

Analysing Translation of Wikidata Properties

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Outline

Outline

1. Introduction
2. WDPProp: Wikidata Property Analysis
3. Towards a coarser analysis on property translation*
 - Data Collection
 - Analysis Results
4. Conclusion and Future Works

* Work done with Thibaut Chamard

1. Introduction

- Wikidata
 - Started in 2012
 - is free, open, linked, structured, collaborative and **multilingual** knowledge base
 - From multi-(sub)domain multilingual Wikipedia sites to a single-domain multilingual website
- Collaborative Multilingual Multi-domain Ontology development
 - Property proposal, discussion and voting
 - **Property creation and translation**
 - Property usage
 - (Property deletion)

1. Introduction

Wikidata Item: Labels, Descriptions and Aliases

Bogotá (Q2841) **Identifier**

capital city of Colombia and Cundinamarca department edit
Santa Fe de Bogotá | Santafé de Bogotá | Bogota

[In more languages](#)
[Configure](#)

Language	Label	Description	Also known as
English	Bogotá	capital city of Colombia and Cundinamarca department	Santa Fe de Bogotá Santafé de Bogotá Bogota
French	Bogota	capitale de la Colombie	Bogotá Santa Fe de Bogotá
Spanish	Bogotá	capital de Colombia y del departamento de Cundinamarca	Santafé de Bogotá Bogota Santafe de Bogota
German	Bogotá	Hauptstadt Kolumbiens und der Provinz Cundinamarca	Bogota Santa Fe de Bogotá Santafe de Bogota

All entered languages

Languages **Labels** **Descriptions** **Alias**

Example Wikidata Item: Bogotá(Q2841)

1. Introduction

Wikidata Item: Labels and Properties

Avignon (Q6397)...

commune in Vaucluse, France

▼ In more languages Configure

Language	Label	Description	Also known as
English	Avignon	commune in Vaucluse, France	


All entered languages

Statements

instance of

- commune of France ... edit
↳ 1 reference
- city ... edit
↳ 0 references
[+ add reference](#)
[+ add value](#)

image

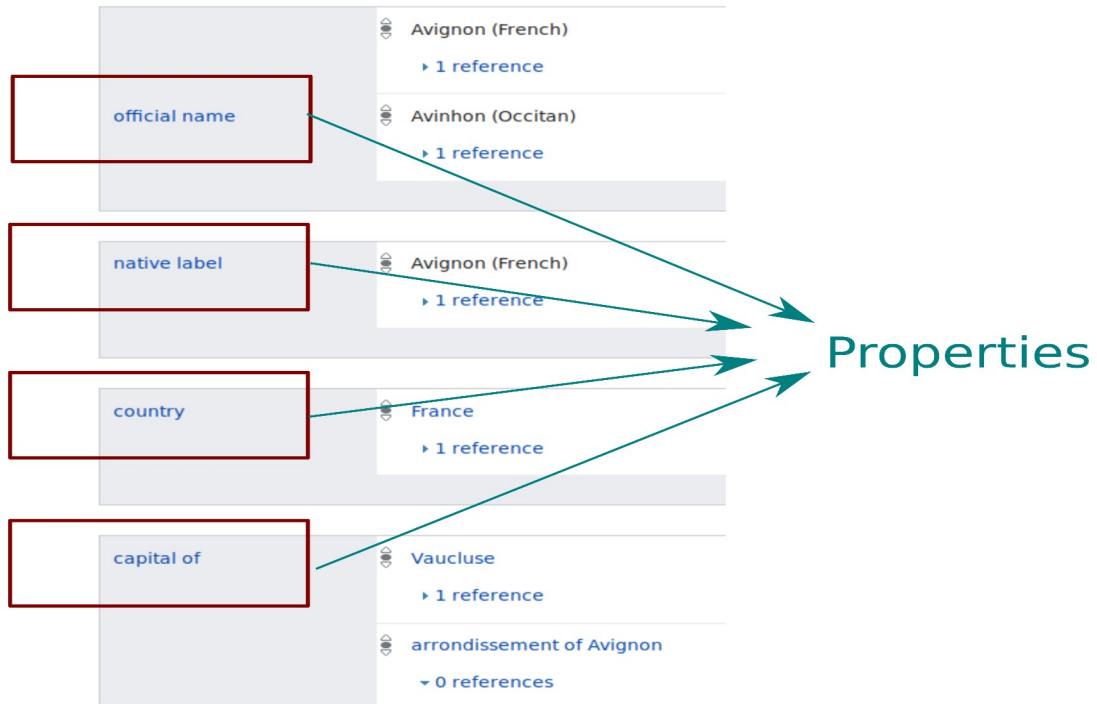


Avignon, Palais des Papes depuis Tour Philippe le Bel by JM Rosier.jpg edit

Example Wikidata Item: Avignon (Q6397)

1. Introduction

Wikidata Properties



Wikidata Properties

1. Introduction

Wikidata Property: Labels and descriptions

country (P17)

sovereign state of this item; don't use on humans

sovereign state | state | land

▼ In more languages Configure

Language	Label	Description
English	country	sovereign state of this item; don't use on humans
French	pays	État souverain de cet élément
Spanish	país	estado soberano de este elemento
German	Staat	souveräner Staat, in dem sich das Objekt befindet

All entered languages

Language Label Description

Data type

Item

<https://www.wikidata.org/wiki/Property:P17>

Example Wikidata Property: country (P17)

1. Introduction

Properties: Labels, description and aliases

instance of (P31)

that class of which this subject is a particular example and member (subject typically an individual member with a proper name label); different from P279; using this property as a qualifier is deprecated—use P2868 or P3831 instead

is a | is an | has class | has type | is a particular | is a specific | is an individual | is a unique | is an example of | member of | unique individual of | distinct member of | non-type member of | subclassable example of | uninstanciable instance of | unclassifiable member of | not a type but is instance of | unsubtypeable particular | unitary element of class | distinct element of | distinct individual member of | occurrence of | rdf:type | type

▼ In more languages

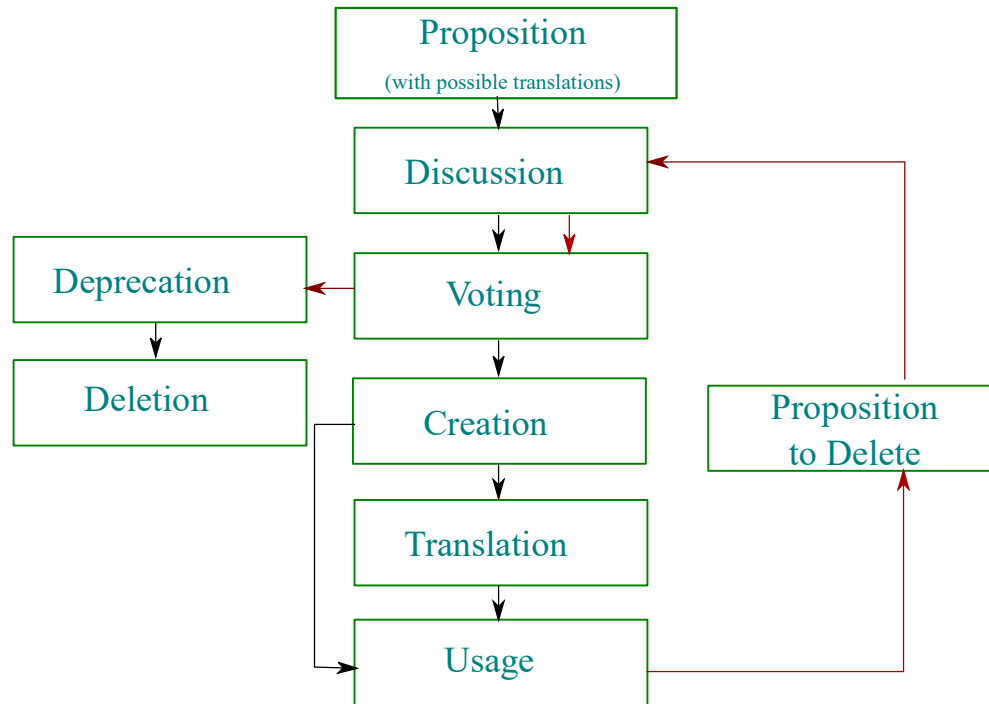
Configure

Language	Label	Description	Also known as
English	instance of	that class of which this subject is a particular example and member (subject typically an individual member with a proper name label); different from P279; using this property as a qualifier is deprecated—use P2868 or P3831 instead	is a is an has class has type is a particular is a specific is an individual is a unique is an example of member of unique individual of distinct member of non-type member of subclassable example of uninstanciable instance of unclassifiable member of not a type but is instance of unsubtypeable particular unitary element of class distinct element of distinct individual member of occurrence of rdf:type type

Labels, description and aliases of Property:P31 in English

1. Introduction

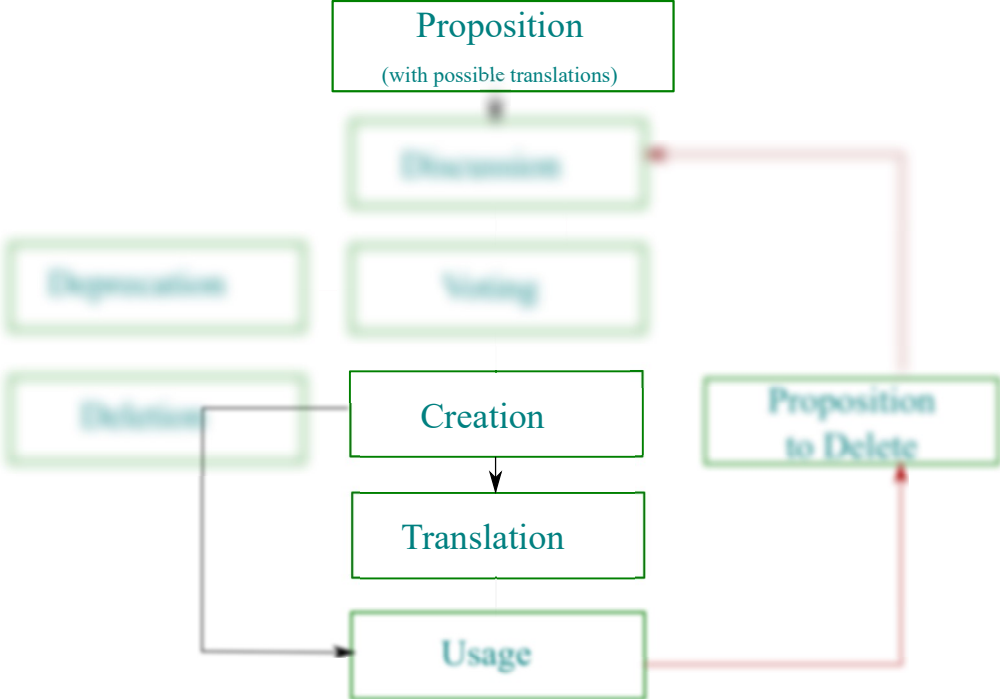
Wikidata Property: from Proposal to Usage



Property proposal, creation and usage on Wikidata

1. Introduction

Wikidata Property: Translation



Property Creation on Wikidata

1. Introduction

Wikidata Property: Missing descriptions

French	nature de l'élément	cet élément est un exemple spécifique de cette classe qui en précise la nature. Ne pas confondre avec la propriété P279 (sous-classe de)	est un est une instance de ∈ a pour classe est un exemple de
Northern Frisian	as en	No description defined	∈
Western Frisian	is in	No description defined	∈
Irish	sampla de	No description defined	∈
Galician	é un/unha	o elemento é unha instancia doutro elemento	∈
Swiss German	isch e	No description defined	∈
Gujarati	ઉદાહરણ	આ લેખ આ વસ્તુનું અન્ય ભાષામાં આપેલું ઉદાહરણ છે.	આ શું છે તે ∈
Hausa	iri	No description defined	irin
Hakka Chinese	he yit chak	No description defined	

Missing Descriptions

Missing multilingual descriptions on Property P31

1. Introduction

Wikidata Properties: Missing descriptions

Odia	ଦୃଷ୍ଟାନ୍ତ	No description defined	ଉଦାହରଣ ∈
Punjabi	ਕੀ ਹੈ?	No description defined	
Pampanga	alimbawa ning	No description defined	metung yang ∈
Picard	est un	No description defined	∈
Polish	jest to	stanowi przykład (jest elementem) danej klasy	∈
Pashto	د بيلګې په توګه	No description defined	
Portuguese	instância de	este item é uma instância deste outro item	é um é uma natureza do elemento ∈ é membro de possui classe é um indivíduo é um exemplo de

Missing Descriptions

Missing multilingual descriptions on Property P31

1. Introduction

Wikidata Properties: Missing labels

Brazilian Portuguese	instância de	aquela classe a qual este sujeito é um membro e exemplo particular. (O sujeito é tipicamente um membro individual com um Nome Próprio). Diferente da P279 (subclasse de)	é um é uma natureza do elemento ∈ é membro de possui classe é do tipo é um indivíduo é um exemplo de rdf:type
Riffian	<div style="border: 1px solid green; padding: 2px;">No label defined</div>	← Missing labels	∈
Romansh	è in(a)	No description defined	∈
Romanian	este un/o	acest element este un exemplar din clasa definită de acel element	este o este un este o/un ∈ reprezintă

Missing multilingual labels on Property P31

2. WDPProp: Wikidata Property Analysis

WDPProp

1. WDPProp:

- Collaborative Multilingual Multi-domain Ontology development: is it possible to achieve a truly multilingual experience?

2. Properties:

- Not so much influenced by bots!

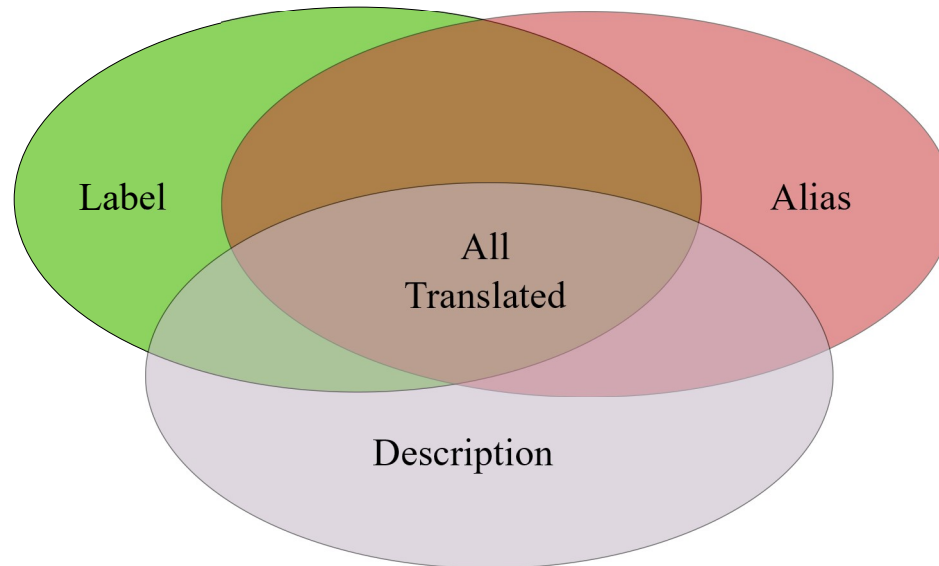
3. Goals:

- Understanding Wikidata property proposal, creation and translation
- Available templates and their usage
- Providing real-time statistics to (multilingual) contributors

2. WDPProp: Wikidata Property Analysis

Towards 'Everything' about Wikidata properties

Translation of Properties



2. WDPProp: Wikidata Property Analysis

Towards 'Everything' about Wikidata properties

WDPProp	
<ul style="list-style-type: none">• Languages• Data types• Properties• Property Classes• Provenance• Search• Compare• Property Discussion• Wikiprojects• About	<h3>Translation statistics by languages</h3> <ul style="list-style-type: none">• Supported languages• Translated Labels• Translated Descriptions• Translated Alias• Overall Translation Statistics• Missing Translation Statistics <hr/> <h3>Navigate properties</h3> <ul style="list-style-type: none">• Browse all properties• Browse by datatype

Information on Wikidata Properties

2. WDPProp: Wikidata Property Analysis

- WDPProp
 - Get real-time translation statistics
 - Navigate supported languages, properties, datatypes, classes
 - Compare translation statistics
 - Find available properties for an entity
 - Uses Wikidata SPARQL endpoints and Mediawiki API
- URL
 - <https://tools.wmflabs.org/wdprop>

2. WDPProp: Wikidata Property Analysis

Wikidata Properties

P6	P10	P14	P15	P16	P17	P18	P19	P20	P21	P22	P25	P26	P27
P30	P31	P35	P36	P37	P38	P39	P40	P41	P47	P50	P51	P53	P54
P57	P58	P59	P61	P65	P66	P69	P78	P81	P84	P85	P86	P87	P88
P91	P92	P94	P97	P98	P101	P102	P103	P105	P106	P108	P109	P110	P111
P112	P113	P114	P115	P117	P118	P119	P121	P122	P123	P126	P127	P128	P129
P131	P134	P135	P136	P137	P138	P140	P141	P143	P144	P149	P150	P154	P155
P156	P157	P158	P159	P161	P162	P163	P166	P167	P169	P170	P171	P172	P175
P176	P177	P178	P179	P180	P181	P183	P184	P185	P186	P189	P190	P193	P194
P195	P196	P197	P199	P200	P201	P205	P206	P207	P208	P209	P210	P212	P213
P214	P215	P217	P218	P219	P220	P221	P223	P225	P227	P229	P230	P231	P232
P233	P234	P235	P236	P237	P238	P239	P240	P241	P242	P243	P244	P245	P246
P247	P248	P249	P263	P264	P267	P268	P269	P270	P271	P272	P274	P275	P276
P277	P278	P279	P281	P282	P286	P287	P289	P291	P296	P297	P298	P299	P300
P301	P303	P304	P305	P306	P344	P345	P347	P348	P349	P350	P351	P352	P353
P354	P355	P356	P358	P359	P360	P361	P364	P366	P367	P368	P369	P370	P371

Wikidata properties

2. WDPProp: Wikidata Property Analysis

Wikidata Properties

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14
P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42
P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54	P55	P56
P57	P58	P59	P60	P61	P62	P63	P64	P65	P66	P67	P68	P69	P70
P71	P72	P73	P74	P75	P76	P77	P78	P79	P80	P81	P82	P83	P84
P85	P86	P87	P88	P89	P90	P91	P92	P93	P94	P95	P96	P97	P98
P99	P100	P101	P102	P103	P104	P105	P106	P107	P108	P109	P110	P111	P112
P113	P114	P115	P116	P117	P118	P119	P120	P121	P122	P123	P124	P125	P126
P127	P128	P129	P130	P131	P132	P133	P134	P135	P136	P137	P138	P139	P140
P141	P142	P143	P144	P145	P146	P147	P148	P149	P150	P151	P152	P153	P154
P155	P156	P157	P158	P159	P160	P161	P162	P163	P164	P165	P166	P167	P168
P169	P170	P171	P172	P173	P174	P175	P176	P177	P178	P179	P180	P181	P182
P183	P184	P185	P186	P187	P188	P189	P190	P191	P192	P193	P194	P195	P196
P197	P198	P199	P200	P201	P202	P203	P204	P205	P206	P207	P208	P209	P210
P211	P212	P213	P214	P215	P216	P217	P218	P219	P220	P221	P222	P223	P224
P225	P226	P227	P228	P229	P230	P231	P232	P233	P234	P235	P236	P237	P238

Wikidata properties: All included deleted ones

2. WDPProp: Wikidata Property Analysis

Wikidata Properties: Multilingual Labels

Count of translated labels

en (6804)	ar (6790)	nl (6768)	uk (6748)	fr (6068)	ca (5567)	mk (4165)	de (4157)	es (4049)	ru (3813)	sr (3615)	it (3492)	pl (3287)	hu (2582)
be-tarask (2519)	pt (2414)	nb (2389)	da (2330)	zh-hans (2319)	ko (2304)	ja (2128)	sv (1978)	cs (1891)	fa (1810)	fi (1722)	he (1706)	zh (1624)	zh-hant (1623)
eo (1548)	en-gb (1477)	be (1384)	nn (1366)	bn (1339)	el (1319)	cy (1281)	id (1162)	pt-br (1110)	lv (1093)	zh-tw (968)	eu (923)	sco (920)	vi (919)
		ms (876)	tr (820)	gl (814)	oc (746)	sq (740)	scn (732)	bs (730)	sr-ec (724)	ro (706)	ast (704)	nds (696)	zh-hk (678)
sr-el (670)	zh-cn (662)	lb (654)	sl (650)	tt (614)	sk (606)	ur (598)	ka (578)	bg (578)	et (541)	tg (536)	hr (492)	th (474)	mr (466)
zh-sg (464)	zh-mo (459)	ga (454)	af (450)	ta (442)	ba (438)	ia (415)	te (396)	en-ca (394)	hy (390)	zh-my (369)	br (362)	lt (347)	gu (292)
											ml (290)	ku-latn (286)	ilo (278)
													tg-cyrl (239)
hi (237)	hsb (232)	yue (231)	gsw (228)	az (223)	la (218)	tt-cyrl (218)	is (203)	frr (190)	or (185)	kn (174)	ne (159)	fo (150)	yo (150)
pa (132)	min (126)	fy (125)	yi (123)	mg (120)	tl (103)	de-at (98)	de-ch (95)	io (89)	uz (87)	ckb (84)	ce (84)	nds-nl (83)	ts (80)
ha (79)	rm (76)	mt (74)	ps (73)	ksh (69)	lfn (65)	pam (64)	gd (62)	se (62)	aln (61)	ky (61)	bar (55)	lmo (50)	co (48)
sh (47)	am (44)	vo (42)	an (39)	atj (37)	diq (33)	mzn (32)	pcd (30)	tt-latn (29)	jv (28)	simple (28)	jbo (27)	olo (27)	kl (26)
si (25)	sw (25)	wa (24)	nap (23)	aeb-arab (21)	li (21)	sc (20)	vmf (19)	vec (19)	pms (19)	sms (18)	lij (18)	smn (18)	zu (18)

Real time information on number of multilingual labels

2. WDPProp: Wikidata Property Analysis

Wikidata Properties: Multilingual Descriptions

Count of translated descriptions

en (6721)	uk (6578)	fr (4617)	de (3159)	it (2737)	es (2552)	ru (2002)	be-tarask (1939)	ko (1458)	nl (1410)	nb (1340)	ja (1339)	en-gb (1258)	pl (1123)
													zh (1103)
fa (1101)	cs (1038)	sv (1030)	ca (979)	da (964)	zh-hans (836)	el (767)	pt (743)	fi (736)	scn (711)	he (700)	tr (673)	pt-br (643)	id (642)
						gl (617)	ast (610)	ar (545)	zh-hant (535)	eu (465)	ms (430)	sr (408)	hu (407)
										ro (405)	be (401)	zh-tw (376)	en-ca (328)
eo (320)	mk (268)	vi (267)	ilo (249)	br (247)	bn (225)	sq (211)	nn (205)	gu (202)	hr (201)	zh-hk (199)	zh-cn (199)	lv (183)	cy (171)
hsb (161)	sl (158)	hi (157)	et (156)	ta (151)	te (145)	bg (143)	sr-ec (142)	bs (134)	sr-el (132)	af (130)	mr (129)	sk (129)	oc (126)
zh-sg (123)	zh-mo (123)	ka (120)	lb (106)	ml (102)	zh-my (95)	gsw (87)	yue (87)	ne (82)	pa (77)	th (69)	ia (68)	ur (60)	de-at (59)
		kn (57)	ba (57)	ksh (56)	de-ch (55)	or (50)	min (49)	is (42)	az (38)	tt (36)	nds (35)	yi (31)	tl (30)
fo (28)	hy (28)	ga (26)	frr (26)	gd (24)	tg (23)	nds-nl (22)	ia (22)	it (20)	tt-cyrl (19)	am (18)	simple (16)	sah (15)	ajj (14)
tt-latn (14)	ts (13)	sh (12)	fy (11)	bar (11)	tg-cyrl (10)	tcy (10)	si (10)	jv (7)	vmf (7)	ce (6)	aeb-arab (6)	sco (6)	nap (6)
												ps (6)	rm (6)
my (6)	mzn (5)	kk (5)	pam (5)	lmo (5)	wa (5)	ky (4)	an (3)	io (3)	uz (2)	aeb-latn (2)	roa-tara (2)	ht (2)	vec (2)
aln (2)	as (2)	se (2)	stq (2)	yo (2)	vo (2)	gan (1)	bxr (1)	ff (1)	es-419 (1)	mg (1)	wuu (1)	nan (1)	ku-arab (1)
rue (1)	rif (1)	lez (1)	lo (1)	mi (1)	gn (1)	bho (1)	ig (1)	mai (1)	ln (1)	tru (1)	bgn (1)	km (1)	ha (1)
bcl (1)	lij (1)	ku (1)	udm (1)	skr-arab (1)	ary (1)	sat (1)	sc (1)	no (1)					

Real time information on number of multilingual descriptions

3. Analysis of Translation of Properties

WDPProp: Translation path

P17

Path of Translation

Color code: Add Update Remove

Time	L	D	A
2013-02-04T19:43:51Z	en		
2013-02-04T19:44:15Z	it		
2013-02-04T19:44:57Z	fr		
2013-02-04T19:53:48Z	zh		
2013-02-04T19:54:11Z	zh-hans		
2013-02-04T19:54:34Z	zh-hant		
2013-02-04T19:59:44Z	en		
2013-02-04T19:59:59Z	fr		
2013-02-04T20:00:19Z	de		
2013-02-04T20:00:35Z	it		
2013-02-04T20:03:15Z	fi		
2013-02-04T20:04:29Z		fr	
2013-02-04T20:04:35Z	fr		
2013-02-04T20:37:40Z	en		
2013-02-04T21:52:09Z	he		
2013-02-04T22:06:09Z	cs		

P856

Path of Translation

Color code: Add Update Remove

Time	L	D	A
2013-09-10T22:43:54Z	en		
2013-09-10T22:59:51Z	ko		
2013-09-10T23:37:22Z	fr		
2013-09-11T01:09:22Z	it		
2013-09-11T01:28:08Z		en	
2013-09-11T01:28:13Z	nl		
2013-09-11T01:33:05Z			en
2013-09-11T02:30:53Z	pt		
2013-09-11T02:31:03Z		pt	
2013-09-11T05:07:25Z	es		
2013-09-11T05:09:04Z		es	
2013-09-11T05:39:35Z	fi		
2013-09-11T05:39:56Z		fi	
2013-09-11T06:27:06Z	fa		

P3966

Path of Translation

Color code: Add Update Remove

Time	L	D	A
2017-05-21T10:07:38Z	en		
2017-05-22T10:10:41Z	ru		
2017-05-23T01:26:15Z	pt		
2017-05-23T10:22:07Z	nb	nb	
2017-05-23T10:22:08Z			nb
2017-05-23T12:11:09Z	fi		
2017-05-23T14:10:47Z	da		
2017-05-23T17:44:11Z	fr	fr	
2017-05-23T17:44:12Z			fr
2017-05-24T04:25:03Z	es		
2017-05-24T04:25:04Z	de		
2017-05-24T04:25:04Z	it		
2017-05-24T04:25:05Z	nl		

Wikidata properties: Translation path of three Wikidata Properties

3. Analysis of Translation of Properties

WDPProp: Translation path

The image shows a Wikidata edit history on the left and a language table on the right. The edit history lists revisions from 2017-03-25 to 2017-09-06 with various language codes (ko, bar, lb, ky, ur, yo, te, tg-cyrl, en, my, es, ro, aeb-arab, tt, tt-cyrl, tt-latn). The language table on the right shows the following data:

Language	Label	Description	Also known as
English	No label defined	sovereign state of this item	sovereign state nation state land
French	pays	État souverain de cet élément	État
Spanish	país	estado soberano de este elemento	estado
German	Staat	souveräner Staat, in dem sich das Objekt befindet	Land

Additional text in the screenshot includes: "No label defined (P17)", "Revision as of 14:21, 8 July 2017 by PiotrMabhi (talk | contribs) (Removed [en] label: country)", "sovereign state of this item", "sovereign state | nation | state | land", "In more languages", and "All entered languages".

Wikidata properties: Possible vandalism (removal of labels)

3. Analysis of Translation of Properties

WDPProp: Translation path

The image shows a Wikidata revision history on the left and a property description on the right. The revision history lists dates and times with language tags (en, it, es, zh-hant, fr) indicating changes. The property description on the right shows the current state of the property, including a description in English and a table of translations for various languages.

Revision as of 04:56, 27 December 2014 (restore) **Revision as of 0**
66.87.121.14 (talk)
(Removed French aliases: *site officiel*, *URL officielle*, *site web*, *site internet*) (Removed [en])
← Older edit

description / en **description / en**
URL to the website of this item

Revision as of 04:56, 27 December 2014

No description defined

More languages Configure

Language	Label	Description	Also known as
English	No label defined	No description defined	
French	No label defined	No description defined	
Spanish	No label defined	No description defined	
German	offizielle Website	URL für die Website des Objektes	Webseite Internetauftritt Website URL Internetseite Homepage

Wikidata properties: Possible vandalism (removal of labels, descriptions and aliases)

3. Analysis of Translation of Properties

Wikidata Properties: Revision History

- (cur | prev) ○ 07:18, 10 January 2018 Llywelyn2000 (talk | contribs) .. (52,090 bytes) (-59) .. (Removed English alias: nation)
- (cur | prev) ○ 07:18, 10 January 2018 Llywelyn2000 (talk | contribs) .. (52,149 bytes) (-23) .. (Changed English description: nation)
- (cur | prev) ○ 04:32, 9 January 2018 Osteologia (talk | contribs) .. (52,172 bytes) (+74) .. (Added Esperanto alias: ŝtato)
- (cur | prev) ○ 18:54, 7 January 2018 Robin van der Vliet (talk | contribs) .. (52,098 bytes) (+62) .. (Added [vo] label: län)
- (cur | prev) ○ 18:54, 7 January 2018 Robin van der Vliet (talk | contribs) .. (52,036 bytes) (+63) .. (Added [io] label: lando)
- (cur | prev) ○ 18:54, 7 January 2018 Robin van der Vliet (talk | contribs) .. (51,973 bytes) (-1) .. (Changed Esperanto label: lando)
- (cur | prev) ○ 17:24, 30 December 2017 Valentina.Anitnelav (talk | contribs) .. (51,974 bytes) (+284) .. (Changed claim: praeaeolus)
- (cur | prev) ○ 04:29, 25 December 2017 Yasasuru (talk | contribs) .. (51,690 bytes) (+75) .. (Added Sinhala alias: country)
- (cur | prev) ○ 04:29, 25 December 2017 Yasasuru (talk | contribs) .. (51,615 bytes) (+141) .. (Added [si] description: රටක් හෝ දිස්ත්‍රික්කයක්)
- (cur | prev) ○ 04:29, 25 December 2017 Yasasuru (talk | contribs) .. (51,474 bytes) (+64) .. (Added [si] label: රට)
- (cur | prev) ○ 01:04, 14 December 2017 Pizza1016 (talk | contribs) .. (51,410 bytes) (+273) .. (Added Malay aliases: negeri)
- (cur | prev) ○ 01:04, 14 December 2017 Pizza1016 (talk | contribs) .. (51,137 bytes) (+213) .. (Added British English aliases: nation)

Compare selected revisions

Revision History on Wikidata: Property P17

3. Analysis of Translation of Properties

Wikidata Properties: Comments from revision history

Attribute	Add	Update	Remove
label	wbsetlabel-add	wbsetlabel-set	wbsetlabel-remove
description	wbsetdescription-add	wbsetdescription-set	wbsetdescription-remove
alias	wbsetaliases-add	wbsetaliases-add-remove	wbsetaliases-remove

3. Analysis of Translation of Properties

Wikidata Properties: Comments from revision history

- Pros
 - Building real-time tools
 - Easier to find what changed without looking at the content
- Cons
 - Multiple language changes in a single edit (bots)

3. Analysis of Translation of Properties

Wikidata Properties: Data Collection

- Wikidata MediaWiki API
 - Make use of content parameter from 'revision history'
 - Find what actually changed between two different versions
- Data Columns
 - timestamp
 - property
 - language
 - type

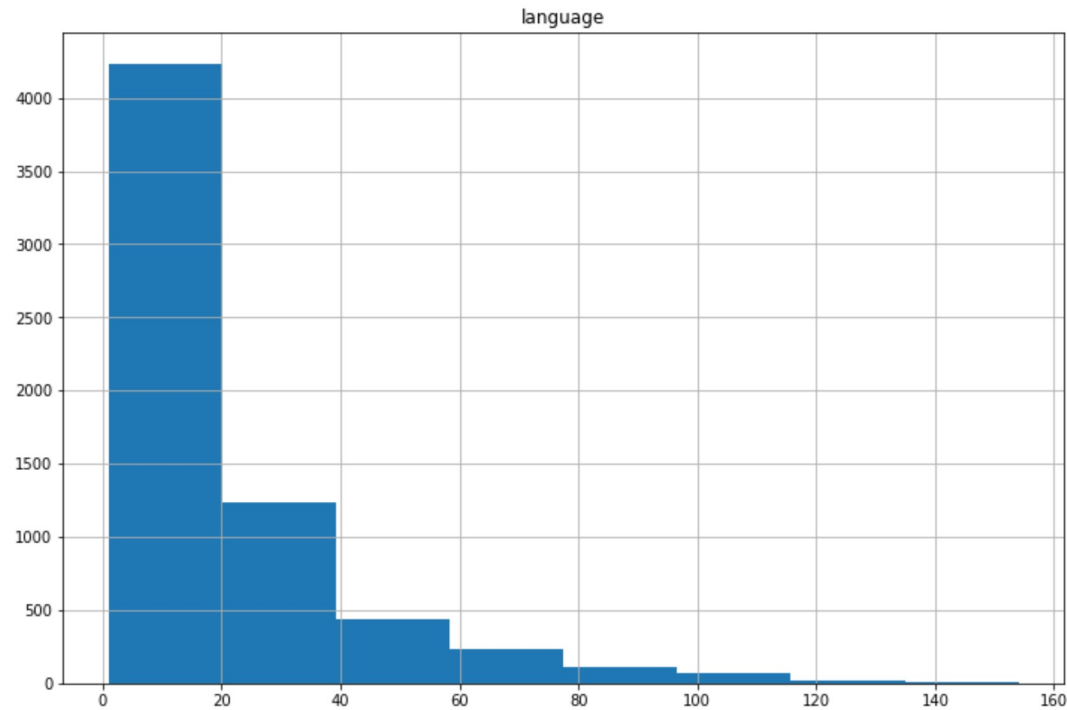
3. Analysis of Translation of Properties

Wikidata Properties: Data Collection

timestamp	property	language	type
2013-10-26T16:45:20Z	P999	en	label
2013-10-26T16:45:20Z	P999	en	description
2013-10-26T18:16:05Z	P999	de	label
2013-10-27T02:55:15Z	P999	pt	label
2013-10-27T02:55:18Z	P999	fr	label
2013-10-28T12:42:28Z	P999	pl	label
2013-10-29T08:41:45Z	P999	fr	description

3. Analysis of Translation of Properties

Wikidata Properties: Analysis Results



Histogram on the distribution of number of languages for different properties

3. Analysis of Translation of Properties

Wikidata Properties: Analysis Results

Measure	Value
count	6347
mean	21.444935
std	20.897675
min	1.000000
max	154.000000

3. Analysis of Translation of Properties

Analysis Results: Frequent itemsets

Count

Language Combinations

6347

en

6338

ar

6306

nl

6263

uk

5928

fr

4823

ca

4019

de

3. Analysis of Translation of Properties

Analysis Results: Frequent itemsets

Count	Language Combinations
6259	ar, uk
5923	fr, ar
5905	fr, uk
4819	ar, ca
4795	ca, uk
4530	fr, ca
4015	ar, de

3. Analysis of Translation of Properties

Analysis Results: Frequent itemsets

Count

Language Combinations

6257

en, nl, ar, uk

5919

en, nl, fr, ar

5903

en, nl, fr, uk

5901

en, ar, fr, uk

5899

nl, fr, uk, ar

4818

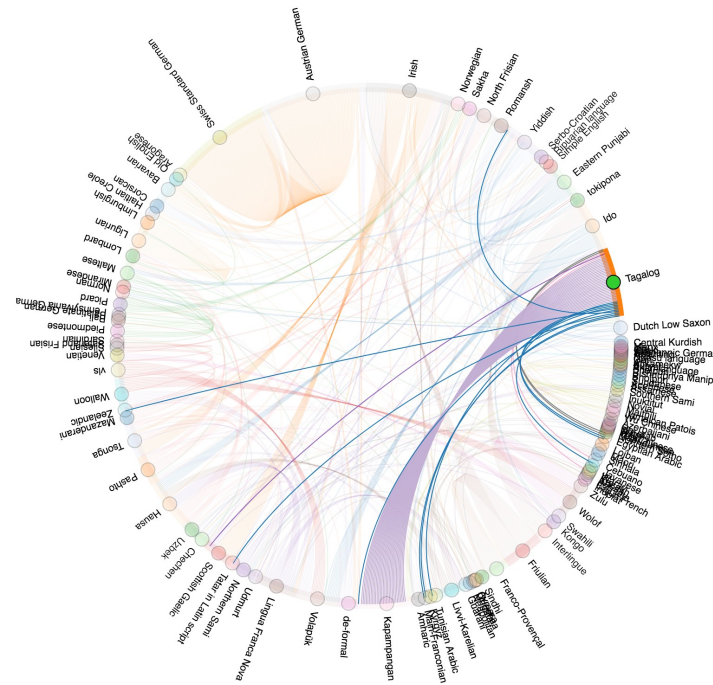
en, nl, ar, ca

4794

en, nl, ca, uk

3. Analysis of Translation of Properties



Wikidata Properties: Analysis Results



Translation Path

4. Conclusion and Future Works

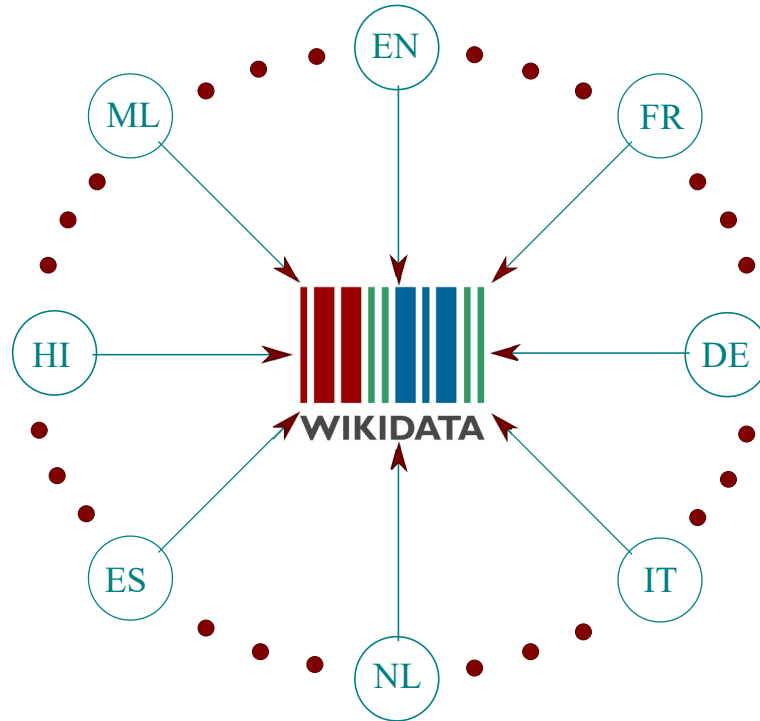
Wikipedia Infobox Properties

Python	C
	
Paradigm Object-oriented, imperative, functional, procedural, reflective	Paradigm Imperative (procedural), structured
Designed by Guido van Rossum	Designed by Dennis Ritchie
Developer Python Software Foundation	Developer Dennis Ritchie & Bell Labs (creators); ANSI X3J11 (ANSI C); ISO/IEC JTC1/SC22/WG14 (ISO C)
First appeared 1990; 28 years ago ^[1]	First appeared 1972; 46 years ago ^[2]
Stable release 3.7.0 / 27 June 2018; 2 months ago ^[2] 2.7.15 / 1 May 2018; 4 months ago ^[3]	Stable release C11 / December 2011; 6 years ago
Typing discipline Duck, dynamic, strong since version 3.5: Gradual ^[4]	Typing discipline Static, weak, manifest, nominal
License Python Software Foundation License	OS Cross-platform
Filename extensions .py, .pyc, .pyd, .pyo (prior to 3.5), ^[5] .pyw, .pyz (since 3.5) ^[6]	Filename extensions .c, .h
Website www.python.org ^[7]	

Existing English Wikipedia Infobox Properties of Programming Languages

4. Conclusion and Future Works

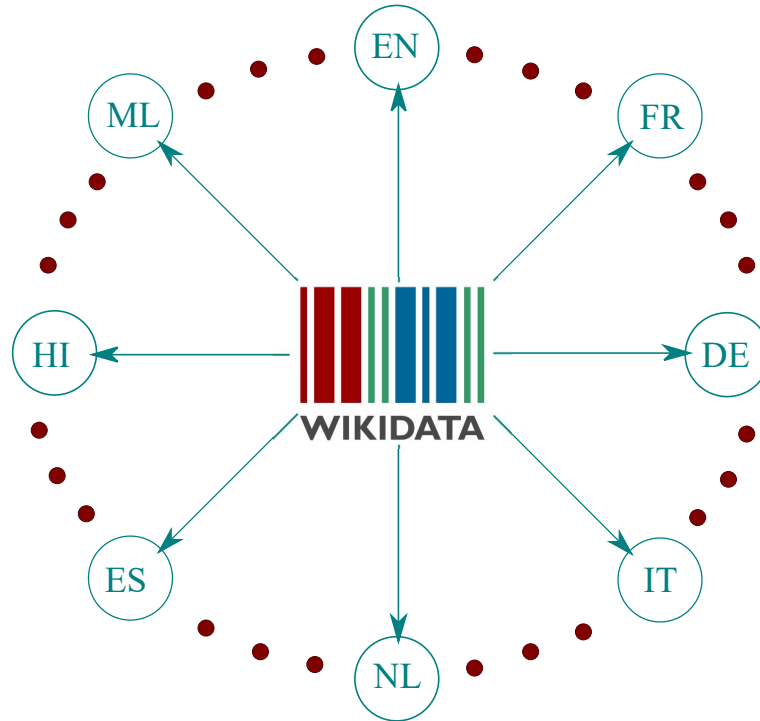
Wikipedia to Wikidata



Importing structured data from Wikipedia Infoboxes to Wikidata

4. Conclusion and Future Works

Wikidata to Wikipedia



Exporting data from Wikidata to multiple multilingual Wikipedia articles

Thank you

Questions?

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