

Linked data: Opening Scotland's library content to the world

Dr Diane Rasmussen Pennington MS PhD PgDip FHEA FRSA
Lecturer in Information Science, University of Strathclyde
Editor-in-Chief, Library and Information Research
[@infogamerist](#)
diane.pennington@strath.ac.uk

The evolution of the Web (1989-now)

- **Web 1.0:** hand-coded HTML pages; accessible and readable, but not interactive
- **Web 2.0:** Facebook and Twitter; everyone can post, share, and respond without extensive technical knowledge
- **Web 3.0:** the Semantic Web
 - “Semantic” is “meaning in language”
 - “Semantic Web” communicates “the *meaning* of the content on web pages in a way that computers can understand. If they can process these meanings, they can then make and convey relationships between related web pages. This leads to improved – and more meaningful – information retrieval.” (p. 34)

Source: Rasmussen Pennington, D. (2016, July/August). Demystifying linked data: Are you ready for what's next? *CILIP Update*, 34-36.

Linked open data principles

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 name, provide useful Resource Description Framework [RDF] information, using the standards (RDF*, SPARQL)
4. Include links to other URIs so that they can discover more things



Source: <http://www.w3.org/DesignIssues/LinkedData.html>

1. Use URIs as names for things
2. Use HTTP URIs so that people can look up names

- The Hypertext Transfer Protocol (HTTP) is a networking protocol for distributed, collaborative, hypermedia information systems.
- HTTP is the foundation of data communication for the World Wide Web.
- Use URIs to name people, for institutions, concepts, topics, and geographical places.

Examples:

- <http://www.strath.ac.uk> (a university)
- <https://www.facebook.com/CILIPinfo> (a professional association)
- <https://personal.cis.strath.ac.uk/diane.pennington> (a lecturer)
- <https://www.flickr.com/photos/chandlerinok/6168389622> (a Chihuahua)

3. When someone looks up a name, provide useful [RDF] information

RDF, or Resource Description Framework, is the language of the Semantic Web



- Use RDF subject-predicate-object 'triples' to describe a thing
- Reciprocate triples to show relationships between things

Emma Watson → StarredInMovie → Harry Potter and the Half-Blood Prince

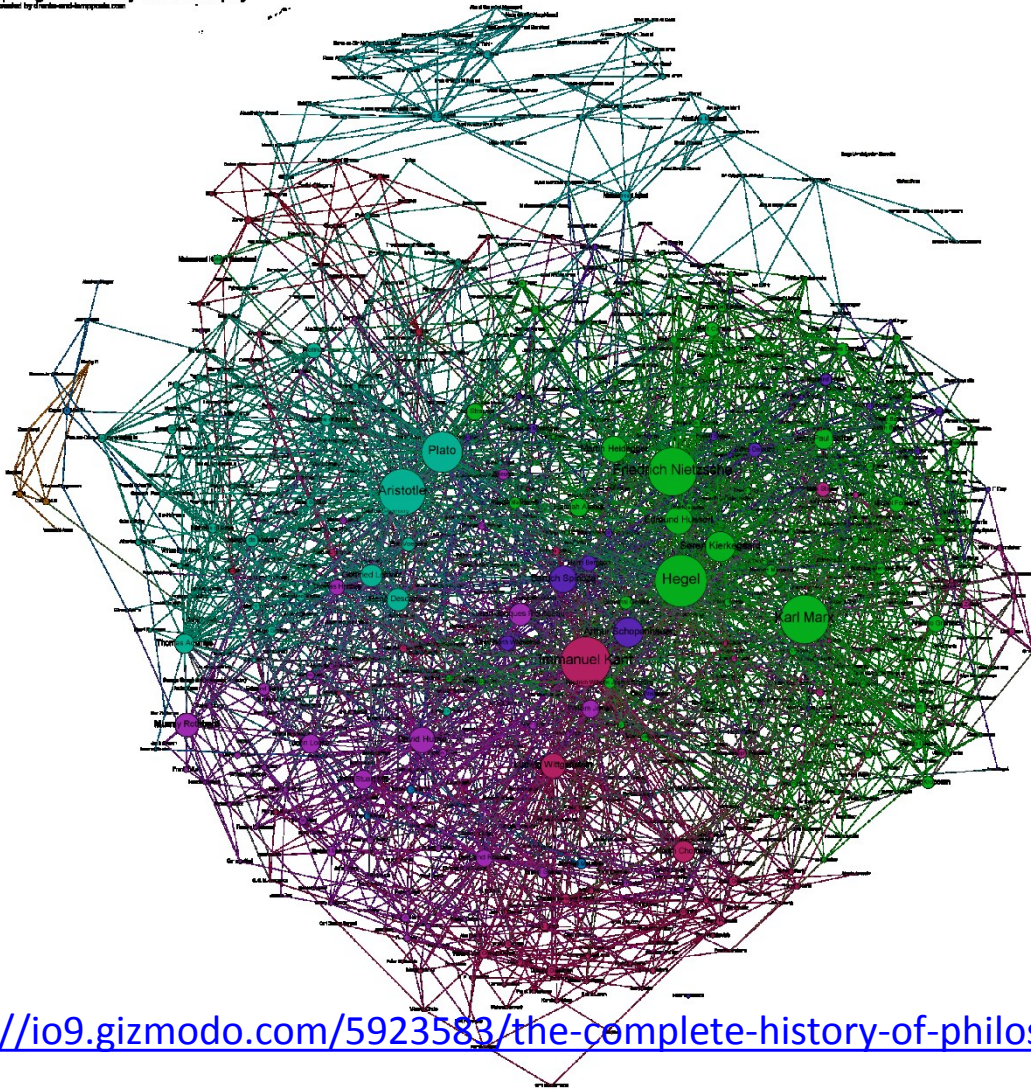
Emma Watson is the subject, StarredInMovie is the predicate, and Harry Potter and the Half-Blood Prince is the object.

This relationship also needs to be reciprocated:

Harry Potter and the Half-Blood Prince → Has Movie Star → Emma Watson

4. Include links to other URIs so that users can discover more things

Graphing The History Of Philosophy
Image created by Functional Artworks.com



An example using
DBpedia; shows
relationships between
philosophers

Google's Knowledge Graph uses linked data to connect related resources

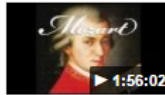


mozart  




All Videos Images News Books More Settings Tools

About 82,400,000 results (0.64 seconds)

Wolfgang Amadeus Mozart - Wikipedia
https://en.wikipedia.org/wiki/Wolfgang_Amadeus_Mozart ▾
Wolfgang Amadeus Mozart baptised as Johannes Chrysostomus Wolfgangus Theophilus Mozart, was a prolific and influential composer of the Classical era.
Salzburg · Death of Wolfgang Amadeus ... · Constanze Mozart · Requiem

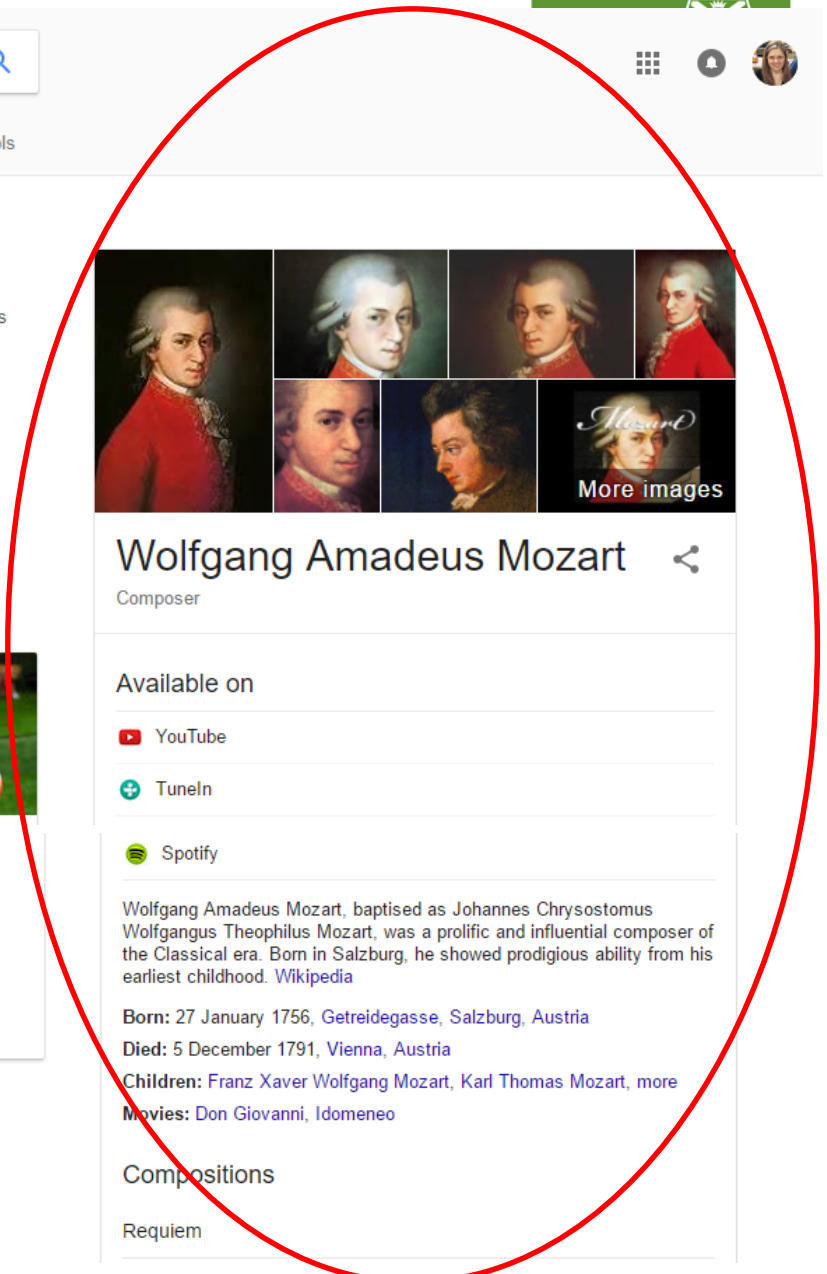
The Best of Mozart - YouTube
 <https://www.youtube.com/watch?v=Rb0UmrCXxVA> ▾
8 Jan 2013 - Uploaded by HALIDONMUSIC
Subscribe for more classical music: <http://bit.ly/YouTubeHalidonMusic> Listen to our Mozart playlist on Spotify ...


Top stories


 <p>Mozart's 'Titus' is about great music and forgiveness</p> <p>STLtoday.com · 1 day ago</p>	 <p>Mozart Won't Make Your Kid Smarter: Music Myths Even Teachers Believe</p> <p>Vocativ · 1 week ago</p>	 <p>The Mozart in the Machine</p> <p>Bloomberg · 1 month ago</p>
--	--	--

→ More for mozart

Mozart - Composers - Classic FM
www.classicfm.com/composers/mozart/ ▾
Johannes Chrystostomus Wolfgangus Theophilus Mozart (1756–1791) was arguably the most gifted musician in the history of classical music. His inspiration is ...








Wolfgang Amadeus Mozart 

Composer

Available on

-  YouTube
-  Tuneln
-  Spotify

Wolfgang Amadeus Mozart, baptised as Johannes Chrysostomus Wolfgangus Theophilus Mozart, was a prolific and influential composer of the Classical era. Born in Salzburg, he showed prodigious ability from his earliest childhood. [Wikipedia](#)

Born: 27 January 1756, Getreidegasse, Salzburg, Austria
Died: 5 December 1791, Vienna, Austria
Children: Franz Xaver Wolfgang Mozart, Karl Thomas Mozart, more
Movies: Don Giovanni, Idomeneo

Compositions

Requiem

Scottish Government's Open Data Strategy (2015)



“This strategy seeks to create a Scotland where non-personal and non-commercially sensitive data from public services is recognised as a resource for wider societal use and as such is made open in an intelligent manner and available for re-use by others.”

Source: <http://www.gov.scot/Publications/2015/02/6614>

Scottish Government's "Realising Scotland's full potential in a digital world: A Digital Strategy for Scotland" (2017)



**"DATA CHANGES EVERYTHING,
OPENING UP NEW CHOICES AND
POSSIBILITIES FOR OUR PUBLIC
SERVICES, OUR BUSINESSES,
OUR WELLBEING."**

**GILLIAN DOCHERTY, CHIEF EXECUTIVE,
DATA LAB**

Data holds the key to unlocking innovation in public services. Better data sharing can generate new insights, stimulate new ideas and deliver potential savings to the public sector of more than £1 billion.⁸ Such benefits will, however, only be realised if people in Scotland trust us to hold their data securely and use it in appropriate ways.

**"SCOTLAND HAS THE POTENTIAL
TO BECOME THE DATA CAPITAL OF
EUROPE."**

**CHARLIE JEFFREY, SENIOR VICE PRINCIPAL,
UNIVERSITY OF EDINBURGH**

Source: <http://www.gov.scot/Publications/2017/03/7843>

Scottish Government's official open data stats: <http://statistics.gov.scot>

STATISTICS.GOV.SCOT

Open access to Scotland's official statistics

Explore ▾ Tools ▾ Search ▾ Help

A range of official statistics about Scotland for information and re-use.

Explore the data by [theme](#), [organisation](#), or [geography](#). [Search](#) for datasets, places or postcodes.



GETTING STARTED



**VIEWING DATA
ON A MAP**



**DOWNLOADING
DATA**



**VIEWING DATA AS
A TIME SERIES**



**... MORE ON OUR
BLOG**

Latest updates

House Prices

31/05/2017

House Sales

31/05/2017

Libraries implementing linked data: Why should we do it?



- People can more easily find library resources on the web
- More creative applications based on library metadata
- Opportunities for cataloguing efficiency and innovation

National Library of Scotland's Open Data Publication Plan

“We will publish our non-personal and non-commercially sensitive data as 3-star open data”

Source: <https://www.nls.uk/about-us/open-data>

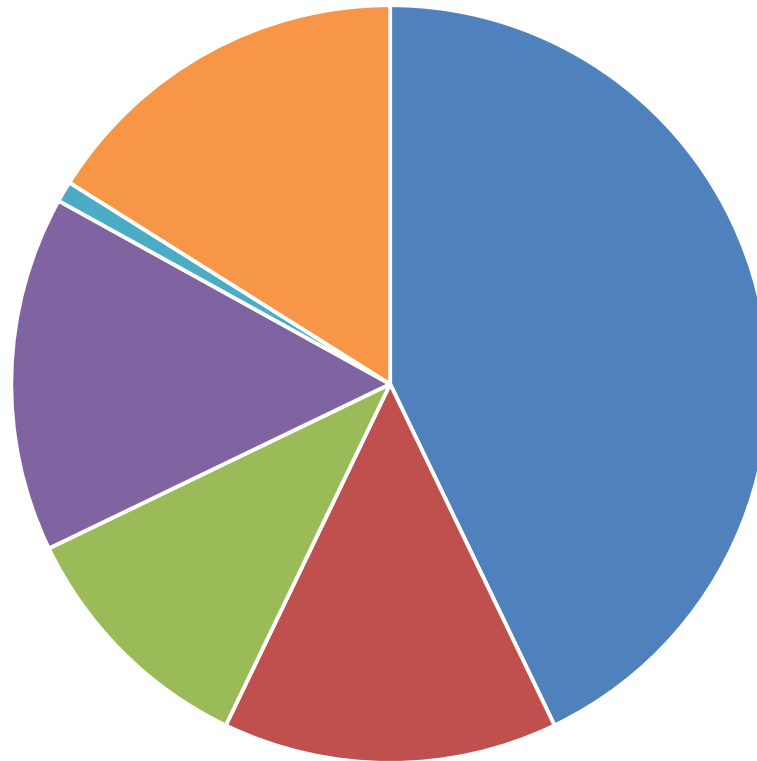


Survey of Scotland's library staff: Design and recruitment



- Short online Qualtrics survey
- Departmental ethics approval
- Recruitment through Twitter, SLIC, CILIPS
- Open from 03/05/17 to 18/05/2017
- n=113 completed responses

Library types of participants



■ Public

■ School

■ Academic

■ Other

■ National

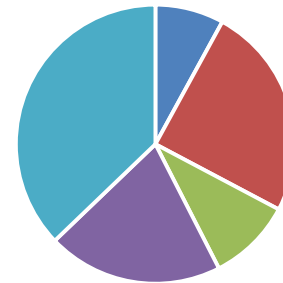
■ Did not specify

Do you know what the term 'linked data' means?



- Definitely yes
- Probably yes
- Might or might not
- Probably not
- Definitely not

Do you know what the term 'Semantic Web' means?



- Definitely yes
- Probably yes
- Might or might not
- Probably not
- Definitely not

In your own words, describe what the term 'linked data' means to you.

- Range of answers and levels of knowledge
- General themes: data/resource sharing, linking, availability, connectedness

“I understand that this is a current term referring to an approach to publishing and sharing data on the Web, although I don't know much about it. As it suggests improved understanding and accessibility, I'm all for it!”

In your own words, describe what the term 'Semantic Web' means to you.



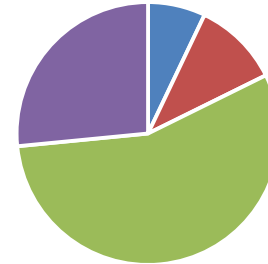
- Decidedly less certainty here
- General themes: improved web searching; more structured online data for better organisation

“A spider with a love of words and their roots???”

Has your library implemented, or is it planning to implement, any linked data applications on its online resources?

- Have implemented
 - MARC records, digitised resources, social media, research outputs using RDF, Dublin Core, SPARQL
- Have plans to implement
 - MARC catalogue records, digitised resources, social media using RDF; also OWL, SKOS, SPARQL, Europeana Data Model
- Have no current plans to implement
 - Lack of knowledge about it, lack of staff, lack of technical resources, no strategy

Implemented or plans to implement linked data?



- Have implemented
- Have plans to implement
- Have no current plans to implement
- No response

Suggestions and concerns...



- Licencing constraints (permission needed from database providers to link)
- Teach practitioners what linked data can concretely achieve
- Lack of knowledge; decisions made further up the chain?
- Potential loss of control of data
- Digitisation means monetisation?
- How should collections be linked?

Preliminary thoughts from survey

- Despite government directives for open data and NLS actions, barriers exist to implementation
 - Lack of awareness
 - Lack of staff/time/resources
 - Licencing
 - Beliefs of the profession at stake?
(Commercialisation, loss of control...)
- Interest in learning more, for some

Ongoing research and other actions

- Finish survey data analysis
- Evaluate online content of Scottish libraries for linked/open data existence
- Conduct interviews in libraries and other information centres at different stages of linked data planning/implementation
- Increase awareness among the ILS community about linked data/Semantic Web in order to (potentially) increase interest in uptake
- Determine how to overcome barriers to help open and share Scottish library content to the world

References/further resources

- Rasmussen Pennington, D. (2016, July/August). Demystifying linked data: Are you ready for what's next? *CILIP Update*, 34-36.
- What is linked data? https://www.youtube.com/watch?v=4x_xzT5eF5Q
- Linked data for libraries (by OCLC):
<https://www.youtube.com/watch?v=fWfEYcnk8Z8>
- The Linking Open Data cloud diagram:
<http://lod-cloud.net/>
- Linked Data – Connect Distributed Data across the Web:
<http://linkeddata.org/>
- Tim Berners-Lee, Linked Data:
<http://www.w3.org/DesignIssues/LinkedData.html>
- About the linked data movement
 - http://www.ted.com/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html
 - http://www.ted.com/index.php/talks/tim_berners_lee_on_the_next_web.html
 - <http://www.youtube.com/watch?v=3YcZ3Zqk0a8>