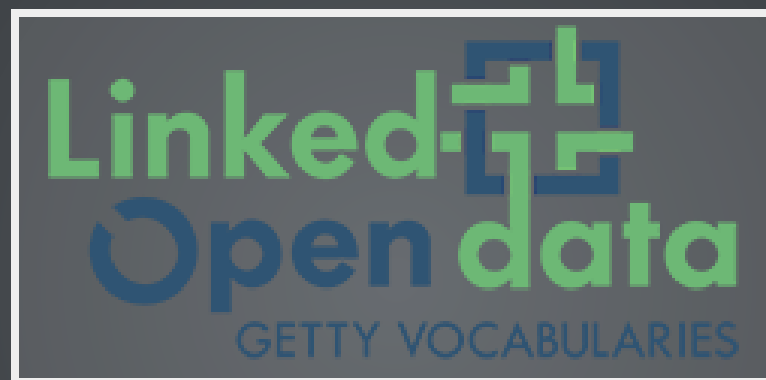# GVP LOD: ONTOLOGIES AND SEMANTIC REPRESENTATION

Vladimir Alexiev, Data and Ontology Group, Ontotext Corp

CIDOC Congress, Dresden, Germany
2014-09-05: International Terminology Working Group
2014-09-09: Getty special session

2D interactive version, pdf, slideshare.

Press O for overview, H for help.
Proudly made in plain text with reveal.js, org-reveal, org-mode and emacs.

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GETTY VOCABULARIES LOD

http://vocab.getty.edu

- Art and Architecture Thesaurus (AAT): released Feb 2014
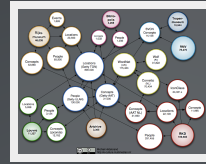- Thesaurus of Geographic Names (TGN): released Aug 2014

Work continues with:

- Unified List of Artist Names (ULAN)
- Cultural Object Names Authority (CONA)
- Getty Museum data
- AATA bibliography

Museum and CONA are more complex, involves LIDO/CDWA-lite XML to CIDOC CRM (RDF)

CULTURAL HERITAGE LOD

Working at the center. (Shows thesauri only, not yet CONA/Museum data)

ONTOTEXT SCOPE OF WORK

- Semantic/ontology development:
  http://vocab.getty.edu/ontology
- Contributed to ISO 25964 ontology (latest standard on thesauri). Provided implementation experience, suggestions and fixes
- Complete mapping specification
- Help implement R2RML scripts working off Getty's Oracle database, contribution to Perl implementation (RDB2RDF), R2RML extension (rrx:languageColumn)
- Work with a wide External Reviewers group (people from OCLC, Europeana, ISO 25964 working group, etc)
- GraphDB (OWLIM) semantic repository. Enterprise Edition (clustered for high-availability)
- Semantic application development (customized Forest user interface) and tech consulting
- SPARQL 1.1 compliant endpoint:
  http://vocab.getty.edu/sparql

GVP LOD ARCHITECTURE

Quite straigntforward

SEMANTIC RESOLUTION & CONTENT NEGOTIATION

All GVP, AAT and TGN URLs resolve, returning human or machine readable content through content negotiation (303 redirect). Eg about the ontology:

- http://vocab.getty.edu/ontology : semantic URI, content-negotiated
- http://vocab.getty.edu/ontology.html : HTML page (application/xhtml+xml).
- http://vocab.getty.edu/ontology.rdf : application/rdf+xml
- http://vocab.getty.edu/ontology.ttl : text/turtle

Example about an AAT subject: aventurine (quartz)

GVP VOCABULARY DATA

Scope includes:

- Subjects: Concepts but also non-concepts
- Terms as plain (SKOS) and rich (SKOS-XL) labels. Term characteristics
- Hierarchical relations: custom & standard, distinguish BTG,BTP,BTI
- Associative Relations
- Historic info on rels (rdf:Statement) and terms
- Obsolete subjects
- Alignment (exactMatch to LCSH)
- Sources (bibo:Document, bibo:DocumentPart with locator)
- Contributors (foaf:Agent)
- Revision history (prov:Activity)
- Thesaurus-specific data (for now: TGN place types, coordinates

Richer than any other SKOS thesaurus I've seen

AAT RELATIONAL SCHEMA
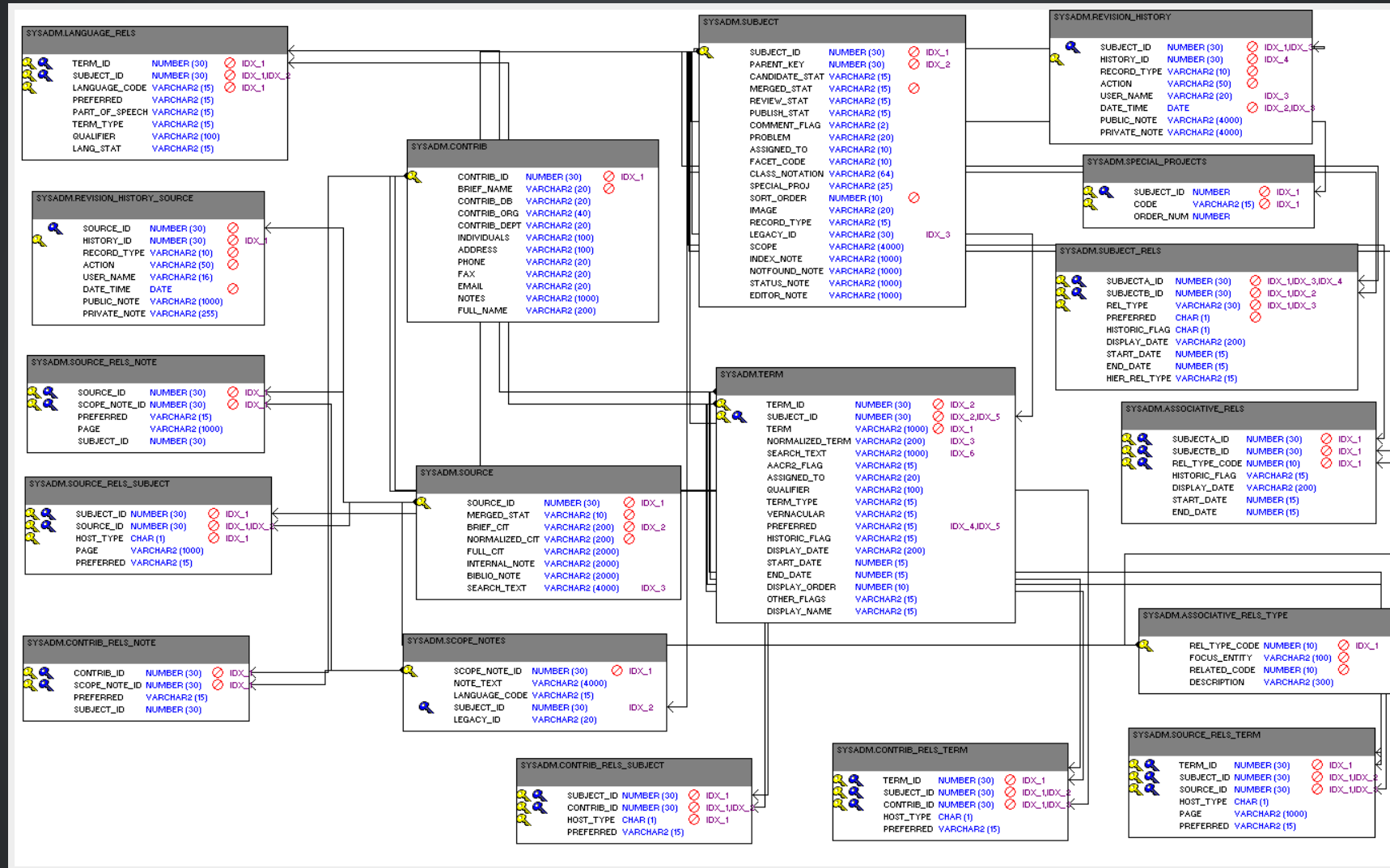
AAT CONCEPTUAL DIAGRAM
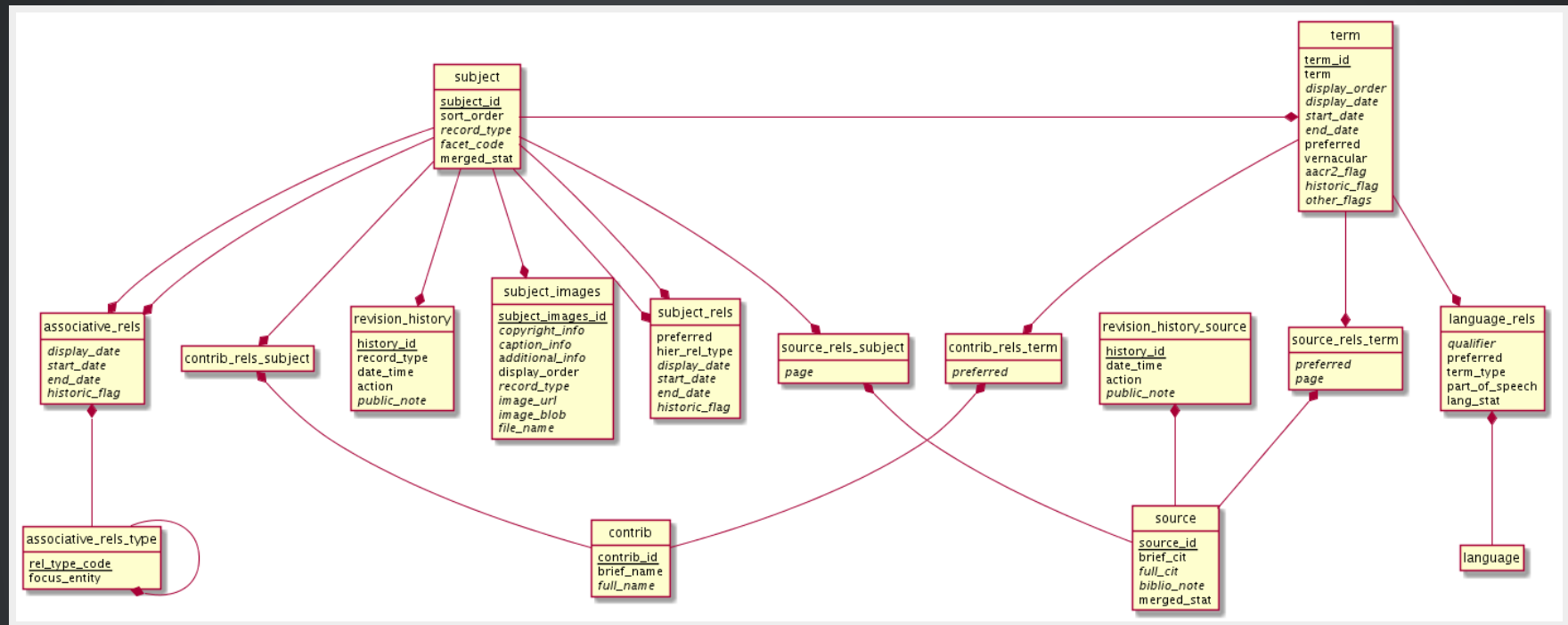
EXTERNAL ONTOLOGIES

Prefix	Ontology	Used for
bibo:	Bibliography Ontology	Sources
dc:	Dublin Core Elements	common
dct:	Dublin Core Terms	common
foaf:	Friend of a Friend ontology	Contributors
iso:	ISO 25946 (latest standard on thesauri)	iso:ThesaurusArray, BTG/BTP/BTI
owl:	Web Ontology Language	Basic RDF representation
prov:	Provenance Ontology	Revision history
rdf:	Resource Description Framework	Basic RDF representation
rdfs:	RDF Schema	Basic RDF representation
schema:	Schema.org	common, geo (TGN)
skos:	Simple Knowledge Organization System	Basis vocabulary representation
skosxl:	SKOS Extension for Labels	Rich labels

AUXILIARY ONTOLOGIES

Prefix	Ontology	Used for
luc:	OWLIM's built-in Lucene	Full Text index & queries
ontogeo:	OWLIM geo-spatial extensions	Geo-spatial index & queries
ptop:	Ontotext PROTON top-level ontology	Inferencing (Extended Property Constructs)
rr:	Relational to RDF Mapping Language	Conversion Oracle->RDF
rrx:	R2RML extension	rrx:languageColumn

DESCRIPTIVE INFO ONTOLOGIES

Prefix	Ontology	Used for
adms:	Asset Description Metadata Schema	Dataset description
cc:	Creative Commons Rights Expression Language	License rights
dcat:	Data Catalog Vocabulary	Dataset description
dctype:	DCMI Type Vocabulary	Dataset class
fmt:	RDF formats used in datasets	Formats of data dumps
sd:	SPARQL Service Description	SPARQL endpoint capabilities (future)
vaem:	Vocabulary for Attaching Essential Metadata	Not used yet
vann:	Vocabulary for annotating vocabulary descriptions	Namespace and prefix
vcard:	vCard (contact info)	Contact info
vdpp:	Vocabulary for Dataset Publication Projects	Not used yet

GVP SEMANTIC REPRESENTATION

GVP SEMANTIC REPRESENTATION (2)

GVP ONTOLOGY

http://vocab.getty.edu/ontology, LOV Entry (10 classes, 177 props)

GVP ONTOLOGY: A CLASS

GVP SUBJECT CLASSES

- GVP Subjects include both Concepts and non-concepts (for organizing the hierarchy, not for indexing)
We handle "impedance mismatch" with

- SKOS: restrict skos:related, infer skos:broader
- ISO: infer iso:broaderGeneric/Partitive/Instantial
S=Standard, G=GVP common, A=AAT, T=TGN
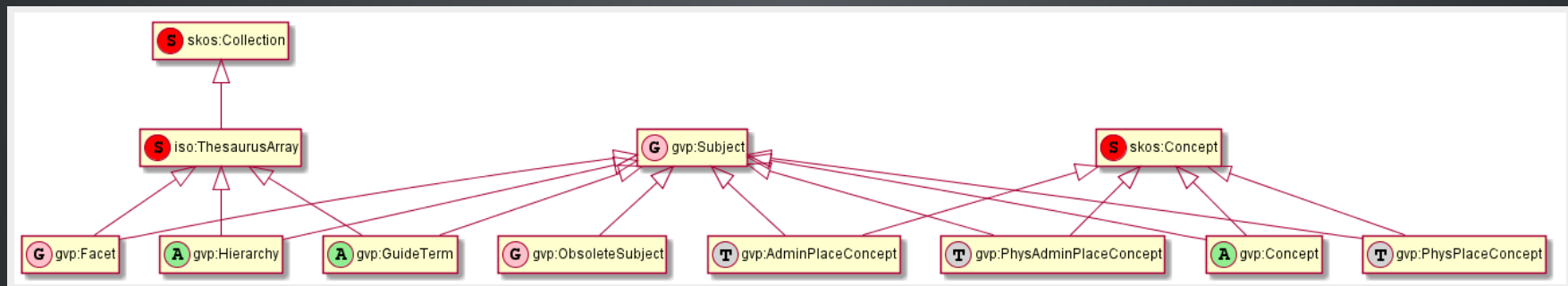
OBSOLETE SUBJECTS

- AAT obsolete subjects are 4.4% of valid subjects, which shows a good rate of editorial actions
- Obsolete subjects may have been used in client data. In order not to leave such data hanging, we publish minimal information:

```
aat:300123456 a gvp:ObsoleteSubject; # Was made non-publishable
   skos:prefLabel "Made up subject";
   skos:inScheme aat: ;
   schema:endDate "2012-12-31T12:34:56"^^xsd:dateTime.

aat:300386746 a gvp:ObsoleteSubject; # Was merged to a dominant Subject
   skos:prefLabel "Buncheong";
   skos:inScheme aat: ;
   dct:isReplacedBy aat:300018699; # Punch'ong
   schema:endDate "2012-12-31T12:34:56"^^xsd:dateTime.
```

HIERARCHICAL RELATIONS

Use iso:ThesaurusArray to allow Guide Terms below Concepts.
Infer cross-threading SKOS/ISO broader relations

KEY VALUES (FLAGS) ARE IMPORTANT

Excel-driven Ontology Generation™ (getty-codes.xls to getty-codes.ttl)

Key **val** can be mapped to Custom sub-class, Custom (sub-)prop, Ontology Value (eg <term/kind/Abbreviation>)

voca	table	field	val	ObjectProperty	Class	label	domain	range	subProperty	subClassOf	ConceptSchem
	subject	record_type	F		gvp:Facet	Facet				gvp:Subject, iso:ThesaurusArray	
AAT	subject	record_type	H		gvp:Hierarchy	Hierarchy Name				gvp:Subject, iso:ThesaurusArray	
AAT	subject	record_type	G		gvp:GuideTerm	Guide Term				gvp:Subject, iso:ThesaurusArray	
AAT	subject	record_type	C		gvp:Concept	Concept				gvp:Subject, skos:Concept	
	subject	record_type	-		gvp:ObsoleteSubject	Obsolete Subject				gvp:Subject	
TGN	subject	record_type	P		gvp:PhysPlaceConcept	Physical Place Concept				gvp:Subject, skos:Concept	
TGN	subject	record_type	A		gvp:AdminPlaceConcept	Administrative Place Concept				gvp:Subject, skos:Concept	
TGN	subject	record_type	B		gvp:PhysAdminPlaceConcept	Physical and Administrative Place Concept				gvp:Subject, skos:Concept	
	subject_rels	preferred	P	gvp:broaderPreferred		Preferred Parent	gvp:Subject	gvp:Subject	gvp:broader		
	subject_rels	preferred	N	gvp:broaderNonPreferred		Non-Preferred Parent	gvp:Subject	gvp:Subject	gvp:broader		
	subject_rels	hier_rel_type	G	gvp:broaderGeneric		Parent (Generic)	gvp:Subject	gvp:Subject	gvp:broader		
	subject_rels	hier_rel_type	P	gvp:broaderPartitive		Parent (Partitive)	gvp:Subject	gvp:Subject	gvp:broader		
	subject_rels	hier_rel_type	I	gvp:broaderInstantial		Parent (Instantial)	gvp:Subject	gvp:Subject	gvp:broader		
	term	preferred	P	gvp:prefLabelGVP		Preferred Label for GVP	gvp:Subject	skosxl:Label			
	term	aacr2_flag	Y	gvp:prefLabelLoC		Preferred Label for LoC	gvp:Subject	skosxl:Label			
	term	vernacular	V	gvp:termFlag		Term Flag	skosxl:Label	skos:Concept			term/flag/
	term	other_flags	A	gvp:termKind		Term Kind	skosxl:Label	skos:Concept			term/kind/
AAT	term	other_flags	C	gvp:termKind		Term Kind	skosxl:Label	skos:Concept			term/kind/
AAT	term	other_flags	CN	gvp:termKind		Term Kind	skosxl:Label	skos:Concept			term/kind/
AAT	term	other_flags	F	gvp:termKind		Term Kind	skosxl:Label	skos:Concept			term/kind/
AAT	term	other_flags	J	gvp:termKind		Term Kind	skosxl:Label	skos:Concept			term/kind/
AAT	term	other_flags	N	gvp:termKind		Term Kind	skosxl:Label	skos:Concept			term/kind/
AAT	term	other_flags	S	gvp:termKind		Term Kind	skosxl:Label	skos:Concept			term/kind/

```
gvp:Facet a owl:Class ;
    rdfs:isDefinedBy <http://vocab.getty.edu/ontology> ;
    rdfs:subClassOf gvp:Subject, iso:ThesaurusArray ;
    rdfs:label "Facet" ;
    rdfs:comment "One of the major divisions of a vocabulary" ;
    skos:example "Objects Facet (AAT), World (TGN)" ;
    dct:description "One of the major divisions of a vocabulary.\nExample: Objects Facet (AAT), World (TGN)".
```

ASSOCIATIVE RELATIONS ARE VALUABLE

More Excel-driven Ontology Generation™ (assoc-rels.xls to assoc-rels.ttl)

- Relations come in owl:inverseOf pairs (or owl:SymmetricProperty self-inverse)
- Shoudl we make a subproperty hierarchy?

fcode	icode	domain (C1)	LOD frel	range (C2)	LOD irel	Editor frel - From C1 to C2	Editor irel - From C2 to C1	fexample	iexample
2000		any	related to	any		any - related to - any	same	*gulf red* is related to *light red (pigment)*	*light red (pigment)* is related to *gulf red*
2001		any	formerly referred to	any		any - formerly referred - any	same	*gigues* formerly referred to *fiddles*	*fiddles* formerly referred to *gigues*
2100		any	distinguished from	any		any - distinguished from - any	same	*historic farms* are distinguished from *abandoned farms*; *naive art* is distinguished from *outsider art*	*abandoned farms* are distinguished from *historic farms*; *outsider art* is distinguished from *naive art*

```
gvp:aat2000_related_to a owl:ObjectProperty;
  rdfs:subPropertyOf skos:related;
  rdfs:domain skos:Concept; rdfs:range skos:Concept;
  # domain "any"; range "any";
  dc:identifier "2000";
  skos:prefLabel "aat2000_related_to";
  dc:title "related to - any";
  skos:example "gulf red is related to light red (pigment)";
  skos:scopeNote "generic relationship, not explained" ;
  dct:description """any - related to - any; generic relationship, not explained.
Example: gulf red is related to light red (pigment)""" .
gvp:aat2000_related_to a owl:SymmetricProperty.
```

ISO 25946: LATEST STANDARD ON THESAURI
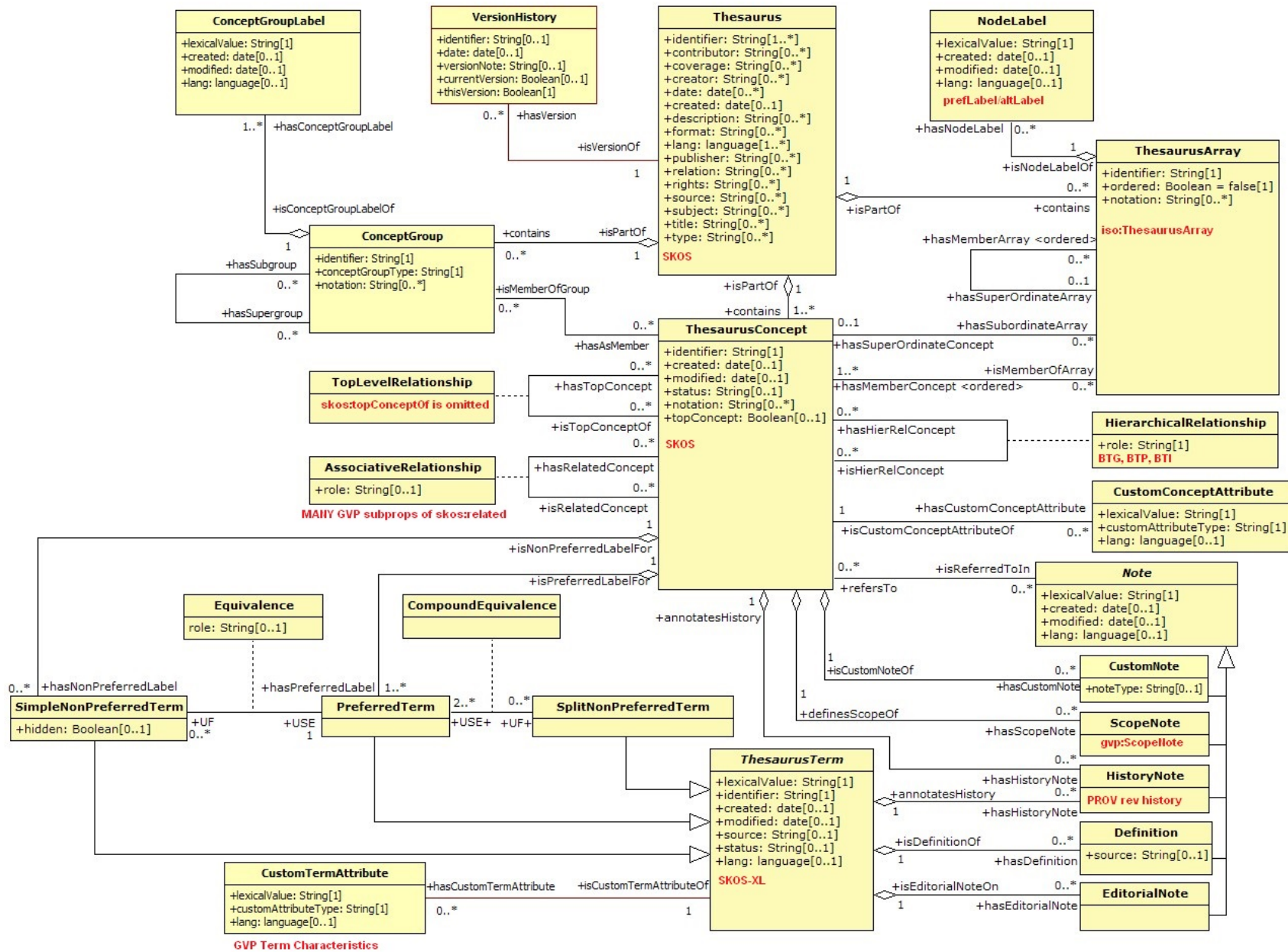
USE OF ISO:THESAURUSARRAY IN GVP

Use for ordered children. Novelty: if parent is Concept, use anonymous array. Careful crafting of URLs to make rdf:List
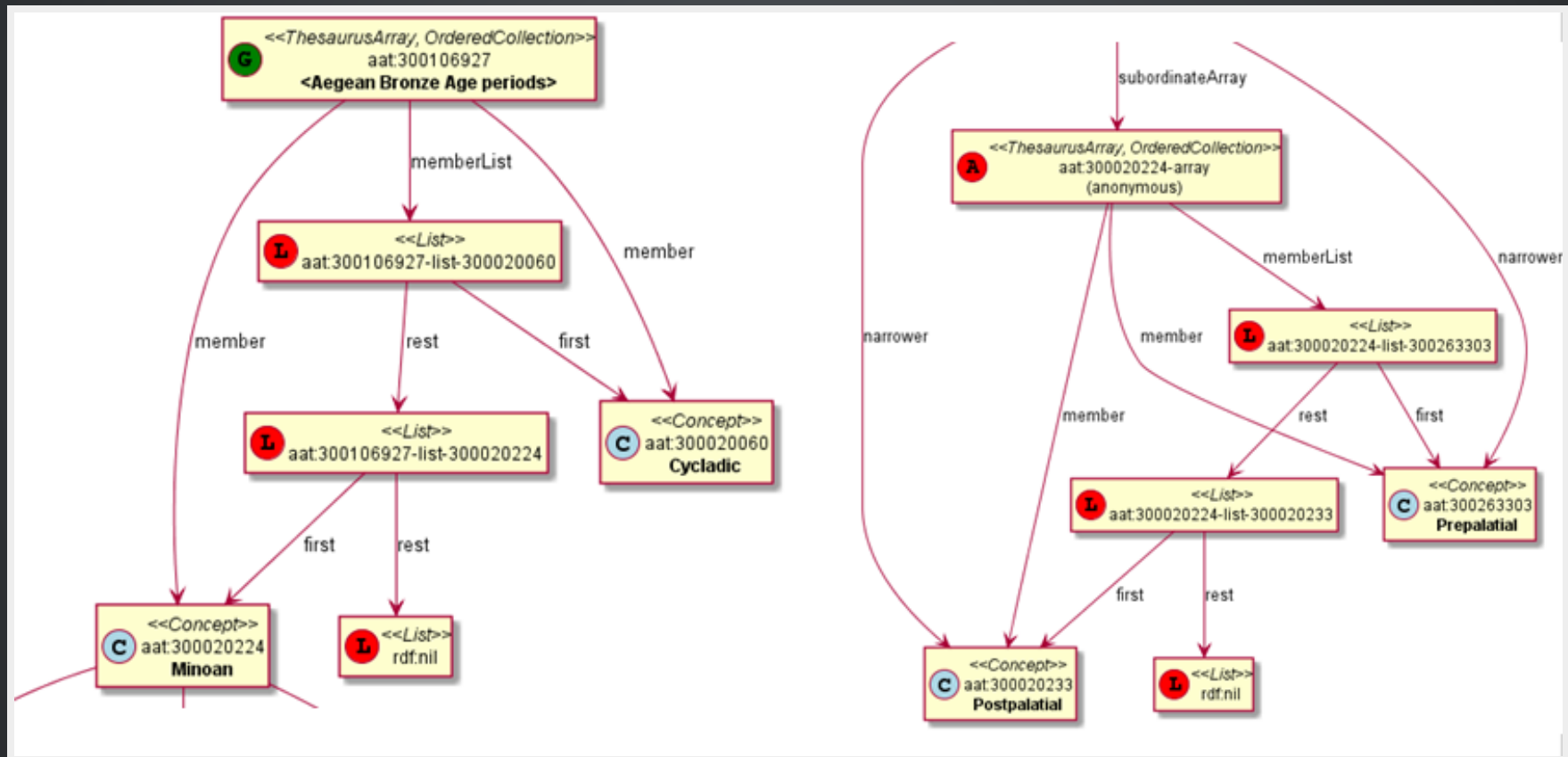
CONTRIBUTION TO ISO 25946

- Contributed to ISO 25946 ontology (LOV entry)
- First industrial use of ISO 25946
- Defined appropriate combinations of BTG, BTP, BTI relations (first formally defined in ISO).

On Compositionality of ISO 25964 Hierarchical Relations (BTG, BTP, BTI), V.Alexiev, J.Lindenthal, A.Isaac. Draft paper, Presentation at NKOS 2014 Workshop at DL 2014, London, 12 Sep 2014

	BTGx	BTPx	BTIx
BTGx	BTGE: numerous examples	BTPE: beak irons BTG anvil components BTP <anvils and anvil accessories>	no
BTPx	BTPE: anvil components BTP <anvils and anvil accessories> BTG <forging and metal-	BTPE: Sofia BTP Bulgaria BTP Europe	no: Sofia BTP Bulgaria BTI country, but Sofia

TERMS

Support both SKOS (plain) and SKOS-XL (rich) labels

```
aat:300198841 a skos:Concept , gvp:Subject , gvp:Concept ;
  skos:prefLabel "rhyta"@el-latn , "rhyta"@en , "rhytons"@es , "rhytons"@fr ,
"rytons"@nl ;
  skos:altLabel "rhyta"@es , "rhyton"@es , "rhyton"@en , "rhyton"@el-latn ...;
  skosxl:prefLabel aat_term:1000198841-en , aat_term:1000198841-el-Latn ...;
  skosxl:altLabel aat_term:1000198841-es , aat_term:1000297235-en ...
```

Rich info in SKOS-XL:

```
aat_term:1000198841-en a skosxl:Label ;
  dc:identifier "1000198841" ;
  dct:language aat:300388277 , gvp_lang:en ; # owl:sameAs
  dct:contributor aat_contrib:10000000 , aat_contrib:10000131 , aat_contrib:10
000088 ;
  skosxl:literalForm "rhyta"@en ;                    #### with Qualifier if applic
able
  gvp:term "rhyta"@en ;                              #### no qualifier
  gvp:displayOrder "1"^^xsd:positiveInteger ;
  gvp:termType <http://vocab.getty.edu/aat/term/type/Descriptor> ; #### Descr/
AltDescr/UseFor
  gvp:termPOS <http://vocab.getty.edu/aat/term/POS/PluralNoun> ;   #### Part o
f Speech
  gvp:contributorPreferred aat_contrib:10000000 , aat_contrib:10000088 ;
  gvp:contributorNonPreferred aat_contrib:10000131 ;
  gvp:sourcePreferred aat_source:2000024811 , aat_source:2000051089-term-10001
98841...;
  dct:source aat_source:2000024811 , aat_source:2000052946 , aat_source:200004
9728...;
```

LANGUAGES

IANA Language Subtag Registry: 9000 registrations (broken down by Type and Scope):

- 7769 languages
- 227 extlangs, e.g. ar-auz (Uzbeki Arabic)
- 116 language collections, e.g. bh (Bihari languages)
- 62 macrolanguages, e.g. zh (Chinese), cr (Cree)
- 4 special languages, e.g. und (Undetermined)
- 162 scripts, eg Latn (Latin), Japn (Japanese)
- 301 regions, e.g. US (United States), 021 (Northern America)
- 61 variants
- 67 redundant
- 26 grandfathered

CUSTOM LANGUAGE TAGS

Despite the richness of IANA tags, we had to define new tags, using several extension mechanisms:

SOURCES

bibo:Document or bibo:DocumentPart

```
aat_source:2000051089 a bibo:Document;
   dc:identifier "2000051089"
   bibo:shortTitle "AATA database (2002-)";
   dct:title "Getty Conservation Institute (GCI). database of AATA Online... 20
02-. ".
aat_source:2000051089-term-1000198841 a bibo:DocumentPart;
   dct:isPartOf aat_source:2000051089;
   bibo:locator "128257 checked 26 January 2012".
```

Applied to subject, term, scopeNote:

```
aat:300198841 # subject (rhyta)
   dct:source aat_source:2000030301-subject-300198841;
   dct:source aat_source:2000052378.
aat_term:1000198841-en # term "rhyta"@en
   gvp:sourceNonPreferred aat_source:2000049728;
   dct:source aat_source:2000051089-term-1000198841.
aat_scopeNote:34904 # scopeNote
   dct:source aat_source:2000046502.
```

CONTRIBUTORS

foaf:Agent

```
aat_contrib:10000131 a foaf:Agent;
   dc:identifier "10000131";
   foaf:nick "CDBP-DIBAM";
   foaf:name "Centro de Documentación de Bienes Patrimoniales...".
```

Applied to subject, term, scopeNote:

```
aat:300198841 # subject "rhyta"
   dct:contributor aat_contrib:10000131;
   dct:contributor aat_contrib:10000000.
aat_term:1000198841-en # term "rhyta"@en
   gvp:contributorNonPreferred aat_contrib:10000131;
   gvp:contributorPreferred aat_contrib:10000000.
aat_scopeNote:34904 # scopeNote
   dct:contributor aat_contrib:10000000.
```

HISTORIC INFO

Includes dates of applicability, historicFlag, comment. Applied to terms; relations, place types (using rdf:Statement)

```
aat_term:1000002693-en a skosxl:Label;
   skosxl:literalForm "lambruscatura"@en ;
   gvp:historicFlag <http://vocab.getty.edu/historic/historic> ;
   schema:startDate "0900"^^xsd:gYear ;
   schema:endDate "1700"^^xsd:gYear ;
   rdfs:comment "Medieval term for wainscoting".

aat_rel:300020271-aat2812_followed-300020269 a rdf:Statement;
   rdf:subject       aat:300020271;        # Second Dynasty (Egyptian)
   rdf:predicate     gvp:aat2812_followed;
   rdf:object        aat:300020269;        # First Dynasty (Egyptian)
   rdfs:comment      "Second Dynasty began ca. 2775 BCE";
   schema:startDate "-2785"^^xsd:gYear;
   schema:endDate    "-2765"^^xsd:gYear.

tgn:7011179-placeType-300008347 a rdf:Statement;
   rdf:subject       tgn:7011179;          # Siena
   rdf:predicate     gvp:placeTypePreferred;
   rdf:object        aat:300008347;        # inhabited place
   rdfs:comment      "settled by Etruscans (flourished 6th century BCE)";
   schema:startDate "-0800"^^xsd:gYear;
   gvp:displayOrder "1"^^xsd:positiveInteger.
```

PROVENANCE ONTOLOGY
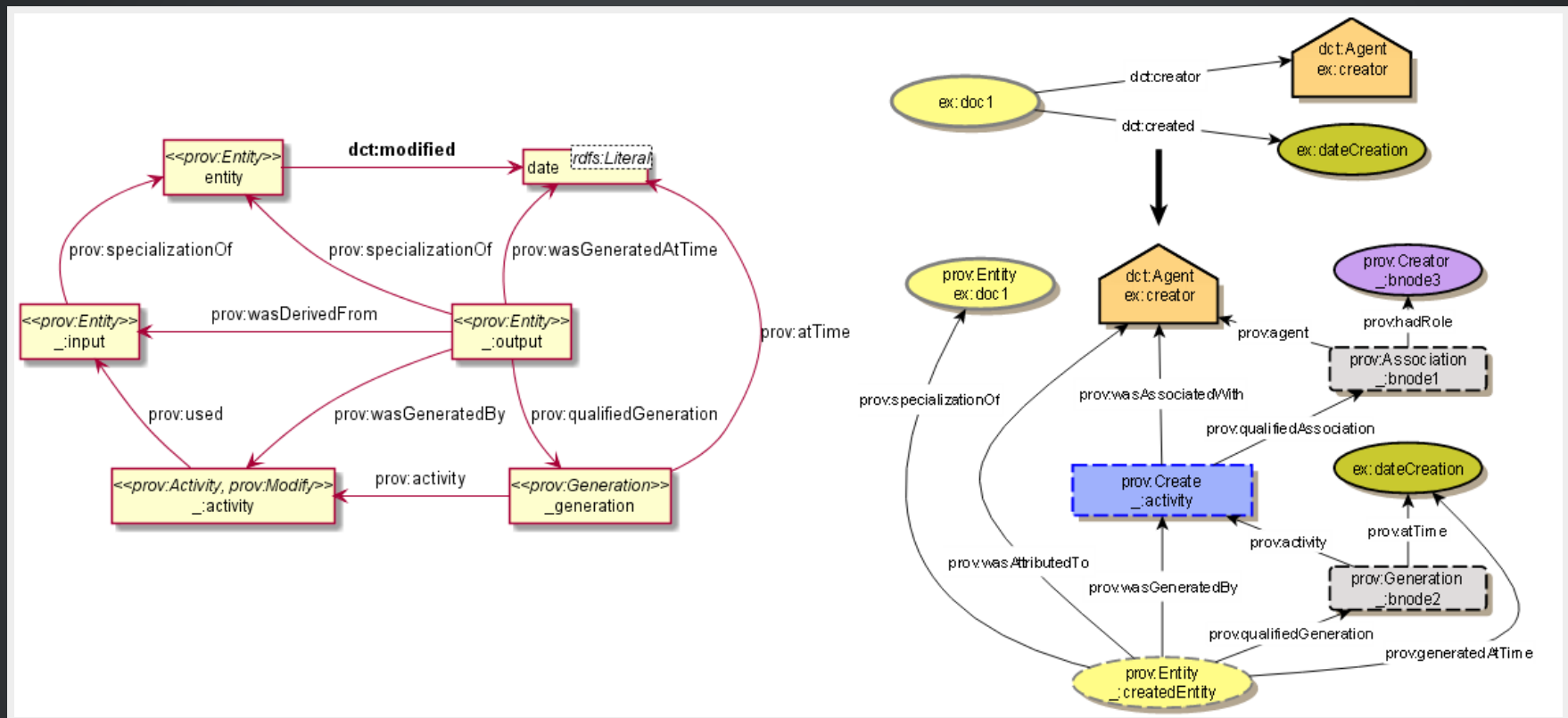
PROV considers that prov:Modify uses an unknown old entity "_:input" and generates an unknown new entity "_:output", both being specializations of the entity under consideration. Need to use prov:Generation so we can use prov:atTime and reflect that the modification is a prov:InstantaneousEvent.

REVISION HISTORY

PROV is too complex, so we simplify:

```
aat:300018699
   skos:changeNote aat_rev:12345, aat_rev:12346, aat_rev:12347;
   prov:wasGeneratedBy aat_rev:12345;
   dct:created  "2014-01-02T01:02:03"^^xsd:dateTime;
   dct:modified "2014-01-03T01:02:03"^^xsd:dateTime;
   dct:issued   "2014-01-04T01:02:03"^^xsd:dateTime.
aat_rev:12345 a prov:Activity, prov:Create;
   dc:type "created";
   prov:startedAtTime "2014-01-02T01:02:03"^^xsd:dateTime.
aat_rev:12346 a prov:Activity, prov:Modify;
   prov:used aat:300018699;
   dc:type "term added";
   dc:description "leggings, puttee (1000248060)";
   prov:startedAtTime "2014-01-03T01:02:03"^^xsd:dateTime.
aat_rev:12347 a prov:Activity, prov:Publish;
   prov:used aat:300018699;
   dc:type "issued";
   prov:startedAtTime "2014-01-04T01:02:03"^^xsd:dateTime.
```

TGN SPECIFICS: CONCEPT-PLACE DUALITY

Duality between Concept and its denotation (ala VIAF, UK BL, FR BnF, SE KB…)
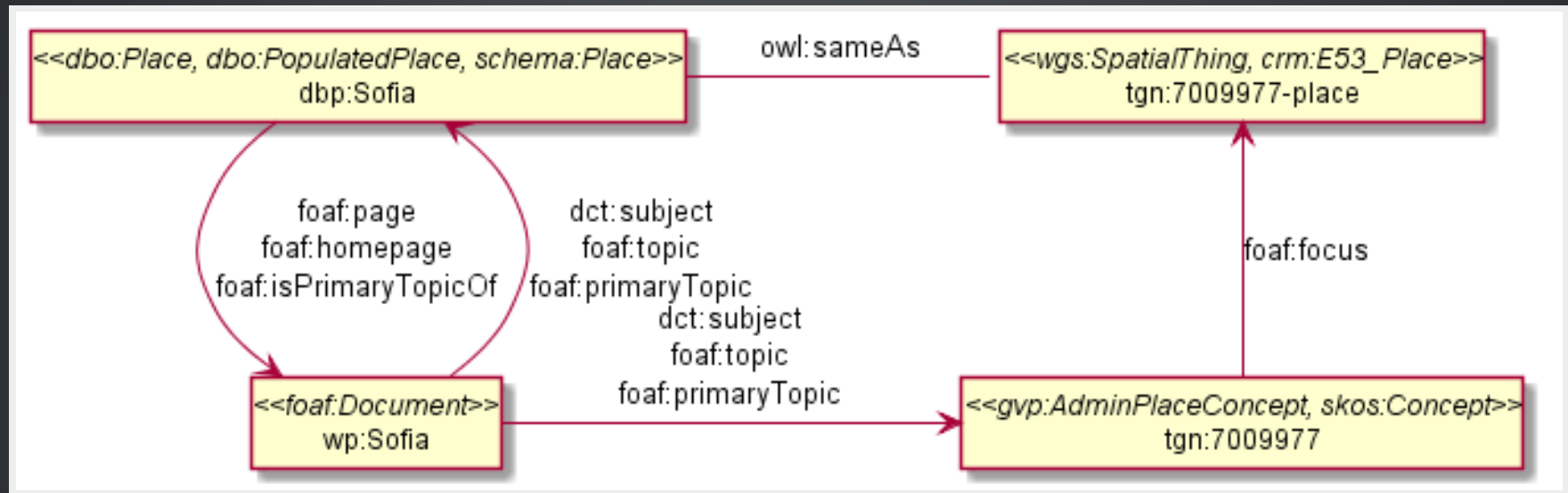
TGN SEMANTIC REPRESENTATION

Adds place types (TGN->AAT), Concept-Place duality, coordinates

INFERENCE

Hierarchical Relations (GVP->Standard) inference:
blue=standard, black=GVP, bold=closure, red=restriction
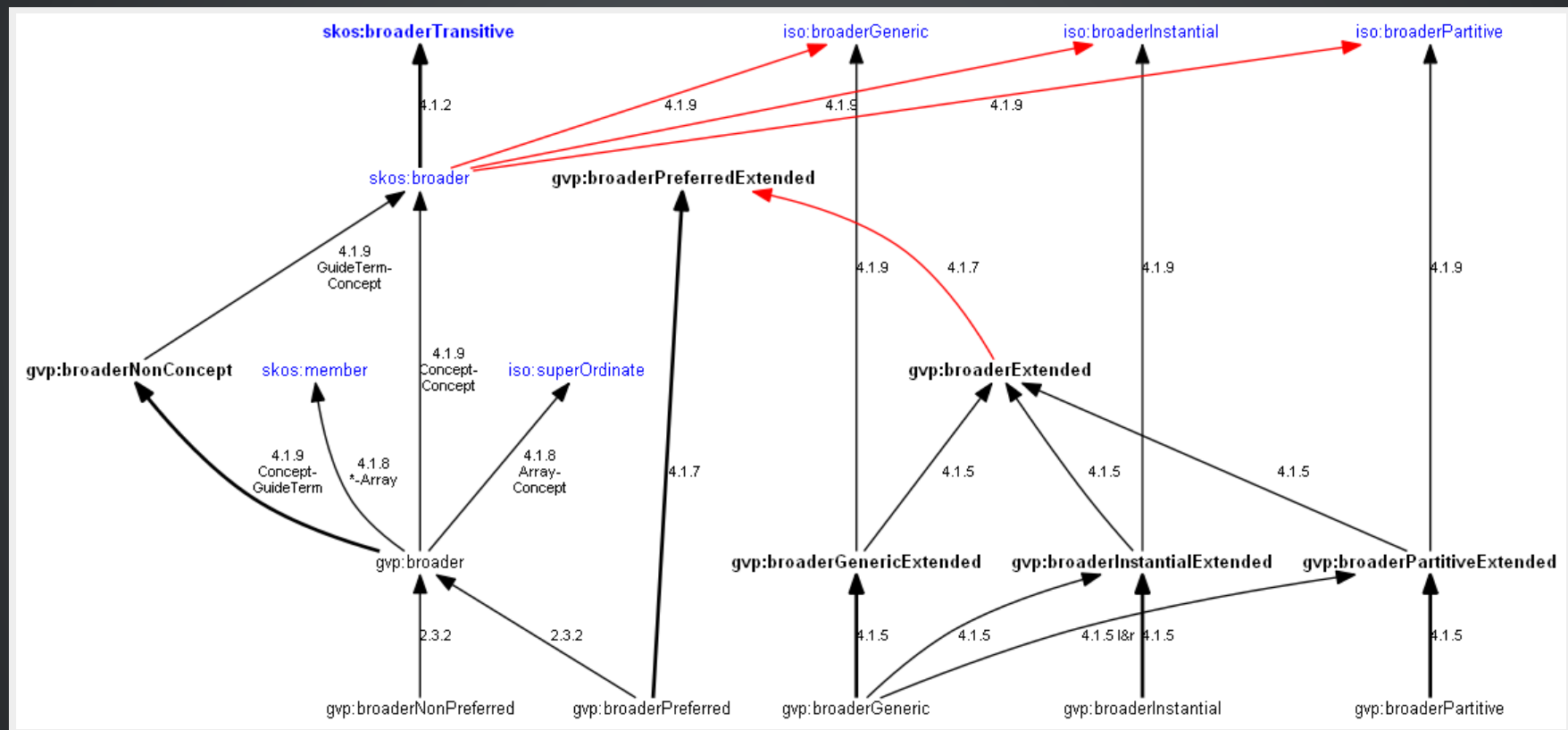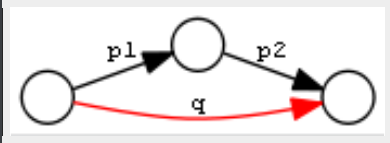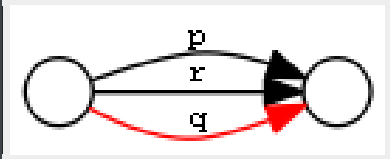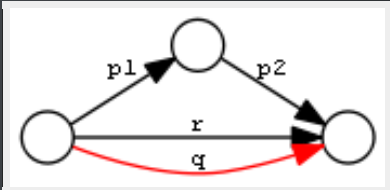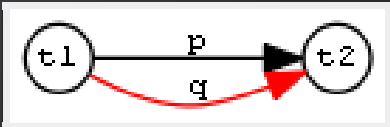
EXTENDED PROPERTY CONSTRUCTS

- TGN is much bigger: AAT: 10M, TGN: 94M (explicit statements)
- We infer 60M statements (1.58x expansion ratio)
- To do this quickly (on biweekly refresh), we decided to use OWLIM Rules
- While OWL2 has very powerful class constructs, its property constructs are quite weak
- Extending OWL2 Property Constructs: several extensions that we found useful

pN = premises, r = restriction (just another premise), tN = types, q = conclusion

EXTENDED PROPERTY CONSTRUCTS (2)

name	prop path	construct	illustration
PropChain	q <= p1 / p2	Chain of fixed length 2	
PropRestr	q <= p & r	Conjunction (restriction by property)	
PropChainRestr	q <= (p1 / p2) & r	Chain and restriction by property	
TypeRestr	q <= [t1] p [t2]	Restriction by two typechecks	

REDUCED SKOS INFERENCE

Eliminate redundant props (World has 1.2M narrowerTransitive, 2.4M semanticRelation). Break inference at red ovals

CONSTRUCT QUERY: GET & CACHE ALL DATA FOR SUBJECT
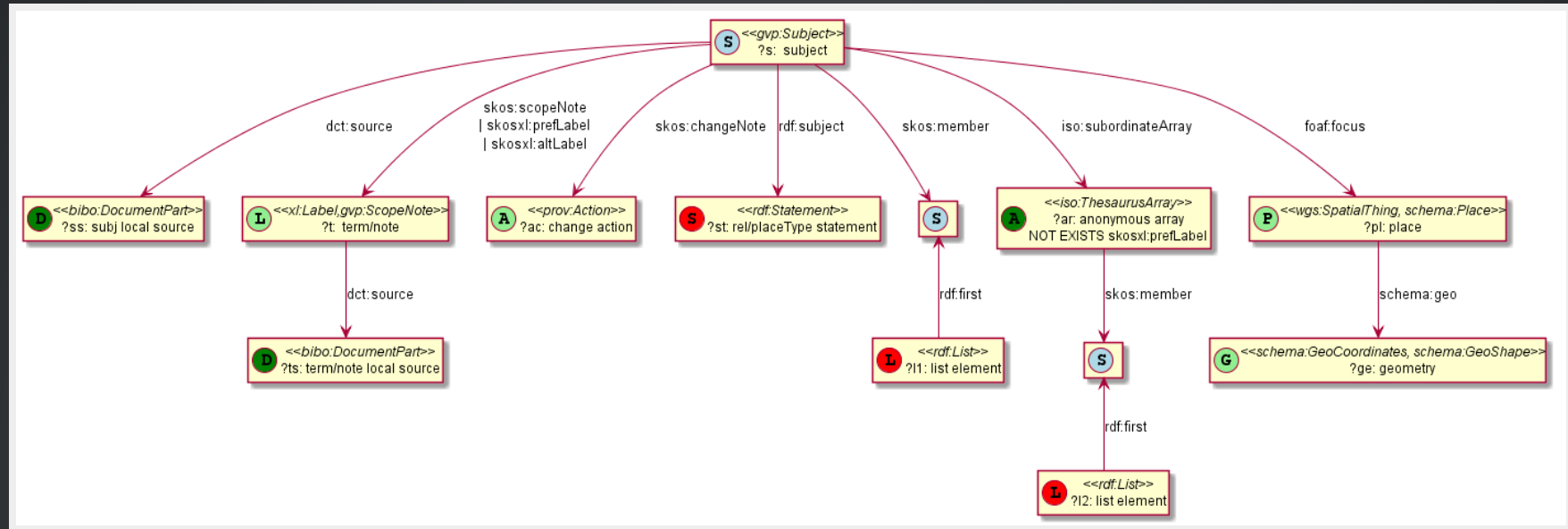
DOCUMENTATION

Getty Vocabularies: Linked Open Data

Very detailed: 100 pages! Linkable anchors:

vocab.getty.edu/doc/#Full_Text_Search

Semantic Representation

Version:	2.0
Last updated:	19 Aug 2014
HTML version:	http://vocab.getty.edu/doc/ (for link
PDF version:	http://vocab.getty.edu/doc/gvp-lod.
Formerly at:	http://www.getty.edu/research/tool:
Initial version:	Vladimir Alexiev, Joan Cobb, Greg
Updates:	Vladimir Alexiev, Joan Cobb

Table of Contents

DOC PRODUCTION

Edit in Word. Spellcheck, link check (below). Print as PDF. Save as Compact HTML, HtmlTidy, rewrite with original images.

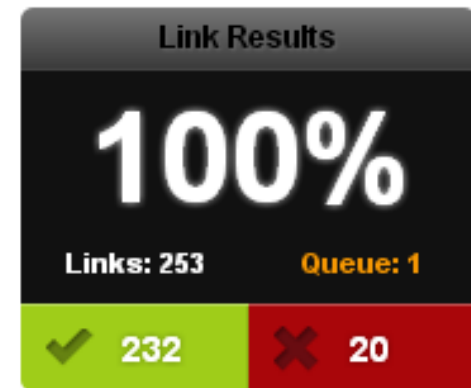## Getty Vocabularies: LOD

Semantic Representation

Version: 2.0
Last updated: 15 Jun 2014
HTML version: http://vocab.getty.edu/doc/ 500 (for linking)
PDF version: http://vocab.getty.edu/doc/gvp-lod.pdf 500 (for printing)
Formerly at: http://www.getty.edu/research/tools/vocabularies/lod/aat_semantic_representation.pdf

Link Results

100%

Links: 253   Queue: 1

✓ 232   ✗ 20

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Benefit: printable PDF and **linkable** HTML

SAMPLE QUERIES

Lots of them! The (!) says "read the documentation first". As part of helpdesk support, we're tracking usage and adding samples.

Sample queries: Append predefined namespaces:

⚠ SPARQL Select template, 5.1.1 Top-level Subjects, 5.1.2 Descendants of a Given Parent, 5.1.3 Subjects by Contributor Id, 5.1.4 Subjects by Contributor Abbrev, 5.1.5 Preferred Ancestors,
5.1.6 Full Text Search Query, 5.1.7 Find Person Occupations by broaderExtended, 5.1.8 Find Person Occupations by Double FTS, 5.1.9 Find Quartz Timepieces by Double FTS,
5.1.10 Find Subject by Exact English PrefLabel, 5.1.11 Find Subject by Language-Independent PrefLabels, 5.1.12 Find Subject by Any Label, 5.1.13 Find Terms by Language Tag,
5.1.14 Find Ordered Subjects, 5.1.15 Find Ordered Hierarchies, 5.1.16 Get Subjects in Order, 5.1.17 Find Contributors by Vocabulary, 5.1.18 Find Sources by Vocabulary,
5.2.1 Subject Preferred Label, 5.2.2 All Data for Terms of Subject, 5.2.3 Preferred and Vernacular Terms, 5.2.4 Scientific Names by Language, 5.2.5 Scientific Names not in English and Latin,
5.2.6 All Data For Subject, 5.2.7 Historic Information on Relations, 5.2.8 Historic Information of Terms, 5.2.9 Preferred Terms for Contributors, 5.2.10 Preferred Terms for Sources,
5.2.11 Concepts Related by Particular Associative Relation, 5.2.12 Languages and ISO Codes, 5.2.13 Language URLs, 5.3.1 Places by Type, 5.3.2 Places, with English or GVP Label,
5.3.3 Places by Direct and Hierarchical Type, 5.3.4 Breakdown of Sovereign States by Type, 5.3.5 Inhabited Places That Were Sovereign States, 5.3.6 Places by Type and Parent Place,
5.3.7 Places by Type, with placeTypePreferred, 5.3.8 Places by Triple FTS, 5.3.9 Places by FTS Parents, 5.3.10 Capitals by Type, 5.3.11 Capitals by Association,
5.3.12 Members of the European Union, 5.3.13 Members of the United Nations, 5.3.14 Geo Chart with SPARQL, 5.3.15 Column Chart with SPARQL,
5.3.16 Countries and Capitals By Type and Containment, 5.3.17 Places by Coordinate Bounding Box, 5.3.18 Places Within Bounding Box, 5.3.19 Places by Type Within Bounding Box,
5.3.20 Places Outside Bounding Box (Overseas Possessions), 5.3.21 Places Nearby Each Other, 5.4.1 Descriptive Info from VOID, 5.4.2 Number of Entities from VOID,
5.4.3 Number of Local Sources (Dynamic), 5.4.4 Number of Global Sources (Dynamic), 5.4.5 Number of Terms per Language, 5.4.6 Number of AAT Revision Actions,
5.5.1 Ontology Classes and Properties, 5.5.2 Ontology Values

SAMPLE QUERY: BAR CHART WITH SPARQL

Number of members of the UN per year. See doc or jsfiddle with it

SAMPLE QUERY: GEO CHART WITH SPARQL

When each nation joined the UN. See doc or jsfiddle with it.

1,945 — 2,002
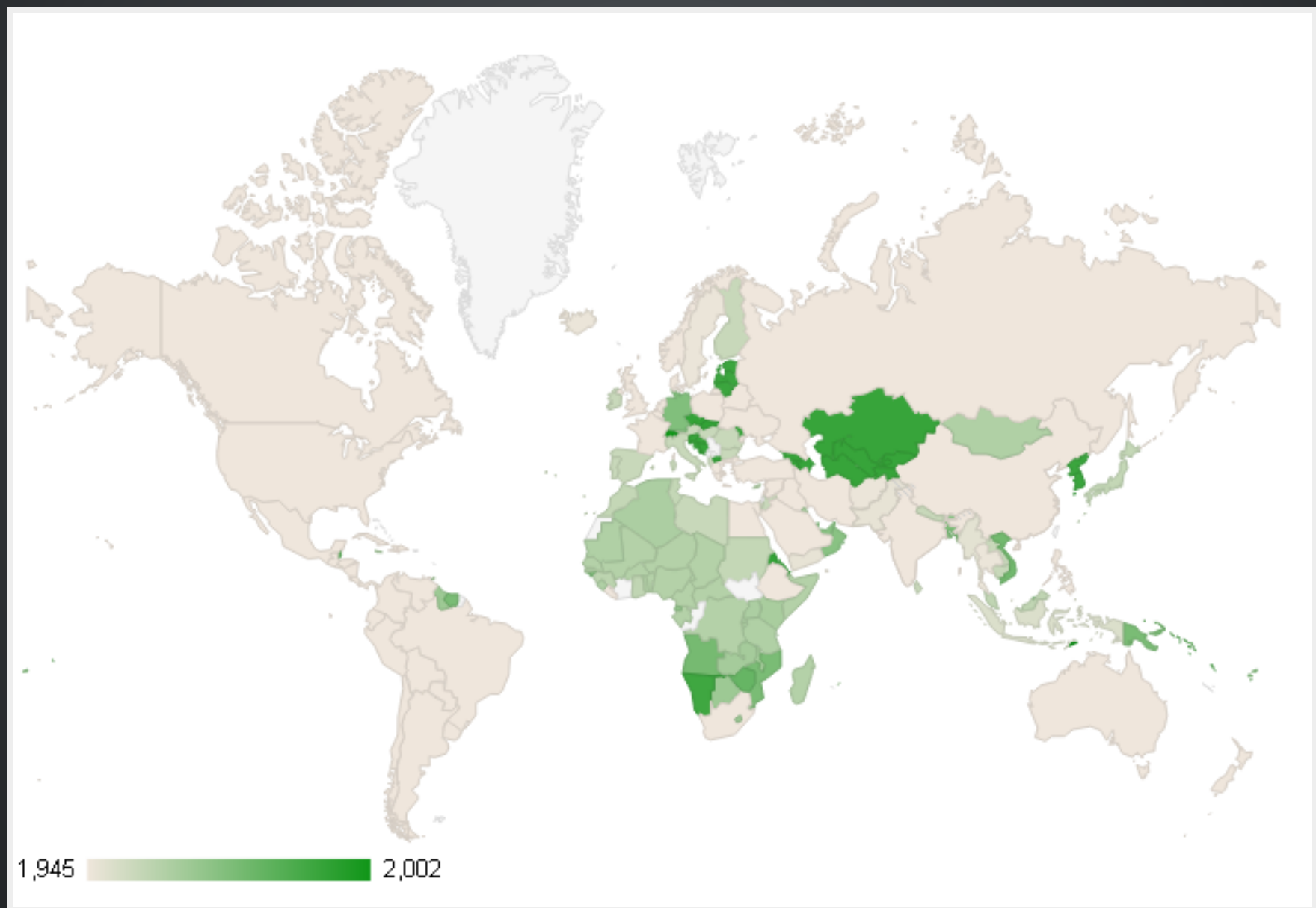
SAMPLE QUERY: OVERSEAS POSSESSIONS OF THE NETHERLANDS

```
# 5.3.20 Places Outside Bounding Box (Overseas Possessions)
select ?place ?name ?lat ?long {
  ?place skos:inScheme tgn: ;
    foaf:focus [wgs:lat ?lat; wgs:long ?long];
    gvp:prefLabelGVP [xl:literalForm ?name];
    gvp:broaderPartitiveExtended [rdfs:label "The Netherlands"@en]
  filter (!(50.787185 <= ?lat && ?lat <= 53.542265 && 3.389722 <= ?long && ?lo
ng <= 7.169019))}
```

Results for # 5.3.20 Places... (100 of 596)

Download

place	name	lat	long
tgn:7256571	Back Off Bay@nl	17.45	-62.95
tgn:7005674	Philipsburg	18.05	-63.0833
tgn:1011622	Basora, Punta	12.4167	-69.85

GVP LOD USAGE

People started using AAT and TGN right after their release

- AAT Concept selection (usually by autocompletion): EADitor, xEAC, VRA Editor, MODES, DIGIMUS, Drupal Web Taxonomy
- TGN Place selection: same as above; Portable Antiquities (finds.org.uk), Nomisma, Kerameikos
- Visualization: Hierarchies with d3js, LOD with lodlive.it
- Semantic enrichment: Europeana (Rijksmuseum, Museo Galileo, Erfgoedplus.be), Partage Plus (Art Nouveau to Europeana)

Vocab	Actual	Potential
AAT	9	6
TGN	3	
ULAN		1

USAGE STORIES

Usage Stories (internal confluence)

THANKS FOR YOUR TIME!

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