

LOD = Linked Open Data

KOS = Knowledge Organization Structures/Systems

FAIR + FIT 

Functional Metrics for
LOD KOS Products

Marcia Lei Zeng
College of Communication and Information (CCI)
Kent State University, USA

Getty ITWG Workshop, Feb.2020, L.A.



Outline

1. FAIR

- a LOD KOS as an open dataset

2. FIT

- a LOD KOS as a KOS vocabulary

3. Discussion

Functional Metrics for LOD KOS Products

Why this talk?

- To bring the awareness of the current trends of FAIR principles for open data;
- To help the ITWG team to maximize the vocabularies' functionality and impacts;
- To seek for good strategies for the vocabulary development, releases, and maintenances.

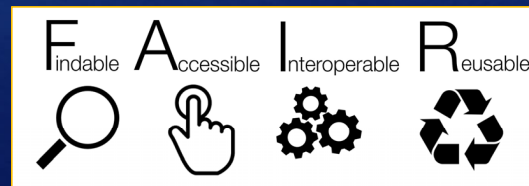
How the metrics are developed?

- Data collected 2015-16, 2017, 2019
 - from Datahub and other vocab services
- A comparative study
 - from other vocab services

FAIR

– a LOD KOS as an open dataset

Findable
Accessible
Interoperable
Reusable



-- as an open dataset

➤ Following the FAIR Principle



Data and supplementary materials have sufficiently rich metadata and a unique and persistent identifier.

FINDABLE



Metadata and data are understandable to humans and machines. Data is deposited in a trusted repository.

ACCESSIBLE



Metadata use a formal, accessible, shared, and broadly applicable language for knowledge representation.

INTEROPERABLE



Data and collections have a clear usage licenses and provide accurate information on provenance.

REUSABLE

'FAIR Guiding Principles for scientific data management and stewardship'
Scientific Data, 2016.

doi:10.1038/sdata.2016.18

Marcia Zeng • Getty ITWG 2020, L.A.

Image source: LIBER Europe: [Implementing FAIR Data Principles - The Role of Libraries](https://en.wikipedia.org/wiki/Implementing_FAIR_Data_Principles_-_The_Role_of_Libraries)

https://en.wikipedia.org/wiki/FAIR_data

LOD KOS' FAIR: Findable



Data and supplementary materials have sufficiently rich metadata and a unique and persistent identifier.

FINDABLE

Findable

- F1. (Meta)data are assigned a globally unique and persistent identifier
- F2. **Data are described with rich metadata** (defined by R1 below)
- F3. Metadata clearly and explicitly include the identifier of the data they describe
- F4. (Meta)data are registered or indexed in a searchable resource

<https://www.go-fair.org/fair-principles/>

Examples from the datahub:
- Various levels of F[indable]

Additional Info

| |
|--------------|
| Field |
| Source |
| Author |
| Maintainer |
| Version |
| Last Updated |
| Created |
| Languages |

VS.

Additional Info

| |
|--------------|
| Field |
| Source |
| Last Updated |
| Created |

❖ Our additional recommendation:

⇒ Enrich metadata about KOS as much as possible to enable data discovery processes.

LOD KOS' FAIR: Accessible



Metadata and data are understandable to humans and machines. Data is deposited in a trusted repository.

ACCESSIBLE

Accessible

A1. (Meta)data are retrievable by their identifier using a standardised communications protocol

- A1.1 The protocol is open, free, and universally implementable
- A1.2 The protocol allows for an authentication and authorisation procedure, where necessary

A2. Metadata are accessible, even when the data are no longer available

<https://www.go-fair.org/fair-principles/>

❖ Our additional recommendation:

⇒ Provide multiple pathways for accessing the KOS datasets.

Examples from the datahub:
- Various levels of Δ [ccessible]

UNESCO Thesaurus

The UNESCO Thesaurus is a controlled and structured list of terms used in subject analysis and retrieval of documents and publications in the fields of education, culture,...

Open Thesaurus

Data and Resources

- SPARQL Endpoint**
No description for this resource
- Home page for browsing and searching**
No description for this resource
- Complete dataset in Turtle**
No description for this resource
- Complete dataset in RDF/XML**
No description for this resource
- Dataset description in VOID**
No description for this resource
- Example in HTML**
No description for this resource
- Example in Notation-3**
No description for this resource
- Example in RDF/XML**
No description for this resource
- Example in Turtle**
No description for this resource
- Unnamed resource**
No description for this resource
- Example in JSON**
No description for this resource
- Example in JSON-LD**
No description for this resource

VS.

Data and Resources

- Linked Data entry point (RDFa)**
Linked Data entry point (RDFa)
- Download (RDF/XML)**
Download (RDF/XML)

LOD KOS' FAIR: Interoperable



Metadata use a formal, accessible, shared, and broadly applicable language for knowledge representation.

INTEROPERABLE

Interoperable

1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
2. (Meta)data use vocabularies that follow FAIR principles
3. (Meta)data include qualified references to other (meta)data

<https://www.go-fair.org/fair-principles/>

Preliminary study findings:

- (Meta)data that have been used in describing the vocabularies vary at different registries.

Examples from the datahub:

| Search Type of KOS/DATASET | # found (initial) | # found (verified) |
|----------------------------|------------------------|------------------------|
| Authority Files | 164 | 18 |
| List | 825 | 71 |
| Terminology | 39 | 35 |
| Thesaurus | 80 | 91* |
| Taxonomy | 37 | 22 |
| Classification | 478 | 43 |
| **Ontology | 531 | 266 |
| Totals | 1623 (+531 ontologies) | 280 (+ 266 ontologies) |

❖ Our additional recommendation:

⇒ Utilize the *KOS Types Vocabulary** to standardize the way vocabulary types are categorized.

*<https://nkos.slis.kent.edu/nkos-type.html>

LOD KOS' FAIR: Reusable



Data and collections have a clear usage licenses and provide accurate information on provenance.

REUSABLE

Reusable

R1. Meta(data) are richly described with a plurality of accurate and relevant attributes

R1.1. (Meta)data are released with a **clear and accessible data usage license**

R1.2. (Meta)data are associated **with detailed provenance**

R1.3. (Meta)data meet domain-relevant community standards

<https://www.go-fair.org/fair-principles/>

❖ Our additional recommendation:

⇒ Adequately supply license and provenance metadata to enable datasets' reusability.

Examples from the datahub: - Various levels of R[eusable]

provenance-metadata

publications

published-by-producer

rdf

thesaurus

vocab-mappings

VS.

lodcloud-diagram-20...

lodcloud-diagram-20...

no-license-metadata

no-proprietary-vocab

no-provenance-metadata

no-vocab-mappings

publications

published-by-producer

FIT

– a LOD KOS as a value vocabulary



Functional
Impactful
Transformable



Metrics for LOD KOS

-- as a value vocabulary

Functional

[The vocabulary is...]

Made available in ways that enhance its inherent purpose

When a KOS is Functional, it could further its Impacts and potential Transformable usages.

Metrics:

F1. The vocabulary is delivered in consumable formats

- Available in various data serialization formats
- Accessible through SPARQL

F2. Provided SPARQL endpoints are operational

F3. Dataset properties and structures are informed effectively

F4. Services are user-friendly, making vocabulary contents reachable

Metrics development for LOD KOS

(cont.) FIT
– a LOD KOS as a value vocabulary



Functional
Impactful
Transformable



-- as a KOS vocabulary

Impactful

**Maximizes the impact of a
LOD KOS vocab**

Impactful

Metrics:

I1. Exposed through terminology services

I2. Used by data providers

a) as a primary value Vocab

b) in semantic enrichment

I3. Mapped with other KOS vocabs

I4. Showed/discussed at professional conferences and publications

I1. Exposed through terminology services

1) Registries --offer information *about* vocabularies

a. Registry of KOS

- BARTOC (Basel Register of Thesauri, Ontologies & Classifications):

2900+ <https://bartoc.org/>

The screenshot shows the BARTOC.org website interface. The logo at the top left reads "BARTOC.org" with the tagline "Basel Register of Thesauri, Ontologies & Classifications". The navigation menu includes "ILC", "Title Finder", "KOS Registries", and "Download".

The "Search" section features a text input field and a red "GO" button.

The "Browse" section includes several dropdown menus for filtering results:

- DDC: <Any>
- EuroVoc: <Any>
- Language: <Any>
- KOS Types Vocabulary: <Any>
- Location: <Any>
- Format: <Any>

On the right side, there are statistics and a table of content by discipline:

Follow @BARTOC_UBBasel

- Currently indexed vocabularies: 3,043
- Currently indexed registries: 96

Content by discipline table:

| Discipline | Count |
|---|-------|
| Social sciences | 1,037 |
| General works, Computer science and Information | 657 |
| Technology | 486 |
| History and Geography | 472 |
| Pure Science | 415 |
| Arts and Recreation | 311 |
| Language | 145 |
| Literature | 117 |
| Religion | 76 |
| Philosophy and Psychology | 75 |

Slide 13

CJ2

The slides from here onwards have different names and event titles on the bottom. I'm not sure if this is deliberate. eg. This is one is Zeng and hlava - taxonomy division. I changed them but you may change back if need be

Clunis, Julaine, 9/1/2019

I1. Exposed through terminology services

1) Registries --offer information *about* vocabularies

a. Registry of KOS

- BARTOC (Basel Register of Thesauri, Ontologies & Classifications):
2900+ <https://bartoc.org/>

b. Registry of LOD vocabularies (“property vocabularies” & “value vocabularies”)

- E.g., LOV (Linked Open Vocabularies) <http://lov.okfn.org/dataset/lov> :
 - 600+ registered, some are value vocabularies.

c. Registry of LOD products, including KOS

- DataHub <https://datahub.io/>

Slide 14

CJ2

The slides from here onwards have different names and event titles on the bottom. I'm not sure if this is deliberate. eg. This is one is Zeng and hlava - taxonomy division. I changed them but you may change back if need be

Clunis, Julaine, 9/1/2019

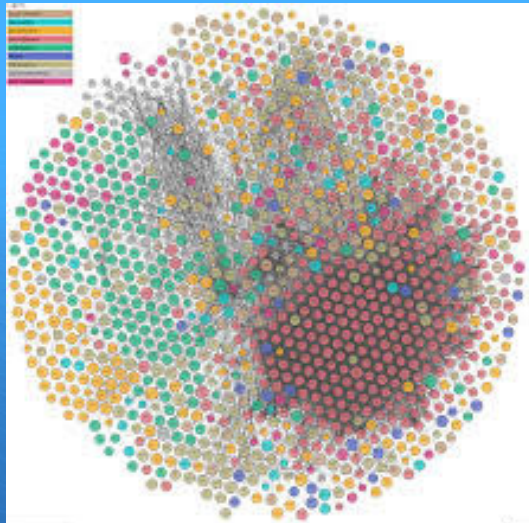
(cont.) I1. Exposed through terminology services

c) Registry of LOD products, including KOS

Impactful

DataHub <https://datahub.io/>

LOD Cloud <https://lod-cloud.net/datasets>



Download Links

SPARQL Endpoints

- SPARQL Endpoint

Examples

- **Objects Facet** (Note: The Objects facet encompasses discrete tangible objects, otherwise fabricated or given form by human activity. Included are objects of purely aesthetic purpose. Natural landscapes are included in this facet.)
- **Furnishings and Equipment (Hierarchy Name)** (Note: The Furnishings and Equipment facet includes objects that provide comfort, convenience, or protection in dwellings, places, or other forms of container (e.g., "candle boxes," "footlockers") are in this facet.)
- **<containers by function or context>** (<containers by function or context> (hierarchy name))
- **Rhyta** (Note: Vessels from Ancient Greece, eastern Europe, or the Middle East used at the top for filling and one at the base so that liquid could stream out used as a drinking cup or for pouring wine into another vessel. Drinking from the stream of liquid in the mouth.)

Other downloads

- **Homepage** (This is the Linked Open Data publication of the Getty Vocabulary Program using the Resource Description Framework (RDF) format.)
- **Getty Vocabulary Program ontology**
- **Semantic Representation Documentation**
- **Total AAT statements / Mirror 1** (NTriples zip, file size is 133.5 Mb)
- **Explicit AAT statements** (NTriples zip, file size is 71 Mb)
- **VOID Description**

https://lod-cloud.net/dataset/getty-aat

The Linked Open Data Cloud

Art & Architecture Thesaurus (Edit)

About this dataset

The Art & Architecture Thesaurus® (AAT) is a structured, multilingual vocabulary including terms, descriptions, and information for generic concepts related to art, architecture, and other cultural heritage, and conservation. For centuries, AAT has been used as a primary reference by museums, art libraries, archives, visual resource catalogers, conservators, archaeological projects, bibliographic projects, researchers, and information specialists who are dealing with the arts. Like all of the Getty Vocabularies, the AAT is compliant with international standards and grows through community participation. ** AAT data is released under Open Data Commons Attribution License. Adherence to ODC Attribution License for the correct assertion of attribution is encouraged. The preferred form of attribution for AAT is: "[title of article or dataset] contains information from the Art & Architecture Thesaurus® (AAT) which is made available under Attribution License." Special Case: In circumstances where providing the full attribution statement above is not feasible, the use of canonical AAT URIs is adequate to satisfy Section 4.3 of the ODC Attribution License. License: <http://www.opendefinition.org/licenses/odc-by>

linguistics Thesauri architecture art conservation cultural heritage format-skos format-skosxl lod

Contact Details

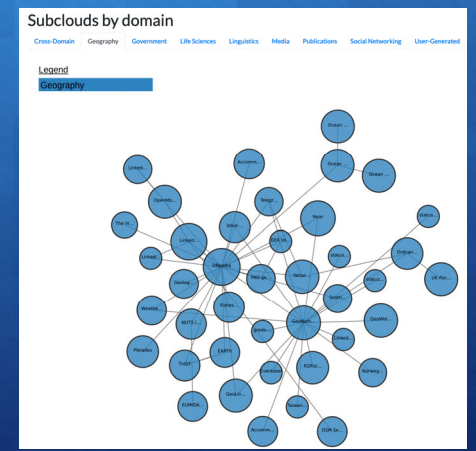
Contact Point: "The Getty Research Institute"
Website: <https://altawil.my.opendatasoft.com>

Data Facts

| | |
|----------------|-------------|
| Total size | 0 triples |
| Links to lclsh | 335 triples |

LOD Cloud Requires

- 1000+ triples
- 50+ links to other datasets in the Cloud.



https://lod-cloud.net/dataset/getty-tgn

The Linked Open Data Cloud

The Getty Thesaurus of Geographic Names (Edit)

Data Facts

| | |
|---------------------|-------------------|
| Total size | 0 triples |
| Links to schema-org | 1,409,085 triples |

I2. Used by data providers

a) as a primary value vocabulary

Impactful

Projects using MESH


- ARRS Goldminer
- Biomedical Semantic QA
- Cell line ontology
- DisGeNET-RDF
- eagle-i
- Epidemic Marketplace
- Kino
- Lexigram
- Neuronal Morphologies and Species Metadata Classification System
- Plant Ontology
- PubChem
- Retrospective Analytics System
- Semantic Indexing of French Biomedical Data Resources
- Socrates MD
- The Ontological Discovery Environment

Medical Subject Headings
Last uploaded: August 27, 2019


Summary **Classes** Properties Notes Mappings Widgets

Details

| | |
|---------------------|--|
| Acronym | MESH |
| Visibility | Public |
| Description | Medical Subject Headings (MeSH);National Library of Medicine; 2011 |
| Status | Production |
| Format | UMLS |
| Contact | NLM Customer Service, custserv@nlm.nih.gov |
| Categories | Health |
| Groups | Unified Medical Language System |
| License Information | This ontology is made available via the UMLS. Users of all UMLS ontologies must abide by the terms of the UMLS license, available at https://uts.nlm.nih.gov/license.html |


Metrics 

| | |
|------------------------------------|---------|
| Classes | 276,475 |
| Individuals | 0 |
| Properties | 38 |
| Maximum depth | 15 |
| Maximum number of children | 121 |
| Average number of children | 4 |
| Classes with a single child | 3,376 |
| Classes with more than 25 children | 154 |
| Classes with no definition | 247,234 |

Visits 

Submissions

| Version | Released | Uploaded | Downloads |
|--|------------|------------|---|
| 2019AA (Uploaded) | 05/06/2019 | 08/27/2019 | RDF/TTL |
| 2018AB (Parsed, Indexed, Metrics, Annotator, Error Diff) | 11/05/2018 | 04/29/2019 | RDF/TTL CSV |
| 2018AA (Archived) | 05/07/2018 | 07/06/2018 | RDF/TTL |
| 2017AB (Archived) | 11/06/2017 | 07/06/2018 | RDF/TTL |
| 2017AA (Archived) | 05/08/2017 | 04/06/2018 | RDF/TTL |

[more...](#) **Projects using MESH **

<http://bioportal.bioontology.org/ontologies/MESH>

(cont.) I2. Used by data providers

b) in semantic enrichment

Impactful

Vocabularies used by Europeana in semantic enrichment

| | A | B | C |
|----|---|---|--|
| 1 | Vocabulary | URL | Type of entity |
| 2 | The Getty - Art & Architecture Thesaurus (AAT) | http://vocab.getty.edu/aat/ | skos:Concept |
| 3 | The Getty - Union List of Artist Names (ULAN) | http://vocab.getty.edu/ulan/ | edm:Agent |
| 4 | Getty Thesaurus of Geographic Names (TGN) | http://vocab.getty.edu/tgn/ | edm:Place |
| 5 | Virtual International Authority File (VIAF) | http://viaf.org/viaf/ | edm:Agent |
| 6 | Geonames | http://sws.geonames.org/ | edm:Place |
| 7 | IconClass | http://iconclass.org/ | skos:Concept |
| 8 | Gemeinsame Normdatei (GND) | http://d-nb.info/gnd | edm:Agent, edm:Place, skos:Concept |
| 9 | Israel Museum Jerusalem Concepts | http://www.imj.org.il/imagine/thesaurus/objects/ | skos:Concept |
| 10 | data.europeana.eu WWI Concepts from Library of Congress Subject Headings (LCSH) | http://data.europeana.eu/concept/loc | skos:Concept |
| 11 | Europeana Sounds Genres | http://data.europeana.eu/concept/soundgenres/ | skos:Concept |
| 12 | UDC | http://udcdata.info/rdf/ | skos:Concept |
| 13 | UNESCO Thesaurus | http://vocabularies.unesco.org/thesaurus/ | |

Europeana semantic enrichment (<https://pro.europeana.eu/page/europeana-semantic-enrichment>) -- link to [several vocabularies](#), captured 2019.9.

I3. Mapped with other KOSs

a) vocabulary-based mapping

Alignments require interoperability in syntax & structure

Asset
EuroVoc
Thesaurus
URI: <http://publications.europa.eu/resource/dataset/eurovoc>

About Browse content Documentation Links Releases SKOS Web services

EuroVoc is a multilingual, multidisciplinary thesaurus covering the activities of the EU, the European Parliament in particular. It contains terms in 23 EU languages (Bulgarian, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Romanian, Slovak, Slovenian, Spanish and Swedish), plus in three languages of countries which are candidates for EU accession: македонски (mk), shqip (sq) and српски (sr).

ID: EuroVoc
Version: 20190329-1 **LATEST**
Published: 2019-03-29
Author: Publications Office
Publisher: Publications Office

Downloads

- [EuroVoc_Excel_export.zip](#)
- [EuroVoc_MarcXML.zip](#)
- [eurovoc_skos.zip](#)
- [eurovoc_in_skos_core_concepts.zip](#)
- [eurovoc_skos_ap.zip](#)
- [eurovoc-skos-ap-act.rdf](#)
- [at-eurovoc-v3.xsd](#)
- [eurovoc_xml.zip](#)

Alignments

- [EuroVoc Alignment Rameau](#)
- [EuroVoc Alignment UMTES](#)
- [EuroVoc Alignment Inspire](#)
- [EuroVoc Alignment ESCO](#)
- [EuroVoc Alignment Eclac](#)
- [EuroVoc Alignment Gemet](#)
- [EuroVoc Alignment LCSH](#)
- [EuroVoc Alignment Thesoz](#)
- [EuroVoc Alignment Unesco](#)
- [EuroVoc Alignment ZBW](#)
- [EuroVoc Alignment Unbis](#)
- [EuroVoc Alignment mesh](#)
- [EuroVoc Alignment Eige](#)
- [EuroVoc Alignment Agrovoc](#)
- [EuroVoc Alignment gnd](#)

Other versions

- 20181220-0
- 20180621-0
- 20171215-0

<https://publications.europa.eu/en/web/eu-vocabularies/th-dataset/-/resource/dataset/eurovoc>

STW Thesaurus for Economics

STW Mappings

Here you find mappings to other thesauri and vocabularies which can also be [downloaded](#).

- [Integrated Authority File \(GND\)](#)
- [Wikidata](#)
- [DBpedia](#)
- [Thesaurus Social Sciences \(TheSoz\)](#)
- [AGROVOC](#)
- [WKD German labor law thesaurus](#)
- [JEL classification](#)
- [SDMX subject-matter domains classification](#)

[RDF/XML](#) [RDF/Turtle](#)

STW Thesaurus for Economics

Mapping AGROVOC

About the Mapping

Description: Built by an automatic string matching process, verified intellectually by a domain expert (see also <http://thedatahub.org/dataset/agrovoc-skos>)

Creator: [FAO - Food and Agriculture Organization of the United Nations](#)

Rights: see <http://aims.fao.org/download-agrovoc>

Relations: 1027 skos:exactMatch
1 skos:closeMatch

Publisher: ZBW - Leibniz Information Centre for Economics

Mapping WKD German labor law thesaurus

About the Mapping

Description: Created by WKD and SWC in course of the LOD2 project and continuously maintained by domain experts of WKD

Creator: [Wolters Kluwer Deutschland GmbH](#)

License: <http://creativecommons.org/publicdomain/zero/1.0/>

Rights: The CC0 license has been applied to the mapping for broad and easy re-use without legal restrictions. We would, however, appreciate an attribution to the creators (as indicated above) and the free availability of projects which make use of this mapping.

<http://opendatacommons.org/norms/odc-by-sa/>

Relations: 270 skos:exactMatch



Publisher: ZBW - Leibniz Information Centre for Economics

Vocabulary sharing and mapping by volunteers (non-centralized)

Tool: Mix'n'Match

This tool lists entries of some external databases (over 1000 catalogs), and allows users to match them against Wikidata items.

<https://tools.wmflabs.org/mix-n-match/#/>

Mix'n'match English  log into [WiDaR for actions](#) Search 

This tool can list entries of some external databases, and allows users to match them against Wikidata items. Think 'red link lists on steroids'. See [the manual](#) for a how-to. For an alternative, see [OpenRefine](#).

Catalog groups

| Group | Catalogs |
|---|----------|
| Cinema | 9 |
| Software | 10 |
| Wolfram Language entity | 85 |
| Archives | 19 |
| Art | 82 |
| Biography | 616 |
| Biology | 66 |
| Books | 21 |
| Encyclopedia | 34 |
| Entertainment | 37 |
| Food | 10 |
| General | 10 |

Search catalogs

Start typing here

Latest catalogs

- [liebertpub](#) Mary Ann Liebert, Inc. journals
- [Dimore Storiche Italiane](#) database containing Italian villas, palaces, gardens and parks members of Associazione Dimore Storiche Italiane (Q63137315)
- [OpenEdition Books author](#) identifier for an author on OpenEdition
- [Voice Directors](#) from behindthevoiceactors
- [Behind The Voice Actors video game](#) identifier for video games on the website Behind The Voice Actors
- [EAS Fellows](#) Ethiopian Academy of Sciences
- [Enciclopedia delle donne](#) identifier for a subject on the "Enciclopedia delle donne"
- [Nolo's Free Dictionary Of Law Terms and Legal Definitions](#) dictionary of legal terms
- [Wex articles](#) legal dictionary and encyclopedia published by the Legal Information Institute
- [NGMDB Prod](#) Catalog of US Map publications

Catalogs by property class

| Group | Catalogs |
|---|----------|
| Authority control for people | 517 |
| Catalogs without Wikidata property | 20 359 |
| Identifiers that suggest notability | 10 |

Mix'n'Match

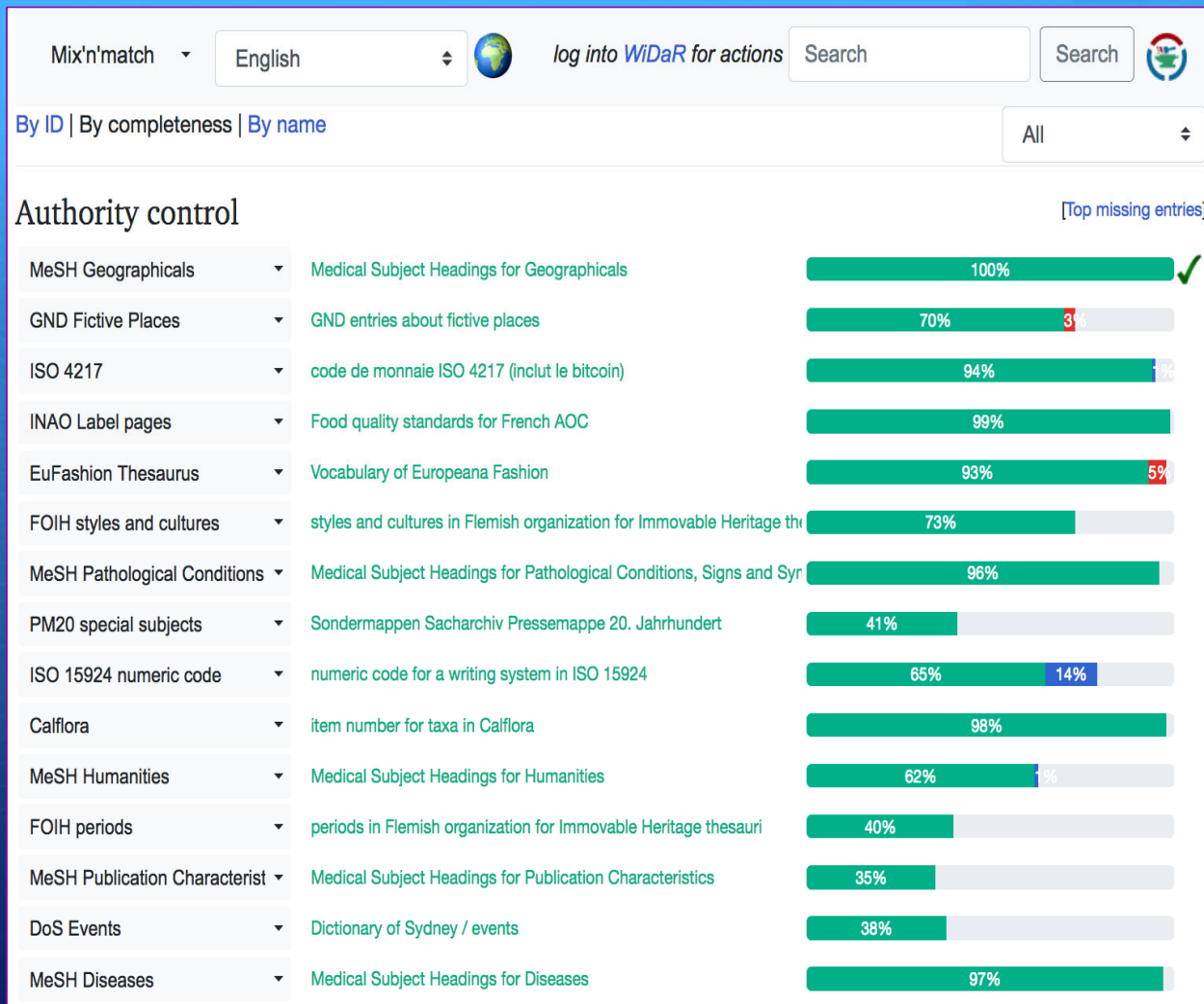
(cont.) Vocabulary sharing and mapping by volunteers
(non-centralized)

Tool: Mix'n'Match

This tool lists entries of some external databases (over 1000 catalogs), and allows users to match them against Wikidata items.

| | | | |
|----------------|----|---|-----------------|
| Encyclopedia | 34 | Catalogs by property class | |
| Entertainment | 37 | Group | Catalogs |
| Food | 10 | Authority control for people | 517 |
| General | 48 | Catalogs without Wikidata property | 359 |
| Geography | 91 | Identifier that suggests notability | 239 |
| Heritage | 61 | Identifier | 196 |
| Infrastructure | 19 | Authority control | 102 |
| Journals | 64 | Software | 95 |
| Language | 6 | Authority control for places | 85 |
| Literature | 51 | Taxa | 75 |
| Location | 37 | Films | 72 |
| Media | 70 | Organisations | 66 |
| Medical | 24 | Authority control for artists | 63 |
| Organisation | 38 | Encyclopedias | 61 |
| Philately | 4 | Film industry | 59 |
| Religion | 10 | Identifier that does not imply notability | 53 |
| Science | 46 | Authority control for works | 53 |
| | | Authority control for writers | 53 |
| | | Video games | 48 |
| | | Sports hall of fame | 45 |
| | | Politics | 41 |
| | | Artworks | 37 |
| | | Medicine | 37 |

Mix'n'Match



Authority Control (100+) includes:

- Well-known vocabularies such as *GeoNames*, *FAST*, *UNESCO Thesaurus*, and *MeSH (Medical Subject Headings)* sub-lists,
- Other specialized vocabularies, e.g.:
 - DoS (Dictionary of Sydney),
 - INRAN Italian Food Nutrient profiles,
 - ISO 15924 numeric code,
 - Gran Enciclopèdia Catalana,
 - Europeana Fashion Thesaurus,
 - MIMO Music Instruments,
 - Great Russian Encyclopedia
 - etc.

More than half of these vocabularies have over 70% of entries manually mapped to Wikidata.

I3. Mapped with other KOSs

b) value-based mapping

Included in Wikimedia

- Wikidata
- Wikipedia

Impactful

| | | |
|--|---|---|
| V · T · E | Notre-Dame de Paris | [hide] |
| Events | Coronation of Napoleon I (1804) · Notre-Dame Affair (1950) · 2016 bombing attempt · 2017 attack · 2019 fire |  |
| Architecture | Bells · <i>Little Dedo</i> · Mays · Sculptures (Virgin of Paris) · Spire | |
| Cultural depictions | <i>The Coronation of Napoleon</i> (1807 painting) · <i>Liberty Leading the People</i> (1830 painting) · <i>The Hunchback of Notre-Dame</i> (1831 novel) · <i>The Bohemian</i> (1890 painting) · <i>The Quai Saint-Michel and Notre-Dame</i> (1901 painting) · <i>Notre-Dame, une fin d'après-midi</i> (1902 painting) · <i>View of Notre-Dame</i> (1914 painting) | |
| Related | Musée de Notre Dame de Paris · Notre-Dame school · Île de la Cité · Maurice de Sully | |
| V · T · E | 4th arrondissement of Paris | [show] |
| V · T · E | Tourism in Paris | [show] |
| Authority control  | BNE: XX142896  · BNF: cb139739432  (data)  · GND: 4075869-2  · ISNI: 0000 0001 2114 0051  · LCCN: n79081635  · MusicBrainz: aec22f78-116c-4c94-982b-42a2669ba4ff  · NKC: kn20131223001  · SELIBR: 325126  · SUDOC: 026551985  · ULAN: 500310021  · VIAF: 158363947  · WorldCat Identities (via VIAF): 158363947  | |



Impactful

I4. Showed/discussed at professional conferences and publications

-- as a KOS vocabulary

- NKOS workshops
- LODLAM Summit
- ISKO and ISKO-chapter events
- Books and journal articles
-

Google Scholar "Thesaurus of Geographic Names"
Articles About 3,480 results (0.06 sec)

Google Scholar "Art & Architecture Thesaurus"
Articles About 1,840 results (0.06 sec)

Google Scholar "Union List of Artist Names"
Articles About 992 results (0.09 sec)

Google Scholar "Cultural Objects Name Authority"
Articles About 186 results (0.10 sec)

Review

-- as a KOS vocabulary

Impactful

**Maximizes the impact of a
LOD KOS vocab**



Metrics:

I₁. Exposed through terminology services

I₂. Used by data providers

a) as a primary value Vocab

b) in semantic enrichment

I₃. Mapped with other KOS vocabs

I₄. Showed/discussed at professional conferences and publications

Metrics development for LOD KOS

FIT
– a LOD KOS as a value vocabulary



Functional
Impactful
Transformable



-- as a KOS vocabulary

Transformable

Transformable

Extends the functionality and impact through innovative adaptations.

Metrics:

T1. Allows special KOS products to be derived from the original data

T2. The user is given autonomy to determine what structure and information is desired and can be reproduced from the vocabulary

T3. Enables extensibility to fit diverse needs

T4. Supports innovative and transformative uses beyond normal "value vocabularies"

UNESCO vocabularies - SPARQL service

Default graph (IRI)

Query

```
1 PREFIX skos: <http://www.w3.org/2004/02/skos/core#> PREFIX isothes: <http://purl.org/iso25964/skos-thes#> SELECT ?domainNotation (STR(?domainLabel) AS ?domainEnglish) ?mtNotation (STR(?englishLabel) AS ?english) WHERE {  
2 ?collection a <http://vocabularies.unesco.org/ontology#MicroThesaurus> .  
3 ?collection isothes:superGroup ?domain .  
4 ?collection skos:notation ?mtNotation .  
5 ?collection skos:notation ?mtNotation .  
6
```

Query examples

- Explore a sample of the data
- List all concepts of a micro-thesaurus in french
- List all concepts of a domain
- List all concepts
- List all micro-thesauri
- List all the translations english-french
- List the translations english-russian
- List concepts created after a given date
- Get the list of countries
- Select all the properties of a concept
- Make a search on all the concept labels
- Get all concepts in english and french, with synonyms, notes, broaders, narrowers and related (with IDs)
- Get the hierarchical table of all the concepts (with IDs)
- Get the hierarchical table of all the concepts (with labels)

derivable?

Result format:

HTML

- HTML
- Text
- XML
- JSON
- NTriples
- RDF/XML
- CSV
- TSV

Run Query

Reset

T1. Allows special KOS products to be *derived* from the original data

Transformable

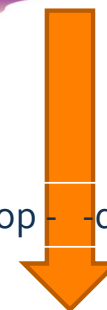
Top - -down

<http://vocabularies.unesco.org/sparql-form/>
Image captured 2019-08-21

About 100 micro-thesauri can be obtained

Transformable

Top - -down



| domainNotation | domainEnglish | mtNotation | english |
|----------------|---|------------|---|
| "1" | "Education" | "1.05" | "Educational sciences and environment" |
| "1" | "Education" | "1.10" | "Educational policy" |
| "1" | "Education" | "1.15" | "Educational planning" |
| "1" | "Education" | "1.20" | "Educational administration" |
| "1" | "Education" | "1.25" | "Educational management" |
| "1" | "Education" | "1.30" | "Educational systems and levels" |
| "1" | "Education" | "1.35" | "Educational institutions" |
| "1" | "Education" | "1.40" | "Curriculum" |
| "1" | "Education" | "1.45" | "Basic and general study subjects" |
| "1" | "Education" | "1.50" | "Technical and vocational study subjects" |
| "1" | "Education" | "1.55" | "Educational population" |
| "1" | "Education" | "1.60" | "Teaching and training" |
| "1" | "Education" | "1.65" | "Educational evaluation" |
| "1" | "Education" | "1.70" | "Educational facilities" |
| "2" | "Science" | "2.05" | "Scientific approach" |
| "2" | "Science" | "2.10" | "Science and research management" |
| "2" | "Science" | "2.15" | "Mathematics and statistics" |
| "2" | "Science" | "2.20" | "Physical sciences" |
| "2" | "Science" | "2.25" | "Chemical sciences" |
| "2" | "Science" | "2.30" | "Space sciences" |
| "2" | http://vocabularies.unesco.org/sparql-form/ | "2.35" | "Earth sciences" |
| "2" | Image captured 2019-08-21 | "2.40" | "Geography and oceanography" |

| | | |
|-------------------------------|--------|---|
| "Politics, law and economics" | "6.05" | "Legal systems" |
| "Politics, law and economics" | "6.10" | "Human rights" |
| "Politics, law and economics" | "6.15" | "Politics and government" |
| "Politics, law and economics" | "6.20" | "International relations" |
| "Politics, law and economics" | "6.25" | "Economics" |
| "Politics, law and economics" | "6.30" | "Economic and social development" |
| "Politics, law and economics" | "6.35" | "Agriculture" |
| "Politics, law and economics" | "6.40" | "Industry" |
| "Politics, law and economics" | "6.45" | "Civil, military and mining engineering" |
| "Politics, law and economics" | "6.50" | "Manufacturing and transport engineering" |
| "Politics, law and economics" | "6.55" | "Materials and products" |
| "Politics, law and economics" | "6.60" | "Equipment and facilities" |
| "Politics, law and economics" | "6.65" | "Services" |
| "Politics, law and economics" | "6.70" | "Finance and trade" |
| "Politics, law and economics" | "6.75" | "Organization and management" |
| "Politics, law and economics" | "6.80" | "Personnel management" |
| "Politics, law and economics" | "6.85" | "Labour" |

UNESCO vocabularies - SPARQL service

Contact us

Default graph (IRI)

Other special KOŞ sets can be obtained.

Transformable

Query

```
1 PREFIX skos: <http://www.w3.org/2004/02/skos/core#> SELECT
  where {?c a skos:Concept} LIMIT 100
```

Query examples

- Explore a sample of the data
- List all concepts of a micro-thesaurus in french
- List all concepts of a domain
- List all concepts
- List all micro-thesauri
- List all the translations english-french
- List the translations english-russian
- List concepts created after a given date
- **Get the list of countries**
- Select all the properties of a concept
- Make a search on all the concept labels
- Get all concepts in english and french, with synonyms, notes, broader, narrower and related
- Get the hierarchical table of all the concepts (with IDs)
- Get the hierarchical table of all the concepts (with labels)

Result format:

HTML

Run Query

Reset

HTML
Text
XML
JSON
NTriples
RDF/XML
CSV
TSV

<http://vocabularies.unesco.org/sparql-form>

Image captured 2019-05-14

| microThesaurus | country | english | Top - down french |
|-----------------|--|------------------------------|----------------------------|
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept688> | "Africa" | "Afrique" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept1608> | "Africa South of the Sahara" | "Afrique au sud du Sahara" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept689> | "Algeria" | "Algérie" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept690> | "Angola" | "Angola" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept691> | "Benin" | "Bénin" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept692> | "Botswana" | "Botswana" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept693> | "Burkina Faso" | "Burkina Faso" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept694> | "Burundi" | "Burundi" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept696> | "Cabo Verde" | "Cabo Verde" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept695> | "Cameroon" | "Cameroun" |
| "7.05 - Africa" | <http://vocabularies.unesco.org/thesaurus/concept697> | "Central Africa" | "Afrique cent |



- 1.2.2 Version 3.1
- 1.2.3 Version 3.2
- 1.2.4 Version 3.3
- 1.2.5 Version 3.4
- 2 Finding Subjects
 - 2.1 Top-level Subjects
 - 2.2 Descendants of a Given Parent
 - 2.3 Subjects by Contributor Id
 - 2.4 Subjects by Contributor Abbrev
 - 2.5 Preferred Ancestors
 - 2.6 Full Text Search Query
 - 2.7 Stop-Word Removal
 - 2.8 Case-insensitive Full Text Search Query
 - 2.9 Exact-Match Full Text Search Query
 - 2.10 Find Person Occupations by broaderExtended
 - 2.11 Find Person Occupations by Double FTS
 - 2.12 Find Quartz Timepieces by Double FTS
 - 2.13 Find Subject by Exact English PrefLabel
 - 2.14 Find Subject by Language-Independent PrefLabels
 - 2.15 Combination Full-Text and Exact String Match
 - 2.16 Find Subject by Any Label
 - 2.17 Find Ordered Subjects



Query: <http://vocab.getty.edu/sparql>

```

1 select * {?x gvp:broaderExtended aat:300194567; skos:inScheme aat: ;
2 gvp:prefLabelGVP/xl:literalForm ?l}

```

reproducible

bottom - - up

- Include inferred
- Expand results over equivalent URIs



Submit

2.2 Descendants of a Given Parent

Let's look for AAT descendants of 300194567 "drinking vessels". This finds "rhyta" and other interesting records, including "Fichtelgebirgehumpen":

```
select * {?x gvp:broaderExtended aat:300194567; skos:inScheme aat: ; gvp:prefLabelGVP/xl:literalForm ?l}
```

SPARQL



2.3 Subjects by Contributor Id

You can easily find subjects contributed by a particular Contributor if you know the id. E.g. the Getty Conservation Institute (GCI) in AAT is aat_contrib:10000088. Let's find their contributions to aat:300033618 paintings (visual works):

```

select * {
  ?x a gvp:Subject; dct:contributor aat_contrib:10000088;
  gvp:broaderExtended aat:300033618;
  gvp:prefLabelGVP/xl:literalForm ?l}

```

T2. The user is given autonomy to determine what structure and information is desired and can be reproduced.

T3. Extended to fit diverse needs, e.g. language and culture

➤ Extended to fit diverse needs

- Culture
- Language
- Domain
- Structure

➤ Virtual harmonization through linking

- E.g., *Faceted Application of Subject Terminology* (FAST) – VIAF, Wikidata

- because the vocabulary is available as a LOD

KOŞ

http://fast.oclc.org/searchfast/

FAST TERMS

Search results for: "JFK (John Fitzgerald Kennedy), 1917-1963"

Limit Results by: All

Displaying 1 to 1 of 1

| Heading | Facet | Uses |
|---|--------|-------|
| Kennedy, John F. (John Fitzgerald), 1917-1963 | person | 13191 |

RECORD ID:
fst00035588

SOURCES AND OTHER LINKS:
Kennedy, John F. (John Fitzgerald), 1917-1963--(DLC)n 79055297
John F. Kennedy--http://en.wikipedia.org/wiki/John_F._Kennedy
Kennedy, John F. (John Fitzgerald), 1917-1963--<https://viaf.org/viaf/68910251>

LINKS TO FULL RECORD:
Permanent Link <http://id.worldcat.org/fast/35588>
MARC-21 record <http://id.worldcat.org/fast/35588/marc21.xml>
RDF record <http://id.worldcat.org/fast/35588/rdf.xml>

With the correct coding of properties
a FAST's **controlled term**

- is related to a **real-world entity** and
- allows humans to gather more information **about the entity** that is being described

CASE:
FAST

```
<foaf:focus>  
<rdf:Description rdf:about="http://en.wikipedia.org/wiki/John_F._Kennedy">  
<rdfs:label>John F. Kennedy</rdfs:label>  
</rdf:Description>  
</foaf:focus>
```

```
<schema:sameAs>  
<rdf:Description rdf:about="https://viaf.org/viaf/68910251">  
<rdfs:label>Kennedy, John F. (John Fitzgerald), 1917-1963</rdfs:label>  
</rdf:Description>  
</schema:sameAs>
```

Virtual harmonization through linking

T4. Supports *innovative* transformative uses beyond normal “value vocabularies”

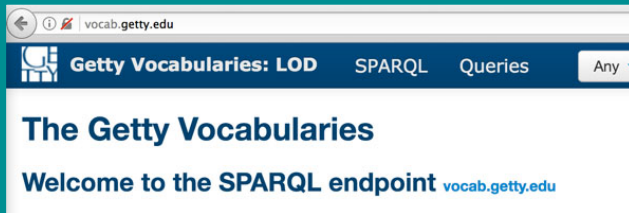
- LOD KOS can be used for
 - obtaining special graphs or datasets for very complicated questions, and
 - revealing unknown relationships.

Could a LOD KOS dataset be considered

- as a knowledge base?
- as the foundation of a network analysis?
- as the building blocks of a framework for research in humanities and science?

beyond being a ‘vocabulary’

Example: Getty Vocabularies: LOD



innovative

http://vocab.getty.edu/queries#TGN-Specific_Queries

Getty Vocabularies: LOD

SPARQL Transformable

- 4 TGN-Specific Queries
 - 4.1 Places by Type
 - 4.2 Places, with English or GVP Label
 - 4.3 Places by Direct and Hierarchical Type
 - 4.4 Breakdown of Sovereign States by Type
 - 4.5 Inhabited Places That Were Sovereign States
 - 4.6 Places by Type and Parent Place
 - 4.7 Places by Type, with placeTypePreferred
 - 4.8 Places by Triple FTS
 - 4.9 Places by FTS Parents
 - 4.10 Capitals by Association
 - 4.11 Members of the European Union
 - 4.12 Members of the United Nations
 - 4.13 Geo Chart with sgvizler
 - 4.14 Column Chart with sgvizler
 - 4.15 Countries and Capitals By Type and Containment
 - 4.16 Places by Coordinate Bounding Box
 - 4.17 Places Within Bounding Box
 - 4.18 Places by Type Within Bounding Box
 - 4.19 Places Outside Bounding Box (Overseas Possessions)
 - 4.20 Places Nearby Each Other

Query:

```
1 select ?place
2 ?place skos
3 foaf:foaf
4 gvp:prefL
5 filter (50.
```

One can obtain special RDF graphs or datasets for very complicated questions, and for revealing unknown relationships

Include inferred
 Expand results over

4.16 Places by C

Find places whose coord

```
select ?place ?name ?
```

Name authorities offer foundational structured data for network analyses.

innovative



Getty Vocabularies: LOD

SP

[4.20 Places Nearby Each Other](#)

5 [ULAN-Specific Queries](#)

[5.1 Agents by Type](#)

[5.2 Associative Relations of Agent](#)

[5.3 Female Artists](#) ←

[5.4 Female Artists as a Hobby](#)

[5.5 Native American Painters](#) ←

[5.6 Names of Native American Painters](#)

[5.7 Architects Born in the 14th or 15th Century](#)

[5.8 Indian and Pakistani Architectural Groups](#)

[5.9 Non-Italians Who Worked in Italy](#) ←

[5.10 Artists Associated to a Given Patron or His Family](#)

[5.11 German, Dutch, Flemish printmakers, listed with their teachers](#) ←

[5.12 Artists Whose Identity May be Associated or Confused With Another](#) ←

[5.13 Ordered Hierarchy of Given Subject](#)

[5.14 Ancient Artists or Groups by Nationality](#) ←

[5.15 Art Repositories in the USA by State](#) ←

[5.16 Popes and Their Reigns](#)

[5.17 Pope Reign Durations](#)

[5.18 Life Events](#)

Marcia Zeng - Getty II WG 2020, L.A.

Transformable

<http://vocab.getty.edu/queries>

At the same query templates page

Find the section for ULAN.

- There are many interesting query examples.

http://vocab.getty.edu/queries#ULAN-Specific_Queries

innovative

Demo




Wikidata

Go beyond individual authorities

Demo: Wikidata Query Service

← → ↻ 🏠 <https://query.wikidata.org> ⋮ 🛡️ ☆ ⬇️ 📄 🌐

 Wikidata Query Service 📁 Examples 🔗 Help ⚙️ More tools 🌐 English


Query Helper ⓘ

+ Filter

+ Show

Limit 100

1 (Input a SPARQL query or choose a query example)



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

Wikidata Query Service

Examples Help More tools

Query Helper

- item instance of
- item subclass of
- item genre
- item located in the
- arr located in the
- item located in the
- item creator
- item inception
- item image
- item coordinate loc

+ Filter

+ Show

Limit

Image grid

Cloud of related Wikidata properties and classes:

- series ordinal (P1545)
- start time (P580)
- has part (P527)
- creator (P170)
- inception (P571)
- position held (P39)
- located in the administrative territorial entity (P131)
- award received (P166)
- subclass of (P279)
- occupation (P106)
- human (Q5)
- sex or gender (P21)
- end time (P582)
- author (P50)
- coordinate location (P625)
- image (P18)
- country (P17)
- country of citizenship (P27)
- date of birth (P569)
- city (Q515)
- date of death (P570)
- point in time (P585)
- part of the series (P179)
- part of (P361)

instance of (P31)

Type to filter 326

- Visual arts
- Public sculptures in Paris
- Locations of Pablo Picasso works
- Eiffel Tower in art
- Paintings by Gustav Klimt
- Map of all the paintings for which we know a location with the count per location
- Versions of The Scream
- Depicted objects in art work
- Monuments historiques in Loire-Atlantique
- Sculptures by Max Bill
- Paintings by Rembrandt in the Louvre or the Rijkmuseum
- Authority control properties usage for paintings
- Authority control properties usage for painters

English

```

(ate) as ?AnneeCreation) ?image ?coo
# sculpture
# genre : art public
# ... située dans Paris
# ... ou dans un arrondiss
"fr"). # Titre
# créateur/créatrice (opti
createur) = "fr" .}
# date de création (option
# image (option)
# coordonnées géographiques
  
```

</> Code Download Link

Wikidata Query Service

Examples Help More tools

Query Helper

Filter

- instance of: painting
- creator: Rembrandt

Show

- collection: any part of
- image

Limit

```

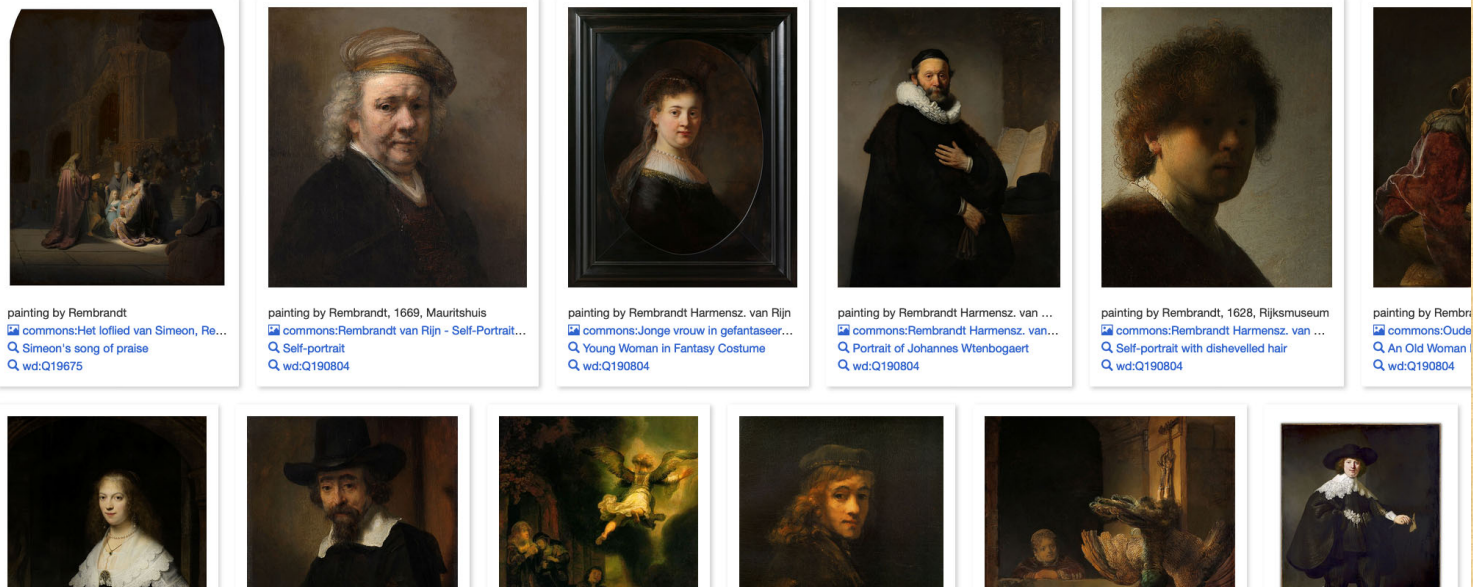
1 #Paintings by Rembrandt in the Louvre or the Rijkmuseum
2 #defaultView:ImageGrid
3
4 SELECT DISTINCT ?item ?itemLabel ?itemDescription ?image ?collection WHERE {
5   ?item wdt:P31 wd:Q3305213 ; # Get items that are instances of painting
6   wdt:P170 wd:Q5598 ; # By creator Rembrandt
7   wdt:P195/wdt:P361* ?collection . # That are in some collection
8
9   # Only return results where 'collection' is either Rijkmuseum or Louvre
10  FILTER ( ?collection = wd:Q190804 || ?collection = wd:Q19675 )
11
12  OPTIONAL { ?item wdt:P18 ?image } # Optionally with an image
13
14  SERVICE wikibase:label { bd:serviceParam wikibase:language "[AUTO_LANGUAGE]" }
15 }

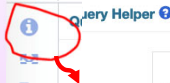
```

Image grid

Query:
 Paintings by
 Rembrandt in the
 Louvre or the
 Rijkmuseum

Query example available at
<https://query.wikidata.org/>





Query Helper

Filter

item instance of any sculpture

item subclass of

item genre public art

item located in the administrative territorial entity Paris

arr located in the administrative territorial entity Paris

item located in the administrative territorial entity arr

item creator Qcreateur

item inception date

item image

item coordinate location coord

Show

```

1 #Public sculptures in Paris
2 #added before 2016-10
3 SELECT DISTINCT ?item ?Titre ?createur (year(?date) as ?AnneeCreation) ?image ?coord
4 WHERE
5 {
6   ?item wdt:P31/wdt:P279* wd:Q860861.           # sculpture
7   ?item wdt:P136 wd:Q557141 .                 # genre : art public
8   {?item wdt:P131 wd:Q90.}                    # ... située dans Paris
9   UNION
10  {?item wdt:P131 ?arr.}                       # ... ou dans un arrondissement de Paris
11  ?arr wdt:P131 wd:Q90. }
12  ?item rdfs:label ?Titre filter (lang(?Titre) = "fr"). # Titre
13
14  OPTIONAL {?item wdt:P170 ?Qcreateur.         # créateur/créatrice (option)
15  ?Qcreateur rdfs:label ?createur filter (lang(?createur) = "fr" ) .}
16  OPTIONAL {?item wdt:P571 ?date.}            # date de création (option)
17  OPTIONAL {?item wdt:P18 ?image.}           # image (option)
18  OPTIONAL {?item wdt:P625 ?coord.}          # coordonnées géographiques (option)
19 }

```

Query:
Public sculptures in Paris

Query example available at
<https://query.wikidata.org/>



Limit

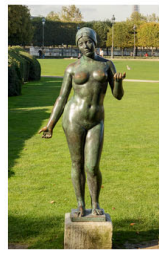
- Image grid
- Table
- Image grid
- Graph builder
- Map
- Line chart
- Bar chart
- Scatter chart
- Area chart
- Bubble chart
- Tree map
- Tree
- Timeline
- Dimensions
- Graph



1848
Point(2.33577 48.84677)
commons:Blanche de Castill...
Blanche de Castille
Auguste Dumont
Q: wd:Q18145890



1938
Point(2.33194 48.8619)
commons:L'Air by Aristide Maillol, Paris 7 Oct 1912.jpg
L'Air
Aristide Maillol
Q: wd:Q3201665



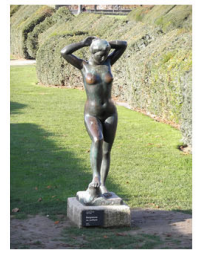
1910
Point(2.33194 48.8619)
commons:L'Été by Aristide Maillol, Paris 7 Oct 1912.jpg
L'Été
Aristide Maillol
Q: wd:Q3205578



1905
Point(2.33194 48.8619)
commons:La Méditerranée by Aristide Maillol, Paris Nov...
La Méditerranée
Aristide Maillol
Q: wd:Q3210962

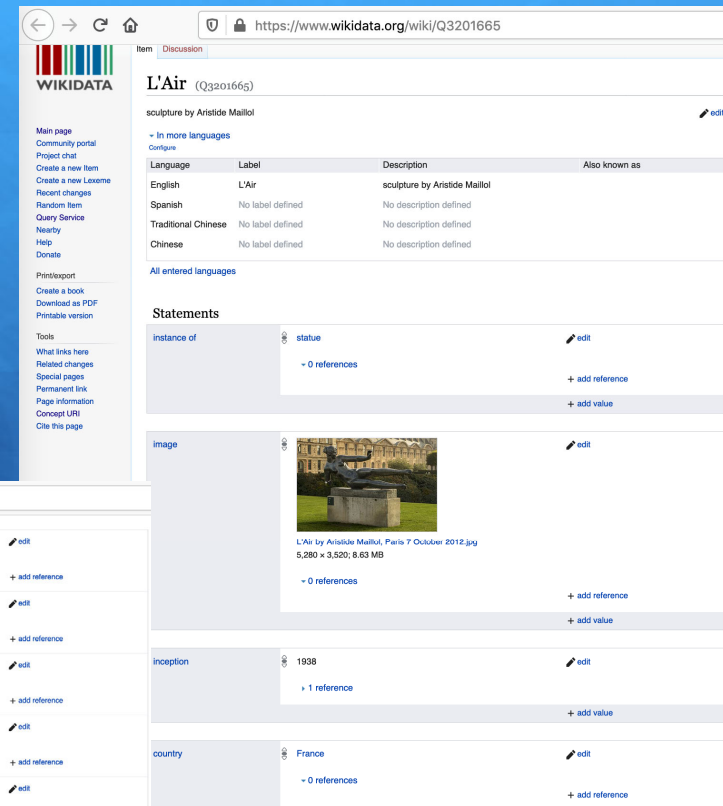
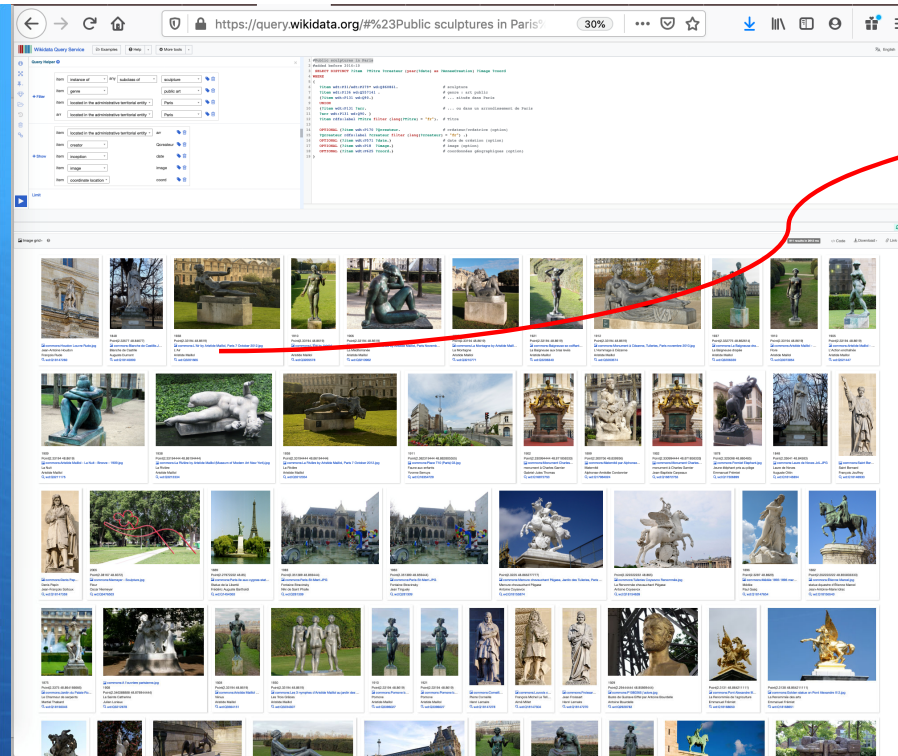


1925
Point(2.33194 48.8619)
commons:La Montagne by Aristide M...
La Montagne
Aristide Maillol
Q: wd:Q3210771



1921
Point(2.33194 48.8619)
commons:Baigneuse aux bras levés...
La Baigneuse aux bras levés
Aristide Maillol
Q: wd:Q3206340

Public sculptures in Paris



Query example available at <https://query.wikidata.org/>

<https://www.wikidata.org/wiki/Q3201665>

EXAMPLE. Query : Map of economists in PM20* by place of birth

The screenshot shows the Wikidata Query Service interface. At the top, there is a header with the Wikidata logo, the text "Wikidata Query Service", and navigation links for "Examples", "Help", and "More tools". The language is set to "English".

On the left side, there is a "Query Helper" panel with several sections:

- Filter:** Includes dropdowns for "occupation" (set to "economist") and "place of birth".
- Show:** Includes dropdowns for "coordinate location" and "image".
- Limit:** A section for setting query limits.

A red arrow points to the "image" dropdown in the "Show" section.

The main area displays a SPARQL query:

```
1 #defaultView:Map{"hide": "?geo"}
2 select ?image ?item ?itemLabel ?pobLabel ?viewer ?geo
3 where {
4   # occupation: economist
5   ?item wdt:P106 wd:Q188094 ;
6     # with PM20 id
7     wdt:P4293 ?pm20Id ;
8     # with place of birth
9     wdt:P19 ?pob .
10  # restrict to items with online accessible articles
11  ?item p:P4293/pq:P5592 ?workCount .
12  filter(?workCount > 0)
13  # geo coordinates for pob
14  ?pob wdt:P625 ?geo .
15  # optional image
16  optional { ?item wdt:P18 ?image . }
17  # viewer link
18  bind(substr(?pm20Id, 4, 4) as ?numStub)
19  bind(substr(?pm20Id, 4, 6) as ?
20  bind(uri(concat('http://dfg-vie
21  # add labels
22  service wikibase:label { bd:ser
23 }
```

Below the query, there is a yellow box containing the text: "Query available at: https://www.wikidata.org/wiki/Wikidata:WikiProject_20th_Century_Press_Archives/Use_cases".

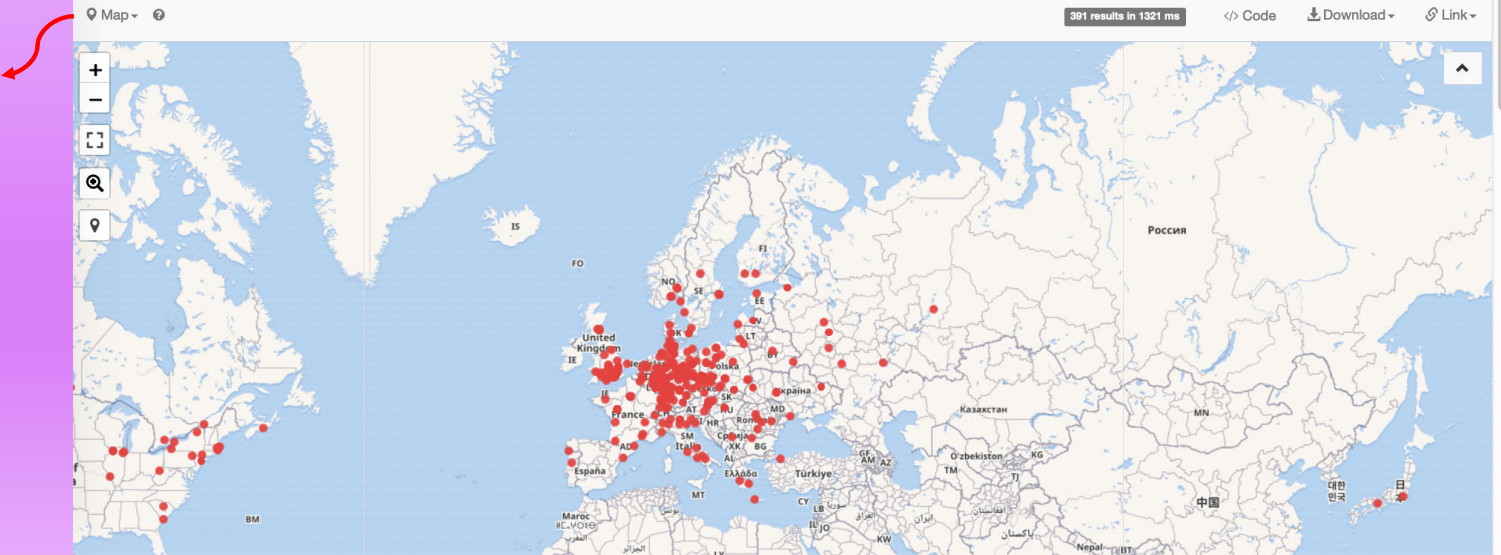
At the bottom right of the interface, there is a blue play button and a red arrow pointing to the "image" dropdown in the "Show" section.

* 20th Century Press Archives
[19 million of newspaper
clippings, 1908-2005]
- ZBW donated the dataset and
enriched Wikidata (thousands).
<http://zbw.eu/labs/>
STW Thesaurus for Economics

Query available at:
https://www.wikidata.org/wiki/Wikidata:WikiProject_20th_Century_Press_Archives/Use_cases
Image captured 2019-11-26.

Wikidata Query Service (cont.) Example: Map of economists in PM20* by place of birth

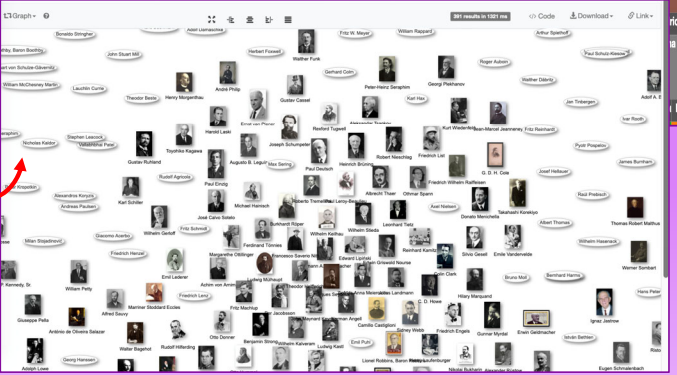
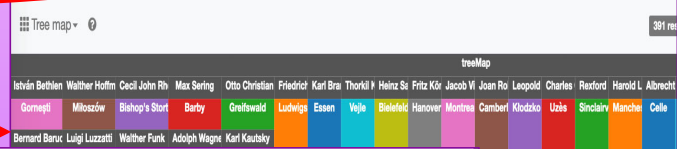
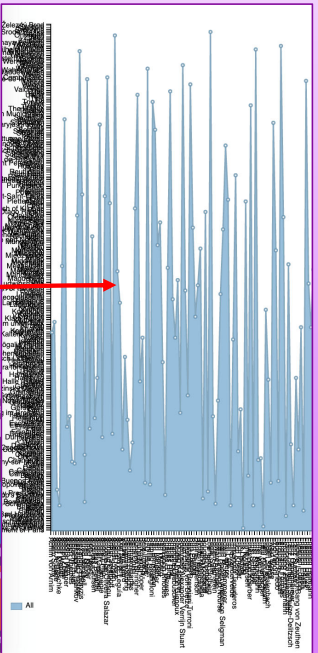
```
1 #defaultView:Map{"hide":"?geo"}
2 select ?image ?item ?itemLabel ?pobLabel ?viewer ?geo
3 where {
4   # occupation: economist
5   ?item wdt:P106 wd:Q188094 ;
6   # with PM20 id
7   wdt:P4293 ?pm20Id ;
8   # with place of birth
9   wdt:P19 ?pob .
10  # restrict to items with online accessible articles
11  ?item p:P4293/pq:P5592 ?workCount .
12  filter(?workCount > 0)
13  # geo coordinates for pob
14  ?pob wdt:P625 ?geo .
15  # optional image
16  optional { ?item wdt:P18 ?image . }
17  # viewer link
18  bind(substr(?pm20Id, 4, 4) as ?numStub)
19  bind(substr(?pm20Id, 4, 6) as ?num)
20  bind(uri(concat('http://dfg-viewer.de/show/?tx_dlf[id]=http://zwb.eu/beta/pm20mets/pe/', ?numStub,
21  # add labels
22  service wikibase:label { bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en,de,fr,es,nl,pl,
23 }
```



(cont.) Example: Map of economists in PM20* by place of birth

- Map
- Table
- Image grid
- Graph builder
- Map
- Line chart
- Bar chart
- Scatter chart
- Area chart
- Bubble chart
- Tree map
- Tree
- Timeline
- Dimensions
- Graph

| Image | Item | ItemLabel | popLabel | viewer | geo |
|-------|------------|---------------------------------|------------|---|----------------------------------|
| | wd:Q76702 | Oswald von Nell-Breuning | Trier | http://dfg-viewer.de/show/?x_ofid=http://zbw.eu/beta/pm20meta/pe/0128xx/012837.xml | Point(6.641388888 49.756666666) |
| | wd:Q104599 | Götz Briefels | Eschweiler | http://dfg-viewer.de/show/?x_ofid=http://zbw.eu/beta/pm20meta/pe/0024xx/002488.xml | Point(6.2833 50.81617) |
| | wd:Q215961 | Franz Hermann Schulze-Delitzsch | Delitzsch | http://dfg-viewer.de/show/?x_ofid=http://zbw.eu/beta/pm20meta/pe/0161xx/016133.xml | Point(12.3425 51.526388888) |
| | wd:Q215961 | Franz Hermann Schulze-Delitzsch | Delitzsch | http://dfg-viewer.de/show/?x_ofid=http://zbw.eu/beta/pm20meta/pe/0161xx/016133.xml | Point(12.3425 51.526388888) |
| | wd:Q278699 | William Petty | Romey | http://dfg-viewer.de/show/?x_ofid=http://zbw.eu/beta/pm20meta/pe/0135xx/013511.xml | Point(-1.4966 50.989) |
| | wd:Q335153 | Nicholas Kaldor | Budapest | http://dfg-viewer.de/show/?x_ofid=http://zbw.eu/beta/pm20meta/pe/0050xx/0050xx.xml | Point(19.040833333 47.498333333) |



Review



-- as a KOS vocabulary

Transformable

Extends the functionality and impact through innovative adaptations.

Metrics:

T1. Allows special KOS products to be derived from the original data

T2. The user is given autonomy to determine what structure and information is desired and can be reproduced from the vocabulary

T3. Enables extensibility to fit diverse needs

T4. Supports innovative and transformative uses beyond normal "value vocabularies"

F I T Metrics for LOD KOS (as value vocabularies)

➤ **Functional**

[The vocabulary is...]

Made available in ways that enhance its inherent purpose

Metrics:

F1. The vocabulary is delivered in consumable formats

F2. Provided SPARQL endpoints are operational

F3. Dataset properties and structures are informed effectively

F4. Services are user-friendly, making vocabulary contents reachable

➤ **Impactful**

[The vocabulary...]

Maximizes the impact of a LOD KOS vocab

Metrics:

I1. Exposed through terminology services

I2. Used by data providers
a) as a primary value Vocab
b) in semantic enrichment

I3. Mapped with other KOS vocabs

I4. Showed/discussed at professional conferences and publications

➤ **Transformable**

[The vocabulary...]

Extends the functionality and impact through innovative adaptations

Metrics:

T1. Allows special KOS products to be derived from the original data

T2. The user is given autonomy to determine what structure and information is desired and can be reproduced from the vocabulary

T3. Enables extensibility to fit diverse needs

T4. Supports innovative and transformative uses beyond normal "value vocabularies"



Discussion

Functional Metrics for LOD KOS Products

FAIR

As a dataset

- Findable
- Accessible
- Interoperable
- Reusable

FIT As a value vocabulary

➤ Functional

- Consumable
- Operational
- Use-friendly, Reachable
- Informative

➤ Impactful

- Exposed
- Used
- Mapped
- Showed/Discussed

➤ Transformable

- Derivable
- Autonomous
- Extendable
- Innovative

Other?

? Trustworthy

? Mature

? Refined

Full paper: “FAIR + FIT – Guiding Principles and Functional Metrics for Linked Open Data (LOD) KOS Products”

Marcia Lei Zeng & Julaine Clunis
[to be published by JDIS, 2020. 04]

Thank
you!

FAIR + FIT 
Functional Metrics for
LOD KOS Products

Marcia Lei Zeng
College of Communication and Information (CCI)
Kent State University, USA

Getty ITWG Workshop, Feb.2020, L.A.

References

- European Commission Expert Group on FAIR Data. (2018). *Turning FAIR into reality: Final report and action plan from the European Commission expert group on FAIR data*. Publications Office of the European Union. <https://op.europa.eu/s/nF4t>
- FORCE11. (2014). *Guiding principles for findable, accessible, interoperable and re-usable data publishing* version b1.0. FORCE11. <https://www.force11.org/fairprinciples>
- Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific data* 3, 160018 (2016) doi:10.1038/sdata.2016.18
- Zeng, M. L. & Mayr. P. (2018). Knowledge Organization Systems (KOS) in the Semantic Web. *International Journal on Digital Libraries*. 20(3), 209-230. <https://doi.org/10.1007/s00799-018-0241-2>