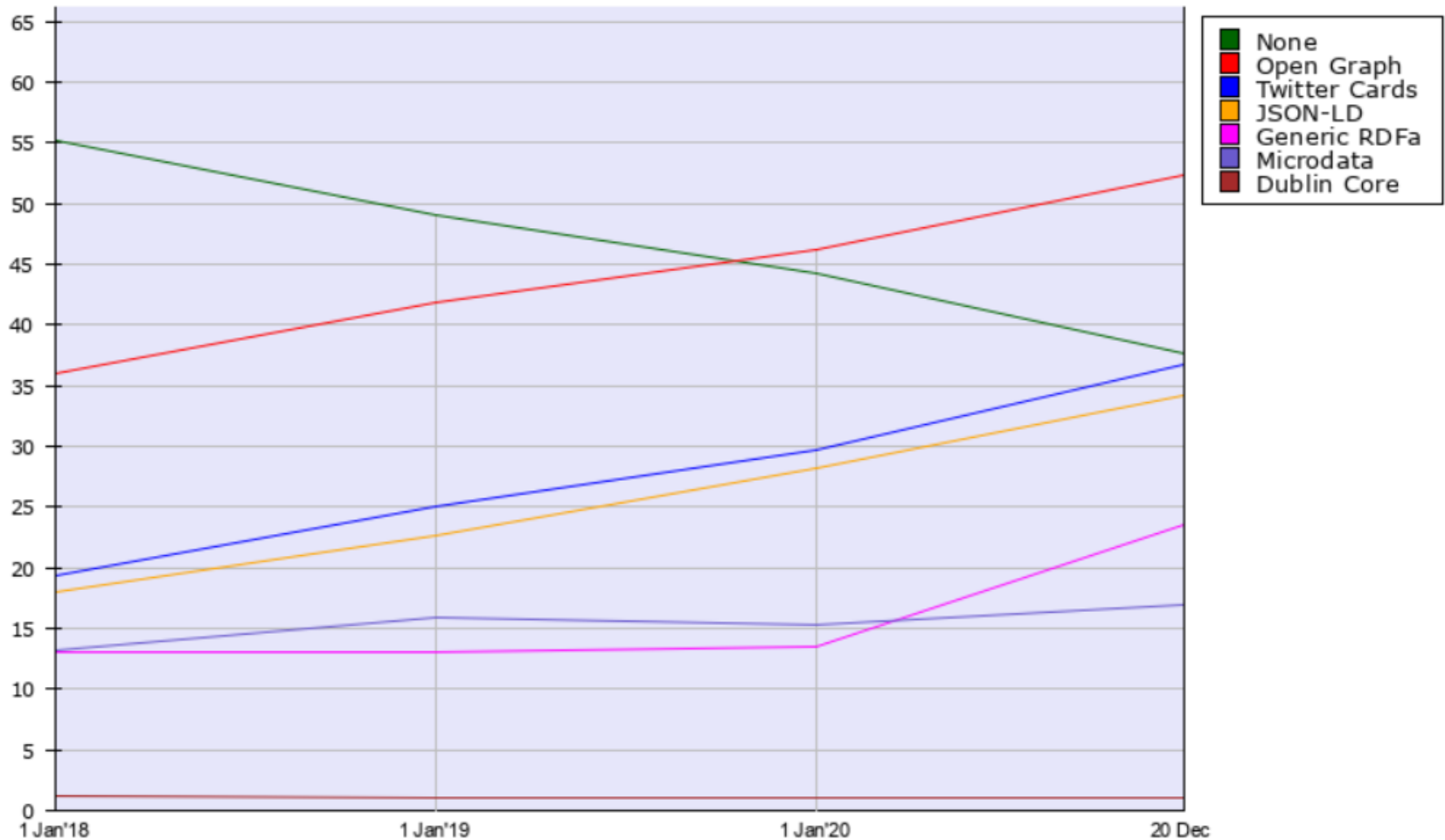
IMDB.COM

Like · Comment · Share · Send · 👍 6,469 💬 395 ➦ 1,381

# EMBEDDED STRUCTURED DATA



# EMBEDDED STRUCTURED DATA



Usage of structured data formats for websites, 20 Dec 2020, W3Techs.com

[https://w3techs.com/technologies/history\\_overview/structured\\_data/all/y](https://w3techs.com/technologies/history_overview/structured_data/all/y)

# GOOGLE'S KNOWLEDGE GRAPH



**Google Knowledge Graph**



**Amazon Prime**



Free UK Delivery by Amazon

FREE Delivery on orders over £10 for books or over £20 for other categories shipped by Amazon

**Deals**

Today's Deals

**Department**

**Books**

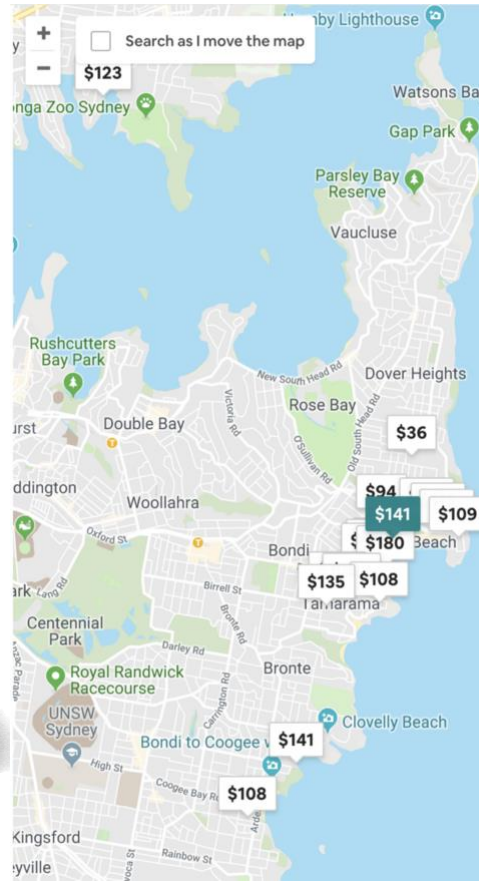
- Artificial Intelligence (A.I.)
- Beginner's Guide to Databases
- Managers' Guides to Computing
- Data Mining
- E-Business
- See more

**Kindle Store**

- Information Technology
- Mathematical & Statistical
- See All 4 Departments

**Avg. Customer Review**

- ★★★★☆ & Up
- ★★★★☆ & Up
- ★★★★☆ & Up
- ★★★☆☆ & Up



# Knowledge Graph

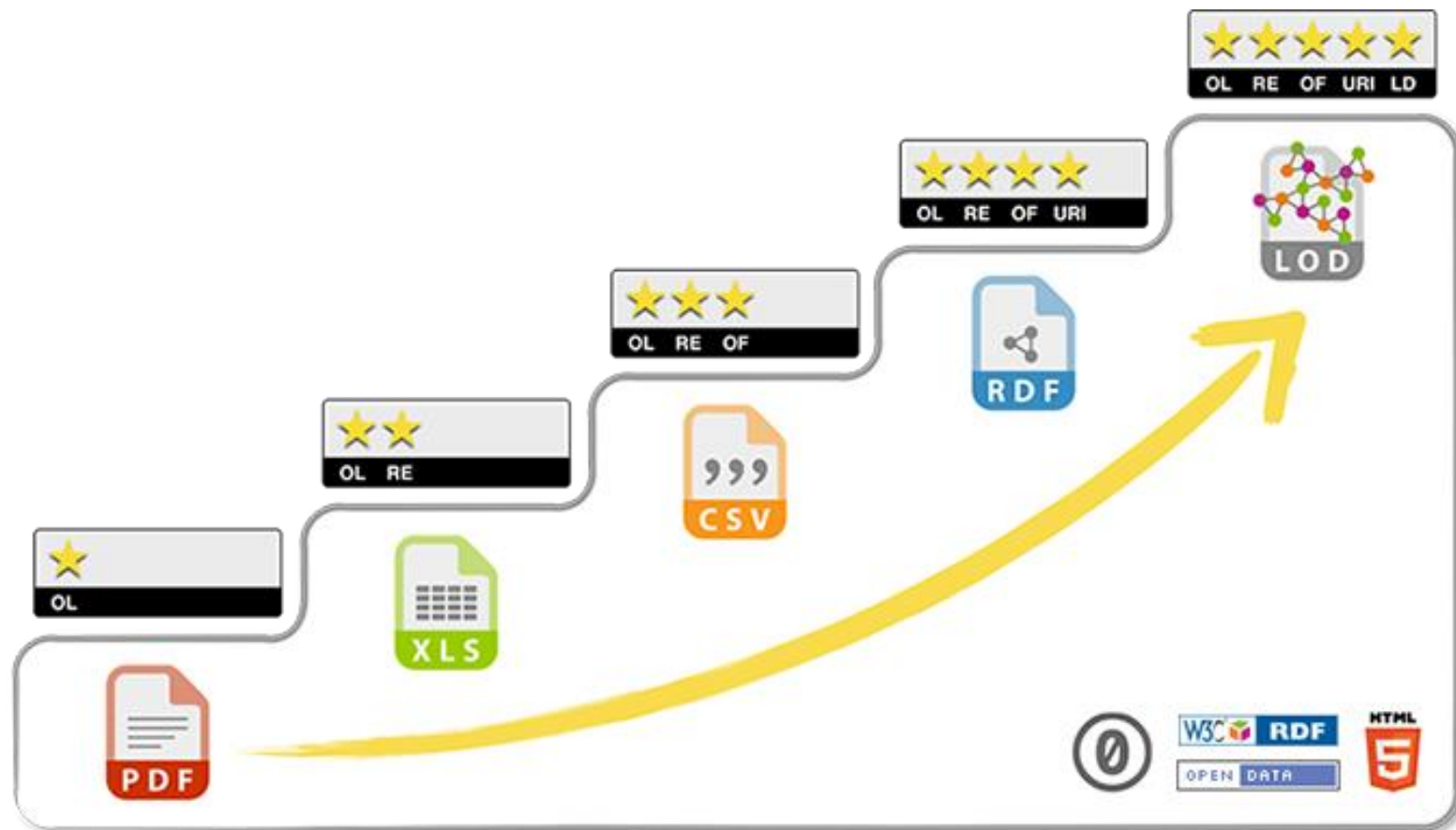


The Knowledge Graph is a knowledge base used by Google and its services to enhance its search engine's results with information gathered from a variety of sources. The information is presented to users in an infobox next to the search results.

[Wikipedia](#)

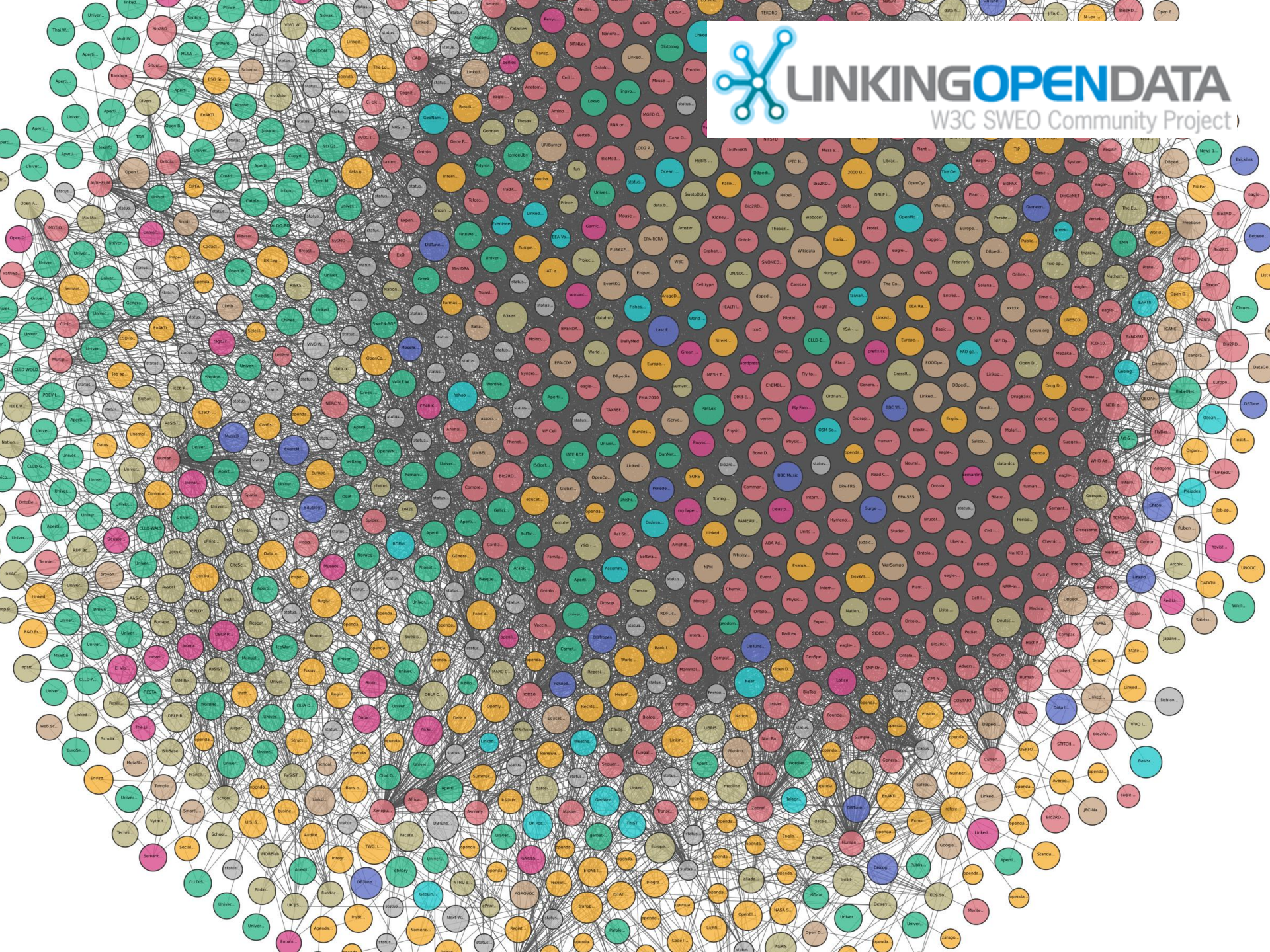


# LINKED OPEN DATA



5-Star Linking Open Data Scheme

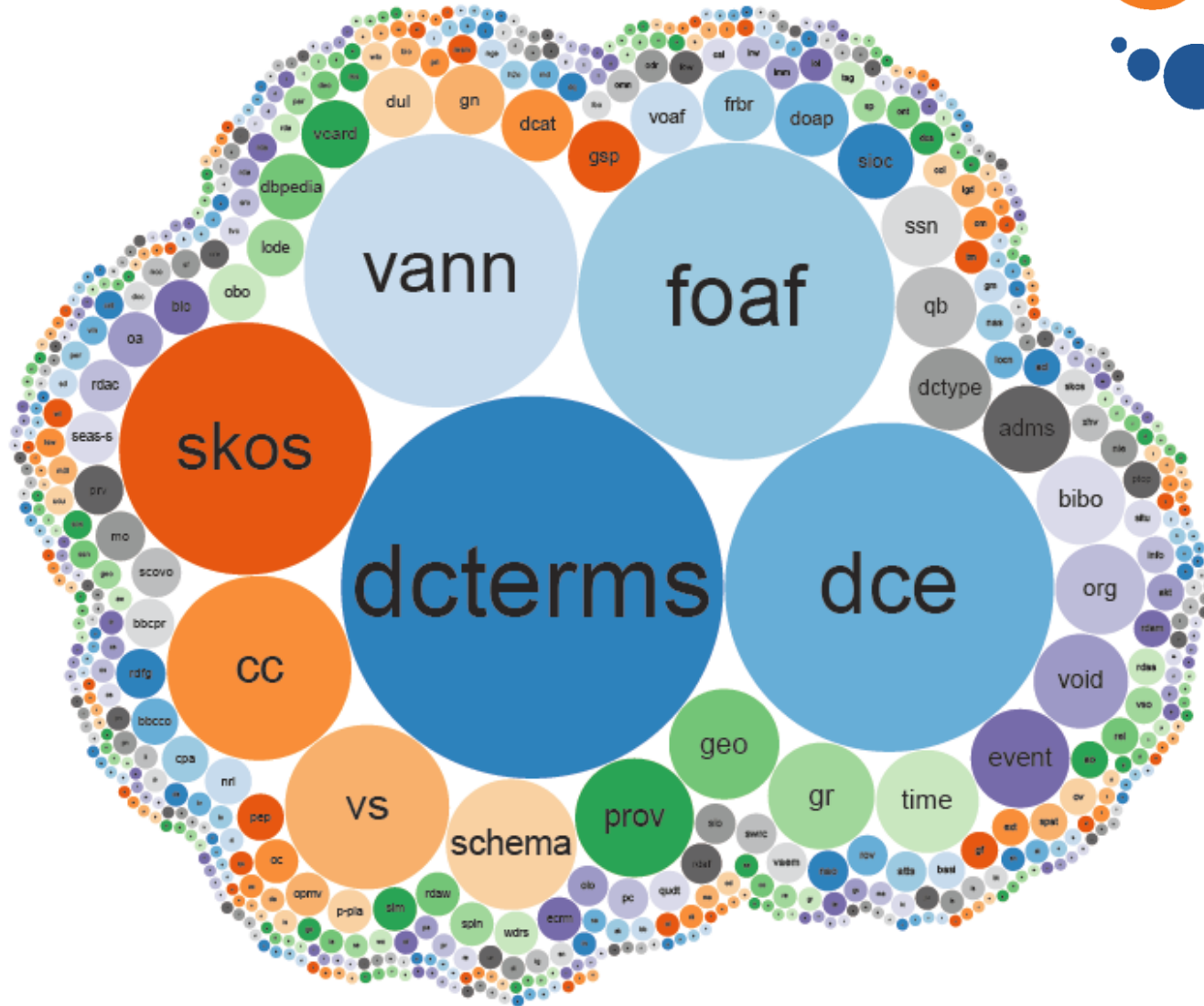




**LINKING OPENDATA**  
W3C SWEO Community Project



# LINKED OPEN VOCABULARIES



From <https://lov.linkeddata.es/>

# BIOMEDICAL ONTOLOGIES



## The Open Biological and Biomedical Ontology (OBO) Foundry

Community development of interoperable ontologies for the biological sciences

<a href="#">bfo</a>	Basic Formal Ontology 	The upper level ontology upon which OBO Foundry ontologies are built. <a href="#">Detail</a>								
<a href="#">chebi</a>	Chemical Entities of Biological Interest 	A structured classification of molecular entities of biological interest focusing on 'small' chemical compounds. <a href="#">Detail</a>								
<a href="#">doid</a>	Human Disease Ontology 	An ontology for describing the classification of human diseases organized by etiology. <a href="#">Detail</a>								
<a href="#">go</a>	Gene Ontology 	An ontology for describing the function of genes and gene products <a href="#">Detail</a>								
<a href="#">obi</a>	Ontology for Biomedical Investigations 	An integrated ontology for the description of life-science and clinical investigations <a href="#">Detail</a>								
<a href="#">pato</a>	Phenotype And Trait Ontology 	An ontology of phenotypic qualities (properties, attributes or characteristics) <a href="#">Detail</a>								
<a href="#">po</a>	Plant Ontology 	The Plant Ontology is a structured vocabulary and database resource that links plant anatomy, morphology and growth and development to plant genomics data. <a href="#">Detail</a>								



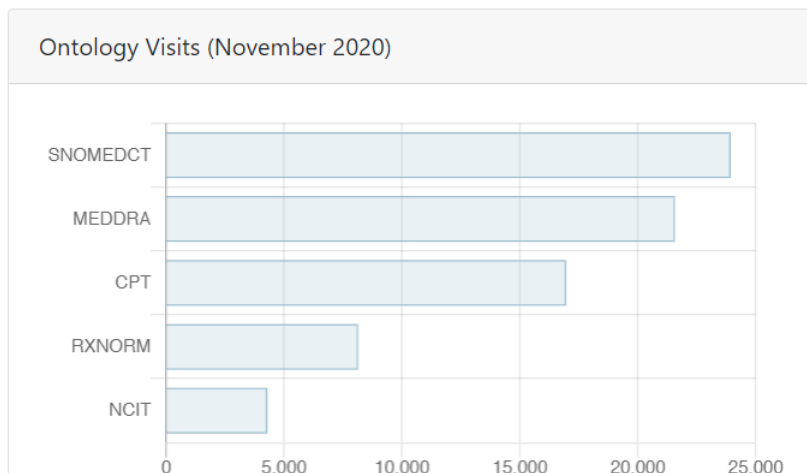
## Welcome to BioPortal, the world's most comprehensive repository of biomedical ontologies

Search for a class

[Advanced Search](#)

Find an ontology

[Browse Ontologies](#) ▾



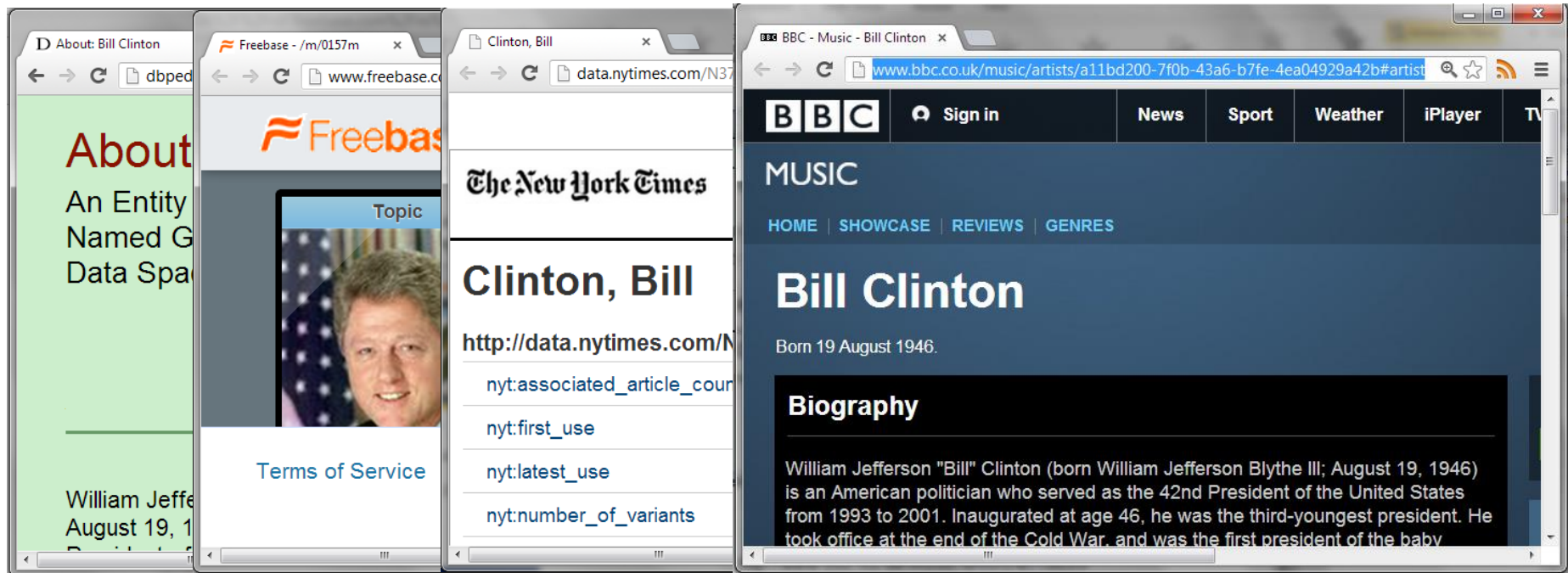
BioPortal Statistics

Ontologies	912
Classes	12,108,726
Properties	36,286
Mappings	111,130,779

A dark green, monochromatic landscape. A path leads through a dense forest of trees. In the foreground, a large, gnarled tree with many bare branches stands prominently. The overall atmosphere is mysterious and natural.

ONGOING RESEARCH

# INTEGRATING DIVERSE DATA



[http://dbpedia.org/resource/Bill\\_Clinton](http://dbpedia.org/resource/Bill_Clinton)

[http://rdf.freebase.com/ns/en.bill\\_clinton](http://rdf.freebase.com/ns/en.bill_clinton)

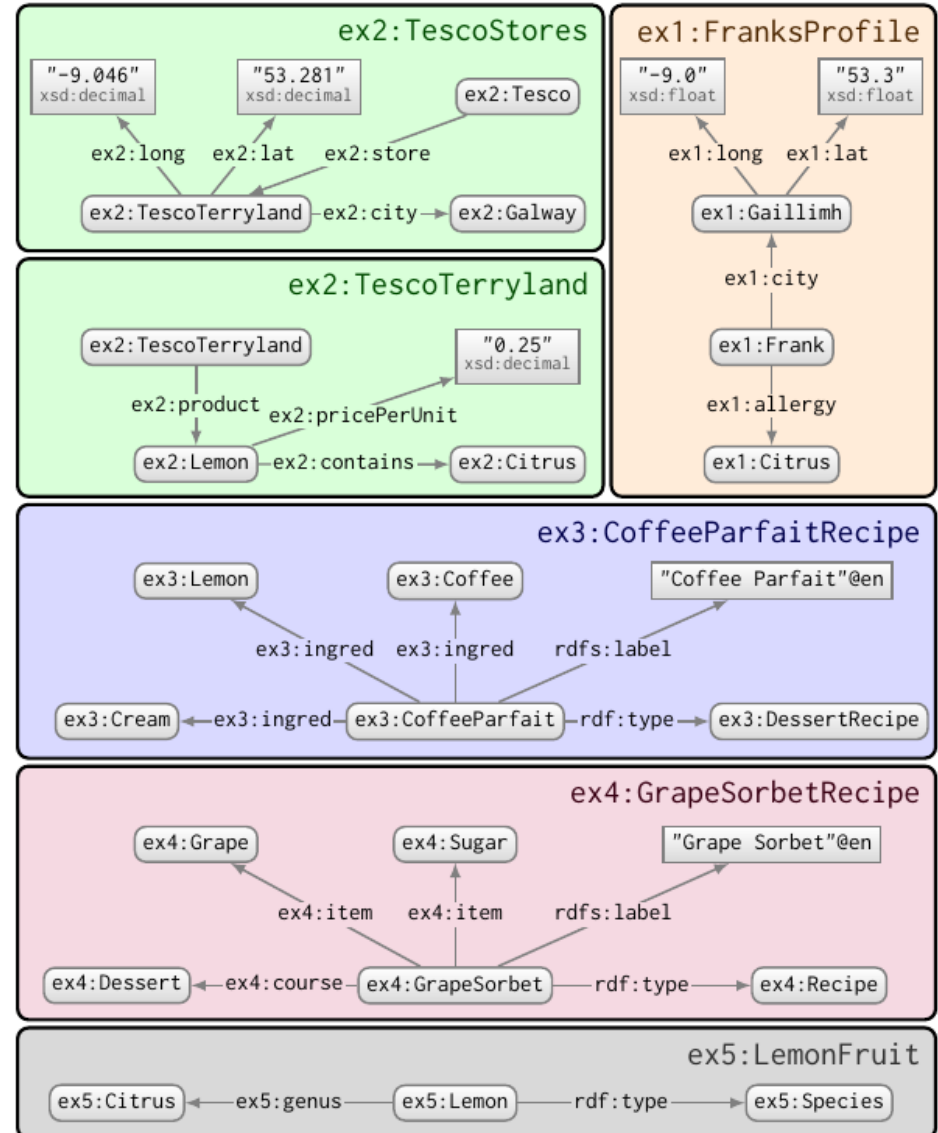
[http://data.nytimes.com/clinton\\_bill\\_per](http://data.nytimes.com/clinton_bill_per)

[http://www.bbc.co.uk/music/artists/...](http://www.bbc.co.uk/music/artists/)

How can we integrate data using different identifiers from different sources?

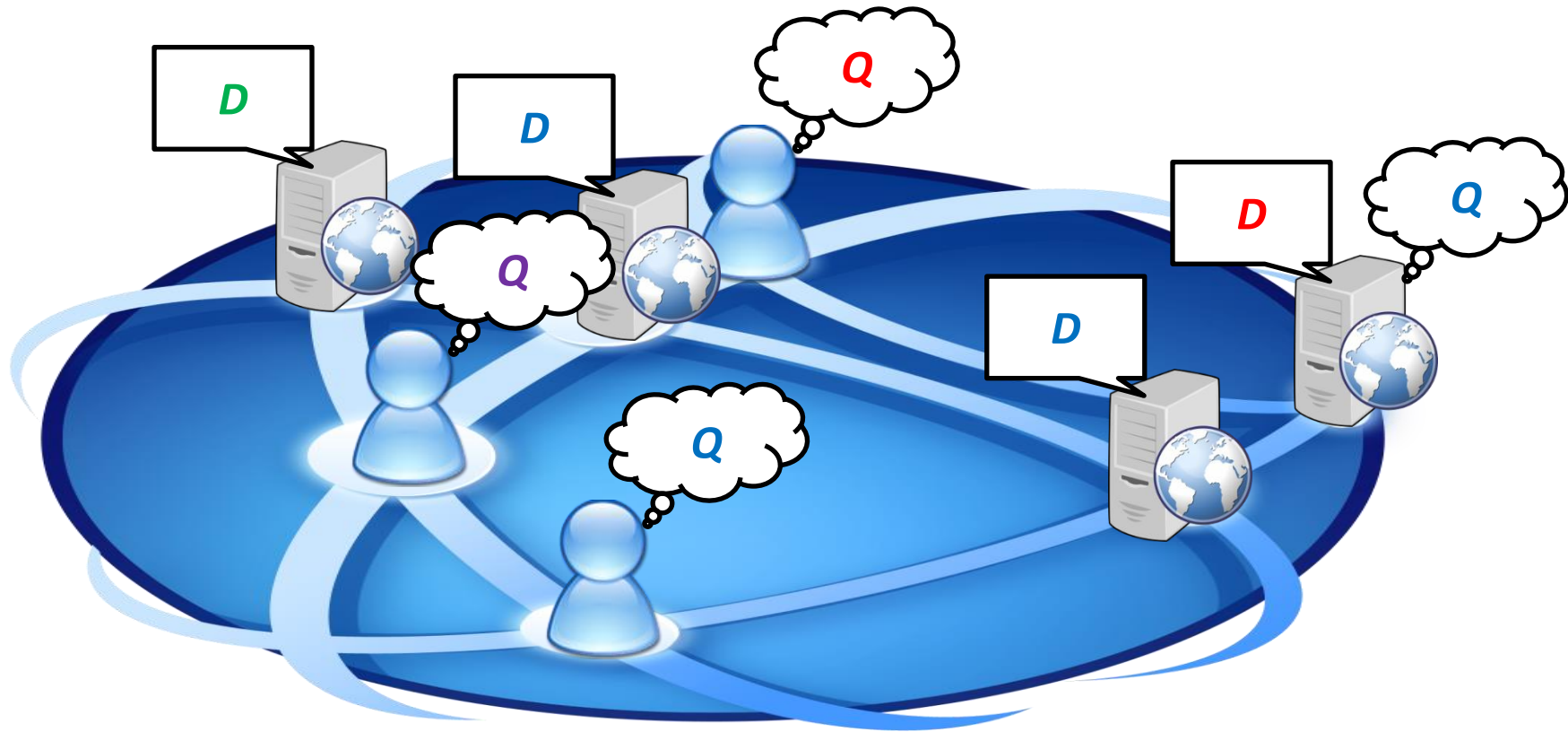
# INTEGRATING DIVERSE VOCABULARIES

How can we integrate and write queries against Linked Data using different vocabularies?





# DECENTRALISED QUERYING



How can we enable decentralised querying over multiple decentralised datasets?



# VERACITY

Top 8 Examples Proving th x

www.enkivillage.com/moon-landing-hoax.html

## Moon Landing Hoax

Society & Culture 27K+ 375

“That’s one small step for [a] man, one giant leap for mankind.” So said Neil Armstrong on that momentous occasion on July 21, 1969 when he stepped onto the surface of the moon for the very first time...supposedly. Does anyone else find it strange that decades before the internet, nanotechnology and cloning, NASA were able to build a rocket that could not only land on the moon, but live broadcast the event to 600 million people? Was the moon landing fake?

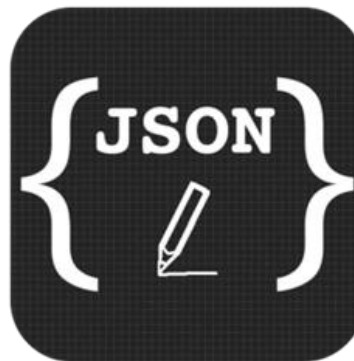
### Top 8 Examples Proving the Moon Landing Was a Hoax

The 60's was a decade where technology was only just figuring out how to develop people question the nes of evidence exposing the

How can we deal with incorrect or malicious data and/or ontologies on the Semantic Web?

# LEGACY DATA

How can we "import" more legacy data into the Semantic Web?



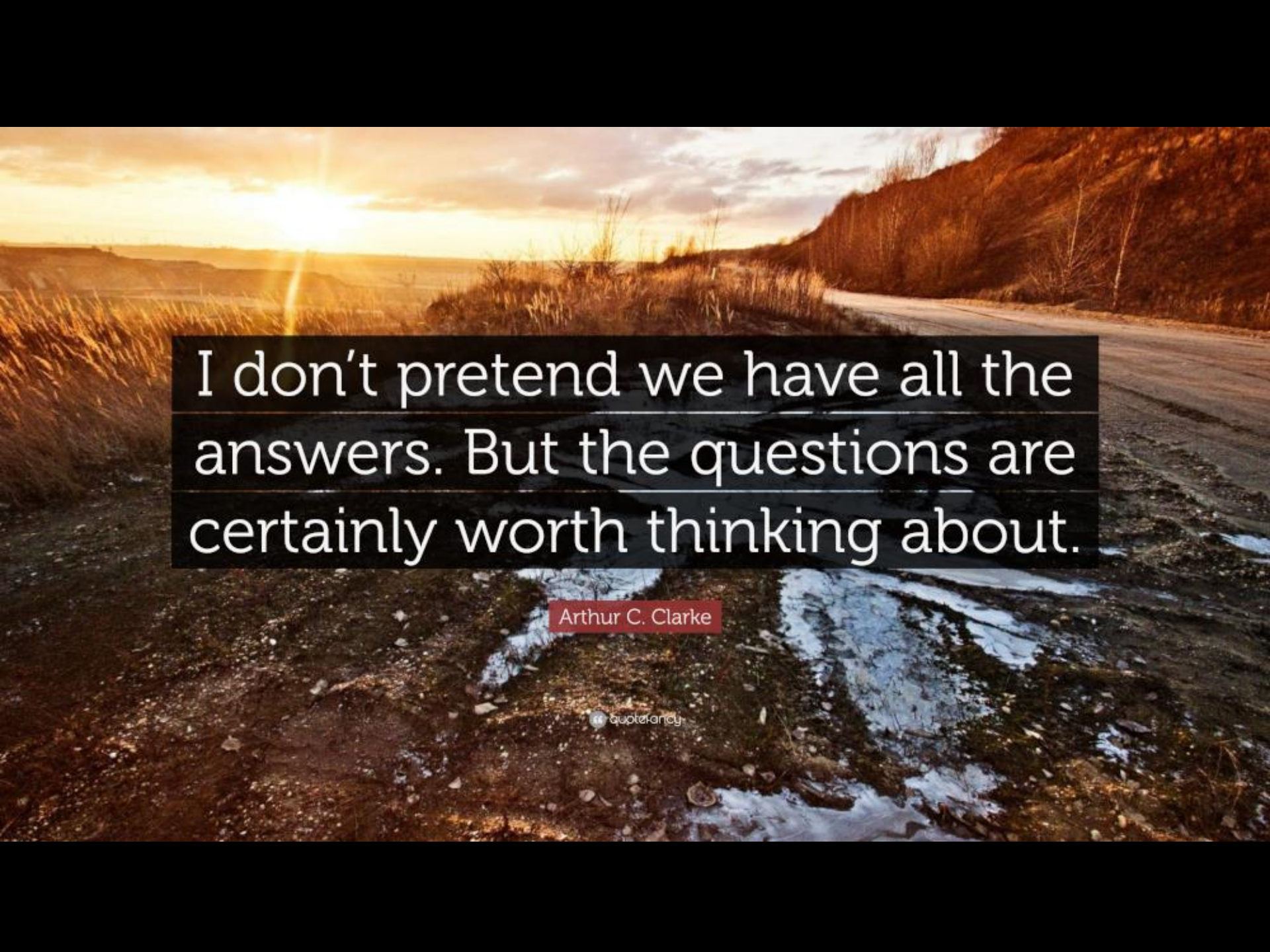
# USABILITY

```
PREFIX geo: <http://www.opengis.net/ont/geosparql#>
PREFIX lgdo: <http://linkedgeodata.org/ontology/>
PREFIX geom: <http://geovocab.org/geometry#>
PREFIX bif: <bif:>

SELECT ?country ?geometry ?label WHERE {
  SERVICE <http://linkedgeodata.org/sparql> {
    ?s geom:geometry [ geo:asWKT ?geometry ] ;
    a lgdo:Embassy ;
    lgdo:country ?code ;
    rdfs:label ?label .
  }
  FILTER(bif:st_intersects(?geometry, bif:st_point(-70.6693,-33.4489), 10))
}
?country wdt:P297 ?code ;
  wdt:P30 wd:Q48 . # continent: Asia
}
```

What kinds of interfaces can help non-expert users to better interact with the Semantic Web?





I don't pretend we have all the answers. But the questions are certainly worth thinking about.

Arthur C. Clarke

quotation



# ONGOING RESEARCH IN CHILE





THAT'S ALL FOLKS ...



QUESTIONS?

