

Semantic Web in Libraries (SWIB18), Bonn, Germany  
28 November 2018

# Linked data implementations— who, what, why?

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OCLC Research

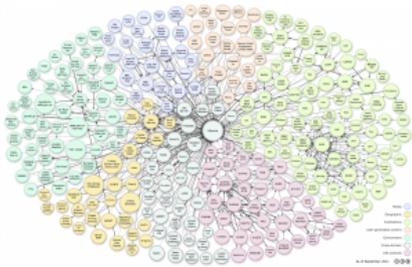
Linking Open Data cloud diagram 2017, by Andrejs Abele, John P. McCrae, Paul Buitelaar, Anja Jentzsch and Richard Cyganiak. <http://lod-cloud.net/> by CC-BY-SA license.

# International Linked Data Surveys for Implementers

## Hanging Together

the OCLC Research blog

### Linked Data Survey results 1 – Who's doing it (Updated)



OCLC Research conducted an international linked data survey for implementers between 7 July and 15 August 2014. This is the first post in the series reporting the results.

We received 122 responses to the international linked data survey conducted between 7 July and 15

August 2014. (So who is using linked data? And for what?) OCLC colleagues also responded to the survey and reported on 6 projects/services. We do not have some answers to share!

Although the survey was designed specifically for implementers of linked projects/services, 26 of the 122 responses said they had not implemented one. Seven of them plan on implementing a linked data project within the next two years and 10 are planning to apply for funding to implement one. Some of them also pointed to interesting link

# 2014

 D-Lib<sup>®</sup> Magazine

The Magazine of Digital Library Research

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D-Lib Magazine

July/August 2016

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# 2015

**Analysis of International Linked Data Survey for Implementers**

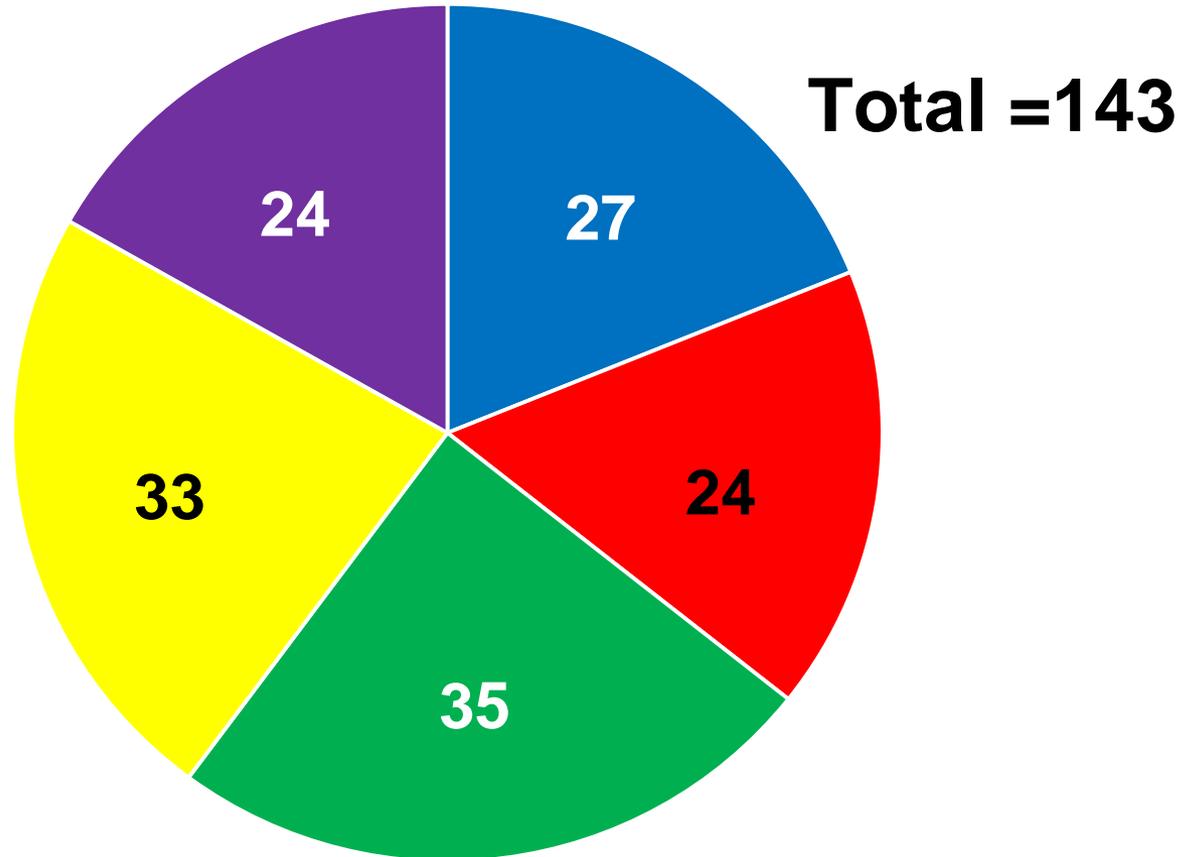
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OCLC Research

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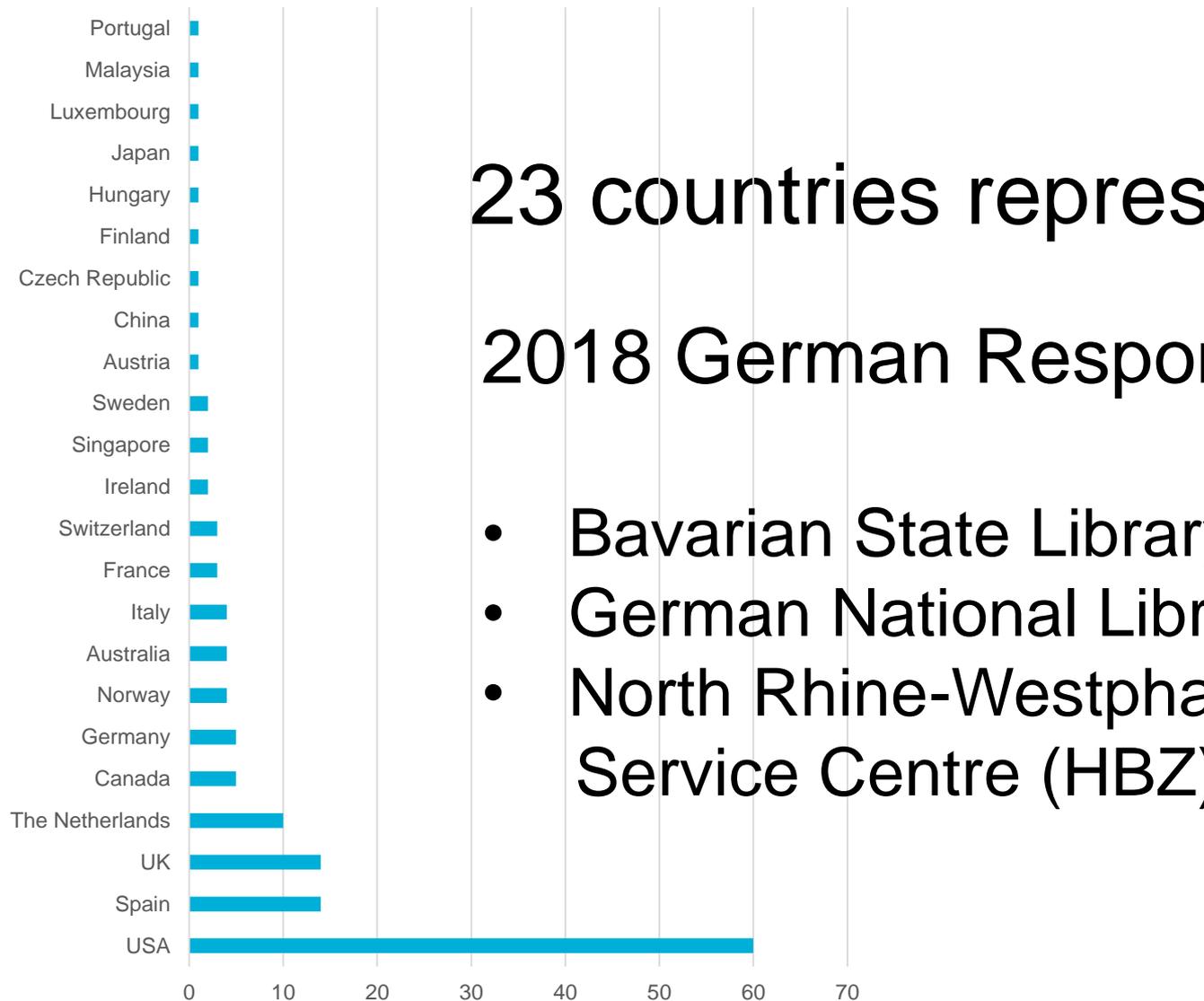
DOI: 10.1045/july2016-smith-yoshimura

# International Linked Data Surveys for Implementers



■ 2014 only ■ 2015 only ■ 2018 only ■ 2 surveys ■ All 3 surveys

# Geographic breakdown of 143 responding institutions

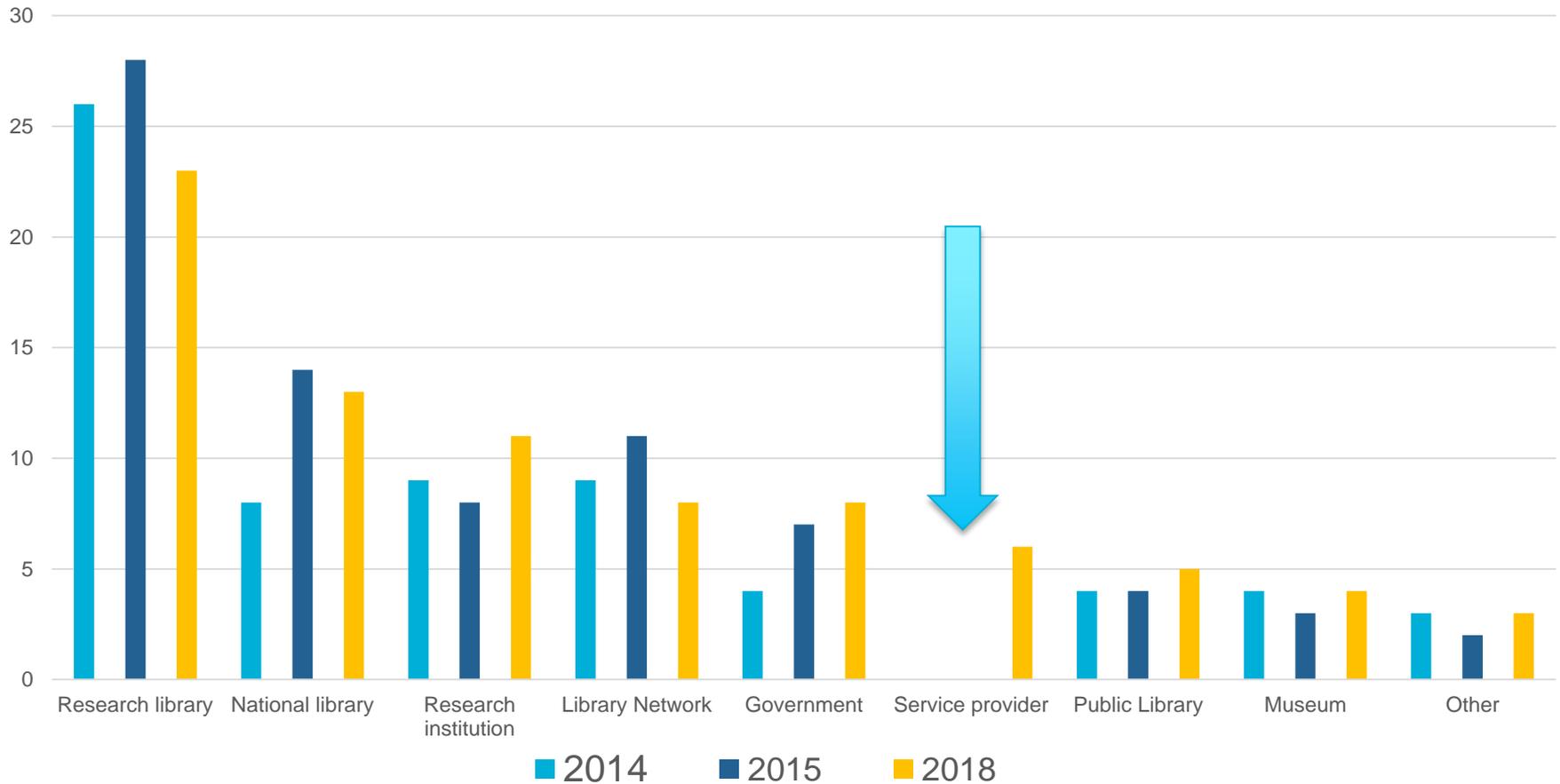


23 countries represented

2018 German Respondents

- Bavarian State Library
- German National Library
- North Rhine-Westphalian Library Service Centre (HBZ)

# Responding institutions by type



# How long linked data project or service in production

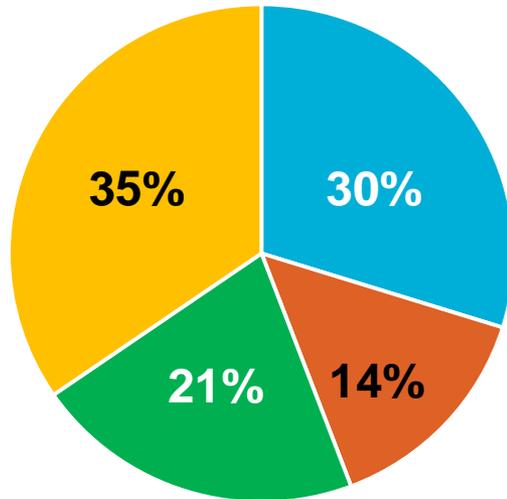
	2018	2015
Not yet in production	26	37
Less than one year	14	19
More than one year, less than two years	15	10
More than two years	18	46
More than four years	31	
Total	104	112

# How linked data is used

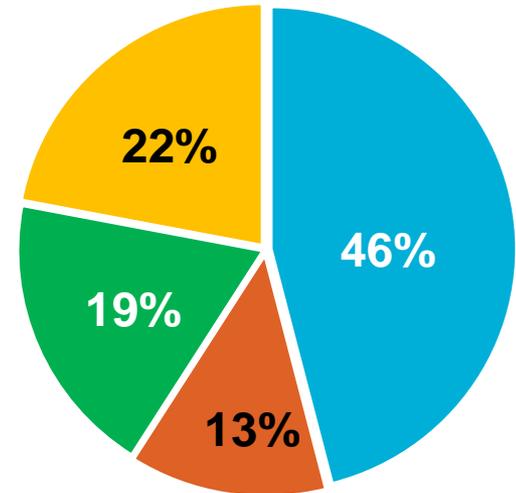
	2018	2015
Consume linked data	34	38
Publish linked data	5	10
Both consume & publish	65	64

# Success assessment

2018



2015



- Don't know yet
- Partially
- Mostly
- Yes

## Indicators of success:

- Usage
- Data re-use
- Interoperability
- User satisfaction
- Influence
- Professional development

# Most accessed



Anomisma.org



NDL Search



(BnF) Bibliothèque nationale de France data.bnf.fr



hbz



lobid



Europeana collections



OCLC



VIAF  
Virtual International Authority File



LIBRARY OF CONGRESS

LC Linked Data Service  
Authorities and Vocabularies



OCLC WorldCat®

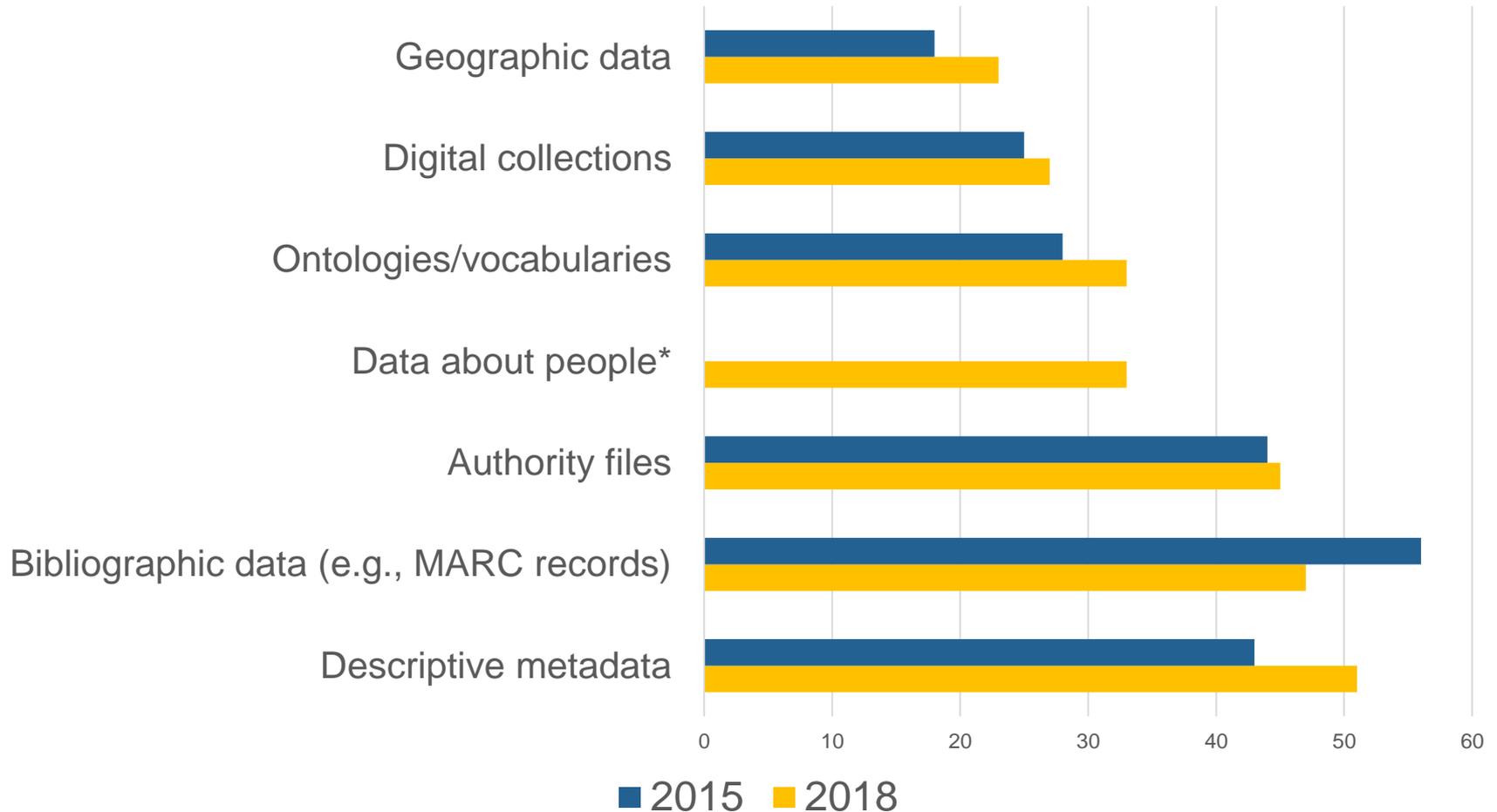
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# PUBLISHING LINKED DATA

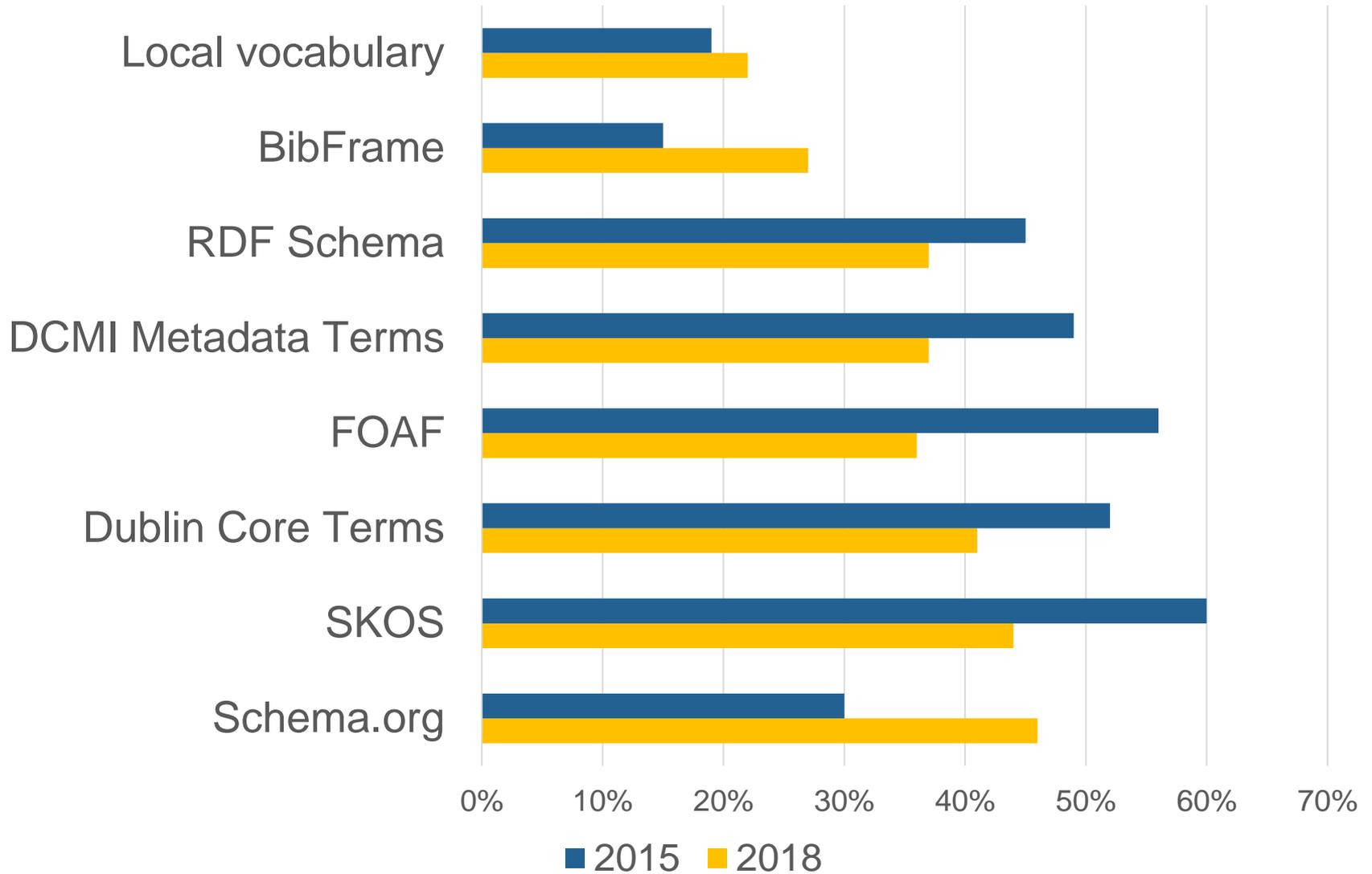
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<b>Reasons for publishing linked data (n=92 in both 2015 &amp; 2018)</b>	<b>2018</b>	<b>2015</b>
Expose to larger audience on the Web	74%	73%
Demonstrate what could be done with datasets as linked data	65%	64%
Heard about linked data and wanted to try it out by exposing our data as linked data.	45%	47%
Needed to publish linked data in order to consume it	25%	*

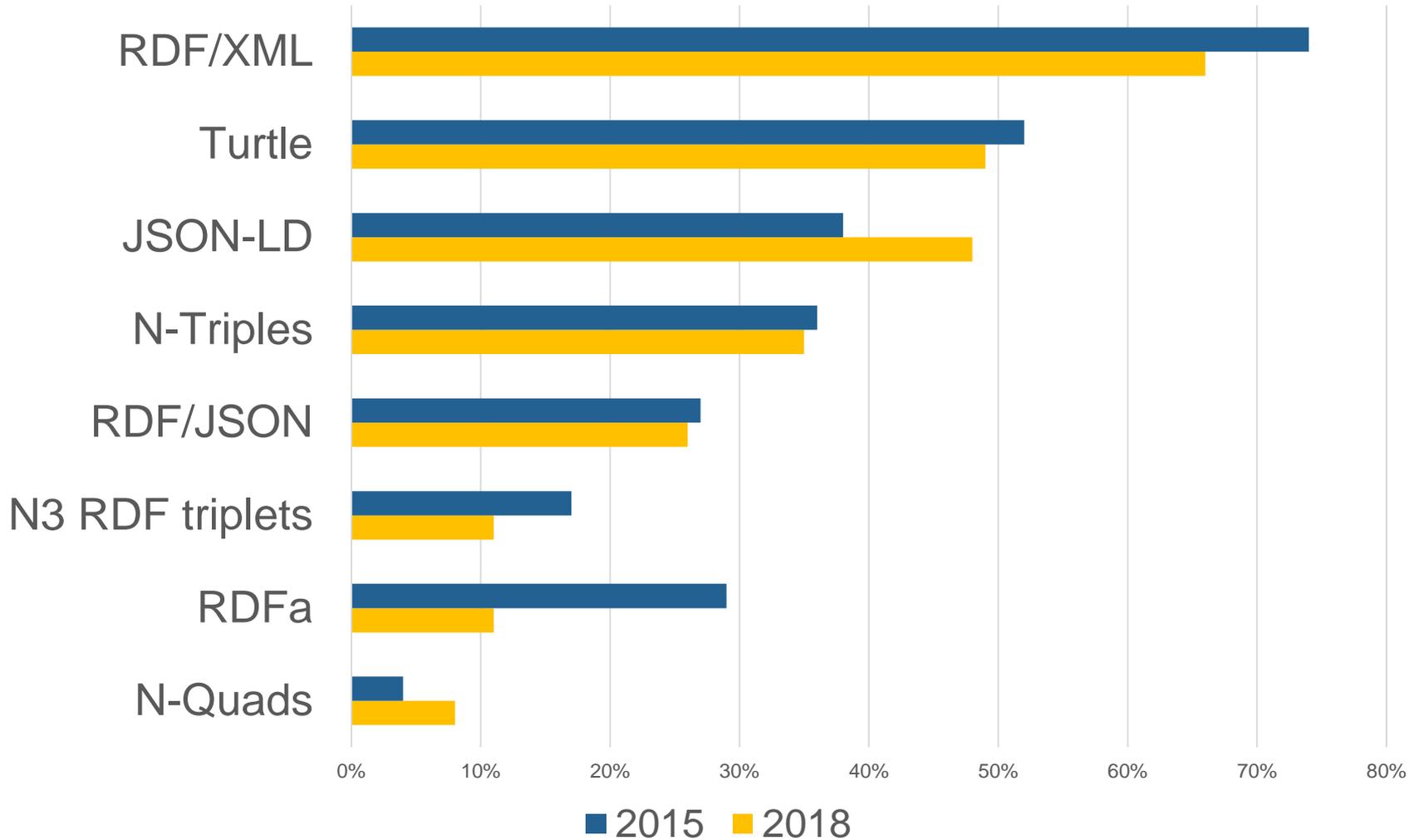
# Types of data published as linked data



# RDF vocabularies/ontologies used



# Serializations used



<b>Barriers to publishing linked data</b>	<b>2018</b>
Steep learning curve for staff	41
Inconsistency in legacy data	38
Selecting appropriate ontologies to represent our data	26
Lack of resources	23
Little documentation or advice on how to build the systems	23
Establishing the links	22

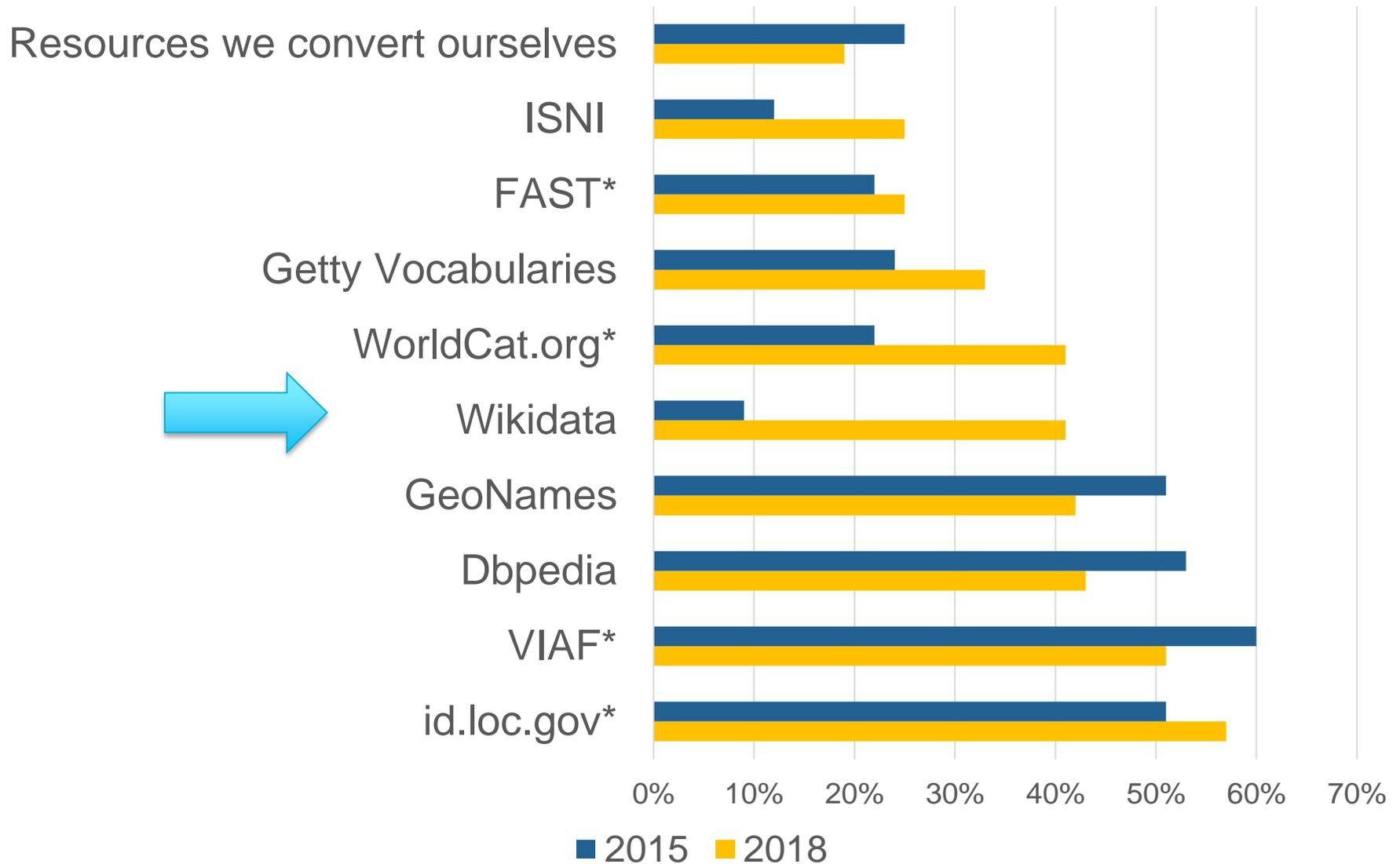
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# CONSUMING LINKED DATA

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Reasons for consuming linked data	2018	2015
Provide our users with a richer experience.	54	51
Enhance our own data by consuming linked data from other sources.	49	50
Heard about linked data and wanted to try it out by using linked data sources.	23	17
 More effective internal metadata management.	21	32
Experiment with combining different types of data into a single triple store.	20	17
 Greater accuracy and scope in our search results	19	27
 See if consuming linked data would improve our Search Engine Optimization (SEO)	7	19

# Linked Data sources consumed



# Some that *started* consuming Wikidata



# Barriers to consuming linked data

2018

2015

Matching, disambiguating and aligning source data and linked data resources

48%

39%

What's published as linked data isn't always reusable/lacks URIs

31%

27%

Size of RDF dumps

28%

20%

Unstable endpoints

28%

17%

Service reliability

26%

15%

Mapping of vocabulary

26%

29%

Understanding how data is structured before using it

24%

20%



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# SOME NEW EXAMPLES IN PRODUCTION

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## Open Data Service

Access open data sources maintained by the National Library of Finland

## Data Catalog

Our data catalog showcases the open data sets and APIs of the National Library.



### Data sets

Open data sets available for reuse.



### APIs

Interfaces that provide access to our data.

Linked Data <http://data.nationallibrary.fi>

### Linked Bibliographic Data

The national bibliography Fennica is available as RDF Linked Open Data.

### Browse our Linked Data

#### Collections

- Fennica

#### Concept Schemes

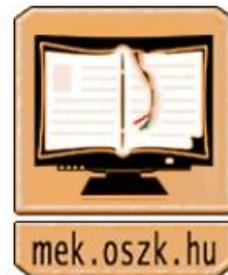
- Finnish Corporate Names
- YSO - General Finnish ontology
- YSO places

### Access

- SPARQL endpoint
- Linked Data Fragments server
- Downloadable data dumps

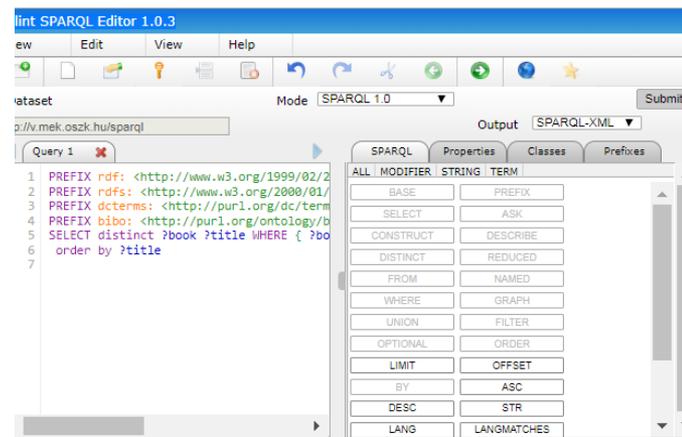
### Documentation

- Fennica RDF data model documentation
- What is included in Fennica (in Finnish)



## SPARQL EDITOR a Magyar Elektronikus Könyvtár RDF metaadatának lekérdezéséhez

Linked Open Data



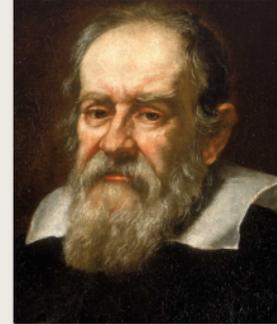
<http://v.mek.oszk.hu/FlintSparqlEditor/index-mek.html>

## Galileo Galilei

(1564 – 1642) scienziato italiano

Dati RDF

Il suo nome è associato a importanti contributi in dinamica e in astronomia (legati al perfezionamento del telescopio, che gli permise importanti osservazioni astronomiche) oltre all'introduzione del metodo scientifico (detto spesso metodo galileiano o metodo scientifico sperimentale). Di primaria importanza fu anche il suo ruolo nella rivoluzione astronomica, con il sostegno al sistema eliocentrico e alla teoria copernicana. Sospettato di eresia e accusato di voler sovvertire la filosofia naturale aristotelica e le Sacre Scritture, Galileo fu processato e condannato dal Sant'Uffizio, nonché costretto, il 22 giugno 1633, all'abiura delle sue concezioni astronomiche e al confino nella propria villa di Arcetri. Solo 359 anni dopo, il 31 ottobre 1992, papa Giovanni Paolo II, alla sessione plenaria della Pontificia accademia delle scienze, ha dichiarato riconosciuti "gli errori commessi" sancendo la conclusione dei lavori di un'apposita commissione di studio da lui istituita nel 1981.



**Nascita:**  
1564-2-24, Pisa

**Morte:**  
1642-1-7, Arcetri

[WIKIPEDIA](#)

Interlink



Opere (97)

Opere di Galileo Galilei a cura di Franz Brunetti

Opere di Galileo Galilei  
Linceo nobile fiorentino ...  
Al serenissim...  
1655-1656

Ioannis Kepleri ... Dioptrice seu demonstratio eorum quae visui & visi...

1611

Quinto libro degli elementi d'Euclide, overo Scienza universale delle...

1674

Discorsi e dimostrazioni matematiche, intorno à due nuoue scienze atte...

1638

Galilaei Galilaei ... Systema cosmicum. In quo dialogis 4. de duobus m...

1699

Vsus et fabrica circini cuiusdam proportionis, per quem omnia fere tum...

1655

Tomo 2  
1718

Sample Queries

Configuration

```
1 SELECT DISTINCT ?property ?hasValue ?isValueOf WHERE {  
2   { <http://data.carnegiehall.org/names/36136> ?property ?hasValue }  
3 UNION  
4   { ?isValueOf ?property <http://data.carnegiehall.org/names/36136> }  
5 }  
6 ORDER BY ?property ?hasValue ?isValueOf  
7 LIMIT 1000
```

Run

- Select first 100 triples
- Find people
- Find triples about a specific person
- Find works
- Find works by string in the title (case-insensitive)
- Find performances of a specific work
- Find events
- Find triples about events in a specific year
- Find venues
- Find instruments
- Find ensembles URIs
- Find roles

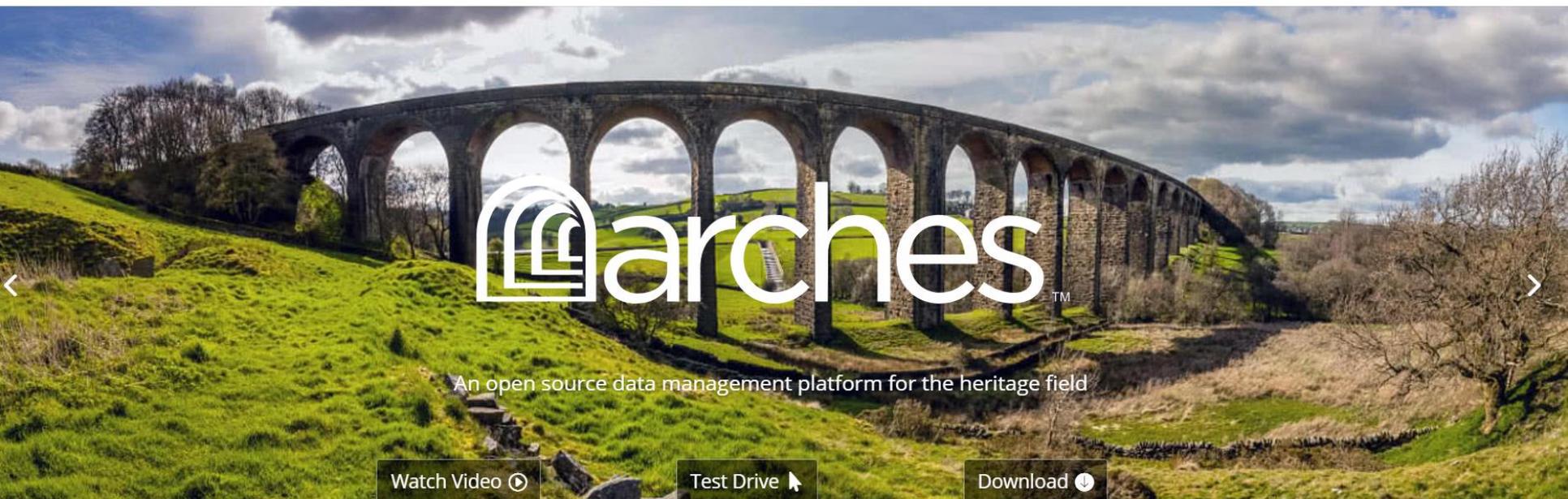
Browse JSON

<http://data.carnegiehall.org>

<http://archesproject.com/>



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# arches™

An open source data management platform for the heritage field

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# SOME ADVICE FROM IMPLEMENTERS & IMPLICATIONS

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# Advice from implementers

- Learn from others
- Focus on your use cases
- Collaborate with others
- Integrate linked data into your daily workflows
- Analyze *what* legacy data should be converted
- Never underestimate the amount of data cleanup that will be required.
- Use existing identifiers and ontologies
- Iterate based on user feedback
- Expect benefits only after reaching scale

# Implications

- Emergence of service providers
- Growing diversity of linked data implementations
- Most linked data projects and services remain experimental or educational in nature.

*“This is the future of data for libraries and the longer we wait the further behind we're going to fall.”*

# Details of all responses

[oc.ly/ld-survey-responses](https://oc.ly/ld-survey-responses)

P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
What was the most interesting part of the survey?	How has the survey impacted your work?	What part of the survey was most helpful to you?	What advice or suggestions were most helpful to you?	How do you think the survey will impact the future of the library?	How do you think the survey will impact the future of the library?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	How do you think the survey will impact the future of the library?	How do you think the survey will impact the future of the library?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?	What advice or suggestions were most helpful to you?
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

# Thank you!

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Together we make breakthroughs possible.

