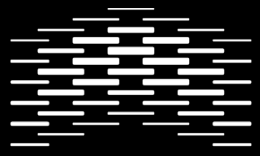

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19 OCTOBER, 2016

Subject Data in National Bibliographies Published as Linked Data

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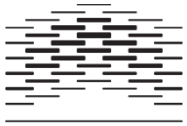
16th European Networked Knowledge Organization Systems (NKOS) Workshop



Agenda

- National bibliographies as Linked data
- Linked data quality
- Linked subject data

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Data sets

Selection criteria

1. The sets must be directly available in their entirety, either through a SPARQL endpoint or as a data dump.
2. The sets must contain bibliographical data, and as a minimum provide information about authors and their intellectual products.
3. The bibliographical information must have a global character in the sense that it contains factual data that is likely to be a potential interlinking candidate for external Linked data publishers.
4. The sets must be an “official” publication, not a result from a mere experimental case study.
5. The sets must have been published by a library institution.
6. The sets must have been updated in 2015/2016.

Rationale

1. The data must be comparable due to a concise and consistent methodology (criteria 1, 2 and 3).
2. The data must be comparable due to content (criteria 2 and 3).
3. The data should represent typical state of the art library linked data, e.g. Linked data from the library community (criteria 3, 4, 5 and 6).

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Datasets

	Downloded	*Modified*	*License*	*Set name/description from download page*
BNB	01.03.2016	06.01.2016	CC0 1.0	BNB LOD Books
BNE	03.03.2016	03.03.2016	CC0 1.0	Registros de autoridad + Registros bibliográficos + Encabezamientos de Materias de la Biblioteca Nacional en SKOS
BNF	06.04.2016	24.11-05.12.2015	Open License 1.0	All documents (complete description)
DNB	29.02.2016	23.10.2015	CC0 1.0	GND + DNBTitel

	Triples	*Data level constants*	*Amount of blank nodes*	*Amount of literal nodes*	*Amount of URIs*
BNB	104139477	52671707	0,0 %	61,1 %	38,9 %
BNE	71199698	56681387	3,8 %	84,5 %	11,8 %
BNF	304587809	192224487	0,0 %	63,6 %	36,4 %
DNB	329261459	250613437	9,0 %	71,1 %	19,9 %
Avg	202297111	138047754,5	3,2 %	70,1 %	26,7 %

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Data set characteristics

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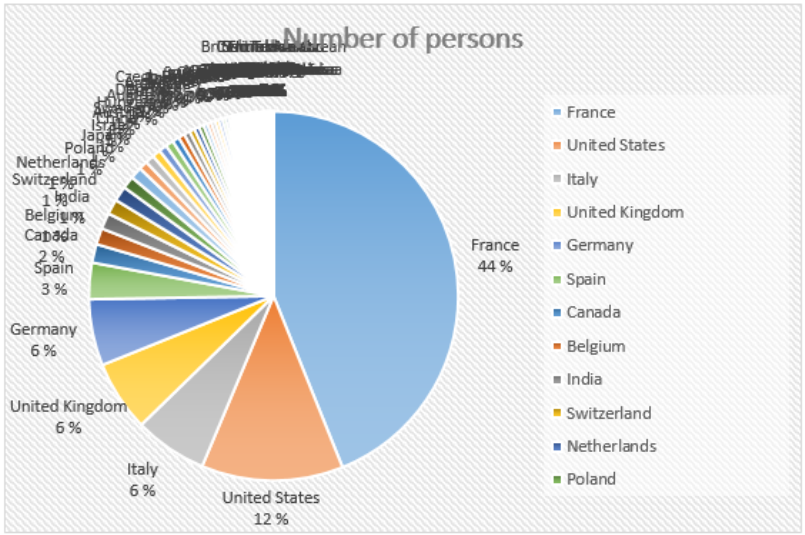
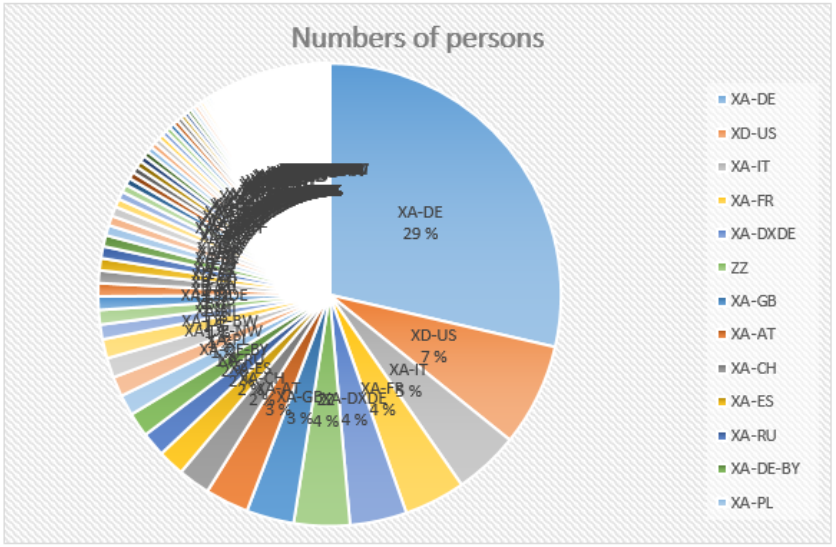
Data set characteristics



http://id.loc.gov/vocabulary/countries/fr

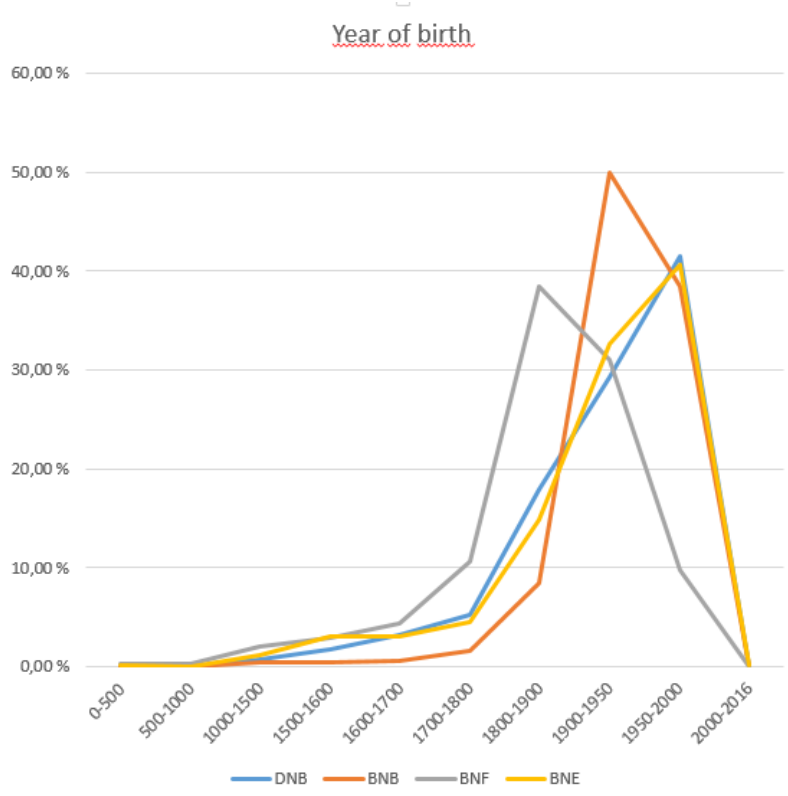
select ?conname (count(?per) as ?no) where {graph <http://phd_project.no/fr> {?per <http://rdvocab.info/ElementsGr2/countryAssociatedWithThePerson> ?con} graph <http://phd_project.no/bnb2016> {?con rdfs:label ?conname}} GROUP BY ?conname ORDER BY DESC(?no)



http://d-nb.info/standards/vocab/gnd/geographic-area-code#XA-DE

select ?con (count(?per) as ?no) where {graph <http://phd_project.no/de> {?per <http://d-nb.info/standards/elementset/gnd#geographicAreaCode> ?con} } GROUP BY ?con ORDER BY DESC(?no)

Data set characteristics



Linked data quality

- Data quality = “fitness for use”
- Operationalized as conformance to best practice guidelines

STEP #1 PREPARE STAKEHOLDERS: Prepare stakeholders by explaining the process of creating and maintaining Linked Open Data.
STEP #2 SELECT A DATASET: Select a dataset that provides benefit to others for reuse.
STEP #3 MODEL THE DATA: Modeling Linked Data involves representing data objects and how they are related in an application-independent way.
STEP #4 SPECIFY AN APPROPRIATE LICENSE: Specify an appropriate open data license. Data reuse is more likely to occur when there is a clear statement about the origin, ownership and terms related to the use of the published data.
STEP #5 GOOD URIs FOR LINKED DATA: The core of Linked Data is a well-considered URI naming strategy and implementation plan, based on HTTP URIs. Consideration for naming objects, multilingual support, data change over time and persistence strategy are the building blocks for useful Linked Data.
STEP #6 USE STANDARD VOCABULARIES: Describe objects with previously defined vocabularies whenever possible. Extend standard vocabularies where necessary, and create vocabularies (only when required) that follow best practices whenever possible.
STEP #7 CONVERT DATA: Convert data to a Linked Data representation. This is typically done by script or other automated processes.
STEP #8 PROVIDE MACHINE ACCESS TO DATA: Provide various ways for search engines and other automated processes to access data using standard Web mechanisms.
STEP #9 ANNOUNCE NEW DATA SETS: Remember to announce new data sets on an authoritative domain. Importantly, remember that as a Linked Open Data publisher, an implicit social contract is in effect.
STEP #10 RECOGNIZE THE SOCIAL CONTRACT: Recognize your responsibility in maintaining data once it is published. Ensure that the dataset(s) remain available where your organization says it will be and is maintained over time.

https://www.w3.org/TR/ld-bp/

Linked data quality: Previous work

"Concerning the linkage of the datasets, our analysis shows that there is still a relatively small number of datasets that set RDF links pointing at many other datasets, while many datasets only links to a few other datasets."

Schmachtenberg, M., Bizer, C., & Paulheim, H. (2014). Adoption of the Linked Data Best Practices in Different Topical Domains. *ISWC 2014, LNCS 8796* (pp. 245–260). Cham: Springer International Publishing. http://doi.org/10.1007/978-3-319-11964-9_16

"We have seen that data publishers are compliant in various degrees with the different Linked Data best practices and guidelines with regard to representation."

Debattista, J., Lange, C., & Auer, S. (2016). Are LOD Datasets Well Represented? A Data Representation Quality Survey. *Working Paper.* http://doi.org/10.13140/RG.2.1.4000.3442

Further reading:

Hogan, A., Umbrich, J., Harth, A., Cyganiak, R., Polleres, A., & Decker, S. (2012). An empirical survey of Linked Data conformance. *Web Semantics: Science, Services and Agents on the World Wide Web*, *14*, 14–44. http://doi.org/10.1016/j.websem.2012.02.001

Kontokostas, D., Westphal, P., Auer, S., Hellmann, S., Lehmann, J., Cornelissen, R., & Zaveri, A. (2014). Test-driven evaluation of linked data quality. In *Proceedings of the 23rd international conference on World wide web - WWW '14* (pp. 747–758). New York, New York, USA: ACM Press. http://doi.org/10.1145/2566486.2568002

Linked data quality dimensions

Dimension	Metric	Description	Type
Availability	accessibility of the SPARQL endpoint and the server	checking whether the server responds to a SPARQL query [14, 26]	O
	accessibility of the RDF dumps	checking whether a RDF dump is provided and can be downloaded [14,26]	O
	dereferencability issues	when a URI returns an error (4xx client error/ 5xx server error) response code or detection of broken links [26]	O
	no structured data available	detection of dead links or detection of a URI without any supporting RDF metadata or no redirection using the status code 303 See Other or no code 200 OK [14,26]	O
	no dereferenced back-links	detection of all local in-links or back-links: locally available triples in which the resource URI appears as an object, in the dereferenced document returned for the given resource [27]	O
	no dereferenced forward-links	detection of all forward links: locally known triples where the local URI is mentioned in the subject [27]	O
	misreported content types	detection of whether the content is suitable for consumption, and whether the content should be accessed [26]	S
Licensing	machine-readable indication of a license	detection of the indication of a license in the VoID description or in the dataset itself [14,27]	O
	human-readable indication of a license	detection of a license in the documentation of the dataset or its source [14,27]	O
	permissions to use the dataset	detection of license indicating whether reproduction, distribution, modification or redistribution is permitted [14]	O
	indication of attribution, *Copyleft* or *ShareAlike*	detection of whether the work is attributed in the same way as specified by the author or licensor [14]	O
Interlinking	interlinking degree, clustering coefficient, centrality and sameAs chains, description richness through sameAs	by using network measures [22]	O
	existence of links to external data providers	detection of the existence and usage of external URIs and owl:sameAs links [27]	S
Security	access to data is secure	use of login credentials or use of SSL or SSH [67]	O
	data is of proprietary nature	data owner allows access only to certain users [67]	O
Performance	no usage of slash-URIs	checking for usage of slash-URIs where large amounts of data is provided [14]	O
	low latency	delay between submission of a request by the user and reception of the response from the system [14,4]	O
	high throughput	no. of answered HTTP-requests per second [14]	O
	scalability of a data source	detection of whether the time to answer an amount of ten requests divided by ten is not longer than the time it takes to answer one request [14]	O

Dimension	Metric	Description	Type
Completeness	schema completeness	no. of classes and properties represented / total no. of classes and properties [4,15,50]	O
	property completeness	no. of values represented for a specific property / total no. of values for a specific property [4,15]	O
	population completeness	no. of real-world objects are represented / total no. of real-world objects [4,15,26,50]	O
	interlinking completeness	no. of instances in the dataset that are interlinked / total no. of instances in a dataset [22]	O
Amount-of-data	appropriate volume of data for a particular task	ratio of no. of semantically valid association rules to the no. of non-trivial rules[20] [10]	O
	appropriate amount of data	use of the apriori algorithm to detect poor predicates based on the occurrence dependencies among predicates [10]	O
	amount of triples	no. of triples present in a dataset [14]	O
	coverage	scope (no. of entities) and level of detail (no. of properties) [14]	O
Relevancy	usage of meta-information attributes	counting the occurrence of relevant terms within these attributes or using vector space model and assigning higher weight to terms that appear within the meta-information attributes [4]	S
	retrieval of relevant resources	sorting documents according to their relevancy for a given query [4]	S

Zaveri, A., Rula, A., Maurino, A., Pietrobon, R., Lehmann, J., & Auer, S. (2015). Quality assessment for Linked Data: A Survey. *Semantic Web*, *7*(1), 63–93. doi:10.3233/SW-150175

RQ

How do subject data in bibliographic Linked data sets conform to Linked data best practices regarding representation and interlinking?

- Do they re-use existing vocabulary elements in order to represent subject data?
- Do they provide links from subject data to external Linked data sets

Examples of BNB subjects

http://bnb.data.bl.uk/id/concept/ddc/e22/823.914

predicate	object
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/2004/02/skos/core#Concept
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.bl.uk/schemas/bibliographic/blterms#TopicDDC
http://www.w3.org/2004/02/skos/core#inScheme	http://dewey.info/scheme/e22/
http://www.w3.org/2004/02/skos/core#notation	"823.914"^^<http://dewey.info/schema-terms/Notation>
http://www.w3.org/2004/02/skos/core#broader	http://dewey.info/class/823/e22/

http://bnb.data.bl.uk/id/concept/lcsh/SupermarketsFiction

predicate	object
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.bl.uk/schemas/bibliographic/blterms#TopicLCSH
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/2004/02/skos/core#Concept
http://www.w3.org/2000/01/rdf-schema#label	Supermarkets--Fiction
http://www.w3.org/2004/02/skos/core#inScheme	http://id.loc.gov/authorities/subjects

http://bnb.data.bl.uk/id/concept/person/lcsh/MunroAlice1931-

predicate	object
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/2004/02/skos/core#Concept
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.bl.uk/schemas/bibliographic/blterms#PersonConcept
http://www.w3.org/2000/01/rdf-schema#label	Munro, Alice, 1931-
http://www.w3.org/2004/02/skos/core#inScheme	http://id.loc.gov/authorities/subjects
http://xmlns.com/foaf/0.1/focus	http://bnb.data.bl.uk/id/person/MunroAlice1931-

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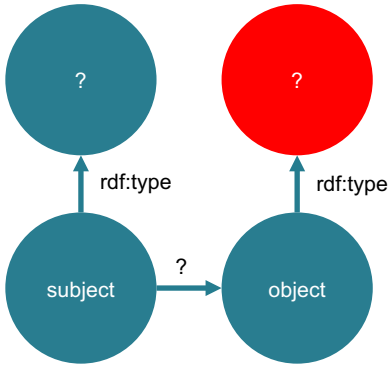
Representation: Classes



	Class	*Distinct class members*	*% of all entities*	*% of all subject entities*
BNB	http://www.w3.org/2004/02/skos/core#Concept	1906019	**18,8 %**	
	http://www.bl.uk/schemas/bibliographic/blterms#TopicLCSH	1238165	12,2 %	65,0 %
	http://www.bl.uk/schemas/bibliographic/blterms#TopicDDC	518941	5,1 %	27,2 %
	http://www.bl.uk/schemas/bibliographic/blterms#PersonConcept	79504	0,8 %	4,2 %
	http://www.bl.uk/schemas/bibliographic/blterms#OrganizationConcept	34751	0,3 %	1,8 %
	http://www.bl.uk/schemas/bibliographic/blterms#PlaceConcept	31889	0,3 %	1,7 %
	http://www.bl.uk/schemas/bibliographic/blterms#FamilyConcept	2769	0,0 %	0,1 %
BNE	http://www.w3.org/2004/02/skos/core#Concept	499449	**8,7 %**	
	http://www.loc.gov/mads/rdf/v1#Topic	59843	1,0 %	12,0 %
BNF	http://www.w3.org/2004/02/skos/core#Concept	2789704	**9,1 %**	
DNB	http://d-nb.info/standards/elementset/gnd#SubjectHeadingSensoStricto	134844	0,4 %	
	http://d-nb.info/standards/elementset/gnd#NomenclatureInBiologyOrChemistry	30316	0,1 %	
	http://d-nb.info/standards/elementset/gnd#SubjectHeading	8829	0,0 %	
	http://d-nb.info/standards/elementset/gnd#SoftwareProduct	7790	0,0 %	
	http://d-nb.info/standards/elementset/gnd#Language	5541	0,0 %	
	http://d-nb.info/standards/elementset/gnd#ProductNameOrBrandName	5320	0,0 %	
	http://d-nb.info/standards/elementset/gnd#HistoricSingleEventOrEra	5130	0,0 %	
	http://d-nb.info/standards/elementset/gnd#EthnographicName	4094	0,0 %	
	http://d-nb.info/standards/elementset/gnd#CharactersOrMorphemes	1883	0,0 %	
	http://d-nb.info/standards/elementset/gnd#MeansOfTransportWithIndividual_name	1332	0,0 %	
	http://d-nb.info/standards/elementset/gnd#GroupOfPersons	310	0,0 %	
	http://d-nb.info/standards/elementset/gnd#FictiveTerm	1	0,0 %	

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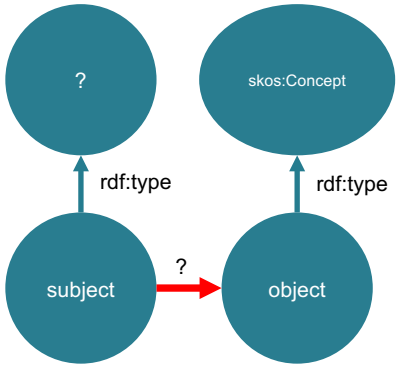
Representation: Properties

	Properties	*Triples*	*% of all triples*
BNB	http://purl.org/dc/terms/subject	8602690	8,3 %
	Total	**8602690**	**8,3 %**
BNE	http://www.w3.org/1999/02/22-rdf-syntax-ns#first	2139814	3,0 %
	http://datos.bne.es/def/OP3008	1355303	1,9 %
	http://datos.bne.es/def/OP7001	58010	0,1 %
	http://www.w3.org/2004/02/skos/core#related	52149	0,1 %
	http://www.w3.org/2004/02/skos/core#broader	36167	0,1 %
	http://www.w3.org/2004/02/skos/core#narrower	35688	0,1 %
	Total	**3677131**	**5,2 %**
BNF	http://purl.org/dc/terms/subject	18208043	6,0 %
	http://www.w3.org/2004/02/skos/core#broader	158301	0,1 %
	http://www.w3.org/2004/02/skos/core#narrower	158301	0,1 %
	http://musicontology.com/genre	136976	0,0 %
	http://data.bnf.fr/ontology/bnf-onto/cadreGeographique	115114	0,0 %
	http://www.w3.org/2004/02/skos/core#related	105338	0,0 %
	http://rdvocab.info/Elements/placeOfProduction	55031	0,0 %
	http://www.w3.org/2004/02/skos/core#closeMatch	36218	0,0 %
	Total	**43532964**	**14,3 %**
DNB	http://purl.org/dc/terms/subject	4487767	1,4 %
	http://d-nb.info/standards/elementset/gnd#professionOrOccupation	2576074	0,8 %
	http://d-nb.info/standards/elementset/gnd#broaderTermInstantial	359864	0,1 %
	http://d-nb.info/standards/elementset/gnd#broaderTermGeneral	99492	0,0 %
	http://d-nb.info/standards/elementset/gnd#fieldOfStudy	47197	0,0 %
	http://d-nb.info/standards/elementset/gnd#mediumOfPerformance	45855	0,0 %
	http://d-nb.info/standards/elementset/gnd#formOfWorkAndExpression	40339	0,0 %
	http://d-nb.info/standards/elementset/gnd#functionOrRole	36889	0,0 %
	http://d-nb.info/standards/elementset/gnd#topic	34502	0,0 %
	http://d-nb.info/standards/elementset/gnd#relatedTerm	28030	0,0 %
	plus 17 properties		
	Total	**7793909**	**2,4 %**



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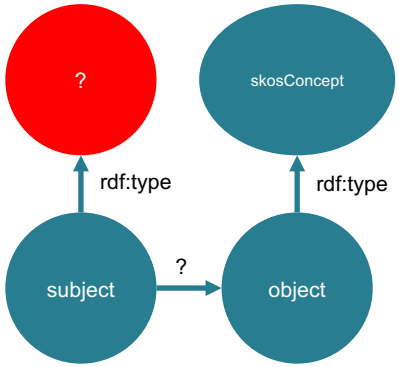
Classes of subjects (completness)

	Classes	*Distinct class members*	*Completness*
BNB	http://purl.org/dc/terms/BibliographicResource	2970718	93,0 %
	http://purl.org/ontology/bibo/Book	2940369	99,4 %
	http://purl.org/ontology/bibo/MultiVolumeBook	30349	99,6 %
BNE	http://datos.bne.es/def/C1003 (Manifestation)	1014292	52,0 %
	http://datos.bne.es/def/C1001 (Work)	55944	3,9 %
BNF	http://rdvocab.info/uri/schema/FRBRentitiesRDA/Manifestation	3369537	40,0 %
	http://rdvocab.info/uri/schema/FRBRentitiesRDA/Expression	2831091	33,6 %
	http://www.w3.org/2003/01/geo/wgs84_pos#SpatialThing	115114	99,3 %
	http://rdvocab.info/uri/schema/FRBRentitiesRDA/Work	57390	11,0 %
	http://purl.org/dc/dcmitype/Event	55659	97,6 %
	http://xmlns.com/foaf/0.1/Document	2932	0,0 %
	http://data.bnf.fr/ontology/bnf-onto/expositionVirtuelle	2701	100,0 %
DNB	http://d-nb.info/standards/elementset/gnd#DifferentiatedPerson	1860199	49,3 %
	http://purl.org/ontology/bibo/Document	1848428	18,4 %
	http://d-nb.info/standards/elementset/gnd#CorporateBody	170092	14,9 %
	http://purl.org/ontology/bibo/Periodical	82753	17,4 %
	http://purl.org/ontology/bibo/Collection	81791	21,1 %
	http://d-nb.info/standards/elementset/gnd#BuildingOrMemorial	55450	93,8 %
	http://d-nb.info/standards/elementset/gnd#MusicalWork	48201	36,3 %
	http://purl.org/ontology/bibo/Map	35566	13,1 %
	http://d-nb.info/standards/elementset/gnd#Work	21410	16,1 %
	plus 45 classes		



BNB, BNE, BNF: subject rdf:type skos:Concept
DNB: subject rdf:type gnd:SubjectHeadingSensoStricto

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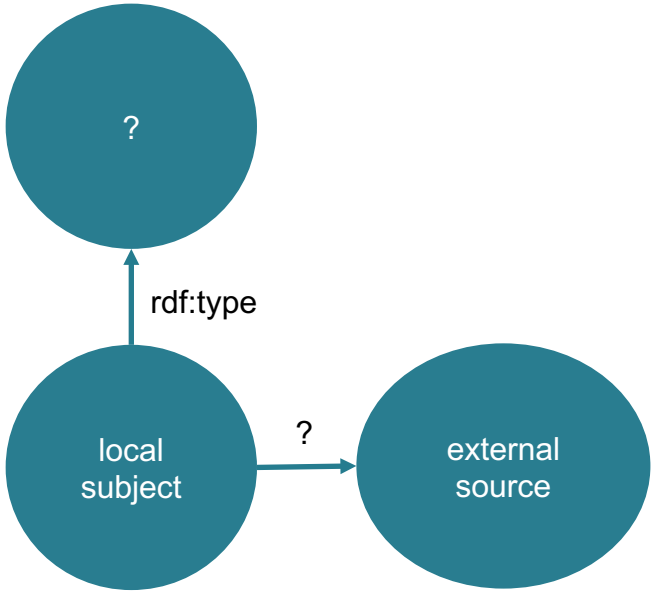
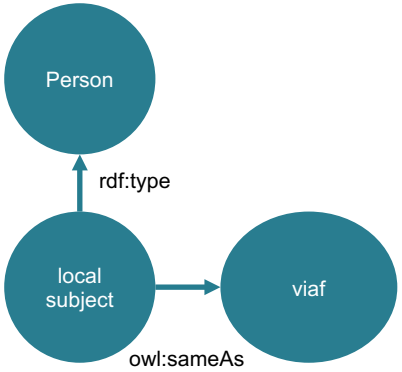
Interlinking

Limitations:

- External linking
- Sources linked to at least 300 distinct subjects
- Sources providing RDF data





	triples	*class completness*
BNB	964043	76,23 %
BNE	385727	31,25 %
BNF	1478821	91,84 %
DNB	8127111	94,83 %

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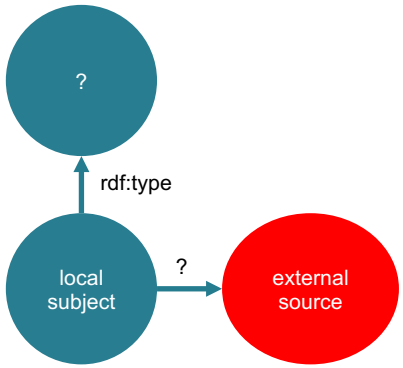
Interlinking: sources

	BNB	BNE	BNF	DNB
http://aims.fao.org/aos/agrovoc/			x	
http://catalogue.bnf.fr		x		
http://data.culture.fr/thesaurus/resource/ark:/			x	
http://data.ign.fr/id/geofla/commune/			x	
http://datos.bne.es/resource/			x	
http://dbpedia.org/resource/			x	x
http://dewey.info/class/	x		x	x
http://d-nb.info/gnd/		x	x	
http://fr.dbpedia.org/resource/			x	
http://id.loc.gov/authorities/childrensSubjects/			x	
http://id.loc.gov/authorities/names/		x		
http://id.loc.gov/authorities/subjects/	x	x	x	
http://id.loc.gov/vocabulary/countries/			x	
http://id.loc.gov/vocabulary/iso639-2/	x		x	x
http://id.loc.gov/vocabulary/languages/		x		
http://id.loc.gov/vocabulary/relators/			x	
http://iflastandards.info/ns/isbd/terms/mediatype/				x
http://isni.org/	x		x	
http://lemac.sgcb.mcu.es/Autoridades/		x		
http://lexvo.org/id/iso639-3/	x			
http://marc21rdf.info/terms/				x
http://rdvocab.info/termList/RDACarrierType/				x
http://reference.data.gov.uk/id/year/	x			
http://stitch.cs.vu.nl/vocabularies/rameau/			x	
http://sws.geonames.org/	x		x	x
http://viaf.org/viaf/	x	x	x	x
http://www.idref.fr/			x	
http://www4.wiwiss.fu-berlin.de/bookmashup/books/	x			
http://zbw.eu/stw/descriptor/				x
No. sources	**9**	**7**	**18**	**9**
No. of base URIs	**8**	**5**	**14**	**9**



Avg.: 20.4

Hogan, A., Umbrich, J., Harth, A., Cyganiak, R., Polleres, A., & Decker, S. (2012)

Categorization by number of linked datasets

Number of linked datasets	Number of datasets
more than 10	79 (7.79%)
6 to 10	81 (7.99%)
5	31 (3.06%)
4	42 (4.14%)
3	54 (5.33%)
2	106 (10.45%)
1	176 (17.36%)
0	445 (43.89%)

Schmachtenberg, M., Bizer, C., & Paulheim, H. (2014).

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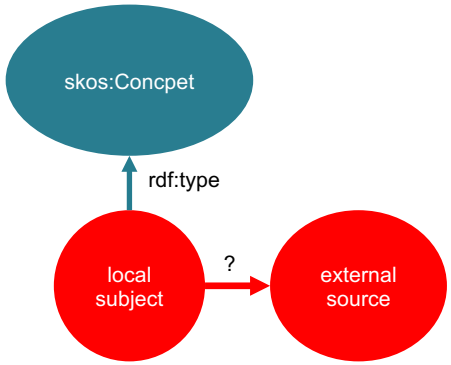
Interlinking: Amount of RDF links

BNB, BNE, BNF: local_subject rdf:type skos:Concept
DNB: local_subject rdf:type gnd:SubjectHeadingSensoStricto



	Predicate	*RDF links*	*Source*	*Distinct subjects*	*Complet-ness*
BNF	http://www.w3.org/2002/07/owl#sameAs	1197229	http://isni.org/	1197227	42,92 %
BNB	http://www.w3.org/2004/02/skos/core#broader	198756	http://dewey.info/class/	198756	10,43 %
BNF	http://www.w3.org/2004/02/skos/core#closeMatch	182634	http://dewey.info/class/	127662	4,58 %
BNF	http://www.w3.org/2002/07/owl#sameAs	180275	http://stitch.cs.vu.nl/vocabularies/rameau/	180275	6,46 %
DNB	http://d-nb.info/[...]relatedDdcWithDegreeOfDeterminacy2	140892	http://dewey.info/class/	77445	57,43 %
BNB	http://www.w3.org/2002/07/owl#sameAs	138695	http://id.loc.gov/authorities/subjects/	138511	7,27 %
BNF	http://www.w3.org/2004/02/skos/core#exactMatch	111737	http://sws.geonames.org	111737	4,01 %
DNB	http://d-nb.info/standards/elementset/gnd#languageCode	103702	http://id.loc.gov/vocabulary/iso639-2/	383	0,28 %
BNF	http://www.w3.org/2004/02/skos/core#closeMatch	80259	http://id.loc.gov/authorities/subjects/	77585	2,78 %
BNF	http://www.w3.org/2004/02/skos/core#exactMatch	37753	http://data.ign.fr/id/geofla/commune/	37753	1,35 %

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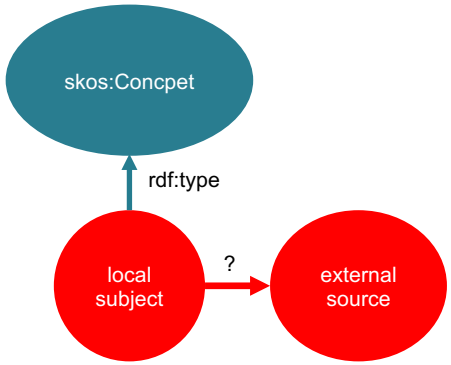
Interlinking: Completness

BNB, BNE, BNF: local_subject rdf:type skos:Concept
DNB: local_subject rdf:type gnd:SubjectHeadingSensoStricto



	Predicate	*RDF links*	*Source*	*Distinct subjects*	*Complet-ness*
DNB	http://d-nb.info/[...]relatedDdcWithDegreeOfDeterminacy2	140892	http://dewey.info/class/	77445	57,43 %
BNF	http://www.w3.org/2002/07/owl#sameAs	1197229	http://isni.org/	1197227	42,92 %
DNB	http://d-nb.info/[...]relatedDdcWithDegreeOfDeterminacy1	24072	http://dewey.info/class/	16223	12,03 %
DNB	http://d-nb.info/[...]relatedDdcWithDegreeOfDeterminacy3	19832	http://dewey.info/class/	14406	10,68 %
BNB	http://www.w3.org/2004/02/skos/core#broader	198756	http://dewey.info/class/	198756	10,43 %
BNE	http://www.w3.org/2004/02/skos/core#closeMatch	37042	http://id.loc.gov/authorities/subjects/	36914	7,39 %
BNB	http://www.w3.org/2002/07/owl#sameAs	138695	http://id.loc.gov/authorities/subjects/	138511	7,27 %
BNF	http://www.w3.org/2002/07/owl#sameAs	180275	http://stitch.cs.vu.nl/vocabularies/rameau/	180275	6,46 %
DNB	http://www.w3.org/2004/02/skos/core#broadMatch	6915	http://zbw.eu/stw/descriptor/	6792	5,04 %
BNF	http://www.w3.org/2004/02/skos/core#closeMatch	182634	http://dewey.info/class/	127662	4,58 %

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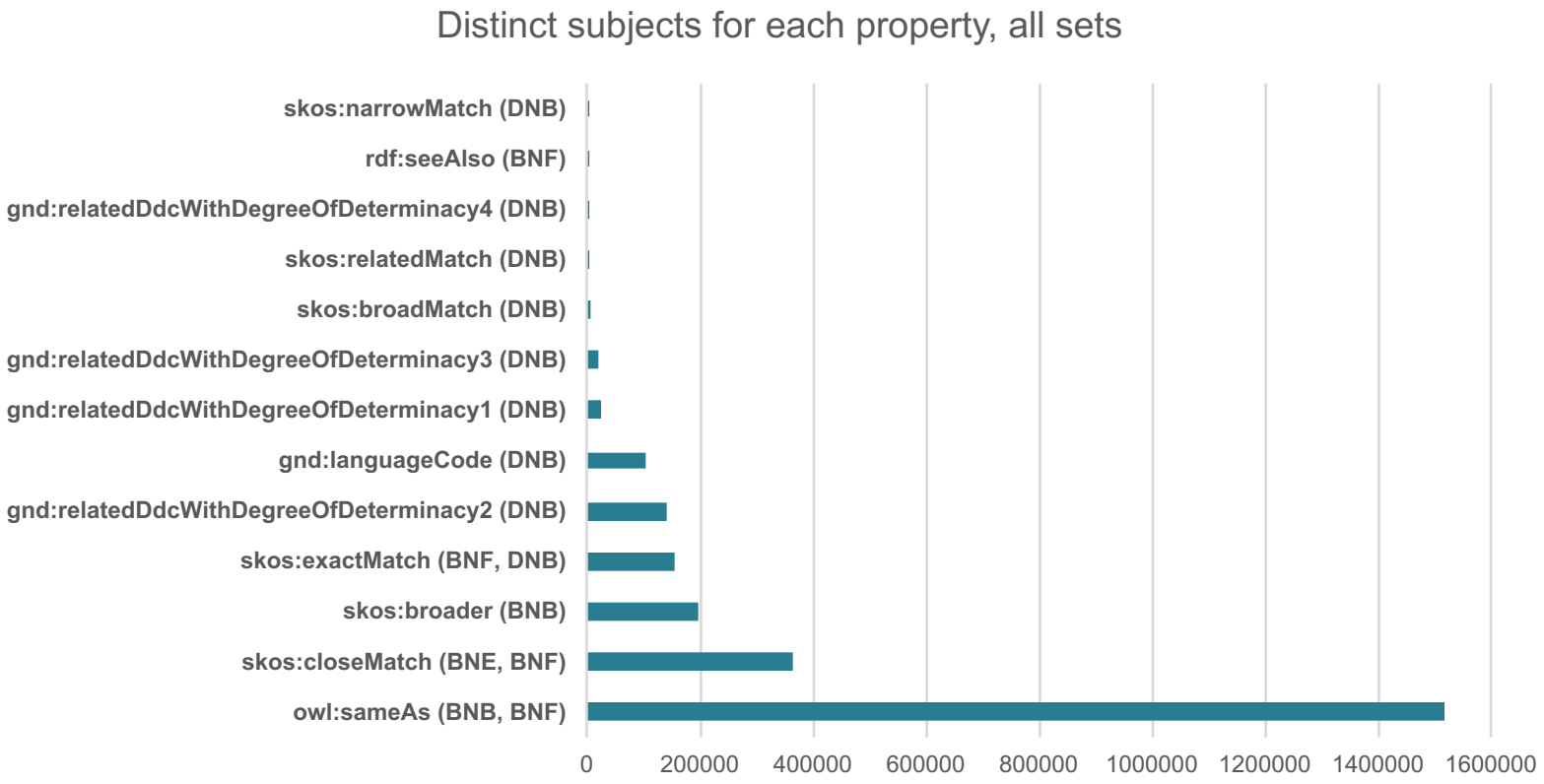
Interlinking: Representation



RQ

How do subject data in bibliographic Linked data sets conform to Linked data best practices regarding representation and interlinking?

- Do they re-use existing vocabulary elements in order to represent subject data?
- Do they provide links from subject data to external Linked data sets

Yes, but….