Web-enabled vocabularies
Value Vocabularies

• Simple lists...
  – “Animal”, “Vegetable”, “Mineral”
  – “Yes”, “No”, “Maybe”

• Controlled vocabularies...
  – Subject headings ("China – History")
Moving from string-based metadata...

<http://openlibrary.org/6/0L7983950M>
a bibo:Book
dc:title 'Weaving the Web';
dc:creator 'Tim Berners-Lee';
dc:subject 'World Wide Web';
dc:publisher 'Texere Publishing';
dc:identifier '0752820907'.
...to Linked Metadata

<http://openlibrary.org/6/0L7983950M>
a bibo:Book
dc:title 'Weaving the Web';
dc:creator 'Tim Berners-Lee';
dc:subject <http://id.loc.gov/authorities/sh95000541#concept>;
dc:publisher 'Texere Publishing';
dc:identifier '0752820907'.

A Web of Broader and Narrower Concepts
<table>
<thead>
<tr>
<th>Term:</th>
<th>Economic cooperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used For:</td>
<td>Economic co-operation</td>
</tr>
<tr>
<td>Broader terms:</td>
<td>Economic policy</td>
</tr>
<tr>
<td>Narrower terms:</td>
<td>Economic integration, European economic cooperation, European industrial cooperation, Industrial cooperation</td>
</tr>
<tr>
<td>Related terms:</td>
<td>Interdependence</td>
</tr>
<tr>
<td>Scope Note:</td>
<td>Includes cooperative measures in banking, trade, industry etc., between and among countries.</td>
</tr>
</tbody>
</table>
Expressing a thesaurus as linked data

Prefix skos: <http://www.w3.org/2004/02/skos/core#>
SKOS

• **Simple Knowledge Organisation System**
  – RDF-based model for simple knowledge structures such as thesauri
  – Porting (“Webifying”) thesauri: representing and sharing classifications, glossaries, thesauri developed in the Print World
  – Examples of existing knowledge structures:
    • In the Print World: Dewey Decimal Classification, Art and Architecture Thesaurus
    • In the Web World: DMOZ categories
• Using SKOS:
  – **concepts** can be identified using URIs,
  – **labeled** with lexical strings in one or more natural languages,
  – assigned **notations** (lexical codes),
  – **documented** with various types of note,
  – **linked to other concepts** and
  – organized into informal hierarchies and association networks,
  – aggregated into **concept schemes**, 
  – grouped into labeled and/or ordered **collections**, and
  – **mapped** to concepts in other schemes.
SKOS Properties

• RDF properties for links to Broader, Narrower, Related Concepts
• RDF properties and classes for defining a knowledge system
  – Basic description (Concept, Concept Scheme)
  – Labeling (Preferred Label, Alternative Label)
  – Documentation (Definition, History Note)
  – Mapping (Broader Match, etc)
• As of August 2009 a W3C Recommendation
  – http://www.w3.org/TR/skos-reference
The aim of SKOS is not to replace original conceptual vocabularies in their initial context of use,

...but to allow them to be ported to a shared space,

...based on a simplified model,

...enabling wider re-use and better interoperability.
Extensibility of SKOS

- Not “take it or leave it”, but “take what you want, create what you need”
- Extension “by refinement”
  - Sub-properties or sub-classes of SKOS properties or classes
  - Extensions are backwards-compatible via RDFS inference
- Extension “by combination”
Ontology engineering – OWL

- **Web Ontology Language** for defining complex conceptual structures
- Class-oriented, logically precise modeling
  - Demanding in terms of expertise, effort, cost
Knowledge Organization Systems versus Formal Ontologies

- **Knowledge Organization Systems (KOS)**
  - Concepts may be linked pragmatically
  - Semi-formal, intuitive “maps” of domains
  - Aid in finding related objects
  - Port to Semantic Web without re-engineering using SKOS

- **Formal Ontologies**
  - Provide an interpretation of reality
  - Assert axioms or facts about things in the world
  - Inference using logical entailments
  - Re-engineering a KOS as formal ontology is hard
Role of Knowledge Organization Systems

- KOS are magnets for attracting links
  - Hubs for resources indexed according to a given subject or topic URI
- Concepts embedded in a KOS can be used to expand or narrow queries
- KOS provide pathways for navigating to related resources
Narrowing a search by topic

Enter free text keywords in the text box or use the Search Assistant to narrow your search selecting the appropriate fields. The Search AGROVOC button on the right frame allows you to browse AGROVOC for a refined keyword search.

The AGRIS database is continuously updated and currently contains over 2.5 million bibliographic references which provide access to a large collection of world literature covering all aspects of agricultural sciences and technology, including grey literature.