

SKOS: Simple Knowledge Organization System

Unit 6

SKOS

- **Simple Knowledge Organization System**
 - A W3C Recommendation
 - Based on RDF, RDFS, and some OWL, a kind of “RDFS-Plus”
- Provides means for expressing knowledge organization systems (KOS) in a distributed and linkable way for use in a **Linked Data and Semantic Web environment**
 - Controlled vocabularies, thesauri, taxonomies, classification schemes, subject heading lists, name authorities, etc.
- W3C *SKOS Primer* Introduction extracts:
 - “... designed to provide a low-cost migration path for porting existing organization systems to the Semantic Web.”
 - “SKOS can be seen as a bridging technology, providing the missing link between the rigorous logical formalism of ontology languages such as OWL and the chaotic, information and weakly-structured world of Web-based collaboration tools, as exemplified by social tagging applications.”

Knowledge organization systems/services (KOS)

- Schemes for organizing information and knowledge
 - Mostly using some kind of vocabulary control
- Connect users to information content via browsing and searching
- Give users an overview of content of a collection, database, or web site
- Multiple ways to accomplish this
- Many different needs in different communities
- Thus: many different KOS and CVs for different communities, users, and information needs

ANSI/NISO Z39.19

- Predominant CV & thesaurus standard in USA
- Provides valuable conceptual framework
- Reflects decades of research and experience
- Take more as general guidelines than absolute rules; judge how best to apply for local situation
- Advantages of staying close to ANSI/NISO:
 - Most thesaurus management software designed to be ANSI/NISO-compliant
 - Interoperability with other databases, corporate mergers → mergers of two databases, etc.

Unit 6: SKOS (for expressing traditional controlled vocabularies as linked data)

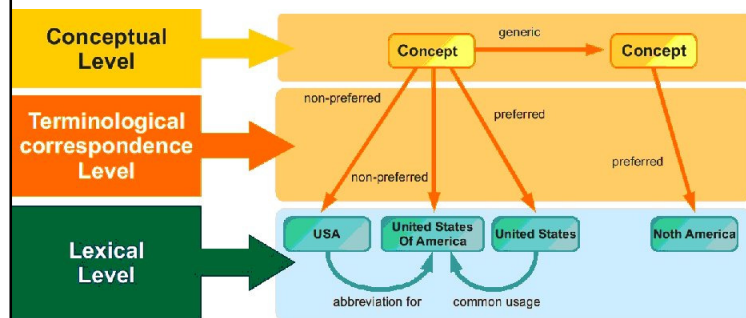
Types of Knowledge Organization Systems (Controlled Vocabularies)

List	Synonym Ring	Authority File	Taxonomy / Classification Scheme	Thesaurus
No semantic relationships	Equivalence relationships	Equivalence relationships	Equivalence relationships Hierarchical relationships	Equivalence relationships Hierarchical relationships Associative relationships
Controlled list of terms; no synonym control	Synonymous terms with no preferred term control <i>Note: used for search engine retrieval, not for indexing</i>	Controlled list of terms, with synonyms identified, and one of those terms selected as preferred, the others non-preferred <i>Note: this is only one of many ways of defining and understanding authority files</i>	Same as authority file, but with preferred terms arranged into hierarchies of broader and narrower terms <i>Note: many Web site taxonomies are not formal CVs of this type</i>	Same as classification scheme, but with associative relationships (related terms) identified among the preferred terms

Traditional semantic relationships

Relationship	Type Example
Equivalence	
Synonymy	UN / United Nations
Lexical variants	pediatrics / paediatrics
Near synonymy	sea water / salt water
Hierarchical	
Generic (or IsA) (is a kind of)	birds / parrots
Instance (or Isa) (is a specific instance of)	sea / Mediterranean Sea
Whole / Part	brain / brain stem
Associative	
Cause / Effect	accident / injury
Process / Agent	velocity measurement / speedometer
Process / Counter-agent	fire / flame retardant
Action / Product	writing / publication
Action / Property	communication / communication skills
Action / Target	teaching / student
Concept or Object / Property	steel alloy / corrosion resistance
Concept or Object/ Origins	water / well
Concept or Object / Measurement Unit or Mechanism	chronometer / minute
Raw material / Product	grapes / wine
Discipline or Field / Object or Practitioner	neonatology / infant

Organizational levels of a concept-based thesaurus



Source: Pastor-Sanchez, J., Martínez Mendez, F. J., Rodríguez-Muñoz, J. V. 2009. "Advantages of thesaurus representation using the Simple Knowledge Organization System (SKOS) compared with proposed alternatives." *Information Research*, Vol. 14, no. 4 (Dec.). <http://informationr.net/ir/14-4/paper422.html>

SKOS concepts and concept schemes

Element	Vocabulary	Descriptive Definition
Concept	<code>skos:Concept</code>	Instance of owl:Class
Concept scheme	<code>skos:ConceptScheme</code>	Instance of owl:Class Disjoint with skos:Concept
Inclusion into a concept scheme	<code>skos:inScheme</code>	Instance of owl:ObjectProperty Domain: skos:Concept Range: skos:ConceptScheme
Top Concept	<code>skos:hasTopConcept</code>	Instance of owl:ObjectProperty Domain: skos:ConceptScheme Range: valores skos:Concept

Source for SKOS tables used in these slides: Pastor-Sanchez, J., Martínez Mendez, F. J., Rodríguez-Muñoz, J. V. 2009. "Advantages of thesaurus representation using the Simple Knowledge Organization System (SKOS) compared with proposed alternatives." *Information Research*, Vol. 14, no. 4 (Dec.).

SKOS lexical labels

Element	Vocabulary	Descriptive Definition
Preferred label	<code>skos:prefLabel</code>	Instance of owl:AnnotationProperty Range: rdf:PlainLiteral Domain: any resource A resource has no more than one value of skos:prefLabel per language Pairwise disjoint with skos:altLabel and skos:hiddenLabel
Alternative label	<code>skos:altLabel</code>	Instance of owl:AnnotationProperty Range: rdf:PlainLiteral Domain: any resource Pairwise disjoint with skos:prefLabel and skos:hiddenLabel
Hidden label	<code>skos:hiddenLabel</code>	Instance of owl:AnnotationProperty Range: rdf:PlainLiteral Domain: any resource Pairwise disjoint with skos:prefLabel and skos:altLabel

Animal thesaurus example: traditional thesaurus display

cats

UF (used for) *domestic cats*

BT (broader terms) **animals**

RT (related term) **wildcats**

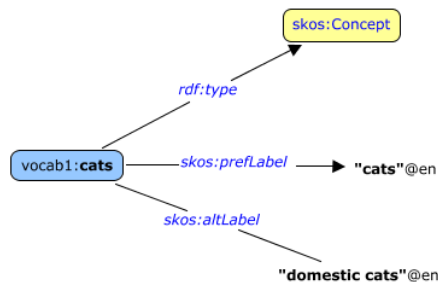
SN (scope note) used only for domestic cats

domestic cats

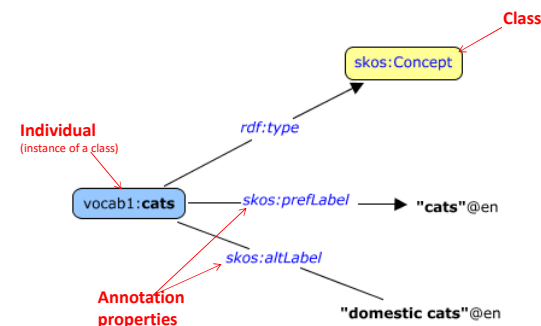
USE cats

This example, here and on the follow slides, is based on: Antoine Isaac, "SKOS Simple Knowledge Organization System," Dublin Core Tutorial, Sept. 21, 2011: http://dublincore.org/resources/training/dc-2011/Tutorial_Isaac.pdf

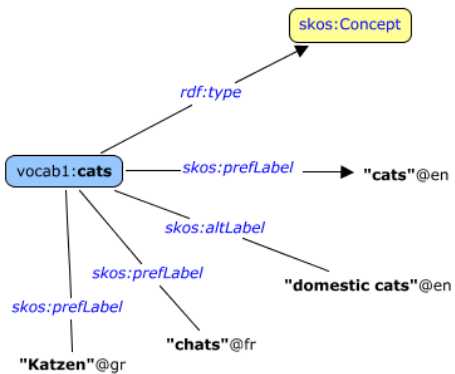
SKOS concept, preferred and alternative labels



SKOS concept, preferred and alternative labels



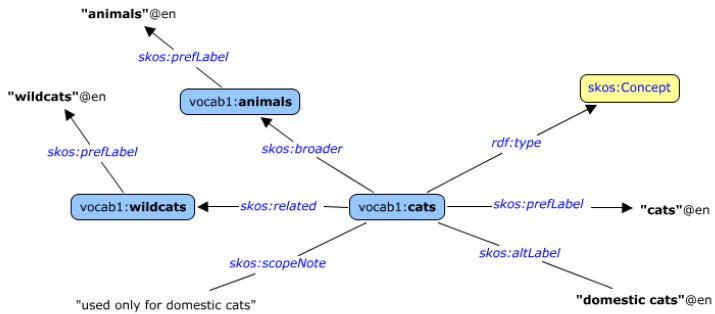
SKOS preferred labels in multiple languages



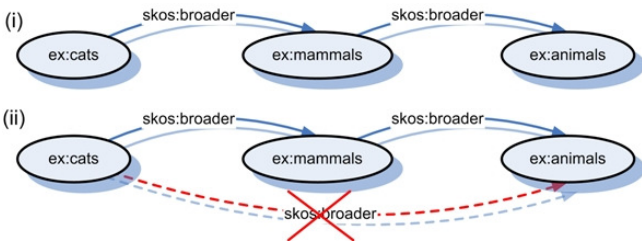
SKOS semantic relationships

Element	Vocabulary	Descriptive Definition
Semantic relationship	skos:semanticRelation	Instance of owl:ObjectProperty Domain: skos:Concept Range: skos:Concept
Broader transitive	skos:broaderTransitive	Instance of owl:ObjectProperty Instance of owl:TransitiveProperty and Sub-property of skos:semanticRelation
Narrower transitive	skos:narrowerTransitive	Instance of owl:ObjectProperty Instance of owl:TransitiveProperty Defined as owl:inverseOf skos:broaderTransitive Sub-property of skos:semanticRelation
Generic broader	skos:broader	Instance of owl:ObjectProperty Not instance of owl:TransitiveProperty Sub-property of skos:broaderTransitive
Generic narrower	skos:narrower	Instance of owl:ObjectProperty Not instance of owl:TransitiveProperty Defined as owl:inverseOf skos:broader Sub-property of skos:narrowerTransitive
Related	skos:related	Instance of owl:ObjectProperty Instance of owl:SymmetricProperty Not instance of owl:TransitiveProperty Sub-property of skos:semanticRelation Disjoint with skos:broaderTransitive

SKOS broader and related terms and scope note

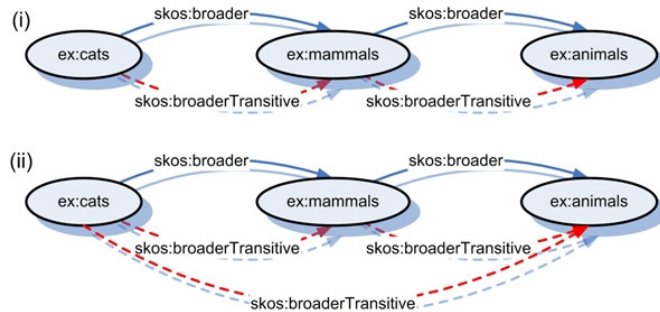


Transitive hierarchies in SKOS



Source: SKOS Primer: <https://www.w3.org/TR/skos-primer/>

Transitive hierarchies in SKOS



Source: SKOS Primer: <https://www.w3.org/TR/skos-primer/>

Transitivity:

Subproperties do not inherit the transitivity of their superproperties

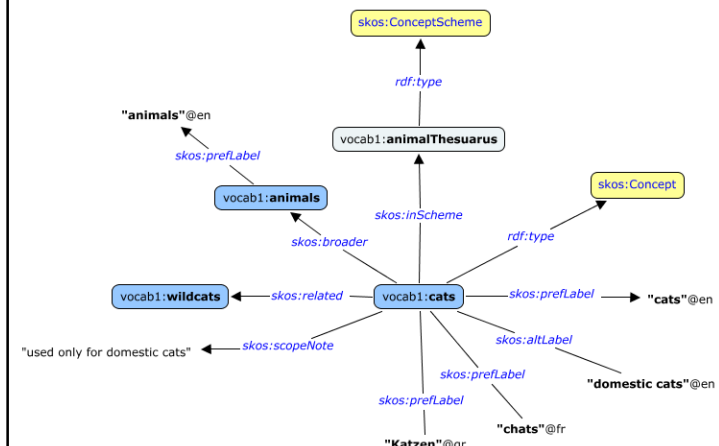
Examples:

- *isAncestorOf* ← transitive property
- *isParentOf* ← non transitive property
- *isMotherOf* ← non transitive property
- *skos:broaderTransitive* ← transitive property
- *skos:broader* ← non transitive property

SKOS notations and documentation

Element	Vocabulary	Descriptive Definition
Notation	<code>skos:notation</code>	Instance of owl:DatatypeProperty Domain: skos:Concept Range: Typed literal
Note	<code>skos:note</code>	Instance of owl:AnnotationProperty Domain: rdfs:Resource
Scope note	<code>skos:scopeNote</code>	Instance of owl:AnnotationProperty Sub-property of skos:note Domain: rdfs:Resource
History note	<code>skos:historyNote</code>	Instance of owl:AnnotationProperty Sub-property of skos:note Domain: rdfs:Resource
Change note	<code>skos:changeNote</code>	Instance of owl:AnnotationProperty Sub-property of skos:note Domain: rdfs:Resource
Definition	<code>skos:definition</code>	Instance of owl:AnnotationProperty Sub-property of skos:note Domain: rdfs:Resource
Editorial note	<code>skos:editorialNote</code>	Instance of owl:AnnotationProperty Sub-property of skos:note Domain: rdfs:Resource
Example	<code>skos:example</code>	Instance of owl:AnnotationProperty Sub-property of skos:note Domain: rdfs:Resource

SKOS concept scheme



SKOS mapping relationships

Element	Vocabulary	Descriptive Definition
Mapping relationship	skos:mappingRelation	Instance of owl:ObjectProperty Domain: skos:Concept Range: skos:Concept
Close match	skos:closeMatch	Instance of owl:ObjectProperty Instance of owl:SymmetricProperty Sub-property of skos:mappingRelation
Exact match	skos:exactMatch	Instance of owl:ObjectProperty Instance of owl:SymmetricProperty Sub-property of skos:mappingRelation
Broad match	skos:broadMatch	Instance of owl:ObjectProperty Sub-property of skos:mappingRelation Sub-property of skos:broader
Narrower match	skos:narrowerMatch	Instance of owl:ObjectProperty Sub-property of skos:mappingRelation Sub-property of skos:narrower Defined as owl:inverseOf skos:broader //identical situation as for skos:narrowerTransitive and skos:narrower//

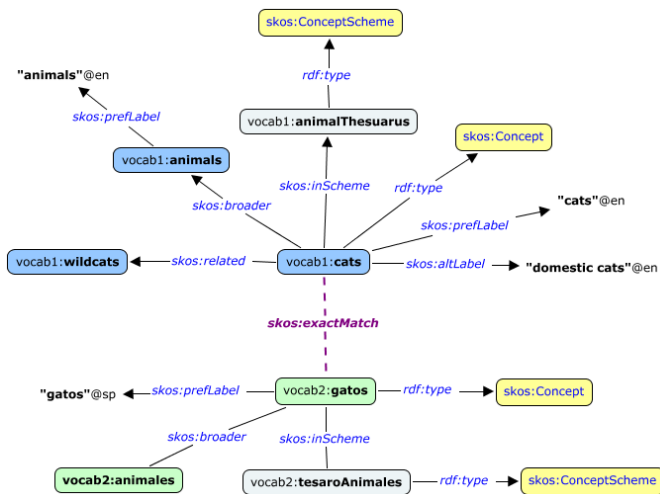
Example from SKOS Primer

ex1:animal **skos:exactMatch** ex2:animals.

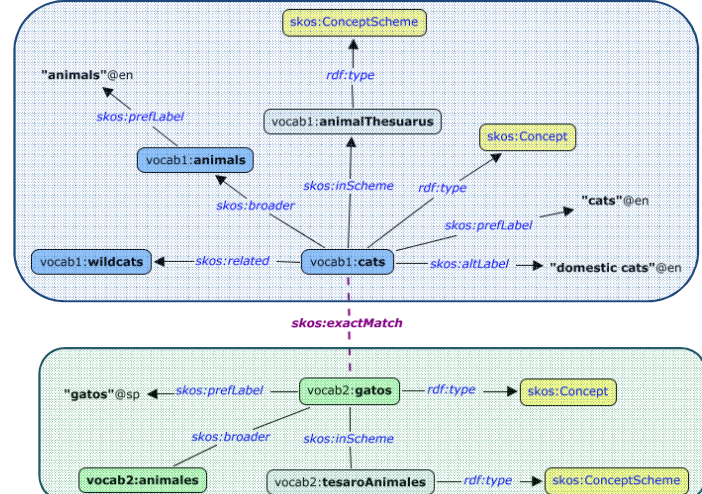
ex1:platypus **skos:relatedMatch** ex2:eggs.

ex1:platypus **skos:broadMatch**
ex2:eggLayingAnimals.

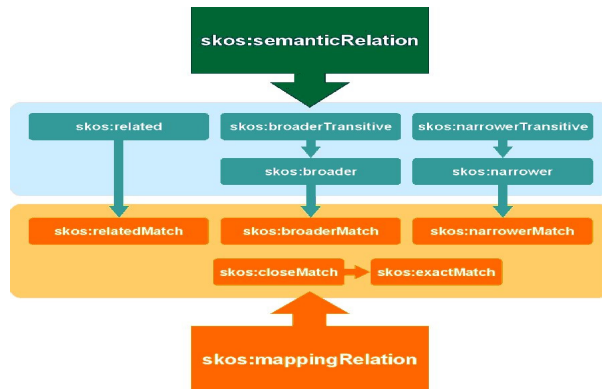
SKOS matching terms among different schemes



SKOS matching terms among different schemes



SKOS semantic relationships



Source: Pastor-Sanchez, J., Martínez Mendez, F. J., Rodríguez-Muñoz, J. V. 2009. "Advantages of thesaurus representation using the Simple Knowledge Organization System (SKOS) compared with proposed alternatives." *Information Research*, Vol. 14, no. 4 (Dec.).

SKOS concept collections

Element	Vocabulary	Descriptive Definition
Collection	<code>skos:Collection</code>	Instance of owl:Class Disjoint with skos:Concept y skos:ConceptScheme
Ordered collection	<code>skos:OrderedCollection</code>	Instance of owl:Class Sub-class of skos:Collection
Member of a collection	<code>skos:member</code>	Instance of owl:ObjectProperty Instance of owl:FunctionalProperty Domain: skos:OrderedCollection Range: rdf:List Allowed more than one value of skos:member
Member of a list	<code>skos:memberList</code>	Instance of owl:ObjectProperty Instance of owl:FunctionalProperty Domain: skos:OrderedCollection Range: rdf:List Allowed more than one value of skos:member

SKOS in Turtle

```

@prefix : <http://www.sjm-animals#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .

:AnimalThesaurus rdf:type skos:ConceptScheme .

:cats rdf:type skos:Concept ;
  skos:prefLabel "cats"@en , "Katzen"@de , "chats"@fr ;
  skos:altLabel "domestic cats"@en ;
  skos:inScheme :AnimalThesaurus ;
  skos:broader :animals ;
  skos:narrower :MaineCoonCats ;
  skos:related :wildcats ;
  skos:scopeNote "used only for domestic cats" .

:animals rdf:type skos:Concept ;
  skos:prefLabel "animals"@en ;
  skos:inScheme :AnimalThesaurus ;
  skos:narrower :cats .

:MaineCoonCats rdf:type skos:Concept ;
  skos:prefLabel "Main Coon cats"@en ;
  skos:inScheme :AnimalThesaurus ;
  skos:broader :cats .

:wildcats rdf:type skos:Concept ;
  skos:prefLabel "wildcats"@en ;
  skos:inScheme :AnimalThesaurus ;
  skos:related :cats .
  
```

SKOS use cases

<http://www.w3.org/TR/2009/NOTE-skos-ucr-20090818/>

1. An integrated view to medieval illuminated manuscripts
 2. Bio-zen ontology framework for representing scientific discourse in life science
 3. Semantic search service across mapped multilingual thesauri in the agriculture domain
 4. Supporting product life cycle
 5. CHOICE@CATCH ranking of candidate terms for description of radio and TV programs
- ... and more ...

Unit 6: SKOS (for expressing traditional controlled vocabularies as linked data)

LIBRARY OF CONGRESS LINKED DATA SERVICE **LC Linked Data Service Authorities and Vocabularies** <http://id.loc.gov/>

[Linked Data Service](#)
[About](#)
[Main Dataset Descriptions](#)
[Preservation Dataset Descriptions](#)
[Small Datasets Descriptions](#)
[Search](#)
[Download](#)
[Technical Center](#)
[Contact Us](#)

Search

Enter Keyword or Phrase

AI
LC Subject Headings
LC Name Authority File
LC Classification
LC Children's Subject Headings

Search **Reset**

Available Datasets

The Linked Data Service provides access to commonly found standards and vocabularies promulgated by the Library of Congress. This includes data values and the controlled vocabularies that house them. The following are currently offered as part of this service:

- > LC Subject Headings
- > LC Name Authority File
- > LC Classification
- > LC Children's Subject Headings
- > LC Genre/Form Terms
- > LC Medium of Performance Thesaurus for Music
- > LC Demographic Group Terms
- > Thesaurus for Graphic Materials
- > AFS Ethnographic Thesaurus
- > Cultural Heritage Organizations
- > MARC Relators
- > MARC Countries
- > MARC Geographic Areas
- > MARC Languages
- > ISO639-1 Languages
- > ISO639-2 Languages
- > ISO639-5 Languages
- > Extended Date/Time Format
- > Schemes and smaller code lists
- > Identifiers
- > Carriers
- > Content Types
- > Media Types
- > Resource Types
- > Description Convention
- > Publication Frequencies
- > Resource Components
- > MARC Genre/Form Schemes
- > MARC Subject Schemes
- > Classification Schemes

Getty Vocabularies: LOD SPARQL Queries **Any** Search... Search Brief

Expressionist (style)

Source: <http://vocab.getty.edu/aat/300021502>

Subject (74) Predicate Object All Website Hierarchy Download in: JSON JSONLD RDF N3/Turtle N-Triples Inference Explicit only

Statements in which the resource exists as a subject

Predicate	Object
rdf:type	gvp:Concept
rdfs:seeAlso	http://www.getty.edu/vow/AATFullDisplay?find=&logic=AND&note=&subjectid=300021502
skos:prefLabel	aat_term:1000021502-en, aat_term:1000422763-es, aat_term:1000584121-zh-Hant, aat_term:1000584122-zh-Latn-pinyin-x-notone, aat_term:1000584123-zh-Latn-pinyin-x-hanyu, aat_term:1000584124-zh-Latn-wadegile, aat_term:1000610101-nl
skos:altLabel	aat_term:1000279960-en, aat_term:1000610102-nl
gvp:broaderGeneric	aat:300021424
gvp:broaderPreferred	aat:300021424
gvp:prefLabelGVP	aat_term:1000021502-en
skos:inScheme	aat
skos:scopeNote	aat_scopeNote:117496, aat_scopeNote:50895, aat_scopeNote:62596, aat_scopeNote:98190
dcterms:contributor	aat_contrib:100000000, aat_contrib:100000088, aat_contrib:10000131, aat_contrib:10000205, aat_contrib:10000250
dcterms:source	aat_source:2000051089-subject-300021502, aat_source:2000052373
dc:identifier	300021502
gvp:aat2336_has_associates	aat:300389788

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


Getty Vocabularies: LOD SPARQL Queries **Any** Search...


The Getty Vocabularies


Welcome to the SPARQL endpoint 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](#)

SKOS Examples

- **NAL: The National Agricultural Library's Agricultural Thesaurus**
 - *Climatic zones*
 - HTML page: Persistent URI: <http://lod.nal.usda.gov/nalt/12169> ; see "Record Views"
 - RDF/XML file: <http://lod.nal.usda.gov/nalt/12169.rdf>
- **LC Linked Data Service: Authorities and Vocabularies: Subjects**
 - *Climatic zones*
 - HTML page URI: <http://id.loc.gov/authorities/subjects/sh85027043>
 - SKOS - RDF/XML file: <http://id.loc.gov/authorities/subjects/sh85027043.skos.rdf>
- **VIAF: Virtual International Authority File**
 - *Gándhí, Indira, 1917-1984*
 - HTML page: Permalink: <http://viaf.org/viaf/86791938>
 - RDF/XML file: <http://viaf.org/viaf/86791938/rdf.xml>
- **LC Linked Data Service: Authorities and Vocabularies: Names**
 - *Mandela, Nelson, 1918-*
 - HTML page URI: <http://id.loc.gov/authorities/names/n85153068.html>
 - SKOS - RDF/XML file: <http://id.loc.gov/authorities/names/n85153068.skos.rdf>

Unit 6: SKOS (for expressing traditional controlled vocabularies as linked data)

The screenshot shows the USDA National Agricultural Library Thesaurus interface. The search term 'climatic zones' is entered, and the results are displayed. The 'climatic zones' term is highlighted, and its 'Term Number' is 12169. The interface also shows 'Used For' (climatic areas), 'Broader Term' (climate), 'Narrower Term' (and zones, cold zones, humid zones, maritime climate, Mediterranean climate, Sahel, semiarid zones, subhumid zones, subtropics, temperate zones, tropics), and 'Related Term' (ecological zones, growing season, winter hardness). The 'Spanish' translation 'zonas climáticas' is also shown. The 'Term Number' 12169 is highlighted in a red box.

NAL “climatic zones” SKOS record

```
<?xml version="1.0"?>
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:skos="http://www.w3.org/TR/2009/REC-skos-reference-20090818/" >
  <rdf:Description rdf:about="http://lod.nal.usda.gov/nalt/12169">
    <skos:altLabel xml:lang="en">climatic zones</skos:altLabel>
    <skos:related rdf:resource="http://lod.nal.usda.gov/nalt/26899"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/26898"/>
    <skos:prefLabel xml:lang="es">zonas climáticas</skos:prefLabel>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/12160"/>
    <skos:broader rdf:resource="http://lod.nal.usda.gov/nalt/76121"/>
    <skos:prefLabel xml:lang="en">climatic zones</skos:prefLabel>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/26892"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/125276"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/26893"/>
    <skos:related rdf:resource="http://lod.nal.usda.gov/nalt/26900"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/11923"/>
    <rdf:type rdf:resource="http://www.w3.org/TR/2009/REC-skos-reference-20090818/Concept"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/26894"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/26896"/>
    <skos:related rdf:resource="http://lod.nal.usda.gov/nalt/17392"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/26895"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/20512"/>
    <skos:narrower rdf:resource="http://lod.nal.usda.gov/nalt/26897"/>
  </rdf:Description>
</rdf:RDF>
```

The screenshot shows the Library of Congress Subject Headings (LCSH) record for 'Climatic zones'. The record is displayed in a table format. The 'Climatic zones' term is highlighted. The 'URI(s)' section shows the URI 'http://id.loc.gov/authorities/subjects/sh85027043'. The 'Exact Matching Concepts from Other Schemes' section shows the URI 'http://aims.fao.org/aos/agrovoc/c_1669'. The 'Closest Matching Concepts from Other Schemes' section shows the URI 'http://id-nb.info/gnd/4128757-5'. The 'LC Classification' section shows 'QC981.8.Z6'. The 'Change Notes' section shows '1986-02-11: new'. The 'Alternate Formats' section shows 'RDF/XML (MADS and SKOS)', 'N-Triples (MADS and SKOS)', 'JSON (MADS/RDF and SKOS/RDF)', 'MADS - RDF/XML', 'MADS - N-Triples', 'MADS/RDF - JSON', 'SKOS - RDF/XML', 'SKOS - N-Triples', 'SKOS - JSON', 'MADS/XML', and 'MARCXML'. The 'Variants' section shows 'Zones, Climatic' and 'Climatic classification'.

LCSH “Climatic zones” SKOS record

```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  <rdf:Description rdf:about="http://id.loc.gov/authorities/subjects/sh85027043">
    <rdf:type rdf:resource="http://www.w3.org/2004/02/skos/core#Concept"/>
    <skos:prefLabel xml:lang="en" xml:skos="http://www.w3.org/2004/02/skos/core#">Climatic zones</skos:prefLabel>
    <skos:altLabel xml:skos="http://www.w3.org/2008/05/skos-xml#">
      <rdf:Description>
        <rdf:type rdf:resource="http://www.w3.org/2008/05/skos-xml#Label"/>
        <skos:literalForm xml:lang="en">Zones, Climatic</skos:literalForm>
      </rdf:Description>
    </skos:altLabel>
    <skos:related rdf:resource="http://id.loc.gov/authorities/subjects/sh85027038" xml:skos="http://www.w3.org/2004/02/skos/core#">
      <skos:exactMatch rdf:resource="http://stitch.cs.vu.nl/vocabularies/rae/ark:/12148/cb120105121"
        xml:skos="http://www.w3.org/2004/02/skos/core#" />
      <skos:exactMatch rdf:resource="http://aims.fao.org/aos/agrovoc/c_1669" xml:skos="http://www.w3.org/2004/02/skos/core#" />
      <skos:closeMatch rdf:resource="http://id-nb.info/gnd/4128757-5" xml:skos="http://www.w3.org/2004/02/skos/core#" />
      <skos:closeMatch rdf:resource="http://id-nb.info/gnd/4164202-8" xml:skos="http://www.w3.org/2004/02/skos/core#" />
      <skos:inScheme rdf:resource="http://id.loc.gov/authorities/subjects" xml:skos="http://www.w3.org/2004/02/skos/core#" />
      <skos:altLabel xml:lang="en" xml:skos="http://www.w3.org/2004/02/skos/core#">Zones, Climatic</skos:altLabel>
      <skos:changeNote xml:skos="http://www.w3.org/2004/02/skos/core#">
        <cs:ChangeSet xml:skos="http://purl.org/vocab/changeset/schema#">
          <cs:subjectOfChange rdf:resource="http://id.loc.gov/authorities/subjects/sh85027043"/>
          <cs:creatorName>Library of Congress, Network Development and MARC Standards Office</cs:creatorName>
          <cs:createdDate rdf:datatype="http://www.w3.org/2001/XMLSchema#dateTime">1986-02-11T00:00:00</cs:createdDate>
          <cs:changeReason rdf:datatype="http://www.w3.org/2001/XMLSchema#string">new</cs:changeReason>
        </cs:ChangeSet>
      </skos:changeNote>
    </rdf:Description>
  </rdf:RDF>
```

LCSH “Climatic zones:” SKOS selections (1)

```
<rdf:Description rdf:about="http://id.loc.gov/authorities/subjects/sh85027043">
<rdf:type rdf:resource="http://www.w3.org/2004/02/skos/core#Concept"/>

<skos:prefLabel xml:lang="en"
xmlns:skos="http://www.w3.org/2004/02/skos/core#">Climatic zones</skos:prefLabel>

<skosxl:altLabel xmlns:skosxl="http://www.w3.org/2008/05/skos-xl#">
  <rdf:Description>
    <rdf:type rdf:resource="http://www.w3.org/2008/05/skos-xl#Label"/>
    <skosxl:literalForm xml:lang="en">Zones, Climatic</skosxl:literalForm>
  </rdf:Description>
</skosxl:altLabel>

<skos:related rdf:resource="http://id.loc.gov/authorities/subjects/sh85027038"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"/>
```

LCSH “Climatic zones:” SKOS selections (2)

```
<rdf:Description rdf:about="http://id.loc.gov/authorities/subjects/sh85027043">
<skos:prefLabel xml:lang="en"
xmlns:skos="http://www.w3.org/2004/02/skos/core#">Climatic
zones</skos:prefLabel>

<skos:exactMatch
rdf:resource="http://stitch.cs.vu.nl/vocabularies/rameau/ark:/12148/cb120105121"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"/>

<skos:exactMatch rdf:resource="http://aims.fao.org/aos/agrovoc/c_1669"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"/>

<skos:closeMatch rdf:resource="http://d-nb.info/gnd/4128757-5"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"/>

<skos:closeMatch rdf:resource="http://d-nb.info/gnd/4164202-8"
xmlns:skos="http://www.w3.org/2004/02/skos/core#"/>
```

LCSH “Climatic zones:” SKOS selections (3)

```
<rdf:Description rdf:about="http://id.loc.gov/authorities/subjects/sh85027043">
<skos:prefLabel xml:lang="en" xmlns:skos="http://www.w3.org/2004/02/skos/core#">Climatic
zones</skos:prefLabel>

<skos:changeNote xmlns:skos="http://www.w3.org/2004/02/skos/core#">
  <cs:ChangeSet xmlns:cs="http://purl.org/vocab/changeset/schema#">
    <cs:subjectOfChange rdf:resource="http://id.loc.gov/authorities/subjects/sh85027043"/>
    <cs:creatorName>Library of Congress, Network Development and MARC Standards
      Office</cs:creatorName>
    <cs:createdDate rdf:datatype="http://www.w3.org/2001/XMLSchema#dateTime">
      1986-02-11T00:00:00</cs:createdDate>
    <cs:changeReason
      rdf:datatype="http://www.w3.org/2001/XMLSchema#string">new</cs:changeReason>
  </cs:ChangeSet>
</skos:changeNote>
```

Indira Gándhí examples

- See separate documents