

# Linked Data: Publication, Coreferencing and Usage with the Getty Vocabularies

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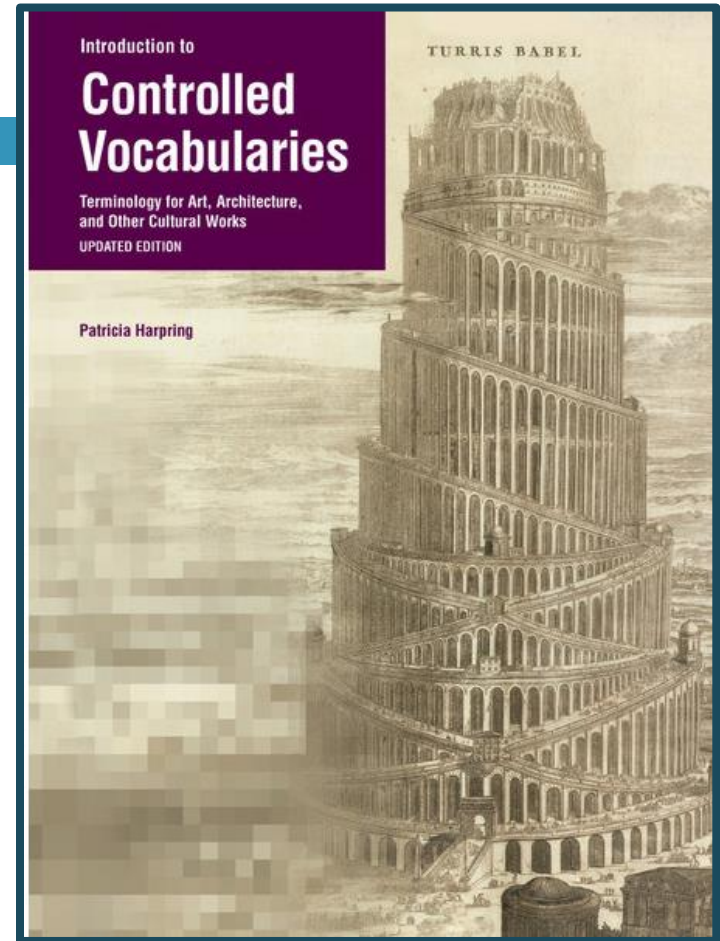
SOFTWARE ARCHITECT, J PAUL GETTY TRUST

# What Are the Getty Vocabularies?

AAT TGN ULAN CONA



- These presentations are not primers on **controlled vocabularies** nor on **what is LOD**
- They focus on issues surrounding the Getty vocabularies specifically
- For basic information on vocabularies, see *Introduction to Controlled Vocabularies* (Harpring, revised 2013) and its bibliography

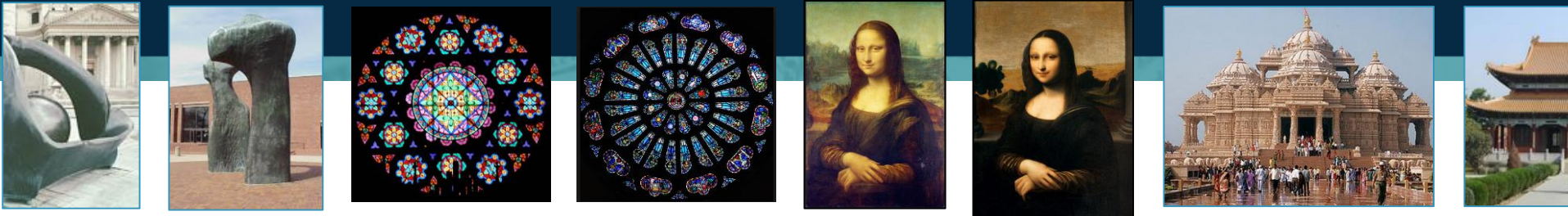


- For basic information on what is LOD, see this Europeana video <http://vimeo.com/36752317>. World Wide Web Consortium (W3C) Glossary: [www.w3.org/TR/ld-glossary/](http://www.w3.org/TR/ld-glossary/)

# The Getty Vocabularies

Discover, link, access, retrieve, research, catalogue, index

Explore art, architecture, cultural heritage, conservation, archaeology, and beyond



## What are the Getty vocabularies?

- *Catherine wheel* or *rose window*? *Mona Lisa* or *La Gioconda*?
- The AAT, TGN, ULAN and CONA contain multilingual terminology and other related data to describe
  - visual art, architecture, other cultural heritage works, conservation, archaeology, archival materials, visual surrogates, and related bibliographic materials

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- Getty vocabularies are valued as authoritative
  - Grow through contributions from experts
  - Contributors and sources are cited
- Compiled, merged, edited, and published by the Getty Vocabulary Program and our talented, tireless technical team
- **Data is made available in various ways:** via online searching; relational tables, XML format, Web services APIs
  - **Now as Linked Open Data:** structured and published to make it openly accessible and shareable on the Semantic Web
    - **Open Data Commons Attribution License (ODC-By) v1.0**
    - Allows sharing, creation, adaptation of data with attribution

# The Getty Vocabularies

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- Getty vocabularies are thesauri compliant with national (NISO) and international (ISO) standards for thesaurus construction
- They are compliant with / map to other standards:
  - CDWA (Categories for the Description of Works of Art)
  - CCO (Cataloging Cultural Objects)
  - VRA Core (Visual Resources Association core categories)
  - LIDO (Lightweight Information Describing Objects)
  - CIDOC CRM (CIDOC Conceptual Reference Model) (ISO 21127:2006)
  - etc.

# The Getty Vocabularies

Discover, link, access, retrieve, research, catalogue, index

Explore art, architecture, cultural heritage, conservation, archaeology, and beyond

- Among the features that allow the Getty vocabularies to be used in cataloging, retrieval, and linking are the following:
  - Each Getty vocabulary records and terms are identified by **unique numeric IDs**
  - The Getty vocabularies are linked to each other
  - The Getty vocabularies share a core data structure

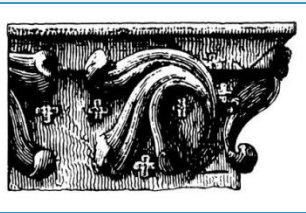
# Scope and Content of the Getty Vocabularies

AAT      TGN      ULAN      CONA





amfoor  
 amphorae  
 arc-boutant  
 brittleness  
 Buddhism  
 calligraphy  
 emulsifier  
 façades  
 flying buttress  
 飛扶壁  
 lithographer  
 litógrafos  
 luchtbogen  
 orthogonal plan  
 Macedonian  
 millwork  
 Rinascimento  
 stupa  
 Sturzbecher  
 travertine  
 weft wrapping  
 yastiks  
 zeppelin  
 Zigula  
 zinc oxide



# AAT, the Art & Architecture Thesaurus®

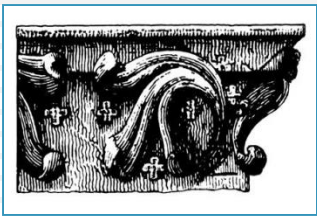
Generic terms for describing art and architecture (decorative arts, other material culture, visual surrogates, archival materials, archaeology, and conservation) (e.g., *oil paintings, Baroque, lithographers, sintering*).

Current totals: 36,000 records; 245,000 terms

- AAT is multilingual; large translation projects are underway
- Conceptually organized from terms to describe abstract concepts to generic terms for concrete, physical artifacts
- Facets are the upper levels of the AAT structure
- AAT is not organized by subject matter or discipline



amfor  
 amphorae  
 arc-boutant  
 brittleness  
 Buddhism  
 calligraphy  
 emulsifier  
 fa  
 fly  
 飛  
 lit  
 litóg  
 luch  
 orth  
 Macedonia  
 millwork  
 Rinascimer  
 stupa  
 Sturzbecher



# AAT, the Art & Architecture Thesaurus®

## Thesaural relationships



**stirrup cups**  
**coaching glasses**  
**hunting glasses**

*associative*



**sturzbechers**  
**Sturzbecher**  
**stortebekers**

**distinguished from**

**Objects Facet** *hierarchical*  
 .... Furnishings and Equipment  
 ..... Containers  
 ..... culinary containers  
 ..... <vessels for serving / consuming food  
 .....

**rhyta** *equivalence*  
 rhyton  
 rhytons  
 rhea  
 rheon  
 rheons  
 ritón





## Sample record

**ID:** 300132869

**Terms:**

bobbin lace (pref, en)  
bone lace (en)  
cushion lace (en)  
梭心蕾絲 (zh)  
線軸編織花邊 (zh)  
kloskant (nl)  
dentelle aux fuseaux (fr)  
encaje de bolillos (es)  
encaje de bolillo (es)  
Klöpplspitze (de)  
Klöpplspitzen (de)

**Associative Relationships**

requires ... lace pillows (<textile fabricating tools and equipment>...Objects Facet) [300132869]

**Hierarchical Relationships (poly)**

.Objects Facet  
... Visual & Verbal Communication  
..... Visual Works  
..... visual works (works)  
..... <visual works by material >  
..... needlework (visual works)  
..... lace (needlework)  
..... bobbin lace

**Contributors:** VP,CHIN,AS,RKD,lFM-SMB-PK,CDPB-DIBAM

**Sources:** Earnshaw, Clabburn, Needleworker's Dictionary (1976); Identification of Lace, 2d ed. (1984); Ginsburg, Illustrated History of Textiles (1991)

**Note:** With "needle lace," one of two primary types of handmade lace. It is characterized by being made by ...

**Chinese (traditional)** ..... 與「針織蕾絲 (needle lace)」同為主要的手工蕾絲, 其特色是以纏繞於線軸或梭心...

**Dutch** ..... Een van de twee belangrijkste soorten met de hand vervaardigde kant; 'naaldkant' is ...

**German** ..... Zusammen mit der "Nadelspitze" eine der wichtigsten...

**Spanish** ..... Junto a "encaje a aguja", uno de los dos tipos principales de ...



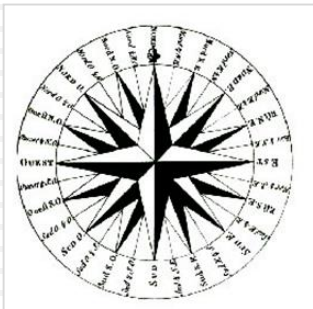
Translations are underway

bobbin lace ([preferred](#), [C,U,LC,English-P,D,U](#))  
 bone lace ([C,U,English,UF,U,N](#))  
 cushion lace ([C,U,English,UF,U,N](#))  
 lace, bobbin ([C,U,English,UF,U,N](#))  
 pillow lace ([C,U,English,UF,U,N](#))  
 梭心蕾絲 ([C,U,Chinese \(traditional\)-P,D,U,U](#))  
 線軸編織花邊 ([C,U,Chinese \(traditional\),UF,U,U](#))  
 骨架花邊 ([C,U,Chinese \(traditional\),UF,U,U](#))  
 枕墊花邊 ([C,U,Chinese \(traditional\),UF,U,U](#))  
 suō xīn lěi sī ([C,U,Chinese \(transliterated Han\)](#))  
 suo xin lei si ([C,U,Chinese \(transliterated Piny\)](#))  
 so hsin lei ssu ([C,U,Chinese \(transliterated Wa](#))  
 kloskant ([C,U,Dutch-P,D,U,U](#))  
 dentelle aux fuseaux ([C,U,French-P,D,U,PN](#))  
 merletto a tombolo ([C,U,Italian-P,D,U,PN](#))  
 encaje de bolillos ([C,U,Spanish-P,D,U,PN](#))  
 encaje de bolillo ([C,U,Spanish,AD,U,SN](#))  
 Klöppelspitze ([C,U,German,AD,U,SN](#))  
 Klöppelspitzen ([C,U,German-P,D,U,PN](#))

Klöppeispitzen ([C,U,German-P,D,U,PN](#))

- **Getty Conservation Institute** (Los Angeles, California)
- **Academia Sinica** (Nankang, Taiwan)
- **Netherlands Institute for Art History** (RKD: Bureau AAT) (The Hague, The Netherlands)
- **Centro de Documentación de Bienes Patrimoniales** (Dirección de Bibliotecas, Archivos y Museos) (Santiago, Chile)
- **Staatliche Museen zu Berlin Preussischer Kulturbesitz** (Berlin, Germany)
- *[Canadian Heritage Information Network (CHIN) (Gatineau, Quebec, Canada), Istituto Centrale per il Catalogo e la Documentazione (Rome, Italy)(ICCD)] and other contributors of partial translations; future translations in French, Italian, Portuguese, other languages*

Angel Falls  
Athens  
Athínai  
Αθήναι  
Ayers Rock  
Bay of Biscay  
Bhārat  
Bora-Bora  
Burkina Faso  
Casablanca  
Chichén Itzá  
Donner Pass  
Firenze  
Gdansk  
Holy See  
Los Alamos  
Luxor  
Micronesia  
New Zealand  
Perú  
Rapa Nui  
Taipei  
臺北  
Toronto  
Yisrael



## TGN, the Getty Thesaurus of Geographic Names®

Names, other information for current & historical administrative places (cities, nations, empires) and physical features (e.g., *Firenze*, *Roman Empire*, *Ganges River*).

Current totals: 1,241,000; 1,800,000 names

- It includes formerly inhabited places, archaeological sites, and historical places with unknown exact locations (i.e., “lost settlements”)
- It focuses on places important to study of art and related disciplines
- It grows through contributions from large national geographic databases, the expert user community, archaeology projects, scholars, etc.



# TGN, the Getty Thesaurus of Geographic Names®

## Sample record

**ID:** 7011179

**Names:**

- Siena
- (it,en,es,fr,nl,de)
- Σιένα (el)
- Siyenah
- 锡耶纳 (zh)
- シエーナ (ja)
- Sienese (en-adj)
- Sienna (h-en)
- Sena Julia (h-la)
- Sanna (h)
- Saena (h)

**Hierarchical Rels. (polyhier.)**

- World (facet)
- .. Europe (continent)
- ... Italy (nation)
- .... Tuscany (region)
- ..... Siena (province)
- ..... Siena (inhabited place)

- World (facet)
- .. Europe (continent)
- ... Italian Peninsula (peninsula)
- .... Etruria (former confederation)
- ..... Siena (inhabited place)
- Historical: Late Etruscan

**Associative Rels**

- ally of** Pisa ..(inhabited place) [7006082]
- Ghibelline allies, 13th-14th centuries

*Contributors:* BHA, FDA, GRLPSC, VP

*Sources:* *Annuario Generale* (1980); *Canby, Historic Places* (2007) 2/861; *Dizionario Corografico Toscana* (1977) 1508; *Library of Congress Subject Headings* (2002-); *Milanesi, Storia dell'Arte Senese* (1969) *passim*; *NGA/NIMA database* (2003-) -129709; *TCI: Toscana* (1984) 479 ff; *Times Atlas of the World* (1992) 183; *UNESCO World Heritage Centre* [online] (1992-) accessed 20 July 2010; *Webster's Geographical Dictionary* (2007) 1114

**Place Types**

- inhabited place settled by Etruscans  
(flourished by 6th century BCE)
- city
- archiepiscopal see
- commune (administrative) since 1125
- cultural center
- university center
- world heritage site

AAT

*Lat:* 43 19 07 N (43.3180)

*Long:* 011 19 50 E (11.3300)

*Elevation:* 1056.430 feet (322.0000 meters)

**Note:** Siena was founded as an Etruscan hill town; later was the Roman city of Sena Julia (3rd century BCE). It flourished under the Lombard kings (6th century CE) and was Medieval self-governing commune ...

Achilles Painter

An Qi

安岐

Bartolo di Fredi  
Burgkmair, Hans,

the elder

Galleria degli Uffizi

Gilbert & George

Katsushika Hokusai

Kicking Bear

Master of Boi

Méraud, Pierre-

Antoine, père

Ngapatari, Hakaraia

O'Keeffe, Georgia

Pei, I. M.

Rothko, Mark

Sa'īd, Mahmūd

Skidmore, Owings

& Merrill

unknown Mende

Vikramaditya I

Wren, Christopher

Zeuxiades

Ζευξιάδης



## ULAN, the Union List of Artist Names®

Names, other information for people (artists, patrons, sitters) and corporate bodies (repositories, studios) related to the design, creation, patronage, collection, conservation, etc. of art, architecture, and other cultural materials (e.g., *Bartolo di Fredi, National Palace Museum*)  
Current totals: 223,000 records; 582,000 names

- It includes current and historical associative relationships (e.g., *student-teacher, firm-member*)
- Contributions to ULAN are from expert communities (museums, art libraries, cataloging projects, etc.)
- ULAN is contributed to the Virtual International Authority File (VIAF) (joint project with US Library of Congress and numerous libraries worldwide to combine name authority)



# ULAN, the Union List of Artist Names®

## Sample record

**ID:** 500115493

**Names:**

- Dürer, Albrecht (pref,de,en)
- Albrecht Dürer
- Duerer, Albrecht (en)
- Durer, Albrecht (en)
- Dürero, Alberto (it)
- Durerus, Albertus (la)
- Direr, Albreht
- Djurer, Albrecht
- Dyûrâ, Albrecht
- Dīrers, Albrehts
- Alberto Duro Tedesco
- デューラー, アルブレヒト (ja)
- 阿尔布雷希特·丢勒 (zh)

**Nationalities:**

- German (pref)
- Bavarian

**AAT**

**Roles:**

- artist (preferred)
- painter
- printmaker
- engraver (printmaker)
- woodcutter
- draftsman
- illustrator
- designer
- mathematician
- theorist
- portraitist
- religious artist

**Gender:** male

**Birth and Death Places:**

- Born: Nuremberg (Bavaria, Germany) (inhab place)
- Died: Nuremberg (Bavaria, Germany) (inhab place)

**AAT**

**TGN**

**Events:**

- active: Nuremberg (Bavaria, Germany) (inhab pl)
- active: Venice (Veneto, Italy) (inhabited place)

**Associative Relationships:**

- apprentice of Wolgemut, Michael; 1486 to 1488  
.....(German painter, printmaker, 1434/1437-1519)
- child of Dürer, Albrecht, the elder  
.....(German goldsmith, 1427-1502)
- founder of ...Albrecht Dürer Workshop  
..... (German workshop, established 1495)
- patron was ...Maximilian I, Holy Roman Emperor  
..... (Roman emperor, 1459-1519)

**Contributors:**

VP,JPGM,Avery,WCI,Prov,GRLPSC,BHA,CCA

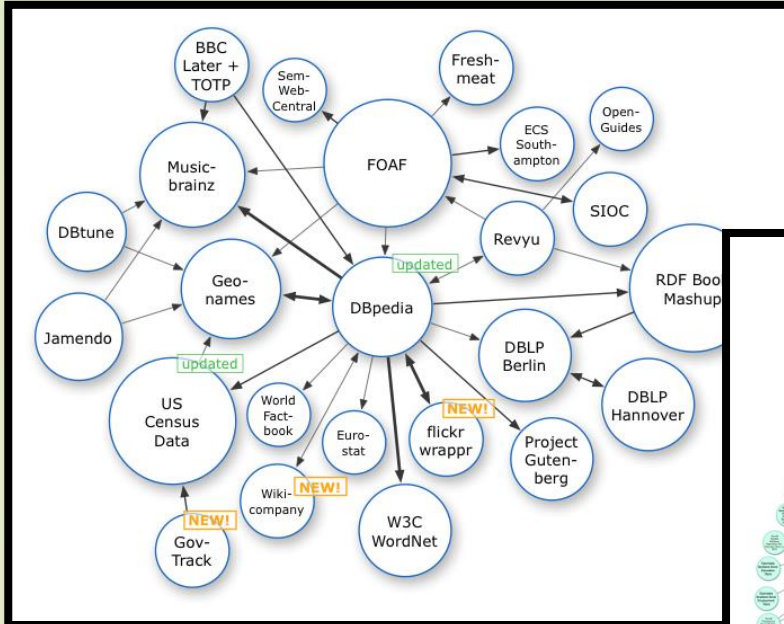
**Sources:** Bartrum, Albrecht Dürer and his Legacy (2002); Bénézit, Dictionnaire des Peintres (1976; Bartsch, Le peintre graveur.



# Basics of Linked Data

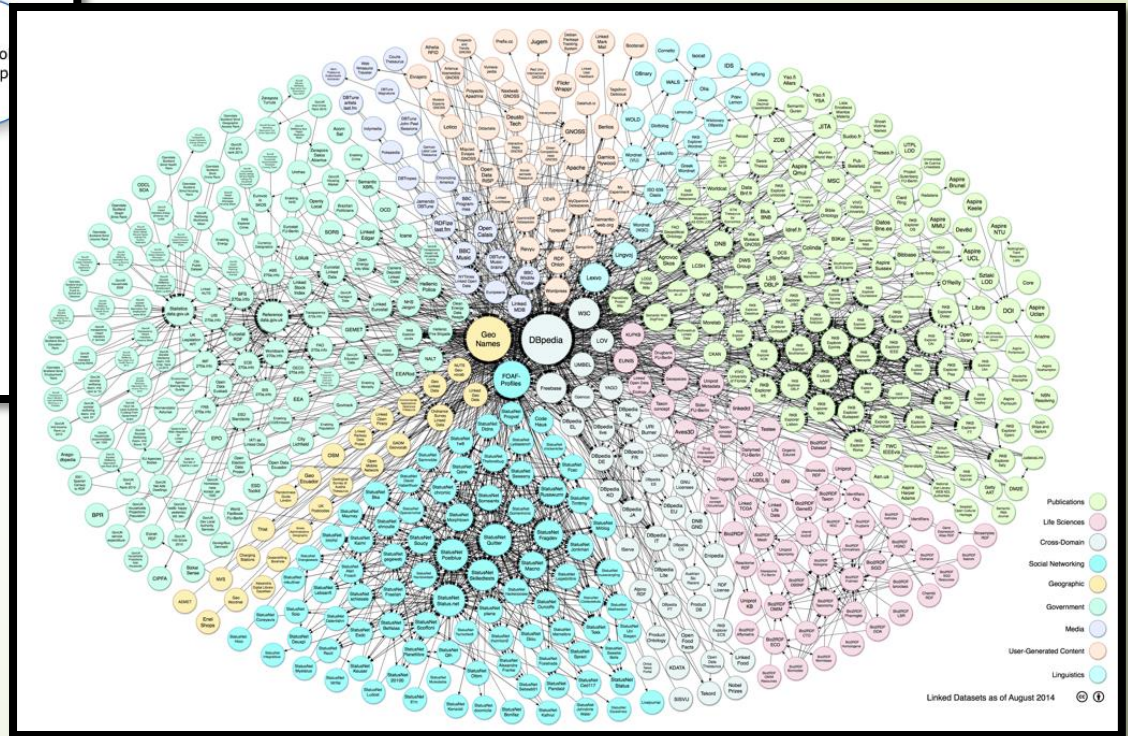
- Universal Resource Identifier (URI) – “an ASCII string used to identify things on the Semantic Web” (<http://www.w3.org/wiki/URI>)
  - <http://vocab.getty.edu/aat/300198841>
  - <http://vocab.getty.edu/tgn/1000193>
- URIs are linked to each other through triples composed of subject-predicate-object relationships
  - `<http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2008/05/skos-xl#prefLabel> <http://vocab.getty.edu/aat/term/1000198841-en> .`
  - `<http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2004/02/skos/core#prefLabel> "rhyta"@en .`
- The definitions of data elements and links described by ontologies
  - <http://www.w3.org/2004/02/skos/core#>
  - <http://www.w3.org/ns/prov#>
  - <http://purl.org/dc/elements/1.1/>
- Data is delivered to a requesting agent through a triple serialization using HTTP  
RDF/XML, Notation-3 (N3), Turtle, N-Triples, RDFa, and RDF/JSON

# Growth of the LOD Cloud since 2007



View of LOD as of October 2007  
12 Datasets

LOD as of August 2014  
570 Datasets



<http://lod-cloud.net/>

# Where to start the implementation?

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- Using the mapping developed by Marcia Zeng, we wanted to see what the Getty AAT looked like as LOD
- D2RQ provided a simple platform for taking our existing RDBMS tables and serving them as URIs
- Attached property definitions to exiting database fields

# AAT Subject Record in D2RQ (1<sup>st</sup> try)

**SUBJECT #300198841**

Resource URI: <http://localhost:2020/resource/AAT/Subject/300198841>

[Home](#) | [All Subject](#)

Property	Value
skosxl:altLabel	escanciad
skosxl:altLabel	lai t'an ch
skosxl:altLabel	lai tan jiu
skosxl:altLabel	lái tǎn jiǔ
skosxl:altLabel	rhea
skosxl:altLabel	ron
skosxl:altLabel	rins
skosxl:altLabel	rhyton
skosxl:altLabel	rhytons
skosxl:altLabel	rhûton
skosxl:altLabel	riton
skosxl:altLabel	ritons
skosxl:altLabel	ritón
skosxl:altLabel	ritóns
skosxl:altLabel	ryton
skosxl:altLabel	rytons
skosxl:altLabel	ῥυτόν
skosxl:altLabel	莱坦酒杯
skosxl:altLabel	角杯
skosxl:altLabel	角状杯
is skos:broader of	<http://localhost:2020/resource/AAT/Subject/300265000>
skos:broader	<http://localhost:2020/resource/AAT/Subject/300194567>
gr:broaderNonPreferred	<http://localhost:2020/resource/AAT/Subject/300198333>
gr:broaderNonPreferred	<http://localhost:2020/resource/AAT/Subject/300198865>
is gr:btgRelationshipType of	<http://localhost:2020/resource/AAT/Subject/300194567>
is gr:btgRelationshipType of	<http://localhost:2020/resource/AAT/Subject/300198333>
is gr:btgRelationshipType of	<http://localhost:2020/resource/AAT/Subject/300198865>
gr:btgRelationshipType	<http://localhost:2020/resource/AAT/Subject/300265000>
dct:contributor	<http://localhost:2020/resource/AAT/Contrib/10000000>
dct:contributor	<http://localhost:2020/resource/AAT/Contrib/10000088>
dct:contributor	<http://localhost:2020/resource/AAT/Contrib/10000131>
dct:contributor	<http://localhost:2020/resource/AAT/Contrib/10000205>
dct:contributor	<http://localhost:2020/resource/AAT/Contrib/10000250>

skosxl:altLabel	ritons
skosxl:altLabel	ritón
skosxl:altLabel	ritóns
skosxl:altLabel	ryton
skosxl:altLabel	rytons
skosxl:altLabel	ῥυτόν
skosxl:altLabel	莱坦酒杯
skosxl:altLabel	角杯
skosxl:altLabel	角状杯

gr:facetCode V.TQ

is gr:historicFlagCurrent of <http://localhost:2020/resource/AAT/Subject/300194567>

is gr:historicFlagCurrent of <http://localhost:2020/resource/AAT/Subject/300198333>

is gr:historicFlagCurrent of <http://localhost:2020/resource/AAT/Subject/300198865>

gr:historicFlagCurrent <http://localhost:2020/resource/AAT/Subject/300265000>

rdfs:label SUBJECT #300198841

vessels from Ancient Greece, eastern Europe, or the Middle East that have a closed form with two openings, one at the top for filling and one at so that liquid could stream out. They are often in the shape of a horn or an head, and were typically used as a drinking cup or for pouring wine into

essel. Drink  
ning the stre  
a vasijas de  
nte son cerra  
narlas, y otra  
de un cuerno  
ara beber o p  
de Griekse  
gerei of om v  
東歐或中東  
二位於底部隨  
時需握住杯子

skos:related	<http://localhost:2020/resource/AAT/Subject/300043229>
skos:related	<http://localhost:2020/resource/AAT/Subject/300197140>
skos:related	<http://localhost:2020/resource/AAT/Subject/300197148>
dct:source	<http://localhost:2020/resource/AAT/Source/2000030301>
dct:source	<http://localhost:2020/resource/AAT/Source/2000051089>
dct:source	<http://localhost:2020/resource/AAT/Source/2000052378>
is gr:subjectId of	<http://localhost:2020/resource/AAT/DescriptiveNote/120596>
is gr:subjectId of	<http://localhost:2020/resource/AAT/DescriptiveNote/34904>
is gr:subjectId of	<http://localhost:2020/resource/AAT/DescriptiveNote/77124>

is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000297235/70051>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000297235/70411>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000297235/70641>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000316909/70051>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000316909/70271>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000316909/70641>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000316920/70641>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000316920/70641>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000317404/70271>

is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000591126/72584>
is gr:subjectId of	<http://localhost:2020/resource/AAT/Term/1000591127/72582>
gr:subject	300198841 (xsd:decimal)
gr:subject	Page 2000030301 horn, drinking
gr:subject	Page 2000051089.128257 checked 26 January 2012
skos:Concept	

The server is configured to display only a limited number of values (limit per property bridge: 50).

Metadata

<http://localhost:2020/data/AAT/Subject/300198841>	
dc:date	2014-08-07T22:18:56.13Z
prv:containedBy	<http://localhost:2020/dataset>
void:inDataset	<http://localhost:2020/dataset>
rdftype	prv:Dataltem
rdftype	foaf:Document

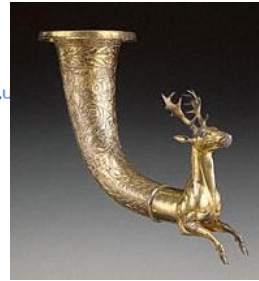
**rhyta** (drinking vessels, <vessels for serving and consuming food>, ... Furni Name))

**Note:** Refers to vessels from Ancient Greece, eastern Europe, or the Middle East with two openings, one at the top for filling and one at the base so that liquid could flow out of a horn or an animal's head, and were typically used as a drinking cup or another vessel. Drinking was done by holding the rhyton above the drinker's head with the liquid in the mouth.

**Terms:**

- rhyta** (preferred, C,U,J,C,English-P,D,U, (Greek (transliterated)-P,D,U,PN) (Spanish,AD,U,SN))
- rhyton** (C,U,English,AD,U,SN) (Greek (transliterated),AD,U,SN) (Spanish,AD,U,SN))
- rhytons** (C,U,English,UF,U,N) (French-P,D,U,PN) (Spanish-P,D,U,PN))
- rhea** (vessels) (C,U,English,UF,U,N)
- rheons** (C,U,English,UF,U,N)
- rheon** (C,U,English,UF,U,N)
- ῥυτόν** (C,U,Ancient Greek,UF,U,U)
- rhūtón** (C,U,Ancient Greek (transliterated),UF,U,U)
- rytons** (C,U,Dutch-P,D,U,U)
- ryton** (C,U,Dutch,AD,U,U)
- rytons** (C,U,French,UF,U,N)
- riton** (C,U,French,UF,U,N)
- ritóns** (C,U,Spanish,UF,U,N)
- ritón** (C,U,Spanish,UF,U,SN)
- escanciadora** (C,U,Spanish,UF,U,SN)

**HTML**



**XML**

**RDF**

**Facet/Hierarchy Code:** V.TQ

**Hierarchical Position:**

- Objects Facet
- .... Furnishings and Equipment (Hierarchy Name) (G)
- ..... Containers (Hierarchy Name) (G)
- ..... containers (receptacles) (G)
- ..... <containers by function or context> (G)
- ..... <culinary containers> (G)
- ..... <containers for serving and consuming food> (G)
- ..... <vessels for serving and consuming food> (G)
- ..... drinking vessels (G)
- ..... rhyta (G)

**Additional Parents:**

- Objects Facet
- .... Furnishings and Equipment (Hierarchy Name) (G)
- ..... Containers (Hierarchy Name) (G)
- ..... containers (receptacles) (G)
- ..... <containers by function or context> (G)
- ..... ceremonial containers (G)
- ..... ceremonial vessels (G)
- ..... rhyta (G)

**Objects Facet**

- .... Furnishings and Equipment (Hierarchy Name) (G)
- ..... Containers (Hierarchy Name) (G)
- ..... containers (receptacles) (G)
- ..... <containers by form> (G)
- ..... vessels (containers) (G)
- ..... vases (G)
- ..... plastic vases (ancient vessels) (G)
- ..... rhyta (G)

**Additional Notes:**

**Dutch** .... Vaten uit de Griekse oudheid in de vorm van een dierenkop, werd of om wijn in een ander vat te gieten.

**Spanish** .... Refiérase a vasijas de la Antigua Grecia, Europa del Este, o del son cerradas pero con dos aberturas, una en el extremo superior para poder para que el líquido pudiera salir. A menudo tienen la forma de un cuerno o t lo común usadas como copas para beber o para vaciar vino en otras vasijas

**Related concepts:**

- distinguished from .... **drinking horns** (drinking vessels, <vessels for serving and consuming Equipment (Hierarchy Name) [300043229]
- distinguished from .... **stirrup cups** (drinking vessels, <vessels for serving and consuming Equipment (Hierarchy Name) [300197140]
- distinguished from .... **sturzbechers** (beakers (drinking vessels), drinking vessels, ... Furni Name)) [300197148]

```

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- <Parent_Relationships>
- <Preferred_Parent>
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[300198938], containers
containers [300197577],
(receptades) [30019719
and Equipment (Hierarch
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(receptades) [300197197], Containers (Hierarchy Name)
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that typically have a closed form with two openings, one at
at the base so that liquid could stream out. They are often
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and catching the stream of liquid in the mouth.</Note_Text:
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+ <Note_Contributors>
+ <Note_Sources>
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- <Descriptive_Note>
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+ <Note_Contributors>
+ <Note_Sources>
</Descriptive_Note>
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menudo tienen la forma de un cuerno o una cabeza de ani
usadas como copas para beber o para vaciar vino en otras
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+ <Note_Sources>
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skosxl:altLabel	rhyton
skosxl:altLabel	rhytons
skosxl:altLabel	rhūtón
skosxl:altLabel	riton
skosxl:altLabel	ritons
skosxl:altLabel	ritón
skosxl:altLabel	ritóns
skosxl:altLabel	ryton
skosxl:altLabel	rytons
skosxl:altLabel	ῥυτόν
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gvp:historicFlagCurrent	<http://karma.getty.edu/2020/resource/AAT/Subject/300265000>
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skos:note	Refers to vessels from Ancient Greece, eastern Europe, or the Middle East with two openings, one at the top for filling and one at the base so that liquid could flow out of a horn or an animal's head, and were typically used as a drinking cup or for pouring liquid by holding the rhyton above the drinker's head and catching the stream of liquid in the mouth.
skos:note	Refi00erase a vasijas de la Antigua Grecia, Europa del Este, o del Medio Oriente, que típicamente son cerradas pero con dos aberturas, una en el extremo superior para poder llenarlas, y otra en la base para que el líquido pudiera salir. A menudo tienen la forma de un cuerno o una cabeza de animal y eran por lo común usadas como copas para beber o para vaciar vino en otras vasijas.
skos:note	Vaten uit de Griekse oudheid in de vorm van een dierenkop, werden vaak gebruikt als drinkgerei of om wijn in een ander vat te gieten.
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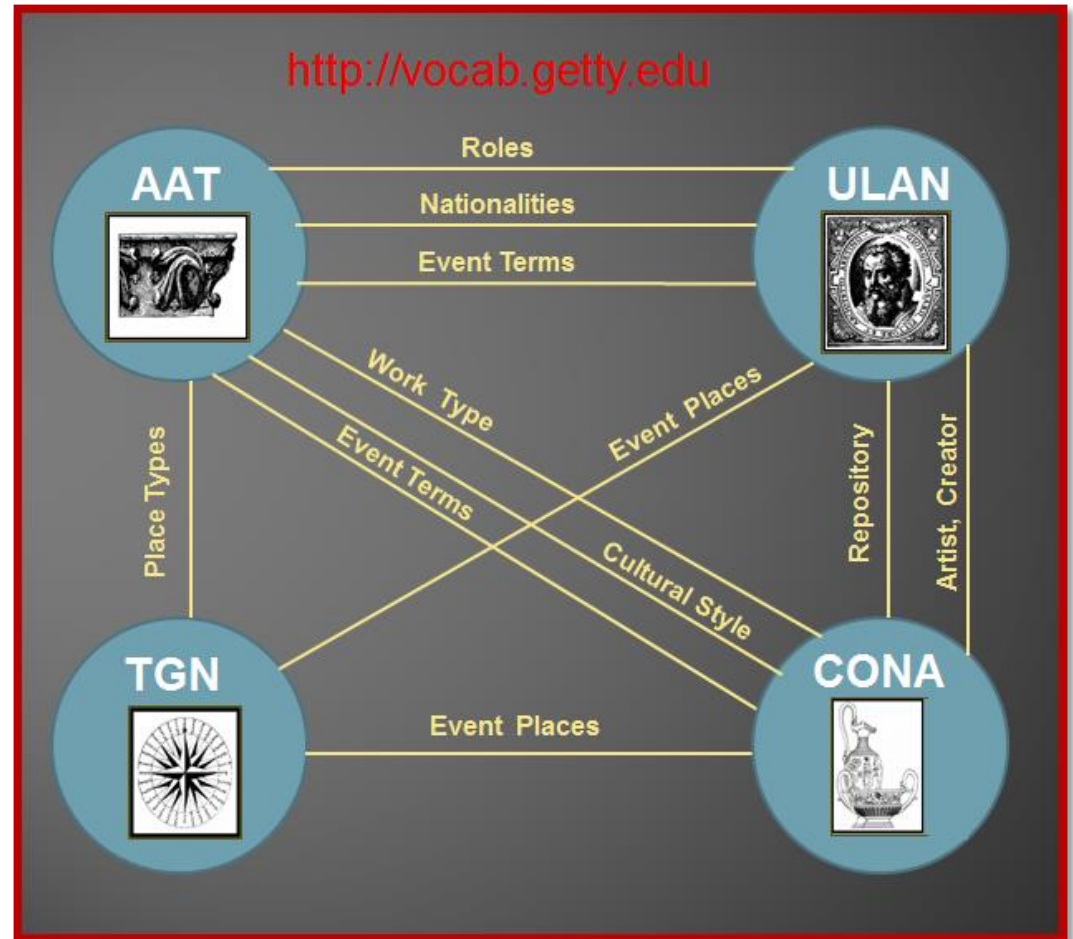
# Issues Discovered Through Prototype Development

---

- How to represent lookup lists, associative relationships, N-ary relations, revision history
- Tool limitations – no functionality for getting language attributes from a database column
- Use RDBMS or triple store?
- Environment limitations – RDF uses much more space on filesystems
- Need for a semantic/ontology expert to help connect data to established standards
- What to do with lookup lists

# Opportunities for Connecting Data - Coreferencing

- Language list made into its own hierarchy in AAT
- Languages coordinated with IANA Subtag Registry
- TGN place types connected to AAT subjects
- ULAN roles connected to AAT subjects
- ULAN nationalities connected to AAT subjects
- ULAN events connected to AAT subjects
- ULAN places connected to TGN subjects



# Query Example

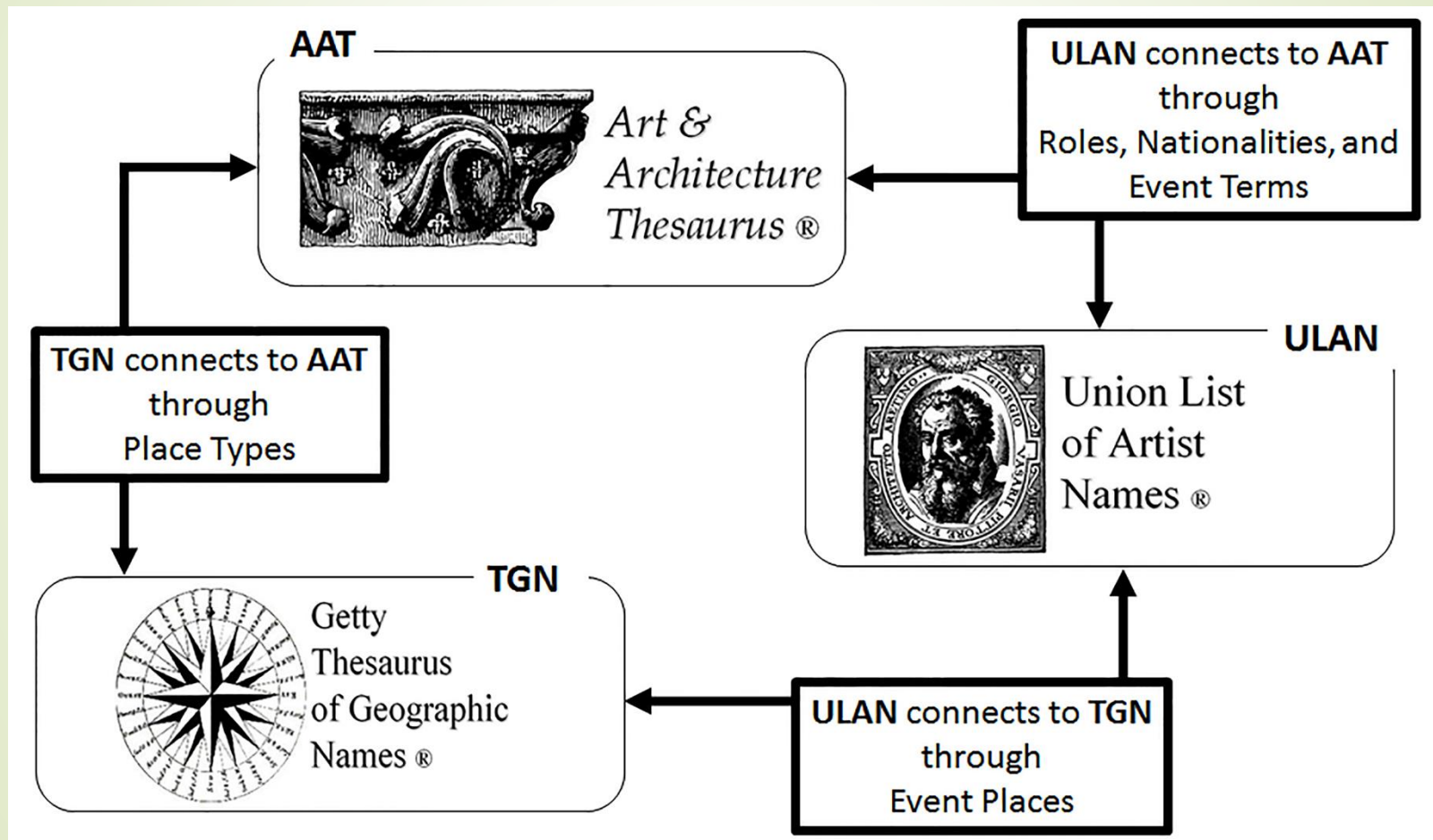
---

- Get all nations from TGN for a lookup list



# Linking Possibilities: Getty Vocabularies

<http://vocab.getty.edu>



# Editorial perspective: LOD

## Many links cannot be made automatically Matching ULAN Nationality to AAT

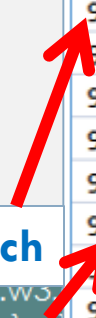
code	Nat/Culture	ULAN	AAT subject_id	AAT term_id	AAT term
901614	Languedocian				
901615	Burgundian (Migration period)		300020847	1000020847	Burgundian (Migration
901620	Parisian				
901630	Gallic		300379855	1000540772	Gallic
901710	Swabian				
901800	German		300111192	1000111192	German
901810	East German	-----			
901820	West German				
901830	Prussian				
901840	Bavarian		300385972	1000568017	Bavarian
901850	Hamburger				
901860	Hessian	-----	300014076	1000014077	hessian
901870	Thuringian		300105675	1000105675	Thuringian
901880	Saxon		300379686	1000540441	Saxon
901890	Wendish		300263656	1000263656	Wendish
901900	Rhenish				
901910	Frankish		300019478	1000019478	Frankish
901920	Merovingian		300019512	1000019512	Merovingian (culture)
			300210049	1000210134	Merovingian (scripts)
901950	Carinthian		300385997	1000568044	Carinthian

This hessian is bad match, type of burlap

no match

false match

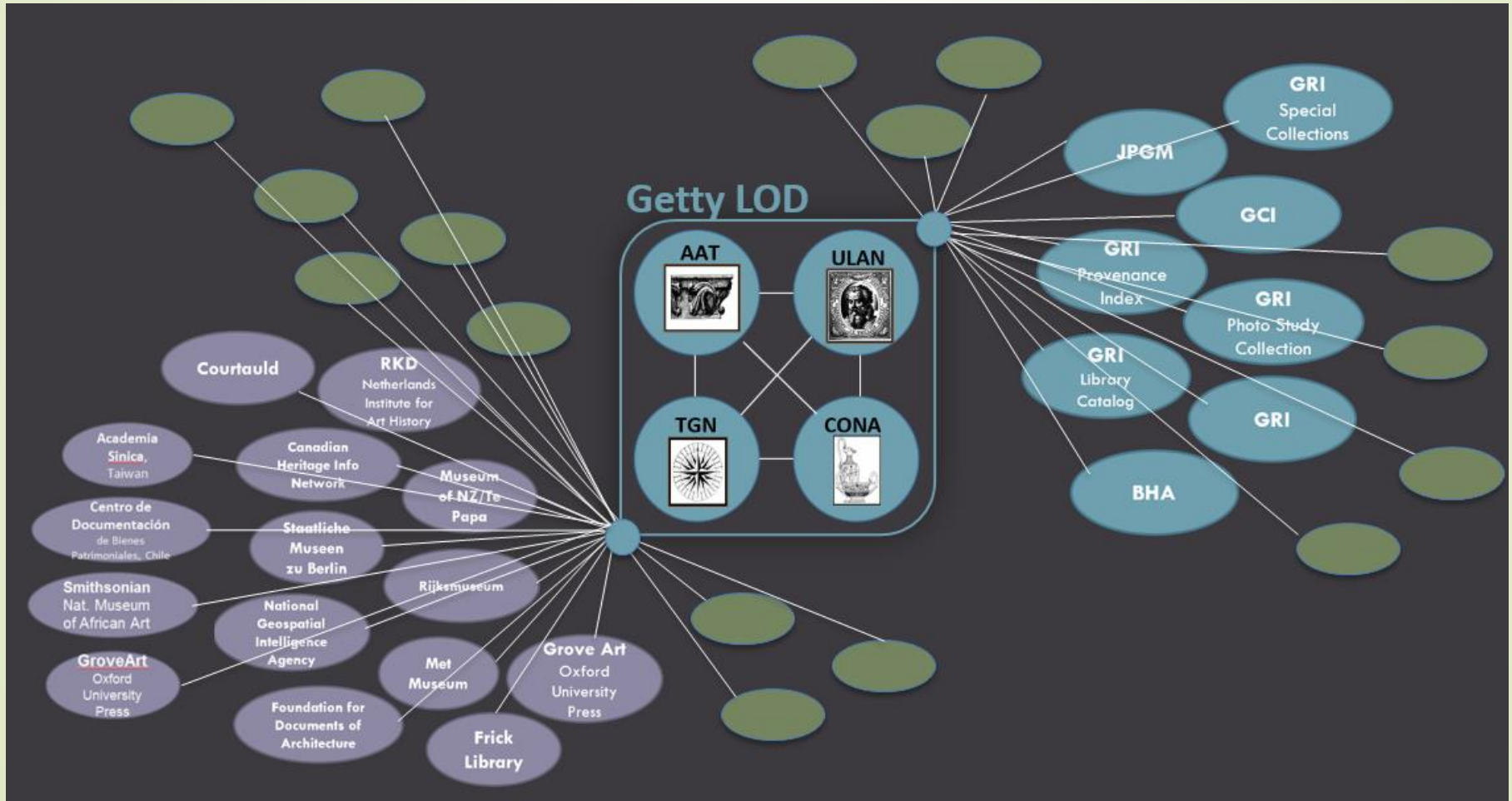
ambiguous match



- Nationality/ Culture/ Race/ Ethnicity in ULAN was conceptual, now needed to be linked to AAT
- Certain matches must be resolved by hand

```
{
  "uri": "http://www.w3.org/1999/02/22-rdf-syntax-ns#type",
  "value": "http://vocab.getty.edu/aat/300019512",
  "type": "iri"
}
```

# Our vocabularies express as LOD can be used to connect other resources



# Triple Store vs. RDBMS

---

## Triple Stores (GraphDB, 4store, Virtuoso)

- Built for storage and retrieval of triples
- Queried using SPARQL
- Import/export using RDF and SPARQL Update

## Relational Database Management Systems (Oracle, SQL Server, MySQL)

- Data is organized into flat, two-dimensional tables containing fields
- Queried using SQL
- Import/export using DML statements along with whatever formats are supported by RDBMS such as comma-delimited files and XML

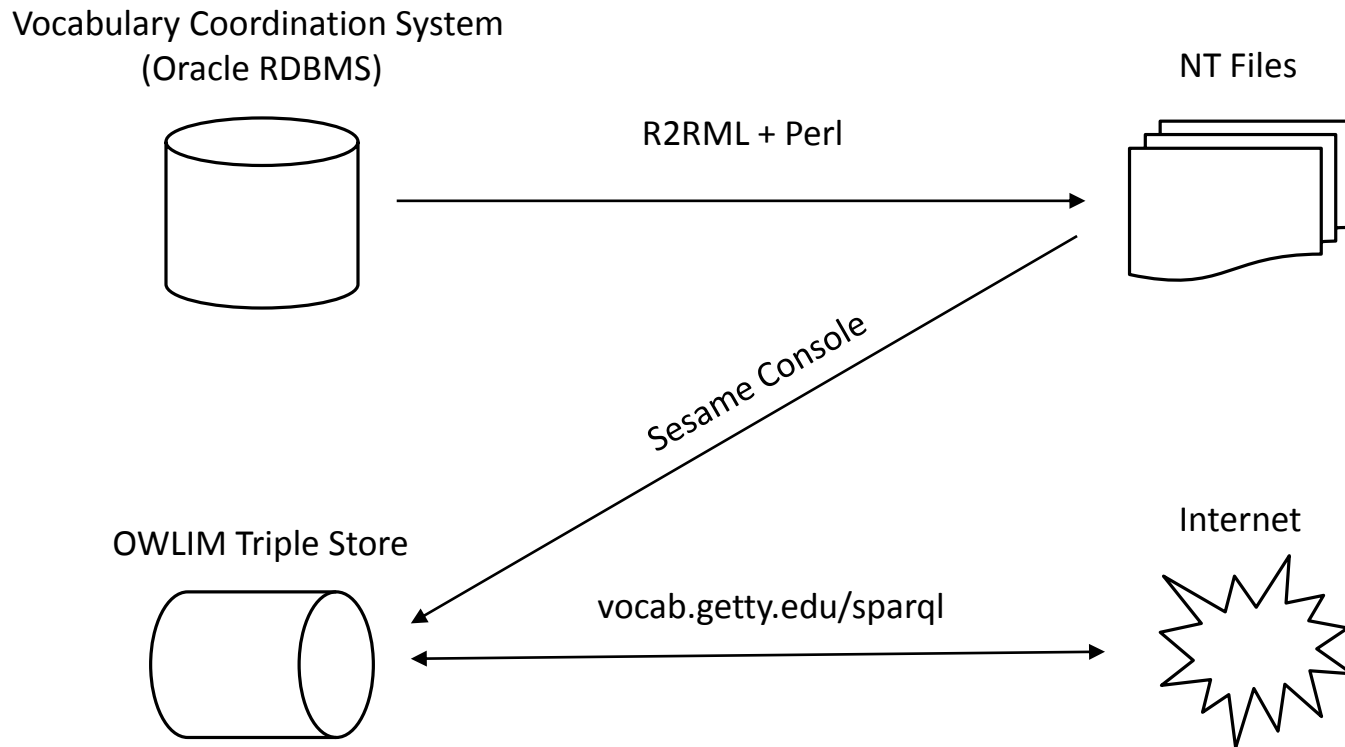
# Tools for Transforming RDBMS Data into RDF Triples

---

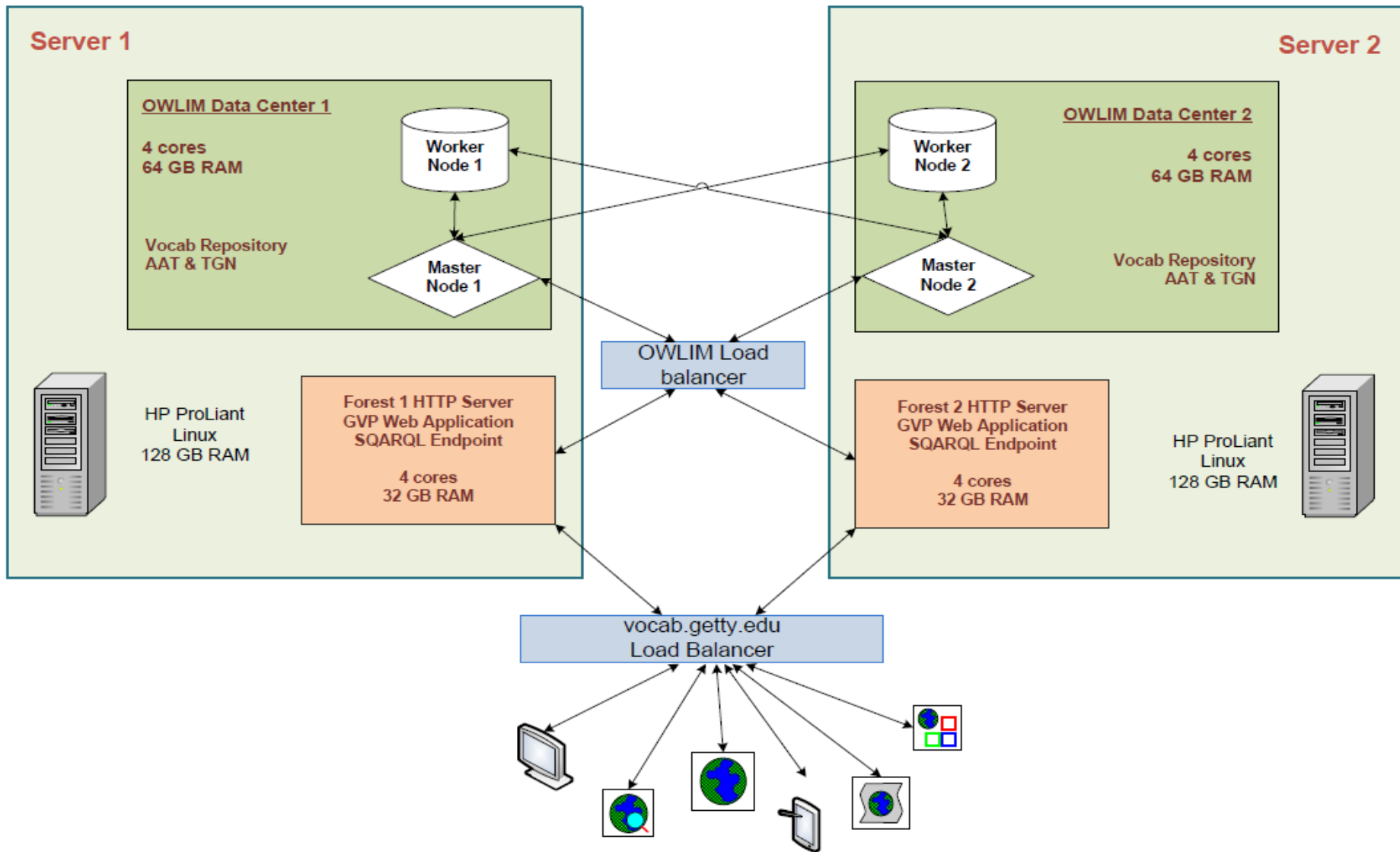
- R2RML standard developed by the W3C for mapping RDBMS tables to RDF triples
- Use perl RDF-RDB2RDF module for implementing R2RML scripts
- Custom scripts for creating staged download files in N3, NT, RDF and JSON serializations
- Use OWLIM triple store and customized Forest application for HTTP server to handle user requests

# Triple Extract Process

---



# Architecture Diagram AAT & TGN





# The Getty Vocabularies

## Welcome to the SPARQL endpoint [vocab.getty.edu](http://vocab.getty.edu)

**The Getty Vocabularies:** The AAT, TGN, ULAN, and CONA contain structured terminology for art and other material culture, archival materials, visual surrogates, and bibliographic materials. Compliant with international standards, they provide authoritative information for catalogers and researchers, and can be used to enhance access to databases and Web sites. The Getty Vocabularies are produced by the Getty Vocabulary Program (GVP) and grow through contributions.

### NOW Available:



**The Art & Architecture Thesaurus (AAT) ®**

*Catherine wheel or rose window?* AAT is a structured vocabulary, including terms, descriptions, and other information for generic concepts related to art and architecture.



**The Getty Thesaurus of Geographic Names (TGN) ®**

*London or Londinium?* TGN is a structured vocabulary, including names, descriptions, and other information for places important to art and architecture.



**The Union List of Artist Names (ULAN) ®**

*Titian or Tiziano Vecellio?* ULAN is a structured vocabulary, including names, biographies, and other information about artists and architects.

**Ontology Update Note:** There are changes to the ontology and mapping, see [Version 2.0 Changes](#) and [Version 3.0 Changes](#).

### Documentation and Downloads:

- **GVP Semantic Representation:** [HTML](#) (for linking), [PDF](#) (for printing).  
Sections [GVP URLs and Prefixes](#) and [Semantic Resolution](#) describe the used URIs and provide examples. All prefixes that we use are in [prefixes.ttl](#).  
Comprehensive [Sample Queries](#) are included.
- **GVP ontology:** [HTML](#), [RDF/XML](#), [Turtle](#)
- **Datasets:** (NTriples Zip, see doc section [Export Files](#) before using!):
  - AAT: [full.zip](#) (all statements), [explicit.zip](#) (only explicit statements)
  - TGN: [full.zip](#) (all statements), [explicit.zip](#) (only explicit statements)
  - ULAN: [full.zip](#) (all statements), [explicit.zip](#) (only explicit statements)
- **VOID:** [void.ttl](#) (see doc section [Descriptive Information](#))
- **Associative Relationship Types:** Full Matrix by Codes [PDF](#)[Excel](#)
- **General information about the [Linked Open Data](#) projects**

### Explore the Dataset:

- **Text search:** Use 'AII/AAT/TGN/ULAN' to select the vocabulary. Enter either text or concept ID in the query box. Multiple words in the text are 'AND'ed. Use 'Brief' to search only



## Documentation and Downloads:

- **GVP Semantic Representation:** [HTML](#) (for linking), [PDF](#) (for printing).  
Sections [GVP URLs and Prefixes](#) and [Semantic Resolution](#) describe the used URIs and provide examples. All prefixes that we use are in [prefixes.ttl](#).  
Comprehensive [Sample Queries](#) are included
- **GVP ontology:** [HTML](#), [RDF/XML](#), [Turtle](#)
- **Datasets:** (NTriples Zip, see doc section [Export Files](#) before using!):
  - AAT: [full.zip](#) (all statements), [explicit.zip](#) (only explicit statements)
  - TGN: [full.zip](#) (all statements), [explicit.zip](#) (only explicit statements)
  - ULAN: [full.zip](#) (all statements), [explicit.zip](#) (only explicit statements)
- **VOID:** [void.ttl](#) (see doc section [Descriptive Information](#))
- **Associative Relationship Types:** [Full Matrix by Codes](#) [PDF](#)[Excel](#)
- **General information about the [Linked Open Data](#) projects**

# Existing Standards (Ontologies) Used

- **Thesaurus information:** SKOS, SKOSXL, ISO 25964
- **Common properties:** Dublin Core (DC), Dublin Core Terms (DCT)
- **Sources and contributors:** Bibliographic Ontology (BIBO), Friends of a Friend (FOAF)
- **Geographic information:** W3C Geo Ontology (WGS)
- **Revision History:** Provenance (PROV)
- **System properties:** Resource Description Framework (RDF), RDF Schema (RDFS), Web Ontology Language (OWL), and XML Schema Definition (XSD)
- **Implementation of the conversion:** RDB to RDF Mapping Language (R2RML)

Link to the HTML version of the full documentation:

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

## Community Support Forum

NEW TOPIC



Help

Shared publicly

31 of many topics

We hope the community will use this [gettyvocablod](#) forum to ask questions, discuss issues, and find solutions related to the technical aspects of this publication. Usage examples are especially welcome.



Welcome to our community discussio... announcement  
By Getty Vocabularies LOD - 1 post - 75 views 6/11/15



Why ISO-8859-1 c... content-negotiation encoding sparql  
By Christopher Johnson - 7 posts - 18 views Apr 10



large results download limits performance sparql ulan  
By Matthew Lincoln - 2 posts - 22 views Mar 8



Getty vocabulary in S... sparql usage-story visualization  
By Sandor Kopacsi - 13 posts - 69 views Feb 19



Getting more data out of ULAN sparql ulan  
By Vladimir Alexiev - 3 posts - 50 views Jan 31



ULAN Import Error Completed ulan  
By Nabeel Ahmed - 2 posts - 18 views Jan 13



How to get all Subjects of a Given Parent in ... sparql  
By Ykje - 3 posts - 23 views 12/22/15



Help with a query ulan  
By Karan - 2 posts - 25 views 12/22/15



Wrongly merged biographies  
By Gabriel Kerneis - 2 posts - 13 views 12/15/15

## Tweets

thisisaaronland Retweeted



Who's On First @alloftheplaces  
you know / just indexing a copy @thegetty 's  
[github.com/thisisaaronlan...](https://github.com/thisisaaronlan...) in a copy of @mapzen 's  
[github.com/pelias/pelias](https://github.com/pelias/pelias) on a lazy saturday



pelias/pelias  
pelias - Pelias is a modular open-source geocoder using  
ElasticSearch for fast geocoding.  
[github.com](https://github.com)



21 May



Who's On First @alloftheplaces  
you know / just indexing a copy @thegetty 's

Embed

View on Twitter



# rhyta

Source: <http://vocab.getty.edu/aat/300198841>

Subject (100 of 424)

Predicate

Object

All

[Website](#) | [Hierarchy](#) |Download in: [JSON](#) | [RDF](#) | [N3/Turtle](#) | [N-Triples](#)

Inference

Explicit and implicit ▾

Statements in which the resource exists as a subject.

Predicate	Object
<a href="#">rdf:type</a>	<a href="#">gvp:Concept</a> , <a href="#">gvp:Subject</a> , <a href="#">skos:Concept</a>
<a href="#">rdfs:label</a>	<a href="#">Rhyta@de</a> , <a href="#">Rhyton@en</a> , <a href="#">escanciadora@es</a> , <a href="#">lai t'an chiu pei@zh-latn-wadegile</a> , <a href="#">lai tan jiu bei@zh-latn-pinyin-x-notone</a> , <a href="#">lái tǎn jiǔ bēi@zh-latn-pinyin-x-hanyu</a> , <a href="#">rhea (vessels)@en</a> , <a href="#">rheon@en</a> , <a href="#">rheons@en</a> , <a href="#">rhyta@es</a> , <a href="#">rhyta@el-latn</a> , <a href="#">rhyta@en</a> , <a href="#">rhyton@es</a> , <a href="#">rhyton@en</a> , <a href="#">rhyton@el-latn</a> , <a href="#">rhytons@es</a> , <a href="#">rhytons@en</a> , <a href="#">rhytons@fr</a> , <a href="#">rhütón@grc-latn</a> , <a href="#">riton@fr</a> , <a href="#">ritons@fr</a> , <a href="#">ritón@es</a> , <a href="#">ritóns@es</a> , <a href="#">ryton@nl</a> , <a href="#">rytons@nl</a> , <a href="#">ρυτόν@grc</a> , <a href="#">莱坦酒杯@zh-hant</a> , <a href="#">角杯@zh-hant</a> , <a href="#">角狀杯@zh-hant</a>
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<a href="#">dcterms:contributor</a>	<a href="#">aat_contrib:10000000</a> , <a href="#">aat_contrib:10000088</a> , <a href="#">aat_contrib:10000131</a> , <a href="#">aat_contrib:10000205</a> , <a href="#">aat_contrib:10000250</a>
<a href="#">skos:scopeNote</a>	<a href="#">aat_scopeNote:119579</a> , <a href="#">aat_scopeNote:119580</a> , <a href="#">aat_scopeNote:34904</a> , <a href="#">aat_scopeNote:77124</a> , <a href="#">aat_scopeNote:83378</a>
<a href="#">skos:inScheme</a>	<a href="#">aat</a>
<a href="#">skos:prefLabel</a>	<a href="#">Rhyta@de</a> , <a href="#">lai t'an chiu pei@zh-latn-wadegile</a> , <a href="#">lai tan jiu bei@zh-latn-pinyin-x-notone</a> , <a href="#">lái tǎn jiǔ bēi@zh-latn-pinyin-x-hanyu</a> , <a href="#">rhyta@el-latn</a> , <a href="#">rhyta@en</a> , <a href="#">rhytons@es</a> , <a href="#">rhytons@fr</a> , <a href="#">rytons@nl</a> , <a href="#">莱坦酒杯@zh-hant</a>
<a href="#">skos:altLabel</a>	<a href="#">Rhyton@en</a> , <a href="#">escanciadora@es</a> , <a href="#">lái tǎn jiǔ bēi@zh-latn-pinyin-x-hanyu</a> , <a href="#">rhea (vessels)@en</a> , <a href="#">rheon@en</a> , <a href="#">rheons@en</a> , <a href="#">rhyta@es</a> , <a href="#">rhyton@es</a> , <a href="#">rhyton@en</a> , <a href="#">rhyton@el-latn</a> , <a href="#">rhytons@en</a> , <a href="#">rhütón@grc-latn</a> , <a href="#">riton@fr</a> , <a href="#">ritons@fr</a> , <a href="#">ritón@es</a> , <a href="#">ritóns@es</a> , <a href="#">ryton@nl</a> , <a href="#">ρυτόν@grc</a> , <a href="#">角杯@zh-hant</a> , <a href="#">角狀杯@zh-hant</a>
<a href="#">skos:note</a>	<a href="#">aat_scopeNote:34904</a> , <a href="#">aat_scopeNote:77124</a> , <a href="#">aat_scopeNote:83378</a> , <a href="#">aat_scopeNote:119579</a> , <a href="#">aat_scopeNote:119580</a> , <a href="#">aat_rev:5000057716</a> , <a href="#">aat_rev:5001147623</a> , <a href="#">aat_rev:5001147624</a> , <a href="#">aat_rev:5001147625</a> , <a href="#">aat_rev:5001147626</a> , <a href="#">aat_rev:5001147627</a> , <a href="#">aat_rev:5001147628</a> , <a href="#">aat_rev:5001147629</a> , <a href="#">aat_rev:5001504912</a> , <a href="#">aat_rev:5001504913</a> , <a href="#">aat_rev:5001692934</a> , <a href="#">aat_rev:5001693073</a> , <a href="#">aat_rev:5001693074</a> , <a href="#">aat_rev:5001708327</a> , <a href="#">aat_rev:5001708329</a>

# Formats available from vocab.getty.edu

```
aat_300198841.json x
```

```
1 {
```

```
2   "head" : {
```

```
3     "vars" : [ "Subject", "Predicate", "Object" ]
```

```
4   },
```

```
5   "results" : {
```

```
6     "bindings" : [ [
```

```
7       "Subject" : {
```

```
8         "type" : "uri",
```

```
9         "value" : "http://vocab.getty.edu/aat/300198841"
```

```
10      },
```

```
11     "Predicate" : {
```

```
12       "type" : "uri",
```

```
13       "value" : "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
```

```
14     },
```

```
15     "Object" : {
```

```
16       "type" : "uri",
```

```
17       "value" : "http://vocab.getty.edu/ontology#Subject"
```

```
18     }, {
```

```
19     "Subject" : {
```

```
20       "type" : "uri",
```

```
21       "value" : "http://vocab.getty.edu/aat/300198841"
```

```
22     },
```

```
23     "Predicate" : {
```

```
24       "type" : "uri",
```

```
25       "value" : "http://www.w3.org/1999/02/22-rdf-syntax-ns#type"
```

```
26     },
```

```
27     "Object" : {
```

```
28       "type" : "uri",
```

```
29       "value" : "http://www.w3.org/2004/02/skos/core#Concept"
```

```
30     } ] ]
```

```
31 }
```

**JSON**

```
aat_300198841.jsonld x
```

```
43 {
```

```
44   "@type" : "http://www.w3.org/2001/XMLSchema#date",
```

```
45   "@value" : "2008-02-05T15:13:36"
```

```
46 }, {
```

```
47   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
48   "@value" : "2010-10-28T11:19:07"
```

```
49 }, {
```

```
50   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
51   "@value" : "2010-10-28T11:20:16"
```

```
52 }, {
```

```
53   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
54   "@value" : "2011-01-07T12:18:43"
```

```
55 }, {
```

```
56   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
57   "@value" : "2014-07-31T13:54:38"
```

```
58 }, {
```

```
59   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
60   "@value" : "2014-07-31T15:49:13"
```

```
61 }, {
```

```
62   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
63   "@value" : "2014-07-31T15:56:08"
```

```
64 }, {
```

```
65   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
66   "@value" : "2014-08-01T08:38:17"
```

```
67 }, {
```

```
68   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
69   "@value" : "2008-10-30T15:53:12"
```

```
70 }, {
```

```
71   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
72   "@value" : "2002-11-18T11:54:47"
```

```
73 }, {
```

```
74   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
75   "@value" : "2001-07-26T22:15:13"
```

```
76 }, {
```

```
77   "@type" : "http://www.w3.org/2001/XMLSchema#dateTime",
```

```
78   "@value" : "2002-11-18T11:54:47"
```

```
79 }
```

**JSONLD**

```
aat_300198841.rdf x
```

```
1 <?xml version="1.0" encoding="UTF-8"?>
```

```
2 <rdf:RDF
```

```
3   xmlns:aat="http://vocab.getty.edu/aat/"
```

```
4   xmlns:aat_contrib="http://vocab.getty.edu/aat/contrib/"
```

```
5   xmlns:aat_rel="http://vocab.getty.edu/aat/rel/"
```

```
6   xmlns:aat_rev="http://vocab.getty.edu/aat/rev/"
```

```
7   xmlns:aat_scopeNote="http://vocab.getty.edu/aat/scopeNote/"
```

```
8   xmlns:aat_source="http://vocab.getty.edu/aat/source/"
```

```
9   xmlns:aat_source_rev="http://vocab.getty.edu/aat/source/rev/"
```

```
10  xmlns:aat_term="http://vocab.getty.edu/aat/term/"
```

```
11  xmlns:adms="http://www.w3.org/ns/adms#"
```

```
12  xmlns:bibo="http://purl.org/ontology/bibo/"
```

```
13  xmlns:bio="http://purl.org/vocab/bio/0.1/"
```

```
14  xmlns:cc="http://creativecommons.org/ns#"
```

```
15  xmlns:dc="http://purl.org/dc/elements/1.1/"
```

```
16  xmlns:dcat="http://www.w3.org/ns/dcat#"
```

```
17  xmlns:dct="http://purl.org/dc/terms/"
```

```
18  xmlns:dctype="http://purl.org/dc/dcmitype/"
```

```
19  xmlns:fmt="http://www.w3.org/ns/formats/"
```

```
20  xmlns:foaf="http://xmlns.com/foaf/0.1/"
```

```
21  xmlns:gvp="http://vocab.getty.edu/ontology#"
```

```
22  xmlns:gvp_lang="http://vocab.getty.edu/language/"
```

```
23  xmlns:iso="http://purl.org/iso25964/skos-thes#"
```

```
24  xmlns:luc="http://www.ontotext.com/owlim/lucene#"
```

```
25  xmlns:ontogeo="http://www.ontotext.com/owlim/geo#"
```

```
26  xmlns:owl="http://www.w3.org/2002/07/owl#"
```

```
27  xmlns:prov="http://www.w3.org/ns/prov#"
```

```
28  xmlns:ptop="http://www.ontotext.com/proton/protontop#"
```

**RDF**

```
aat_300198841.nt x
```

```
1 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vocab.getty.edu/ontology#Subject>
```

```
2 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type>
```

```
3 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyta"@es.
```

```
4 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyta"@el-latn.
```

```
5 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyton"@el-latn.
```

```
6 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyton"@es.
```

```
7 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyton"@en.
```

```
8 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhytons"@es.
```

```
9 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhytons"@en.
```

```
10 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhytons"@fr.
```

```
11 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhea (vessels)"@en.
```

```
12 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rheons"@en.
```

```
13 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rheon"@en.
```

```
14 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "u0F1E5u093C5u03C4u03CCu03B8u03B9"@grc.
```

```
15 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhU016Dtu00F3n"@grc-latn.
```

```
16 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "u048A4u5766u9152u676F"@zh-hant.
```

```
17 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "u089D2u720u676F"@zh-hant.
```

```
18 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "u0902u676F"@zh-hant.
```

```
19 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "u090E11 tu001CEn ji u0104 bu0113i"@zh-latn-pinyin.
```

```
20 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "lai tan jiu bei"@zh-latn-pinyin-x-notone.
```

```
21 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "lai tan chiu pei"@zh-latn-wadegile.
```

```
22 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhytons"@en1.
```

```
23 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyton"@en1.
```

```
24 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyton"@fr.
```

```
25 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhyton"@grc.
```

```
26 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhit u00F3ns"@es.
```

```
27 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rhit u00F3n"@es.
```

```
28 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> "rescanc1a0ra"@es.
```

```
29 <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2000/01/rdf-schema#label> <http://www.w3.org/2000/01/rdf-schema#seeAlso>
```

```
30 <http://vocab.getty.edu/aat/300198841> <http://purl.org/dc/terms/created> "1991-10-02T00:00:00"^^<http://www.w3.org/2001/XMLSchema#dateTime>
```

```
31 <http://vocab.getty.edu/aat/300198841> <http://purl.org/dc/terms/modified> "1998-12-03T00:00:00"^^<http://www.w3.org/2001/XMLSchema#dateTime>
```

```
32 <http://vocab.getty.edu/aat/300198841> <http://purl.org/dc/terms/modified> "2001-07-26T22:03:43"^^<http://www.w3.org/2001/XMLSchema#dateTime>
```

```
33 <http://vocab.getty.edu/aat/300198841> <http://purl.org/dc/terms/modified> "2004-06-23T10:36:12"^^<http://www.w3.org/2001/XMLSchema#dateTime>
```

```
34 <http://vocab.getty.edu/aat/300198841> <http://purl.org/dc/terms/modified> "2007-11-15T16:05:04"^^<http://www.w3.org/2001/XMLSchema#dateTime>
```

```
35 <http://vocab.getty.edu/aat/300198841> <http://purl.org/dc/terms/modified> "2007-11-15T20:31:24"^^<http://www.w3.org/2001/XMLSchema#dateTime>
```

**N-Triples**

```
aat_300198841.ttl x
```

```
52 @prefix ulan_source: <http://vocab.getty.edu/ulan/source/rev/> .
```

```
53 @prefix ulan_term: <http://vocab.getty.edu/ulan/term/> .
```

```
54 @prefix vaem: <http://www.linkedmodel.org/schema/vaem#> .
```

```
55 @prefix vann: <http://purl.org/vocab/vann/> .
```

```
56 @prefix vcard: <http://www.w3.org/2006/vcard/ns#> .
```

```
57 @prefix vdpp: <http://data.lirmm.fr/ontologies/vdpp#> .
```

```
58 @prefix voaf: <http://purl.org/vocommons/voaf#> .
```

```
59 @prefix voag: <http://voag.linkedmodel.org/voag#> .
```

```
60 @prefix void: <http://rdfs.org/ns/void#> .
```

```
61 @prefix vdr: <http://www.w3.org/2007/05/powder-s#> .
```

```
62 @prefix wgs: <http://www.w3.org/2003/01/geo/wgs84_pos#> .
```

```
63 @prefix ww: <http://vocab.org/waiver/terms/> .
```

```
64 @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
```

```
65
```

```
66 aat:300198841 a gvp:Subject, skos:Concept, gvp:Concept ;
```

```
67 rdfs:label "rhyta"@es, "rhyta"@el-latn, "rhyta"@en, "rhyton"@el-latn, "rhyton"@es, "rhyton"@en ;
```

```
68 rdfs:seeAlso <http://www.getty.edu/vow/AATFullDisplay?find=&include=AND&note=&subjectid=300198841> ;
```

```
69 dct:created "1991-10-02T00:00:00"^^xsd:dateTime ;
```

```
70 dct:modified "1998-12-03T00:00:00"^^xsd:dateTime, "2001-07-26T22:03:43"^^xsd:dateTime, "2004-06-23T10:36:12"^^xsd:dateTime ;
```

```
71 skos:changeNote aat_rev:5000057716, aat_rev:5001147623, aat_rev:5001147624, aat_rev:5001147625 ;
```

```
72 gvp:broader aat:300198333, aat:300198865, aat:300194567 ;
```

```
73 gvp:broaderGenericExtended aat:300194507, aat:300197197, aat:300198938, aat:300197200, aat:300185713 ;
```

```
74 gvp:broaderExtended aat:300194507, aat:300197197, aat:300198938, aat:300197200, aat:300198760, aat:300198769 ;
```

```
75 gvp:broaderPreferredExtended aat:300197197, aat:300198938, aat:300197200, aat:300198760, aat:300198769 ;
```

```
76 gvp:broaderString "drinking vessels, <vessels for serving and consuming food>, <containers for serving and consuming food>, <containers for serving and consuming food>, ... Objects";
```

```
77 skos:note aat_scopeNote:34994, aat_scopeNote:83378, aat_scopeNote:71724, aat_scopeNote:119579 ;
```

```
78 gvp:parentStringAbbrev "drinking vessels, <vessels for serving and consuming food>, ... Objects";
```

```
79 gvp:displayOrder "19"^^xsd:positiveInteger ;
```

```
80 skosxl:prefLabel aat_term:1000198841-en, aat_term:1000198841-el-Latn, aat_term:1000316909-fr, aat_term:1000316909-grc, aat_term:1000316909-latn ;
```

```
81 skos:prefLabel "rhyta"@el-latn, "rhyta"@en, "rhytons"@es, "rhytons"@fr, "承担酒杯"@zh-hant, "承担酒杯"@zh-hant ;
```

```
82 skosxl:altLabel aat_term:1000198841-es, aat_term:1000297235-es, aat_term:1000297235-el-Latn, aat_term:1000297235-el-Latn ;
```

```
83 skos:altLabel "rhyta"@es, "rhyton"@el-latn, "rhyton"@en, "rhyton"@grc, "rhyton"@grc-latn, "rhyton"@en1, "rhyton"@en1 ;
```

```
84 gvp:broaderGeneric aat:300198333, aat:300198865, aat:300194567 ;
```

```
85 gvp:broaderPreferred aat:300194567 ;
```

```
86 skos:broader aat:300198333, aat:300198865, aat:300194567 ;
```

```
87 iso:broaderGeneric aat:300198333, aat:300198865, aat:300194567 ;
```

```
88 gvp:broaderNonPreferred aat:300198333, aat:300198865 ;
```

```
89 gvp:prefLabelGVP aat_term:1000198841-en ;
```

```
90 gvp:prefLabelOVP aat_term:1000198841-en ;
```

```
91 skos:inScheme <http://vocab.getty.edu/aat/> ;
```


**N-Triples**



# Art & Architecture Thesaurus® Online

## Full Record Display

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Click the  icon to view the hierarchy.

[Semantic View](#) ([JSON](#), [RDF](#), [N3/Turtle](#), [N-Triples](#))

■ [Representative Images](#): [1](#) [2](#) [3](#) [4](#) [5](#) [6](#)

**ID: 300198841**

**Record Type:** [concept](#)

 **rhyta** (drinking vessels, <vessels for serving and consuming food>, ... Furnishings and Equipment (Hierarchy Name))

**Note:** Refers to vessels from Ancient Greece, eastern Europe, or the Middle East that typically have a closed form with two openings, one at the top for filling and one at the base so that liquid could stream out. They are often in the shape of a horn or an animal's head, and were typically used as a drinking cup or for pouring wine into another vessel. Drinking was done by holding the rhyton above the drinker's head and catching the stream of liquid in the mouth.

### Terms:

**rhyta** ([preferred](#),C,U,LC,English-P,D,U,PN)  
(Greek (transliterated)-P,D,U,PN)  
(Spanish,UF,U,PN)

**rhyton** (C,U,English,AD,U,SN)  
(Greek (transliterated),AD,U,SN)  
(Spanish,AD,U,SN)

**Rhyton** (C,U,English,AD,U,SN)

**rhytons** (C,U,English,UF,U,N)  
(French-P,D,U,PN)  
(Spanish-P,D,U,PN)

**rhea (vessels)** (C,U,English,UF,U,N)

**rheons** (C,U,English,UF,U,N)

**rheon** (C,U,English,UF,U,N)

**ῥυτόν** (C,U,Ancient Greek,UF,U,U)

**rhütón** (C,U,Ancient Greek (transliterated),UF,U,U)

# Full Text Search – Brief Results



Getty Vocabularies: LOD

SPARQL

Any ▾

yute

Search

Brief ▾

Results for "yute" ( 6 of 6 )

Subject	Term	Parents	Scope Note	Type
<a href="#">aat:300375512</a>	Hibiscus cannabinus (species)	Hibiscus (genus), Malvaceae (family), ... Agents Facet	Species of fast growing herbaceous annual plant, with stalks growing to 5.5 m (18 feet) in height. It is probably native to southern Asia, though its exact natural origin is unknown. It is widely d...	Concept
<a href="#">aat:300014244</a>	jute board	fiberboard, fiber products, ... Materials Facet	A strong plyboard containing no jute fiber but made typically from sulfate and wastepaper pulp, used especially for shipping containers.	Concept
<a href="#">aat:300014045</a>	jute (fiber)	plant fiber, natural fiber, ... Materials Facet	Bast fiber derived from either of two East Indian plants (Corchorus olitorius and C. capsularis). The pale brown fibers are soft, lustrous, and coarse, ranging in length from 4 to 10 feet. The brit...	Concept
<a href="#">tgn:2786554</a>	Yutes Run	Allegheny, Pennsylvania, ... World		PhysPlaceConcept
<a href="#">tgn:7475035</a>	Yutengping	Miaoli Xian, Chung-hua Min-kuo, ... World		AdminPlaceConcept
<a href="#">tgn:7415324</a>	Yuteriaica, Río	Oaxaca, México, ... World		PhysPlaceConcept

# Full Text Search – Full Results



Getty Vocabularies: LOD

SPARQL

Any ▾

yute

Search

Full ▾

Results for "yute" ( 11 of 11 )

Subject	Term	Parents	Scope Note	Type
<a href="#">aat:300375512</a>	Hibiscus cannabinus (species)	Hibiscus (genus), Malvaceae (family), ... Agents Facet	Species of fast growing herbaceous annual plant, with stalks growing to 5.5 m (18 feet) in height. It is probably native to southern Asia, though its exact natural origin is unknown. It is widely d...	Concept
<a href="#">aat:300014076</a>	burlap	canvas, <textile materials by process or technique>, ... Materials Facet	Coarse canvas made of jute, used mainly for sacks and wrapping.	Concept
<a href="#">aat:300014244</a>	jute board	fiberboard, fiber products, ... Materials Facet	A strong plyboard containing no jute fiber but made typically from sulfate and wastepaper pulp, used especially for shipping containers.	Concept
<a href="#">aat:300253474</a>	buckram	<textile materials by finishing process>, <textile materials by process or technique>, ... Materials Facet	Heavy weave cotton, jute, or linen textile stiffened with glue, size, or starch and used for interlinings in garments, box making, bookbinding, etc.	Concept
<a href="#">aat:300015203</a>	oakum	caulking compound, sealing compound, ... Materials Facet	Loosely twisted hemp or jute fiber impregnated with tar or a tar derivative and used in caulking seams, as of wooden ships, and packing joints, as of pipes.	Concept
<a href="#">aat:300014078</a>	canvas	<textile materials by process or technique>, textile materials, ... Materials Facet	Closely woven textile made in various weights, usually of flax, hemp, jute, or cotton, used especially for sails, tarpaulins, awnings, upholstery, and as a support for oil painting. Also used for a...	Concept
<a href="#">aat:300131081</a>	oilcloth	<textile materials by finishing process>, <textile materials by process or technique>, ... Materials Facet	Textile of woven cotton, jute, or hemp, treated with oil and pigment and used as a waterproof covering.	Concept





1.2.1	Version 3.0
1.2.2	Version 3.1
1.2.3	Version 3.2
1.2.4	Version 3.3
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	Case-insensitive Full Text Search Query
2.8	Exact-Match Full Text Search Query
2.9	Find Person Occupations by broaderExtended
2.10	Find Person Occupations by Double FTS
2.11	Find Quartz Timepieces by Double FTS
2.12	Find Subject by Exact English PrefLabel
2.13	Find Subject by Language-Independent PrefLabels
2.14	Combination Full-Text and Exact String Match
2.15	Find Subject by Any Label
2.16	Find Ordered Subjects
2.17	Find Ordered Collections
2.18	Get Subjects in Order
2.19	Find Contributors by Vocabulary
2.20	Find Sources by Vocabulary
3	Getting Information
3.1	All Data For Subject
3.2	All Data for Terms of Subject
3.3	Subject Preferred Label
3.4	Preferred and Vernacular Terms
3.5	Historic Information on Relations
3.6	Historic Information of Terms
3.7	Preferred Terms for Contributors
3.8	Preferred Terms for Sources
3.9	Concepts Related by Particular Associative Relation
3.10	Recently Created Subjects
3.11	Recently Modified Subjects
3.12	Recent Revision Actions
3.13	OpenRefine Reconciliation Service
3.14	Smart Resource Title
4	TGN-Specific Queries
4.1	Places by Type

Query:

```

1 select ?Subject ?Term ?Parents ?Descr ?ScopeNote ?Type (coalesce(?Type1,?Type2) as ?ExtraType) {
2   ?Subject luc:term "fishing* AND vessel*"; a ?typ.
3   ?typ rdfs:subClassOf gvp:Subject; rdfs:label ?Type.
4   filter (?typ != gvp:Subject)
5   optional {?Subject gvp:placeTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type1]]}
6   optional {?Subject gvp:agentTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type2]]}
7   optional {?Subject gvp:prefLabelGVP [xl:literalForm ?Term]}
8   optional {?Subject gvp:parentStringAbbrev ?Parents}
9   optional {?Subject foaf:focus/gvp:biographyPreferred/schema:description ?Descr}
10  optional {?Subject skos:scopeNote [dct:language gvp_lang:en; rdf:value ?ScopeNote]}

```

 Include inferred Expand results over equivalent URIs

Submit

OPTIONAL {?parent gvp:broaderPreferred ?grandParent};

## 2.6 Full Text Search Query

This is the query used for the [Full Text Search](#).

```

select ?Subject ?Term ?Parents ?Descr ?ScopeNote ?Type (coalesce(?Type1,?Type2) as ?ExtraType) {
  ?Subject luc:term "fishing* AND vessel*"; a ?typ.
  ?typ rdfs:subClassOf gvp:Subject; rdfs:label ?Type.
  filter (?typ != gvp:Subject)
  optional {?Subject gvp:placeTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type1]]}
  optional {?Subject gvp:agentTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type2]]}
  optional {?Subject gvp:prefLabelGVP [xl:literalForm ?Term]}
  optional {?Subject gvp:parentStringAbbrev ?Parents}
  optional {?Subject foaf:focus/gvp:biographyPreferred/schema:description ?Descr}
  optional {?Subject skos:scopeNote [dct:language gvp_lang:en; rdf:value ?ScopeNote]}

```

- If the user selected **Brief**, we use predicate luc:term (just before the red text), for **Full**, we use predicate luc:text

- If the user selected only one of the vocabularies (e.g. AAT), we add a clause like

```
?subject skos:inScheme aat:
```

The following result columns are included:

- Subject
- GVP preferred Term
- Abbreviated Parent string

Two field pairs that the FTS concatenates (if present):

- Description (ULAN one-line biography) and

# What the artists of these works of art have in common?



**Joseph Heintz, the elder**  
*The Toilette of Venus*

**Robert Macpherson**  
*The Campagna near Rome*



**Jean-Honoré Fragonard**  
*Ruins of an Imperial Palace, Rome*



# All three were active in Italy but were not Italian.

## SPARQL Query

```
select ?x ?name ?bio ?birth {
  {select distinct ?x
   {?x foaf:focus/bio:event/(schema:location | (schema:location/gvp:broaderExtended)) tgn:1000080-place}}
  ?x gvp:prefLabelGVP/xl:literalForm ?name;
  foaf:focus/gvp:biographyPreferred [
    schema:description ?bio;
    gvp:estStart ?birth].
  filter ("1550"^^xsd:gYear <= ?birth && ?birth <= "1900"^^xsd:gYear)
  filter exists {?x gvp:broaderExtended ?facet.
    filter (?facet in (ulan:500000002))}
  filter not exists {
    ?x foaf:focus/(schema:nationality | (schema:nationality/gvp:broaderExtended)) aat:300111198}}
```

Participated in an event that took place in Italy

In the Person, Artist Facet

Nationality is NOT Italian

- Just one of the ways to get interesting results using all three vocabularies.
- The full URIs are:
  - Italy: <http://vocab.getty.edu/tgn/1000080-place>
  - Person, Artists facet: <http://vocab.getty.edu/ulan/500000002>
  - Italian (culture or style): <http://vocab.getty.edu/aat/300111198>



# Query Examples/Exercises

- ▶ Keyword phrase search with stemming
- ▶ Combination term and scope note search
- ▶ Expanded search using term and scope note
- ▶ Exact match on term
- ▶ Get count of subjects having a Chinese term
- ▶ Get count of subjects having a Chinese term in AAT

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The Getty Trust (4) ✕

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api/sparql (2)

ZIP (2)

**+** Add Dataset

Getty

### 4 datasets found for "Getty"

Order by: Relevance

Organizations: **The Getty Trust** ✕

#### The Getty Thesaurus of Geographic Names

Getty Thesaurus of Geographic Names (TGN)® is a structured vocabulary of geographic names intended to provide terminology and other information important to various disciplines...

[web page](#) [api/sparql](#) [owl, ontology, meta/owl](#) [example/rdf+xml](#) [ZIP](#)

#### The Cultural Objects Name Authority

The Cultural Objects Name Authority (CONA)®, a new vocabulary now accepting contributions, includes titles, attributions, and other information for art and architecture. The...

#### The Union List of Artist Names

The Union List of Artist Names (ULAN)® is a structured vocabulary, including names, biographies, and other information about artists and architects. The target date for the...

#### Art & Architecture Thesaurus

The Art & Architecture Thesaurus (AAT)® is a structured, multilingual vocabulary including terms, descriptions, and other information for generic concepts related to art,...

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# Registered with Datahub

<http://datahub.io/organization/the-getty-trust>

## Open Data Commons Attribution License

### (ODC-By) v1.0

<http://opendatacommons.org/licenses/by/1-0/>



# Linked Open Data Five Star Rating

- Available on the web (whatever format) *but with an open licence, to be Open Data*
- Available as machine-readable structured data (e.g. excel instead of image scan of a table)
- Available as (2) plus non-proprietary format (e.g. CSV instead of excel)
- All the above plus, Use open standards from W3C (RDF and SPARQL) to identify things, so that people can point at your stuff
- All the above, plus: Link your data to other people's data to provide context

# Some Useful Resources and Links

## ► Tim Berners-Lee TED Talk

- [http://www.ted.com/talks/tim\\_berniers\\_lee\\_the\\_year\\_open\\_data\\_went\\_world\\_wide.html](http://www.ted.com/talks/tim_berniers_lee_the_year_open_data_went_world_wide.html)

## ► Europeana Video

- Sometimes a picture is worth a thousand words – in this case, it's a video
- <http://vimeo.com/36752317>

## ► Eero Hyvönen's book

- *Publishing and Using Cultural Heritage Linked Data on the Semantic Web*

## ► Linked Open Data in Libraries Archives and Museums (LODLAM)

- <http://lodlam.net/>

## ► Open Memory Project

- <http://summit2015.lodlam.net/2015/04/21/challenge-entry-open-memory-project>

# Links to the live demo

Developer SPARQL Endpoint

<http://vocab.getty.edu>

General Information about our LOD project

<http://www.getty.edu/research/tools/vocabularies/loд/index.html>

About the Getty Vocabularies in general

<http://www.getty.edu/research/tools/vocabularies/index.html>

Public Forum

<https://groups.google.com/forum/#!forum/gettyvocablod>

Examples of ID 300198841

Human readable: <http://vocab.getty.edu/page/aat/300198841>

Machine readable: <http://vocab.getty.edu/aat/300198841>