Semantic Web Best Practices and Deployment

SKOS Tutorial
Catch

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Based on slides by

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http://isegserv.itd.rl.ac.uk/cvs-public/skos/press/dc2005/tutorial.ppt

Intro

- SKOS
  - “Simple Knowledge Organisation System(s)”
  - Simple, extensible, machine-understandable representation for “concept schemes”
    - Thesauri
    - Classification Schemes
    - Taxonomies
    - Subject Headings
    - Other types of ‘controlled vocabulary’...

SKOS Development

- Developed by W3C's Semantic Web Best Practices-WG
- Draft for Working Group Note
- Design: public, consensus-driven, open community, email
- Input from actual vocabulary maintainers

Motivation

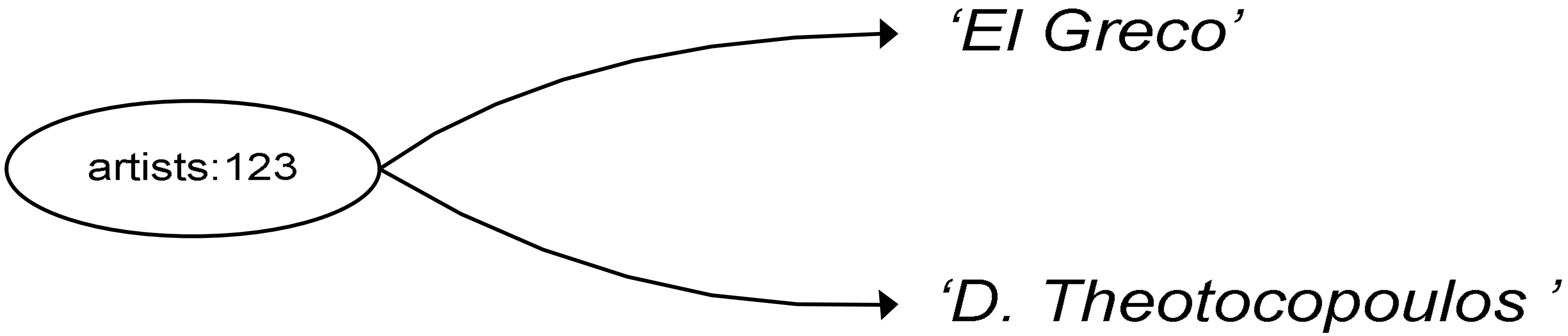
Semantic Web technology can help improve search facilities and reuse:

1. Concept-based search instead of text-based search
2. Reuse each other’s concept definitions
3. Search across (institution) boundaries
4. Standard software

1. Concept Search

- Painter Domenikos Theotocopoulos = “El Greco” (nickname)
- Some indexers use “El Greco”, others “D. Theotocopoulos”
- Searching for “El Greco” does not give all results
- Solution: one *concept* with different *lexical labels*.

Example



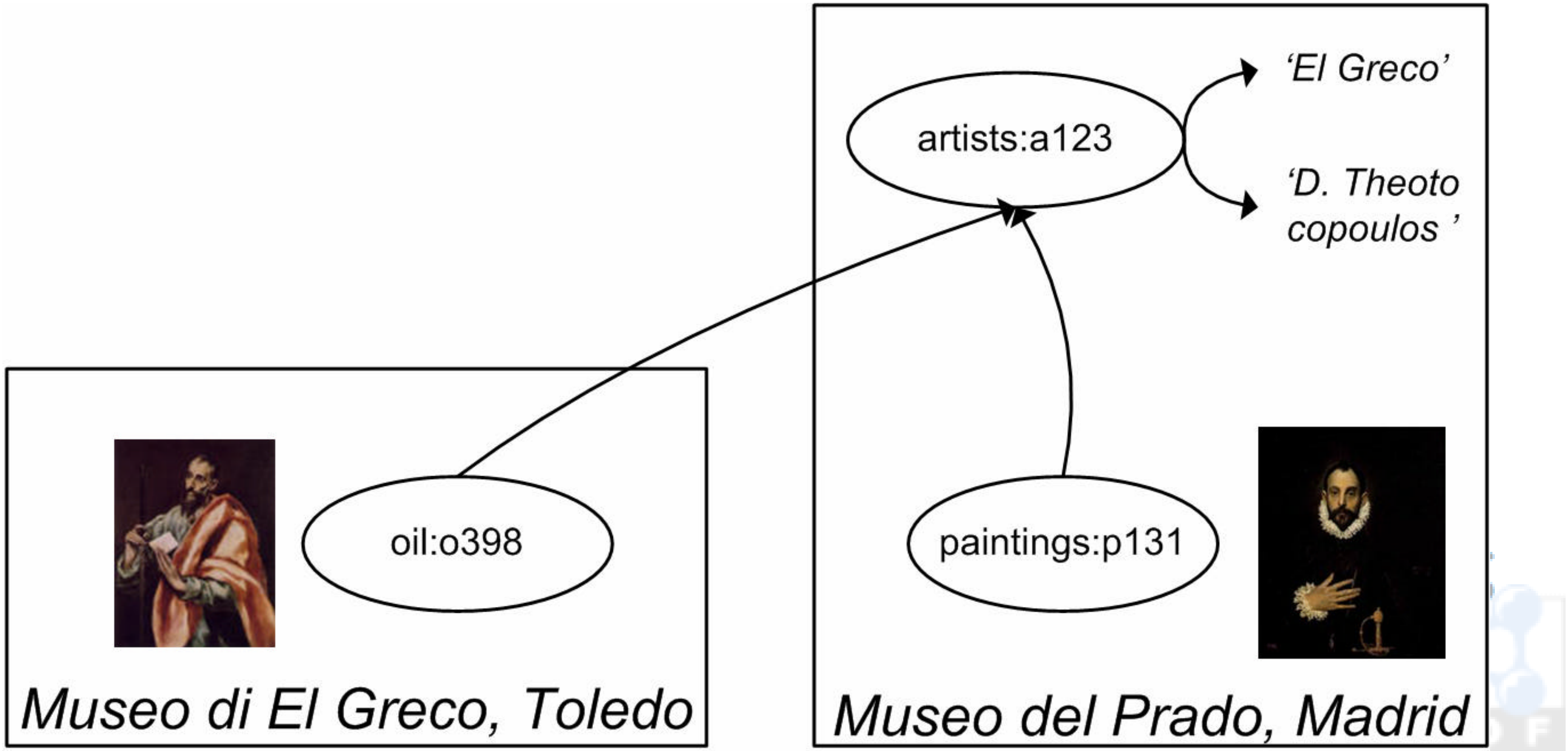
- N.B.: vocabulary with *identifiers* for preferred terms and indexing with *identifiers* accomplishes this

2. Reuse

- Reuse existing concept “El Greco”

✍ Req. 1: one “exchange syntax”

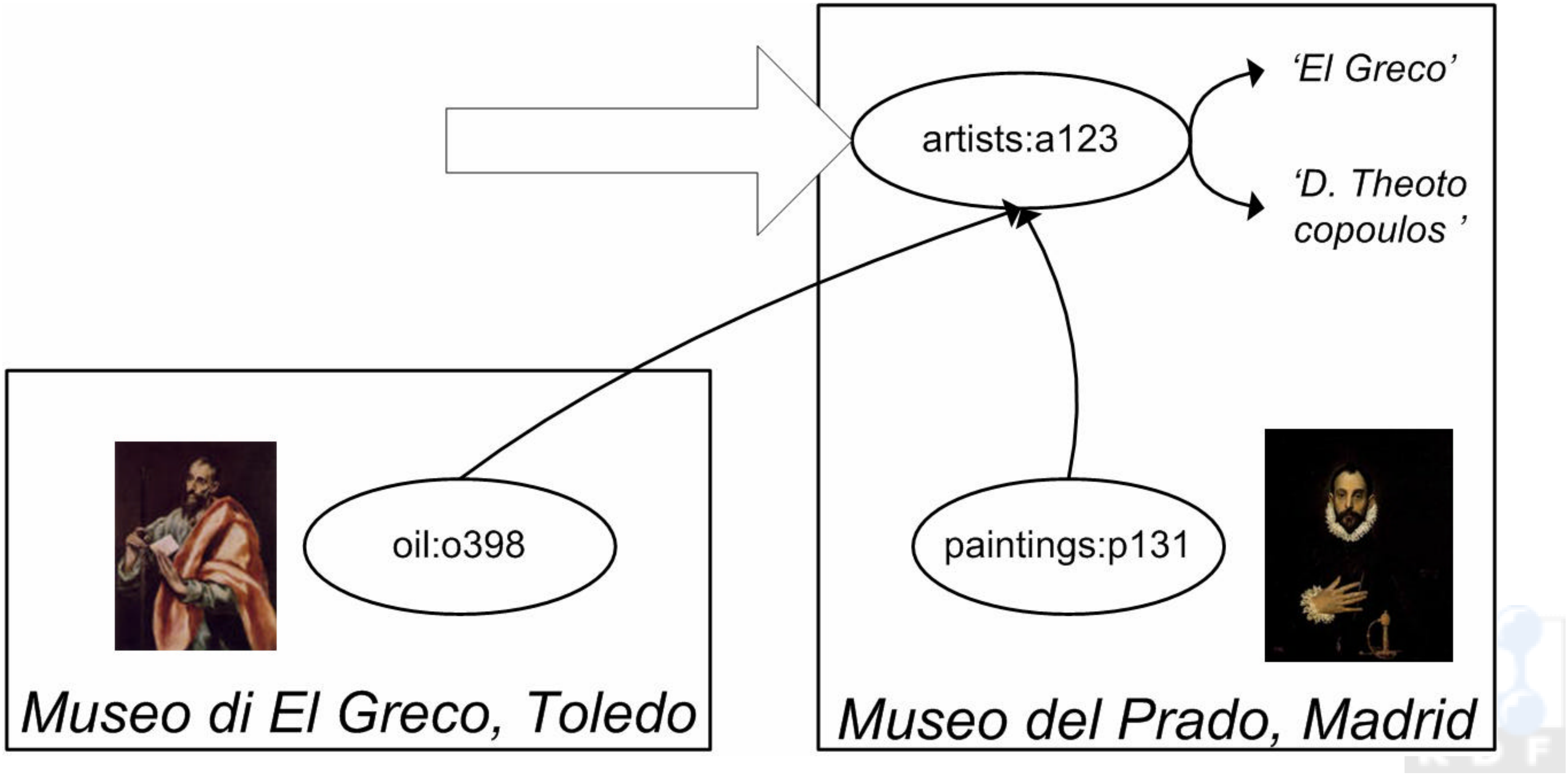
✍ Req. 2: “point” at other concepts



3. Search Across Boundaries

- Search for *concept* “El Greco” returns paintings from both institutions

✍ Same requirements



4. Standard Software

- If all concept schemes use same “exchange syntax” and “structure”, standardized software can be built to:
  - Display/browse concept scheme
  - Annotate with concept scheme
  - Integrate data from 2 institutions using standard concept schemes (“search across boundaries”)

✍ Req. 3: Similar *structures* (graphs) in exchange syntax

Why SKOS helps

SKOS uses RDF

- sharing “graphs” in distributed environment (intranet/internet)
- Uses URIs for “pointing” (identifying)
- Easy to extend by anyone for specific purposes

✍ “exchange syntax”

✍ “Point at concept”

SKOS: set of *classes* and *properties* to describe concept schemes

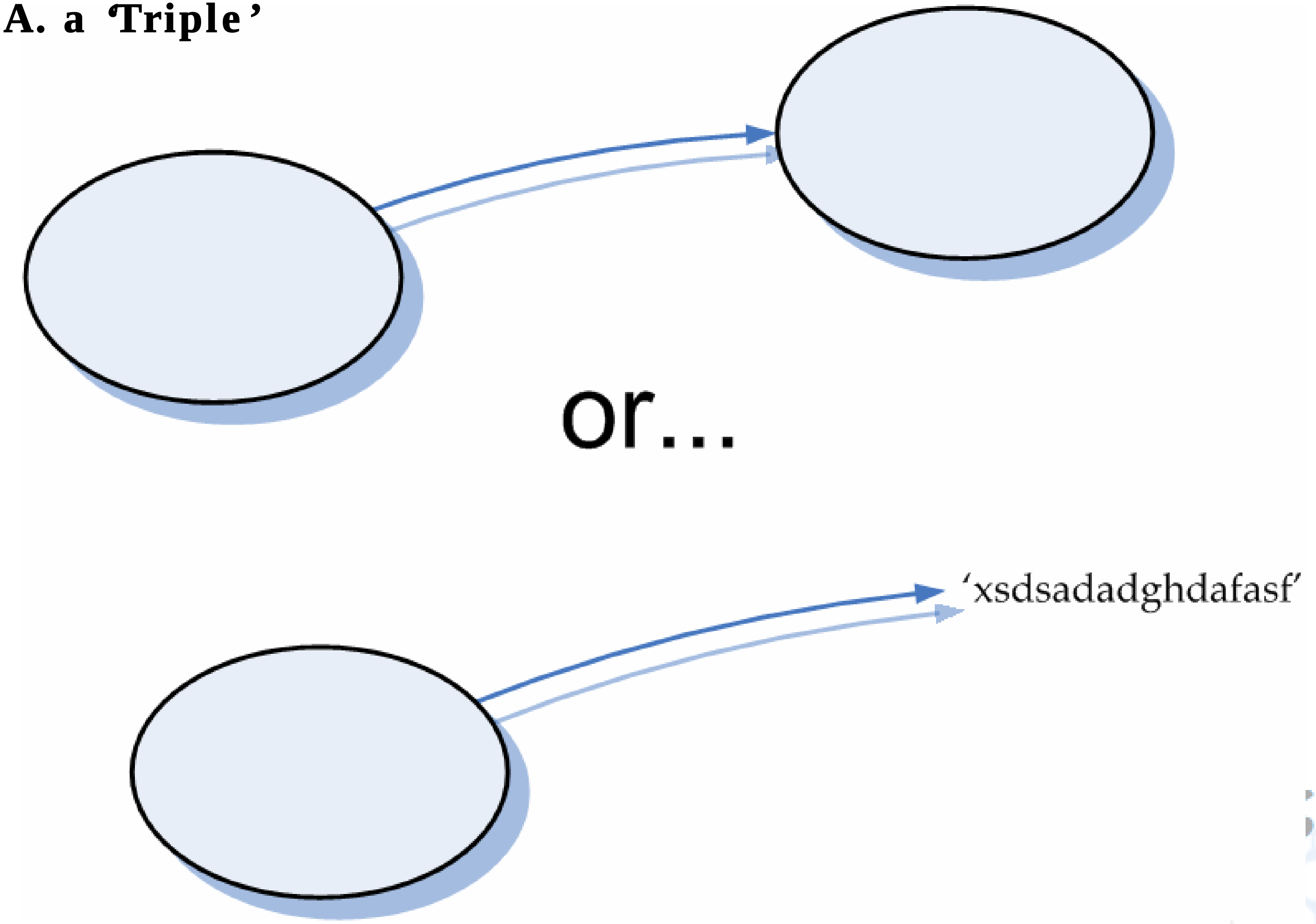
- Produce “similar graphs”

✍ “Same structures”/ clear what graph means

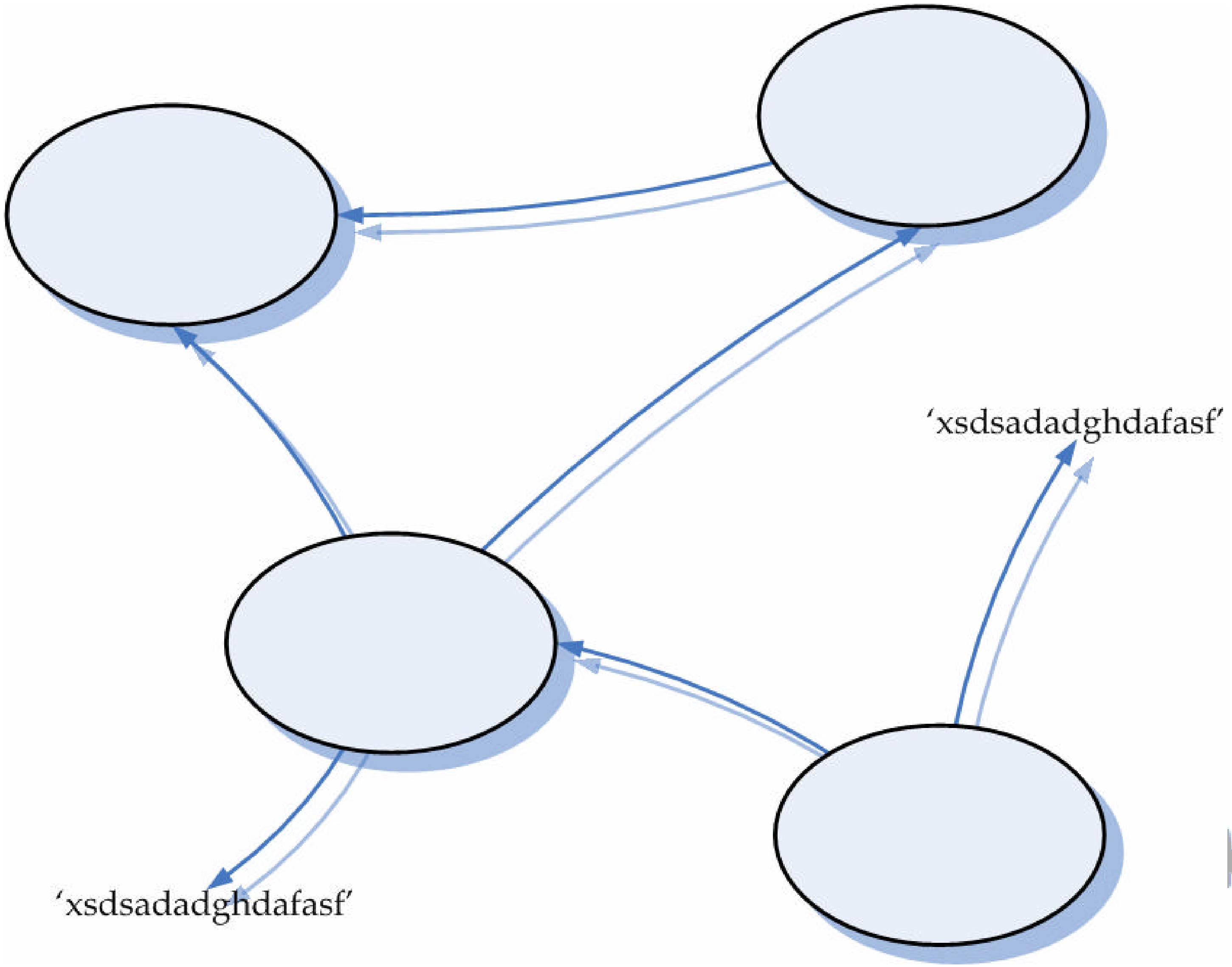
Disadvantage: unusual concept schemes don’t fit into SKOS (original structure too complex)

Quick RDF: a ‘Statement’

A.K.A. a ‘Triple’



Quick RDF: a 'Graph'



Quick RDF: exchange syntax

- RDF Graphs can be exchanged in XML (and other formats)
- Alternative ways to represent & exchange the *same* graph
- Here we only discuss RDF graphs, exchange syntax is “lower-level” technical issue

Controlled Vocabulary

Love

Strong feelings of attraction towards, and affection for, another adult, or great affection for a friend or family member.

Awe

A feeling of great respect sometimes mixed with fear or surprise.

Joy

A feeling of bliss and great happiness.

Converting into SKOS graph

1. Identify
2. Describe
3. Publish

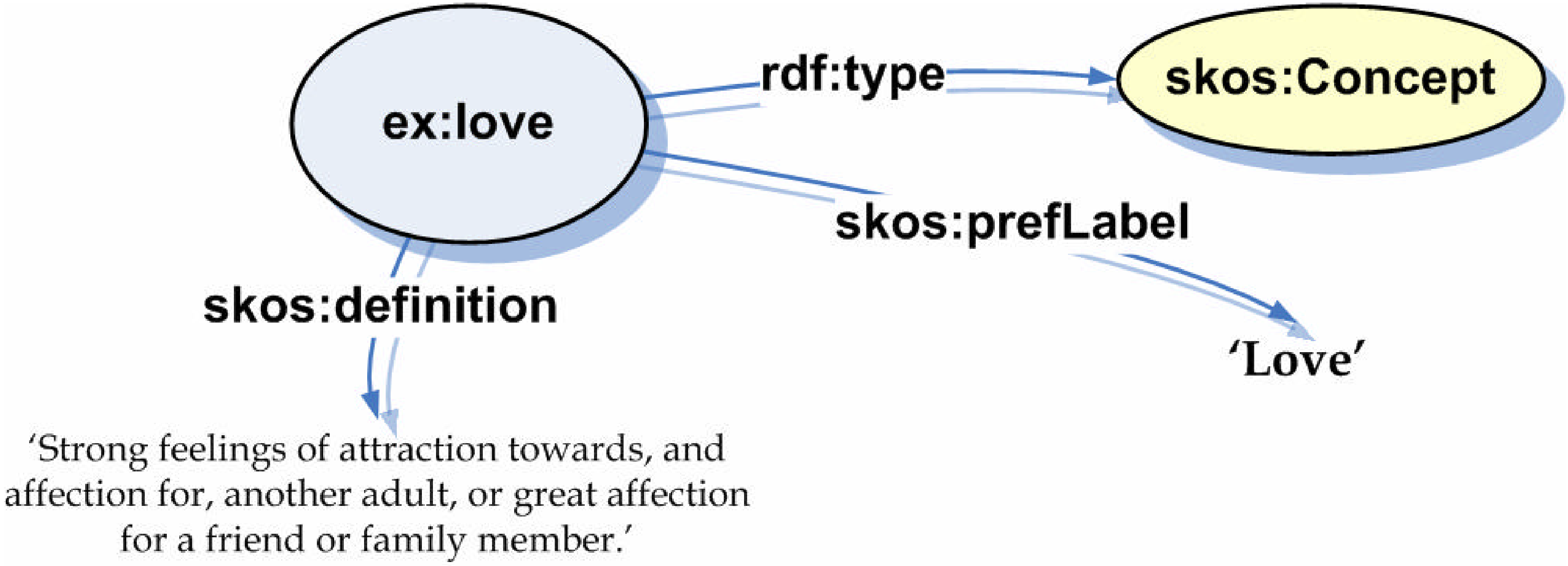
Identify

- Step 1: Identify concepts…

  http://www.example.com/concepts#love
  http://www.example.com/concepts#awe
  http://www.example.com/concepts#joy

Describe

- Step 2: Describe…



ex:love

rdf:type

skos:Concept

skos:prefLabel

'Love'

skos:definition

'Strong feelings of attraction towards, and affection for, another adult, or great affection for a friend or family member.'

Publish

- Step 3: Publish…
  - Put the file on a web server for programs to download & process
  - Put the file on special RDF server on which you can query with SQL-like language:
    - Select * from … Where …

Thesaurus (USE/UF)

Love *(preferred term)*

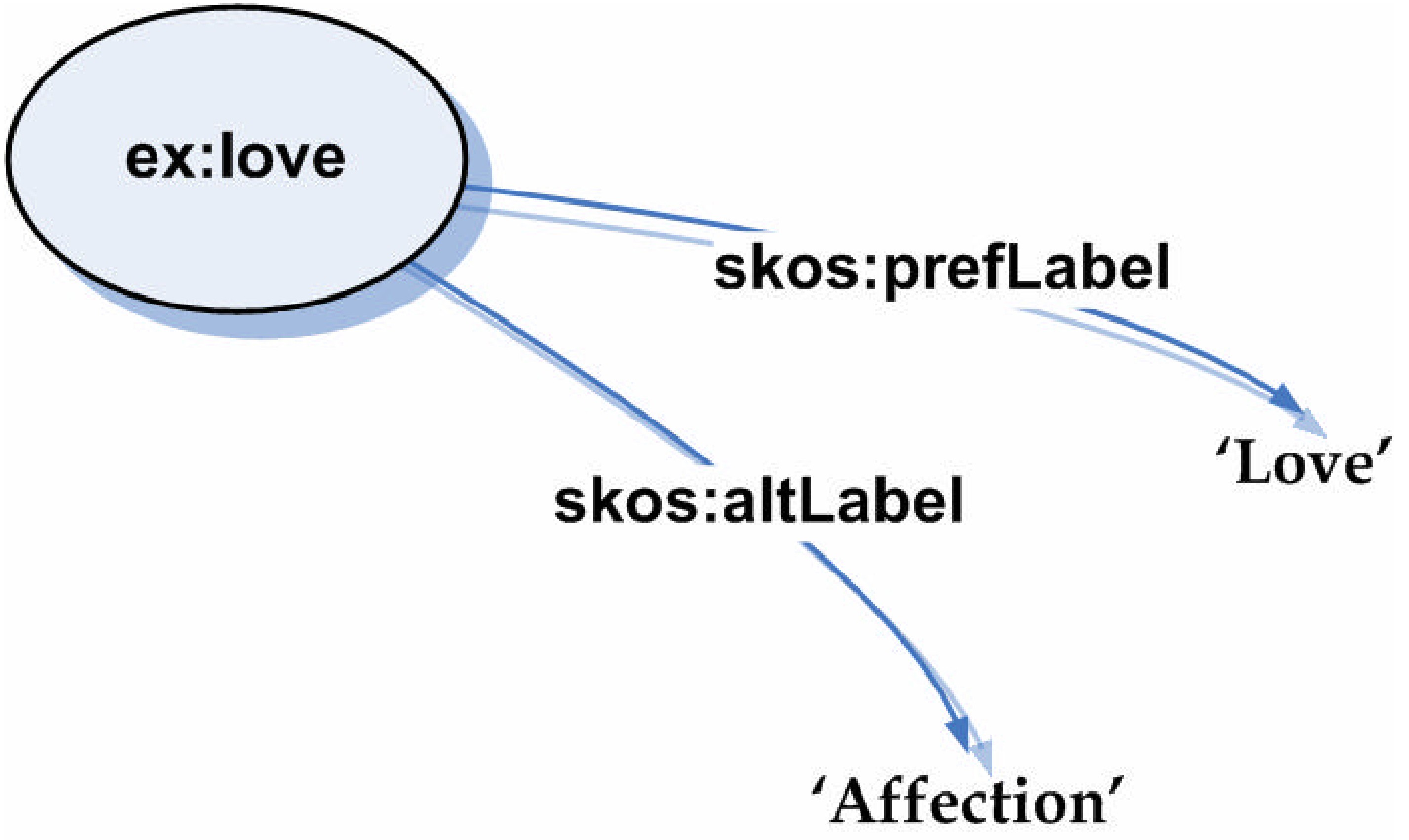
UF Affection

Affection *(non-preferred term)*

USE Love

("USE" directs user from non-pref term to pref-term that should be used in indexing and search)

Lexical Labels



Thesaurus (BT/NT)

Love

BT Emotion *(“BT” = Broader Term)*

Emotion

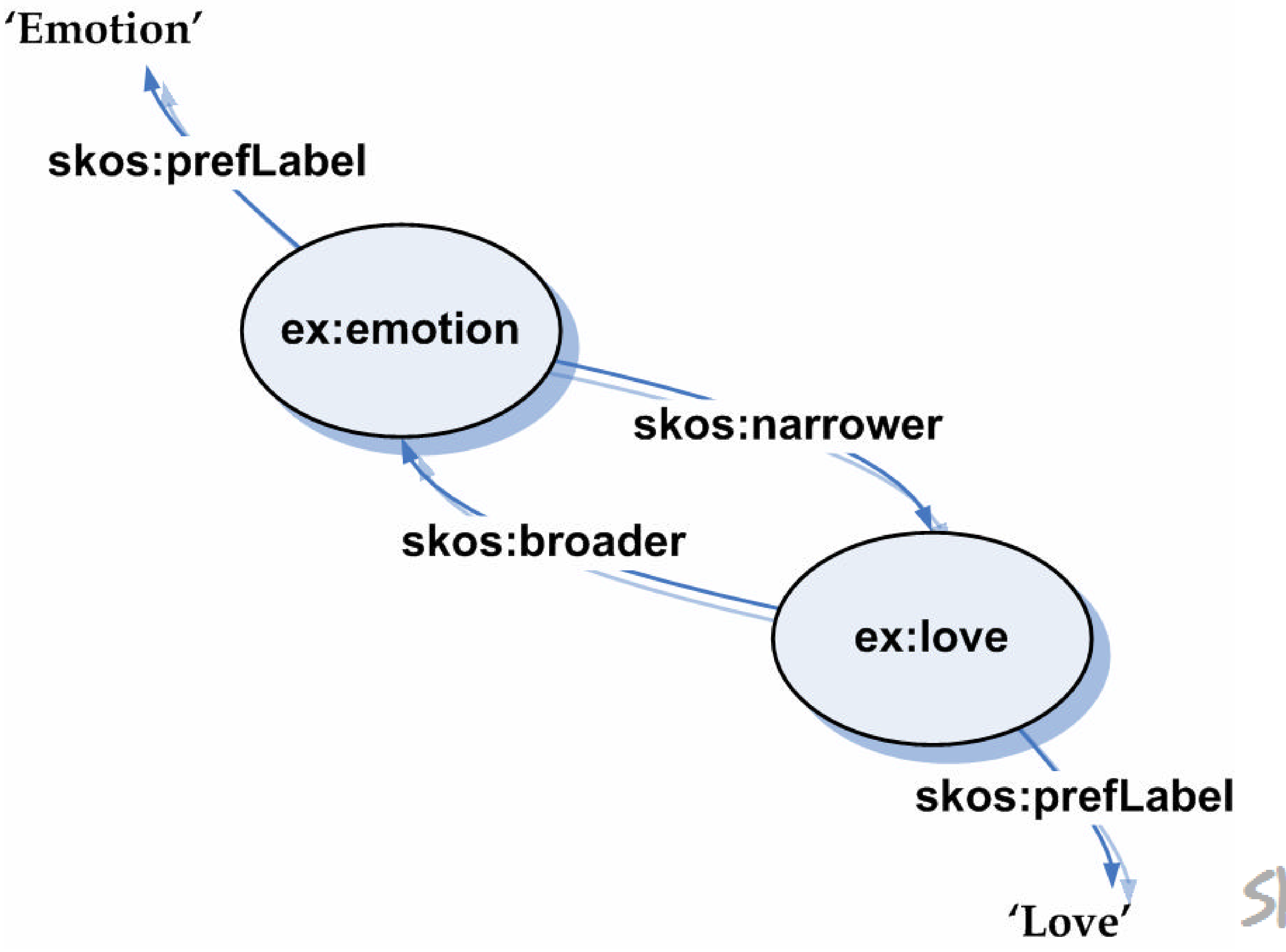
NT Love *(“NT” = Narrower Term)*

NT Awe

NT Joy

(*BT/NT only between preferred terms*)

Broader/Narrower



Thesaurus (RT)

Love

RT Beauty

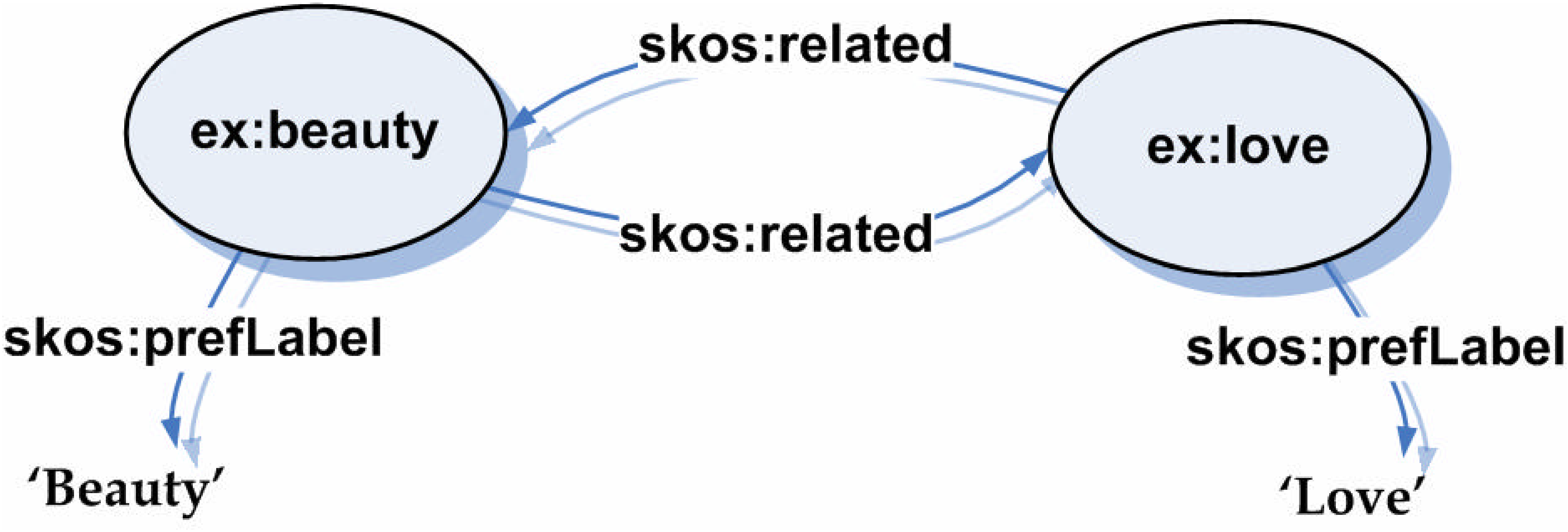
("RT" = Related Term)

Beauty

RT Love

(RT only between preferred terms)

Related



skos:related
ex:beauty
ex:love
skos:related
skos:prefLabel
skos:prefLabel
'Beauty'
'Love'

Story So Far...

- Basic Structure
  - skos:Concept
- Lexical Labelling
  - skos:prefLabel, skos:altLabel
- Documentation
  - skos:definition
- Semantic Relations
  - skos:broader, skos:narrower, skos:related

More Documentation Properties

- skos:note

  e.g. 'I'm going bananas'

- skos:definition

  e.g. 'A long curved fruit with a yellow skin and soft, sweet white flesh inside.'

- skos:example

  e.g. 'A bunch of bananas.'

- skos:scopeNote

  e.g. 'Only use for the western family of bananas'

- skos:historyNote

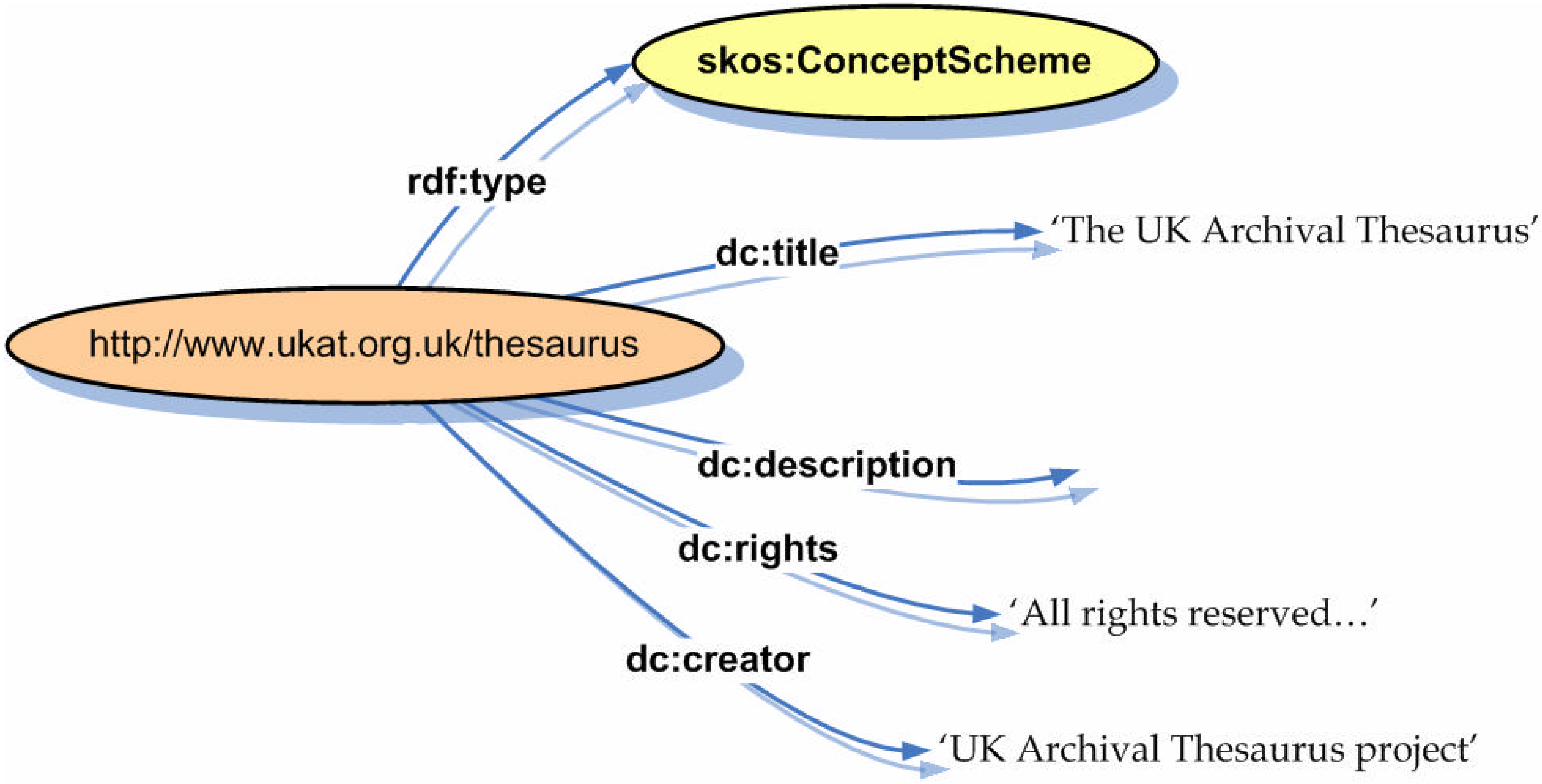
  e.g. 'Introduced 1986.'

Concept Schemes

- Organise a set of concepts into a **concept scheme**

- Add metadata about the scheme
  - Title
  - Rights
  - creator

Concept Scheme



skos:ConceptScheme

rdf:type

http://www.ukat.org.uk/thesaurus

dc:title

'The UK Archival Thesaurus'

dc:description

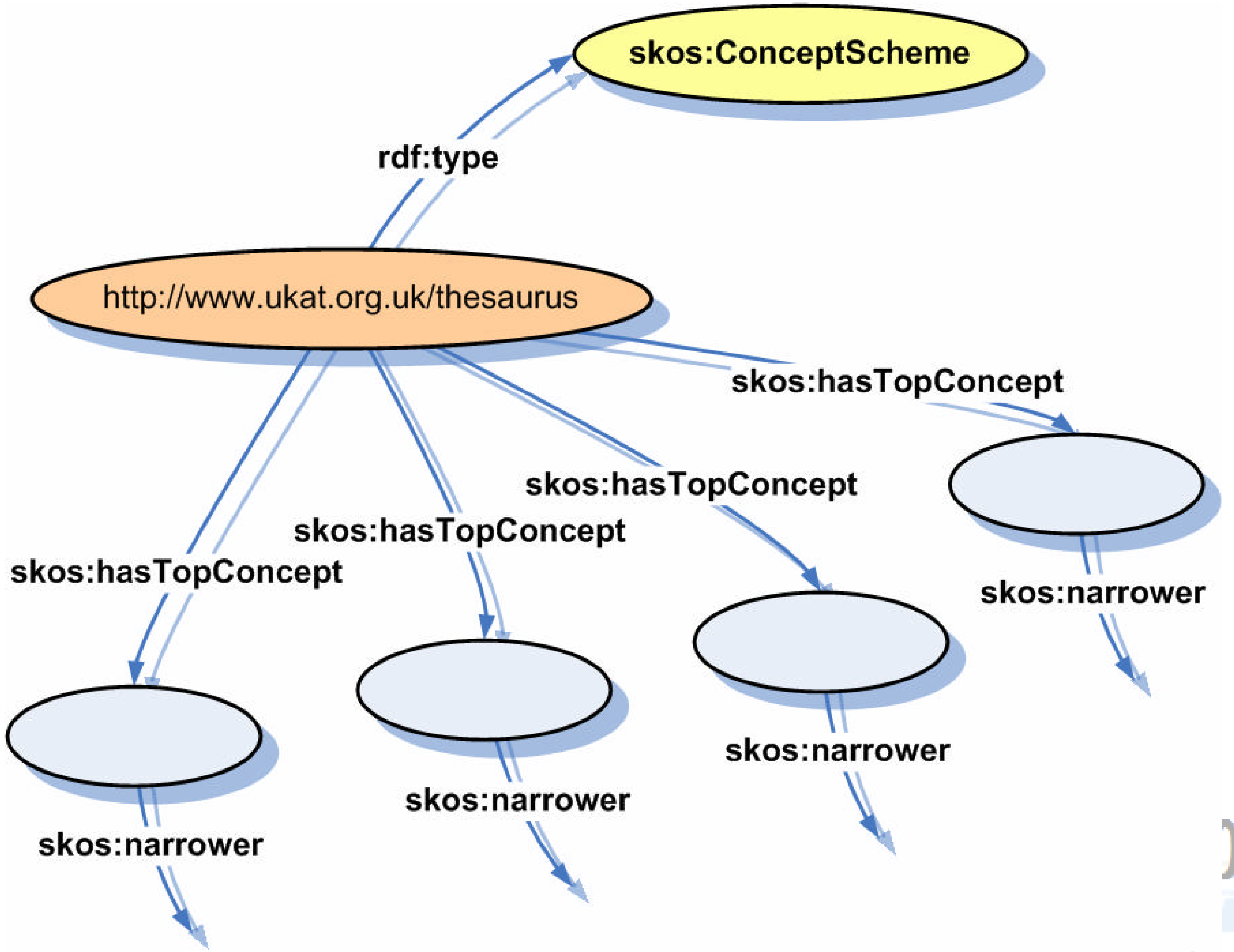
dc:rights

'All rights reserved…'

dc:creator

'UK Archival Thesaurus project'

Top Concepts

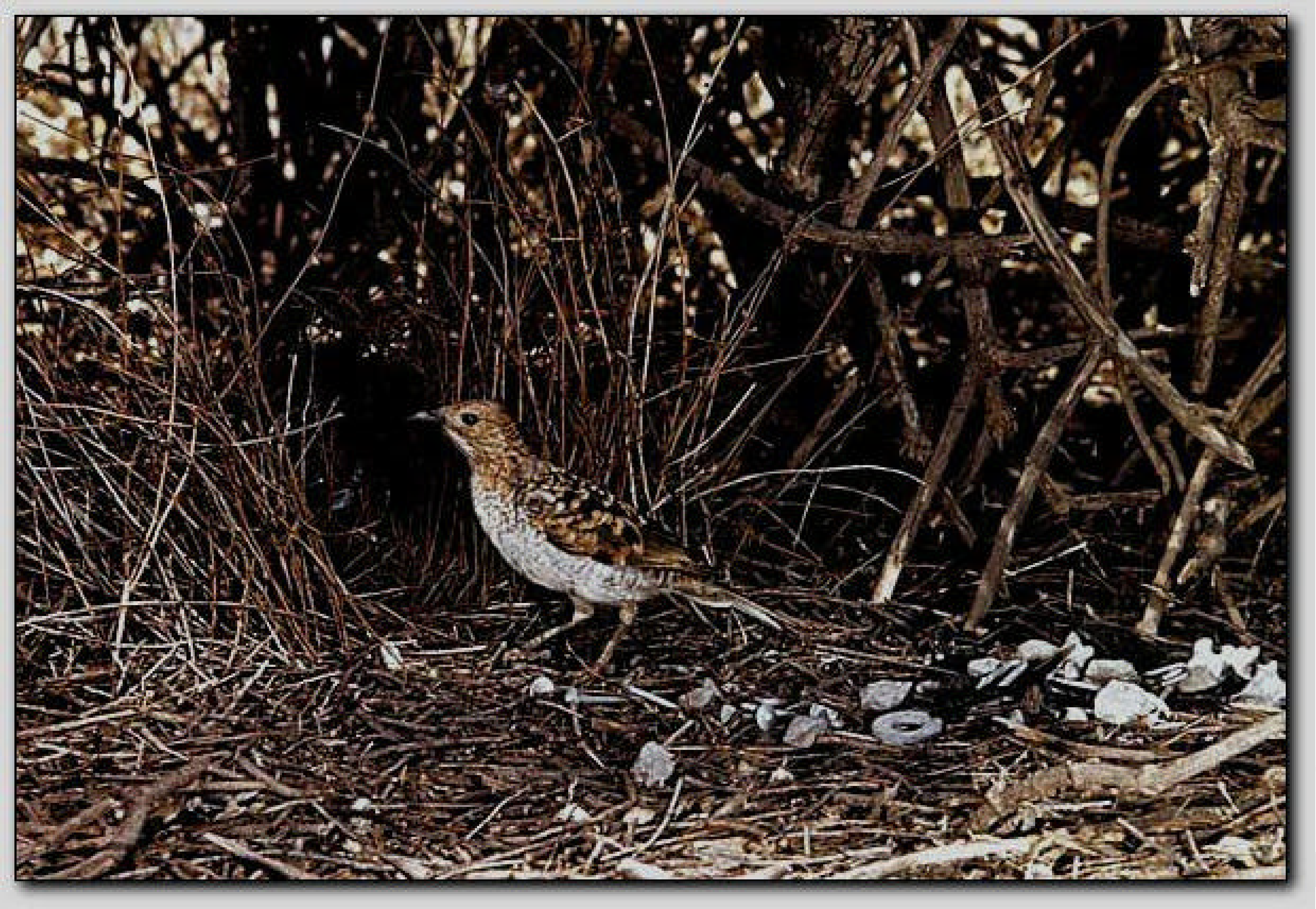


Subject Indexing

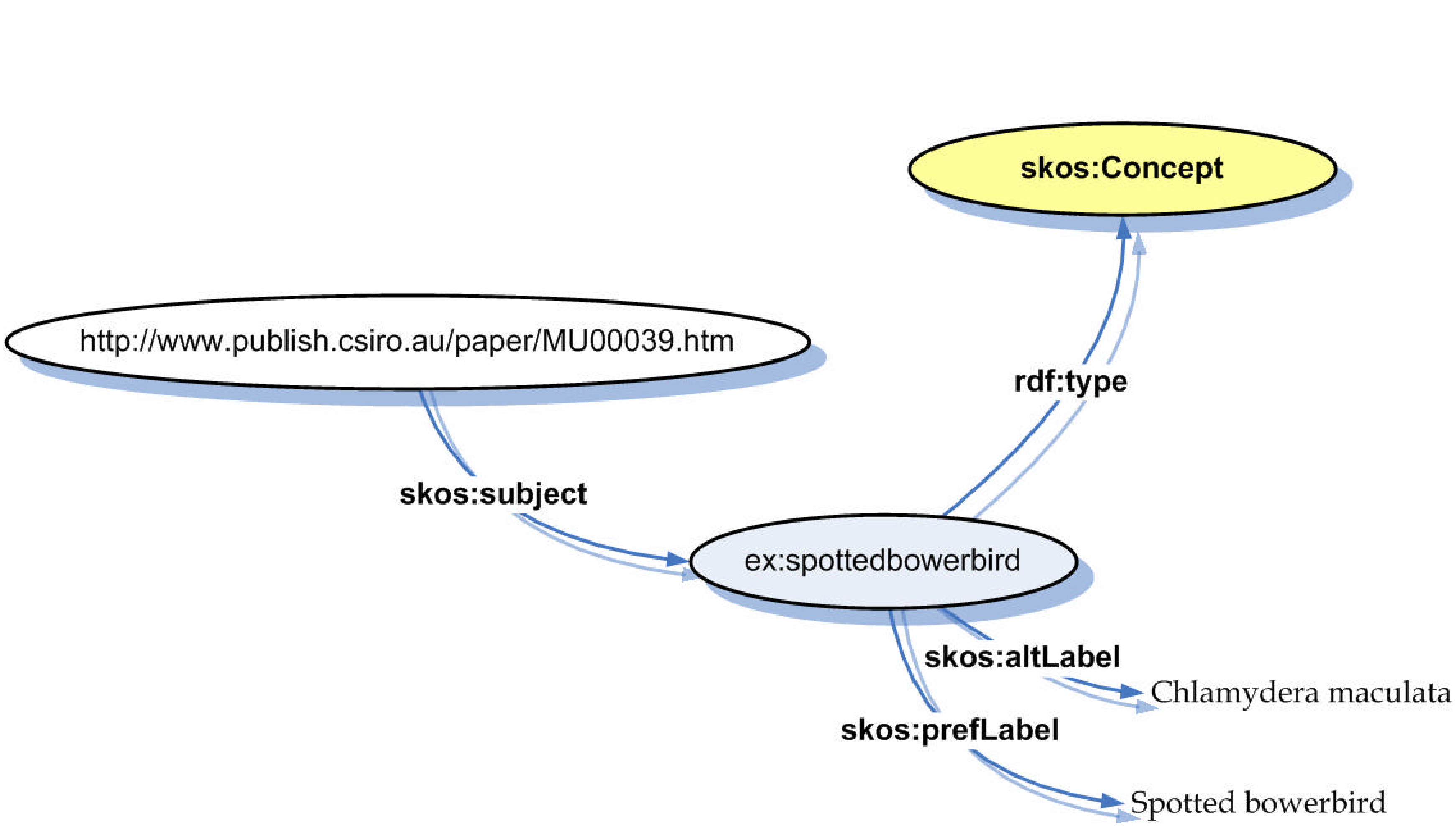
- One of the main uses of concept scheme is to index documents, pictures, …

- *skos:subject*

Spotted Bowerbird



Subject

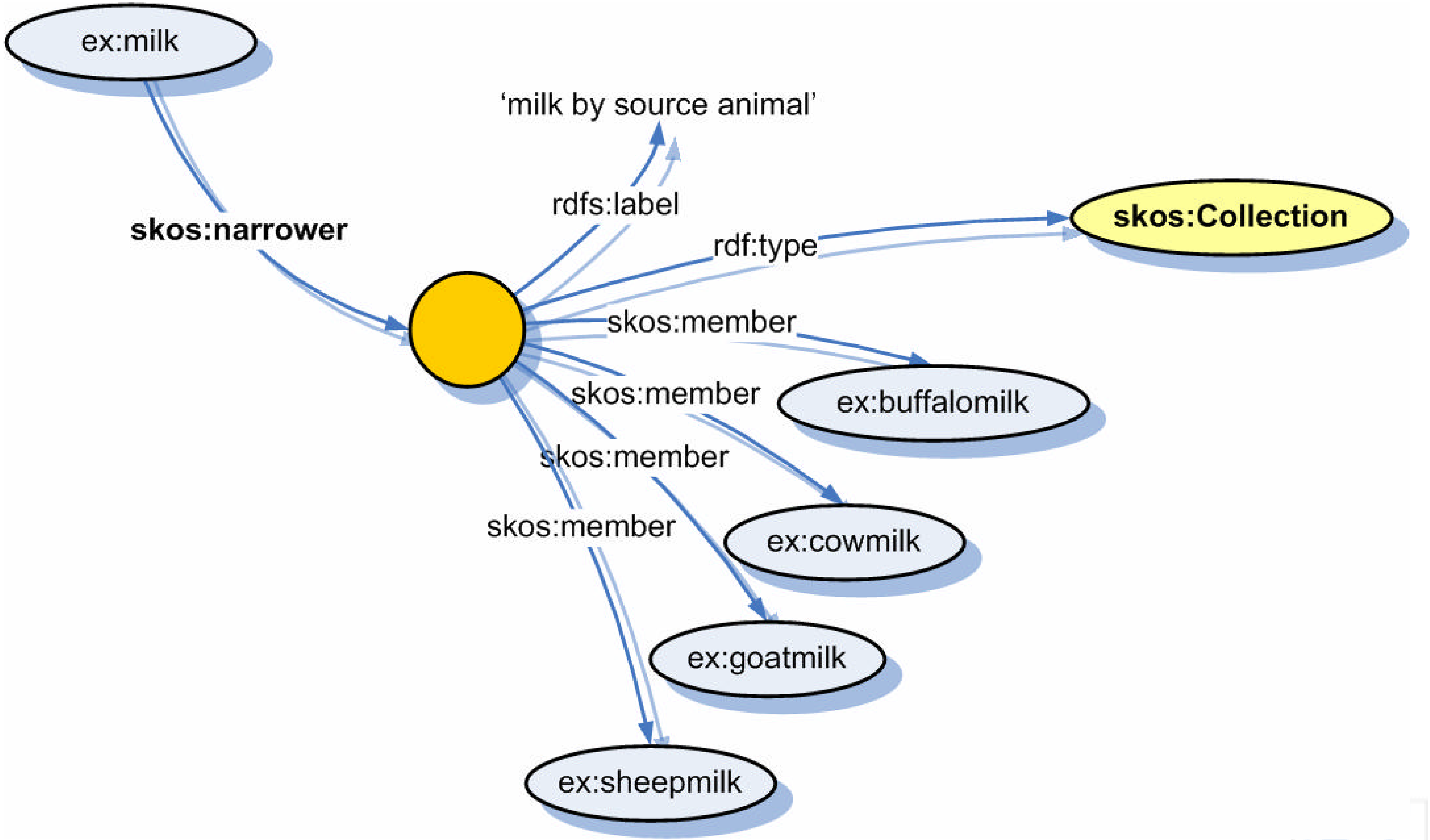

skos:Concept
http://www.publish.csiro.au/paper/MU00039.htm
rdf:type
skos:subject
ex:spottedbowerbird
skos:altLabel
Chlamydera maculata
skos:prefLabel
Spotted bowerbird

Node Labels in Hierarchy

milk
<milk by source animal> *(node label)*
buffalo milk
cow milk
goat milk
sheep milk

(*Organize terms into “subcategories” to help users find relevant term; “guide terms”; node label itself not meant for indexing*)

Representation in SKOS



Story So Far…

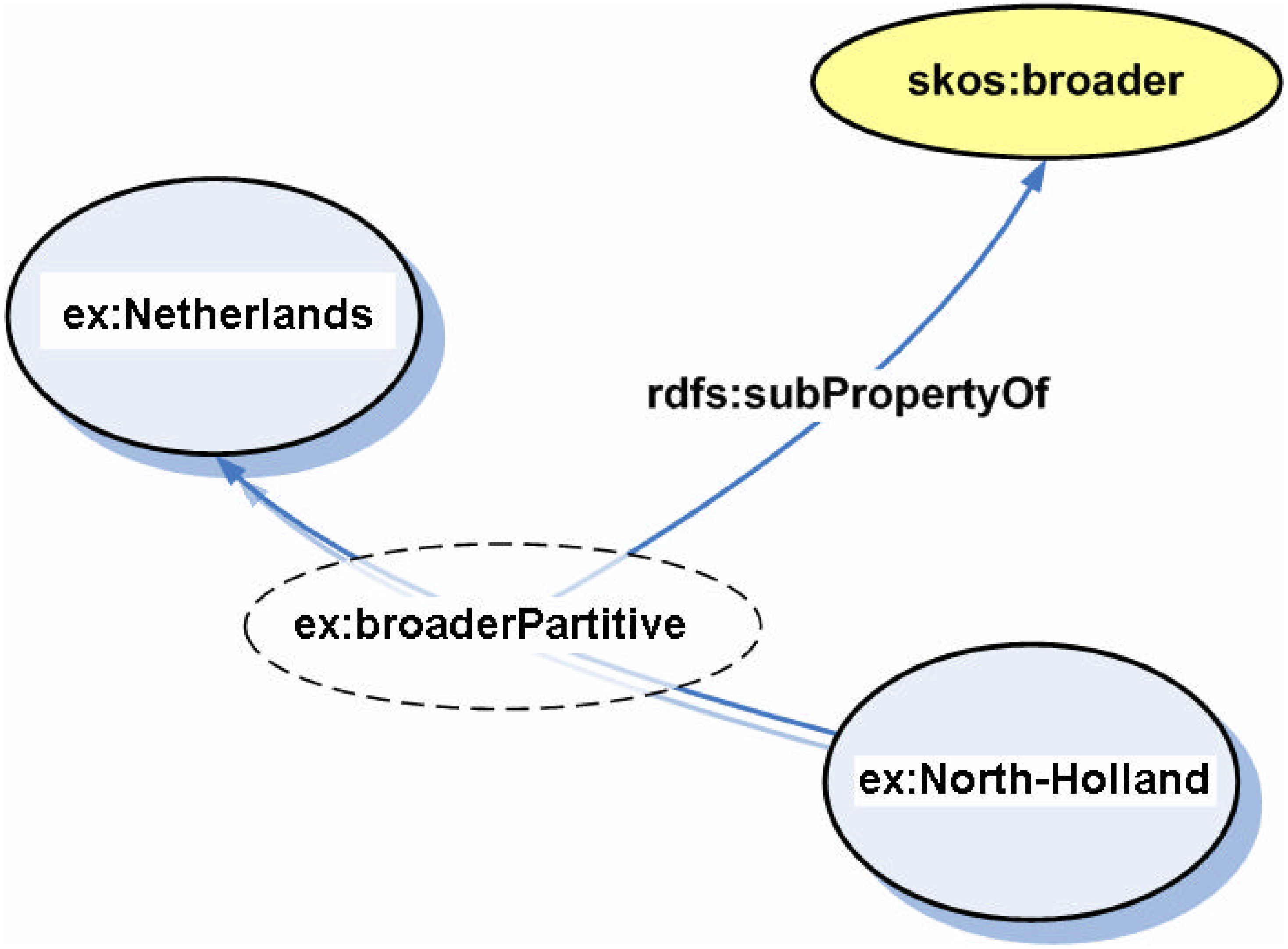
- Documentation Properties
  - skos:note, skos:definition, skos:example, skos:scopeNote, skos:historyNote
- Concept Schemes
  - skos:ConceptScheme, skos:hasTopConcept,
- Subject Indexing
  - skos:subject
- Node Labels
  - skos:Collection, skos:member
- More properties not shown here

Extensions

- SKOS Core can be **extended** by **refining** the classes and properties of the SKOS RDF Schema

- E.g. North-Holland BT Netherlands is a part-of relationship

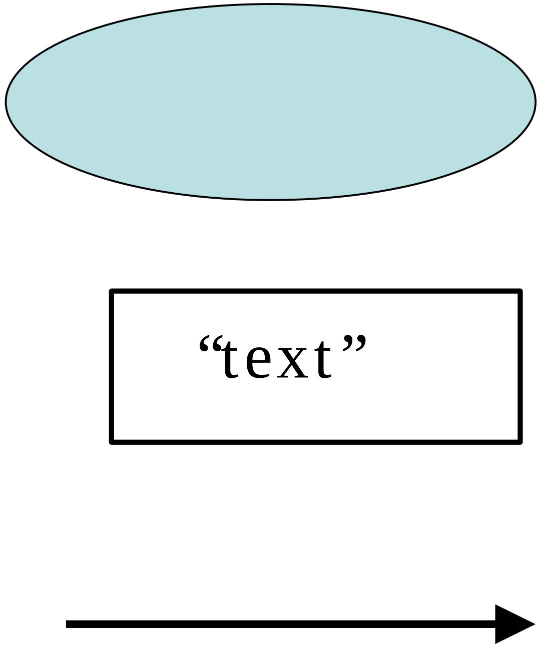
Example


skos:broader
ex:Netherlands
rdfs:subPropertyOf
ex:broaderPartitive
ex:North-Holland

Exercise

- Groups of six, separated into group A and group B
- Given a “concept scheme” (text), create SKOS graph for it
- Groups A: give SKOS *graph* (not the text) to group B (and vice versa)
- Re-create “concept scheme” (text) from SKOS graph

SKOS Graph Legend



Concept in concept scheme

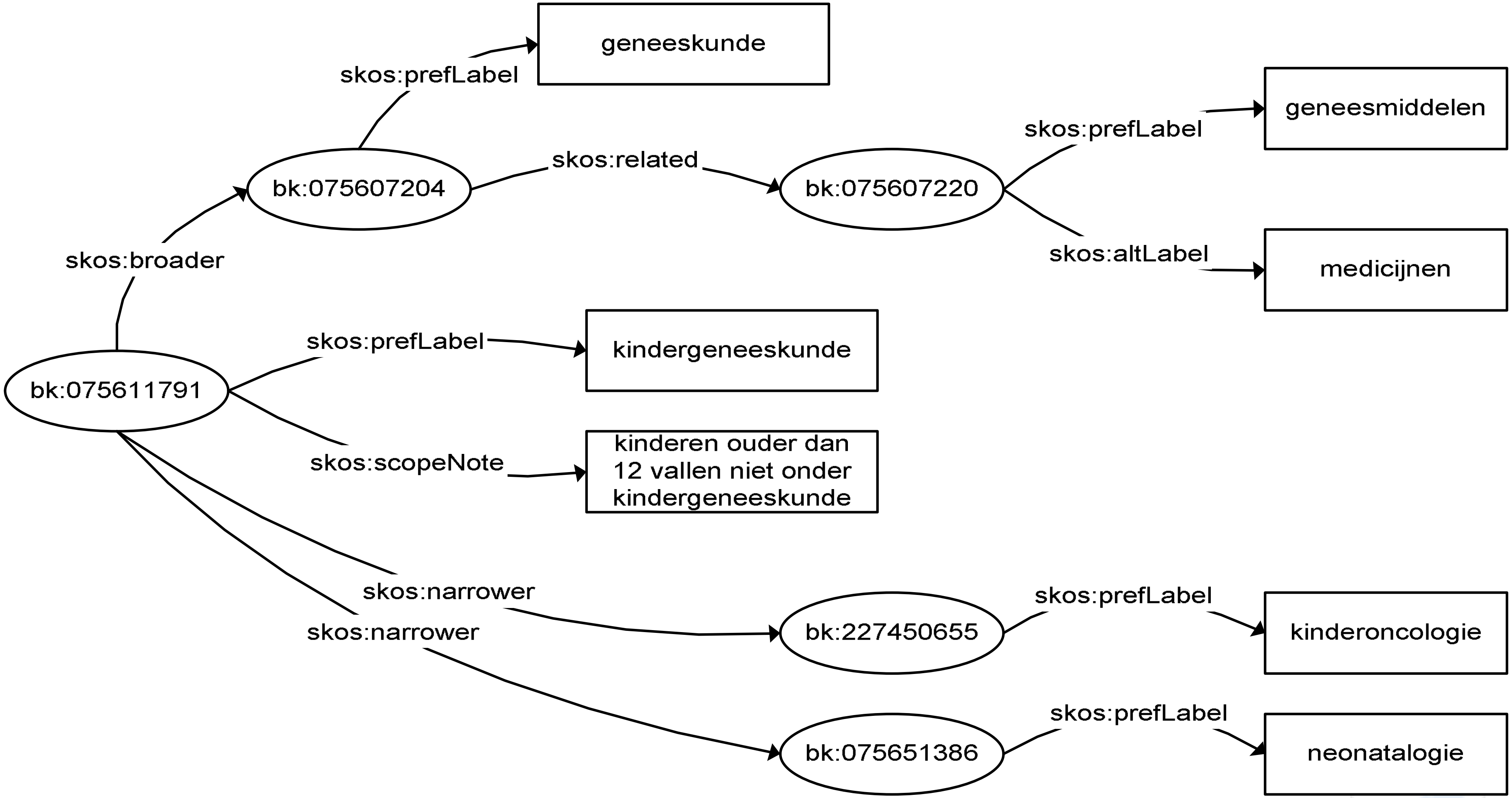
String

Arrow types:

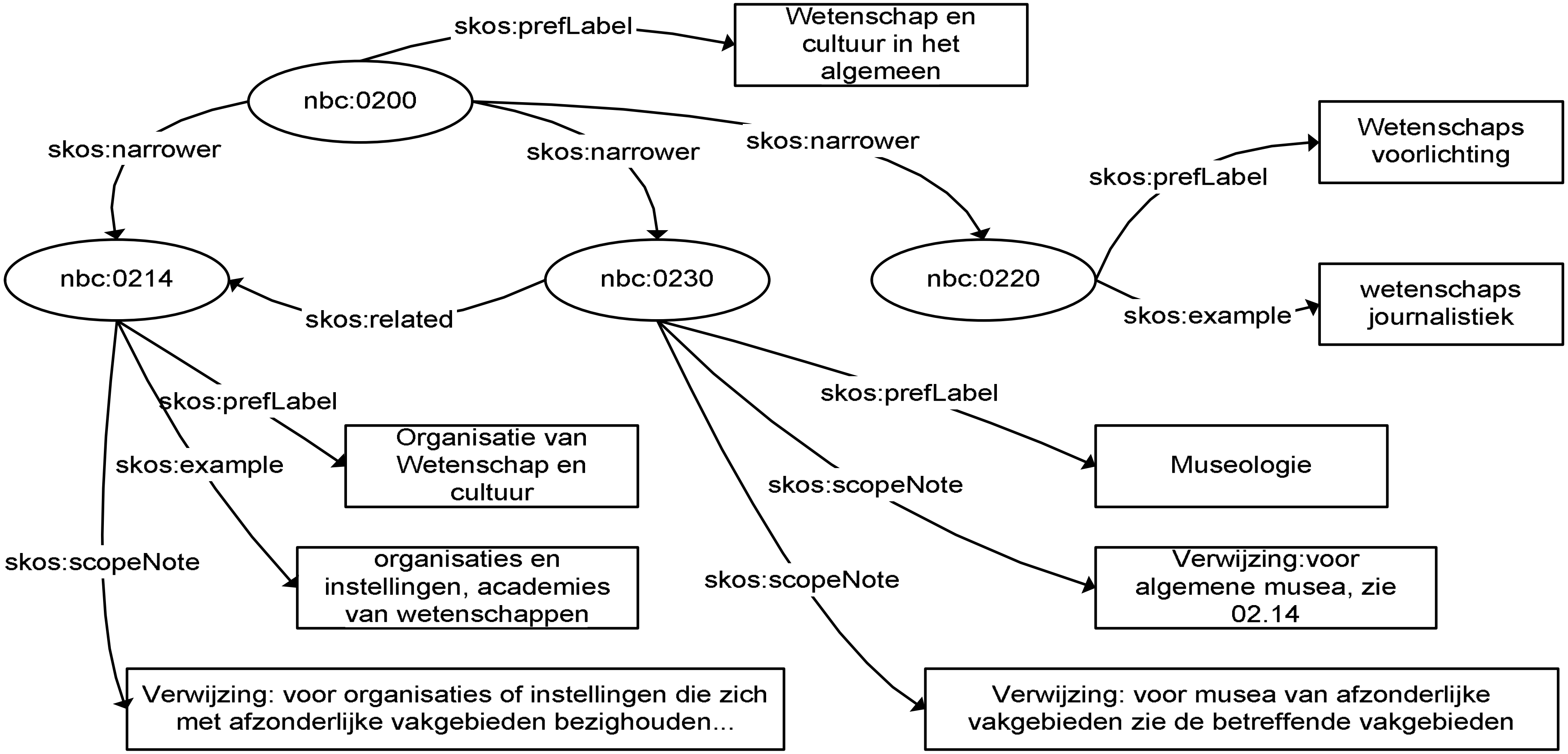
- broader, narrower, related, broaderPartOf, …
- prefLabel, altLabel, scopeNote, definition, historyNote, …

- Introduce new “arrow types” if required

Possible Exercise Solution (Brinkman)



Possible Exercise Solution (NBC)



nbc:0200

skos:prefLabel

Wetenschap en cultuur in het algemeen

skos:narrower

skos:narrower

skos:narrower

nbc:0214

nbc:0230

nbc:0220

skos:related

skos:prefLabel

Wetenschaps voorlichting

skos:example

wetenschaps journalistiek

skos:prefLabel

Organisatie van Wetenschap en cultuur

skos:example

organisaties en instellingen, academies van wetenschappen

skos:scopeNote

Verwijzing: voor organisaties of instellingen die zich met afzonderlijke vakgebieden bezighouden...

skos:prefLabel

Museologie

skos:scopeNote

Verwijzing:voor algemene musea, zie 02.14

skos:scopeNote

Verwijzing: voor musea van afzonderlijke vakgebieden zie de betreffende vakgebieden

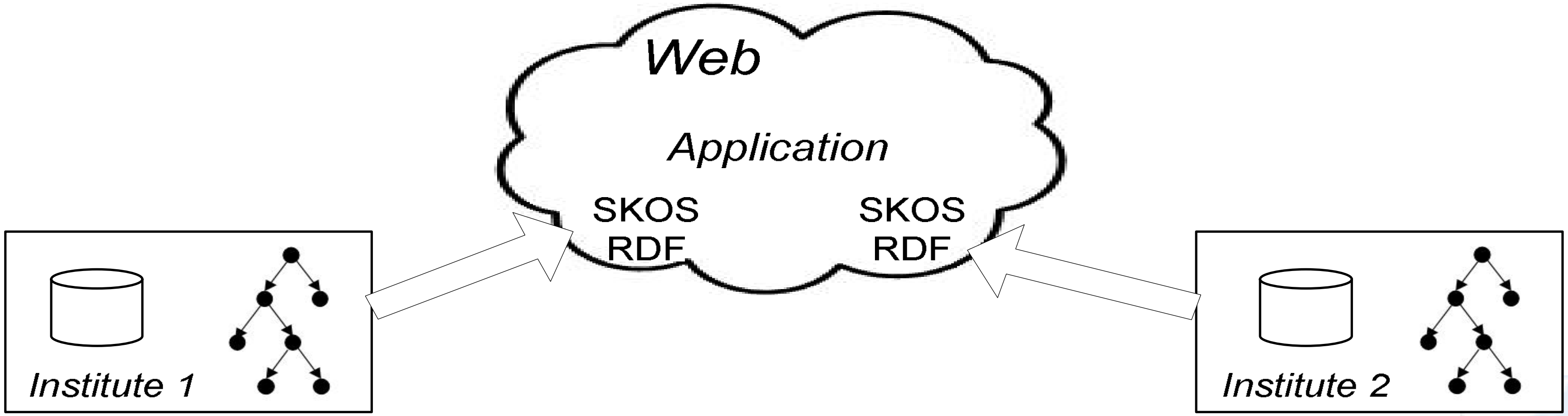
Conclusions from exercise

- Different syntax/structures cause problems
- SKOS graph makes graphs for concept schemes more uniform

- Not trivial how to convert original source into SKOS graph
- But once agreement on that ✍ interoperability

Last Point

- Do we expect everyone to change to SKOS?
- No, internal formats and SKOS can co-exist
- Export to SKOS RDF for interoperability
- Right tool for the right job!



Links

SKOS Core Homepage

- http://www.w3.org/2004/02/skos/core

SKOS Core Guide

- http://www.w3.org/TR/swbp-skos-core-guide

SKOS Core Vocabulary Specification

- http://www.w3.org/TR/swbp-skos-core-spec

Mailing list

- mailto:public-esw-thes@w3.org
- http://lists.w3.org/Archives/Public/public-esw-thes/