

Introducing FRSAD and Mapping it with Other Models

[FRSAD = Functional Requirements for Subject Authority Data]

Marcia L. Zeng, Kent State University, USA

Maja Žumer, University of Ljubljana, Slovenia

Based on the work of the IFLA FRSAR Working Group

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Acknowledgement

- This paper is based on the work of the FRSAR (**Functional Requirements for Subject Authority Records**) Working Group, established by the IFLA Division IV Bibliographic Control and especially the Section of Classification and Indexing.
- IFLA, OCLC, and Kent State University have provided funding, facilities, and tremendous support.

Outline

- 1. Introducing the FRSAD model
- 2. Mapping to other models (BS 8723 and ISO 25964, SKOS, OWL, DCMI-AM)

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1. Introducing the FRSAD model

FRSAD = Functional Requirements for Subject Authority **Data**

FRBR

- Functional Requirements for Bibliographic Records (FRBR)
 - Approved by IFLA in 1997
 - Published in 1998
 - Conceptual model of the 'bibliographic universe'

IFLA. (1998). *Functional Requirements for Bibliographic Records: Final Report*. IFLA Study Group on the Functional Requirements for Bibliographic Records. München: KG Saur.
<http://www.ifla.org/publications/functional-requirements-for-bibliographic-records>

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The "FRBR family"

- **FRBR**: the original framework
 - All entities, focusing on Group 1 entities
- **FRAD**: Functional Requirements for Authority Data
 - Focusing on Group 2 entities
 - Published recently
- **FRSAD**: Functional Requirements for Subject Authority Data
 - Focusing on Group 3 entities
 - FRSAR WG established in 2005
 - Draft Report was available for comment by end of July
 - Several comments received

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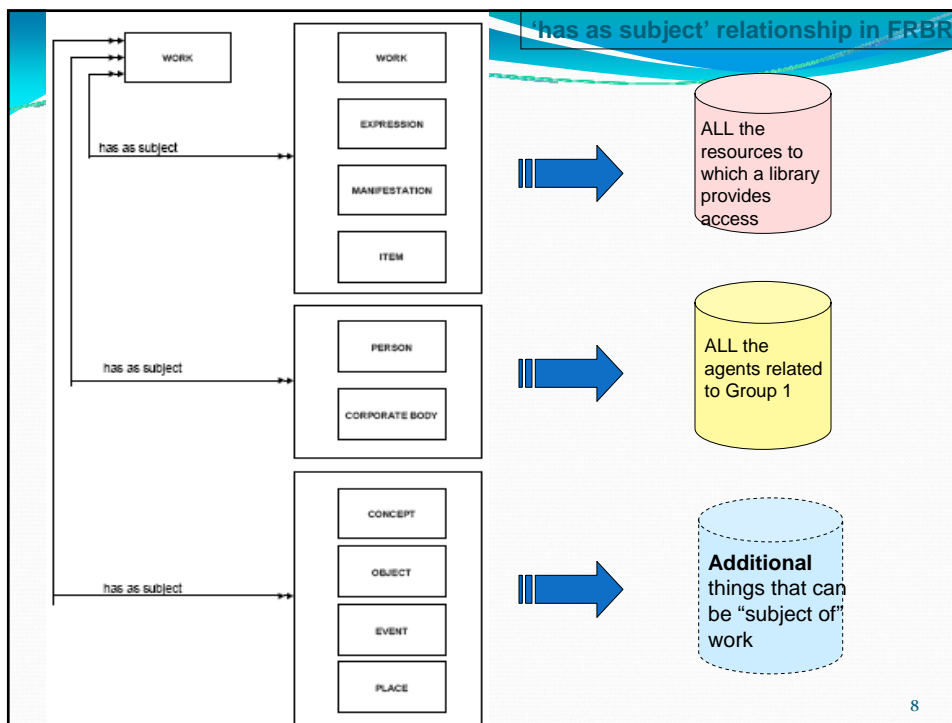
FRSAR Working Group

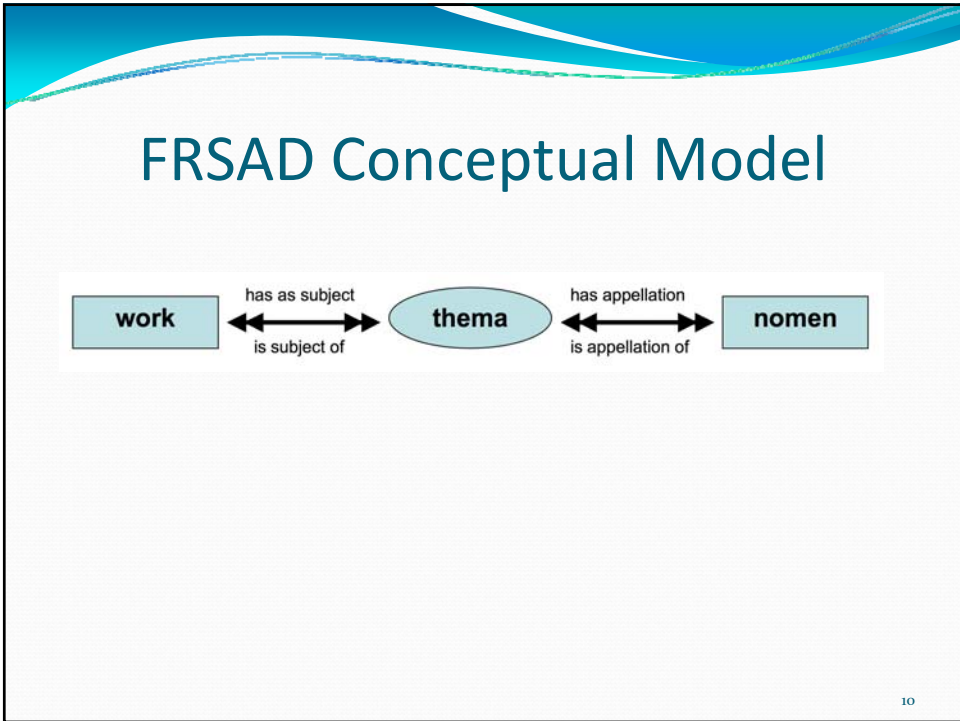
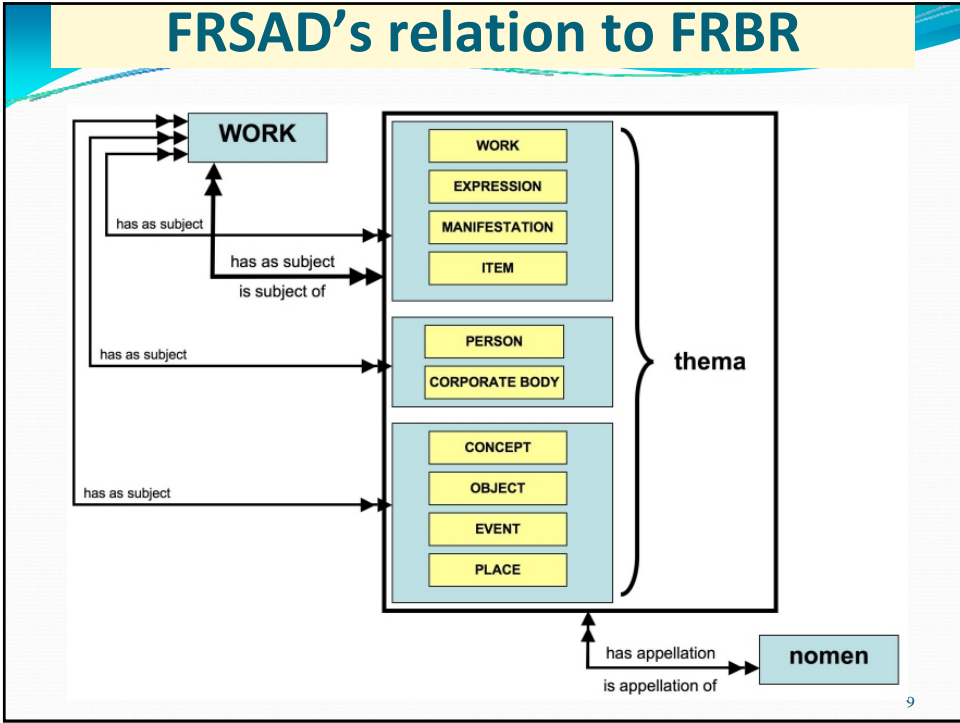
FRSAR = Functional Requirements for Subject Authority Records

- **Terms of Reference**

1. to build a conceptual model of Group 3 entities within the FRBR framework as they relate to the **aboutness** of works,
2. to provide a clearly defined, structured frame of reference for relating the data that are recorded in subject authority records to the needs of the users of those records, and
3. to assist in an assessment of the potential for international sharing and use of subject authority data both within the library sector and beyond.

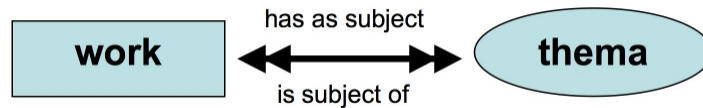
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FRSAD Part 1:

***WORK* has as subject *THEMA*
/ *THEMA* is subject of *WORK*.**



This model confirms one of the basic relationships defined in FRBR:

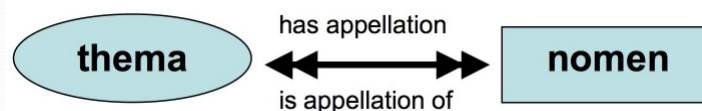
WORK* has as subject *THEMA* / *THEMA* is subject of *WORK

- *Thema* = "any entity that can be subject of a *work*".
- *Thema* includes any of the FRBR entities:
Group 1 and Group 2 entities and,
in addition, all other subjects of *works*.

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FRSAD Part 2:

***THEMA* has appellation *NOMEN* /
NOMEN is appellation of *THEMA*.**



This model also proposes a new relationship:

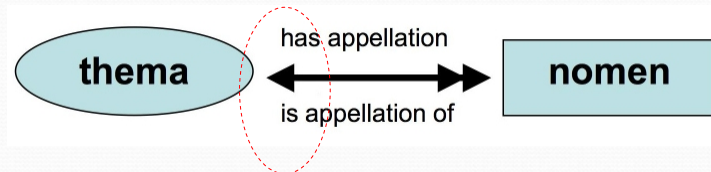
THEMA* has appellation *NOMEN* / *NOMEN* is appellation of *THEMA

- *NOMEN* = any sign or sequence of signs (alphanumeric characters, symbols, sound, etc.) by which a *thema* is known, referred to or addressed as.

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Part 2b

Note: in a given controlled vocabulary and within a domain, a *nomen* should be an appellation of only one *thema*,



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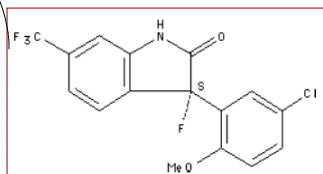
NOMEN = any sign or sequence of signs (alphanumeric characters, symbols, sound, etc.) by which a *thema* is known, referred to or addressed as.

Example:

Accession Number	(AN): 2005:3738	USAN
Publication Year	(PY): 2002	
Generic Name	(CN): Flindokalner	
OTHER NAMES:		
Chemical Name	(CN): 2H-Indol-2-one, 3-(5-chloro-2-methoxyphenyl)-3-fluoro-1,3-dihydro-6-(trifluoromethyl)-, (3S)-	
Chemical Name	(CN): (3S)-3-(5-Chloro-2-methoxyphenyl)-3-fluoro-6-(trifluoromethyl)-1,3-dihydro-2H-indol-2-one	
Trade Name	(CN): MaxiPost (Bristol-Myers Squibb)	
Code Designation	(CN): EMS-204352	
CAS Registry No.	(RN): 187523-35-9	
Molecular Formula	(MF): C ₁₆ H ₁₀ Cl F ₄ N O ₂	
Lin. Str. Formula (LSF)	(LSF): C16 H10 Cl F4 N O2	
Molecular Weight	(MW): 359.71	

Absolute stereochemistry. Rotation (+).

different types of nomen



nomen representation="graphic"

Source: STN Database Summary Sheet: USAN (The USP Dictionary of U.S. Adopted Names and International Drug Names)

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Choice of terms (thema, nomen)

- Different and overlapping meaning of 'subject', 'topic', 'concept', 'class', etc.
- Different views on granularity
- 'Name' understood as 'proper name'

Therefore:

- Terms from Latin that do not have to be translated and are not loaded with other meanings

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Attributes

- Some general attributes of *thema* and *nomen* are proposed
- In an implementation **additional** attributes may be recorded

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Thema-to-thema relationships

- Hierarchical
 - Partitive
 - Generic
 - Instance
- Associative

Other *thema-to-thema* relationships are domain- or implementation-dependent

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Example: An online display record of the AAT concept “Mercury”

ID: 300011026 Record Type: concept

mercury (<mercury and amalgam>, nonferrous metal, ... Materials)

Note: Pure metallic element having symbol Hg and atomic number 80. It is a colorless, lustrous, liquid at ordinary temperatures. Use also for this metal as part of a combination with other substances, to make various objects.

Terms:
 mercury (preferred, C, D, U, I, C, English - P)
 Hg (C, U, F, U, A, English)
 quicksilver (C, U, F, U, English)
 argento vivo (C, D, U, Italian - P)

Facet/Hierarchy Code: M.MT

Hierarchical Position:

- Materials Facet
- Materials
- materials
- <materials by composition>
- inorganic material
- <metal and metal products>
- metal
- <metal by composition or by chemical form>
- nonferrous metal
- <mercury and amalgam>
- mercury

Additional Parents:

- Materials Facet
- Materials
- materials
- <materials by form>
- <materials by chemical form>
- elements (chemical substances)
- mercury

The diagram shows a central node 'mercury'@aat. It has a 'has nomen' relationship to 'mercury'@aat. It has a 'has broader concept' relationship to 'elements (chemical substances)'@aat, which also has a 'has nomen' relationship to 'elements (chemical substances)'@aat. It also has a 'has broader concept' relationship to 'nonferrous metal'@aat, which has a 'has nomen' relationship to 'nonferrous metal'@aat. 'nonferrous metal'@aat has a 'has broader concept' relationship to 'metals'@aat, which has a 'has nomen' relationship to 'metals'@aat. The diagram is divided into two sections: '<materials by form>' on the left and '<materials by composition>' on the right.

Source: *Art and Architecture Thesaurus Online*

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Nomen-to-nomen relationships

- Partitive
- Equivalence

Equivalence can be specified further, e.g.:

- replaces/is replaced by
- has variant form/is variant form
- has derivation/is derived from
 - has acronym/is acronym for
 - has abbreviation/is abbreviation of
 - has transliterated form/is transliteration of

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The importance of the *THEMA-NOMEN* model to the subject authority data

- to separate what are usually called *concepts* (or *topics*, *subjects*, *classes [of concepts]*) from what they are known by, referred to, or addressed as
- A general abstract model, not limited to any particular domain or implementation
- Potential for interoperability within the library field and beyond

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Future development of FRSAD

- Comments collected from the 1st world-wide review are to be analysed and discussed
- New document will be prepared by the end of 2009
- 2nd review is expected in 2010
- Final report is targeted for submission in 2010

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Relationship of FRSAD with FRBR

- A generalisation of FRBR (no predefined entities in Group3)
- Introduction of *nomen*
- New user function: *explore*

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Relationship of FRSAD with FRAD

- Independent parallel development; no hierarchical relationship
- FRAD was published after FRSAD was available for comments
- Different user functions (FRAD justify and contextualise / FRSAR explore)
- Similar approach (name; nomen), but not identical
 - FRSAD *nomen* is a superclass of FRAD *name, identifier* and *controlled access point*

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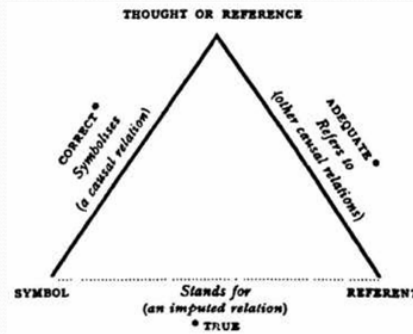
The future: harmonisation of the FRBR family

- A new working group under the umbrella of the FRBR RG will have to develop a new model, taking FRAD and FRSAD into account
- A new name?

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2. Mapping to Other Models

2.1 Ogden & Richard's (1923) triangle of meaning



- the referent of an expression (a word or another sign or symbol) is relative to different language users.
- multiple terms may refer to the same object or idea,
- a single term may refer ambiguously to more than one object or idea,
- terms may be confusing because they are out of date

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FRSAD and BS8723-5/ ISO 25964 Model

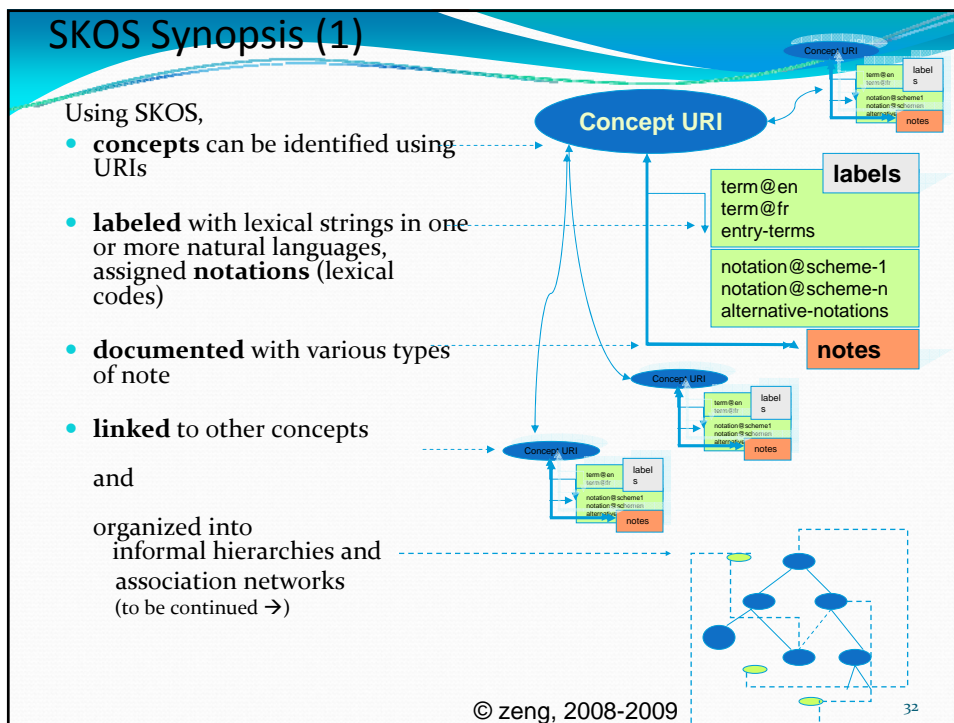
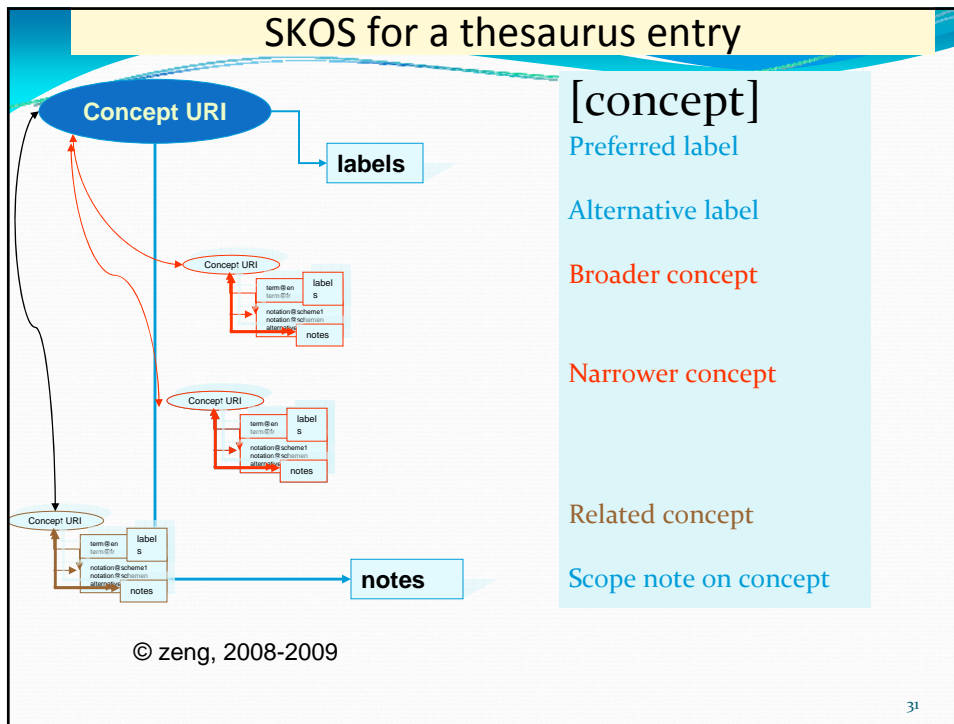
- BS8723-5 model is adopted by ISO 25964 *Thesauri and interoperability with other vocabularies*, with some revisions
- Both represent these relationships:
 - (1) *thema-and-nomen* (a record documenting a concept and its *nomen(s)*),
 - (2) *thema-and-thema* (hierarchical (broader, narrower, and top concepts)) and associative (related concepts), and
 - (3) *nomen-and-nomen* (preferred and non-preferred, variant lexical forms, and in various languages).

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2.3 SKOS (Simple Knowledge Organization System)

- provides a model for expressing the basic structure and content of concept schemes such as
 - Thesauri
 - Classification Schemes
 - Taxonomies
 - Subject Heading lists
 - Folksonomies, and
 - other similar types of controlled vocabulary.
- is an **application of RDF**
- allows concepts to be
 - **composed**
 - **published** on the Web
 - **linked** with data on the Web and
 - **integrated** into other concept schemes.

--SKOS Reference, <http://www.w3.org/TR/skos-reference/>



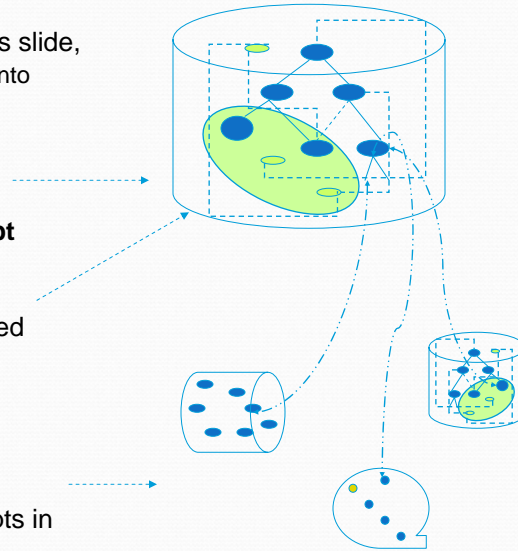
SKOS Synopsis (2)

(continued from previous slide,
-- concepts are 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.



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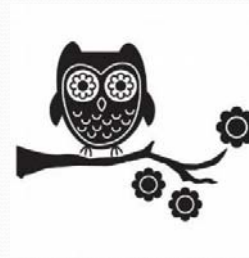
SKOS and FRSAD models

- SKOS model is based on a concept-centric view of vocabulary, where primitive objects are not labels; rather, they are concepts represented by labels.
- These can be matched to what have been defined in the FRSAD model, in terms of *thema*, *nomen* and their attributes.
- SKOS also has specific properties to represent all the semantic relationships, which matches the ones defined by FRSAD as well.

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2.4 OWL Web Ontology Language

- standard ontology languages
- endorsed by the W3C to promote the *Semantic Web* vision.



At least two different user groups:

- OWL used as data exchange language (define interfaces of services and agents)
- **OWL used for terminologies or knowledge models**

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OWL Classes

OWL is an ontology language that is primarily designed to describe and define classes. Classes are therefore the basic building blocks of an OWL ontology.




OWL provides axioms (statements that say what is true in the domain) that allow relationships to be established between class expressions, including:

- SubClassOf,
- EquivalentClasses,
- DisjointClasses, and
- DisjointUnion.



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- In OWL, classes and property expressions are used to construct 'class expressions', (sometimes also called 'descriptions', and, in the description logic literature, 'complex concepts').

- ObjectIntersectionOf, 
- ObjectUnionOf, and 
- ObjectComplementOf 

- ObjectOneOf -- contains exactly the specified individuals



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OWL and FRSAD

- For the issues of the complexity and granularity of *themas* and comprehensive semantic relationships between and among *themas* that FRSAD attempted to cover, OWL has great matches.



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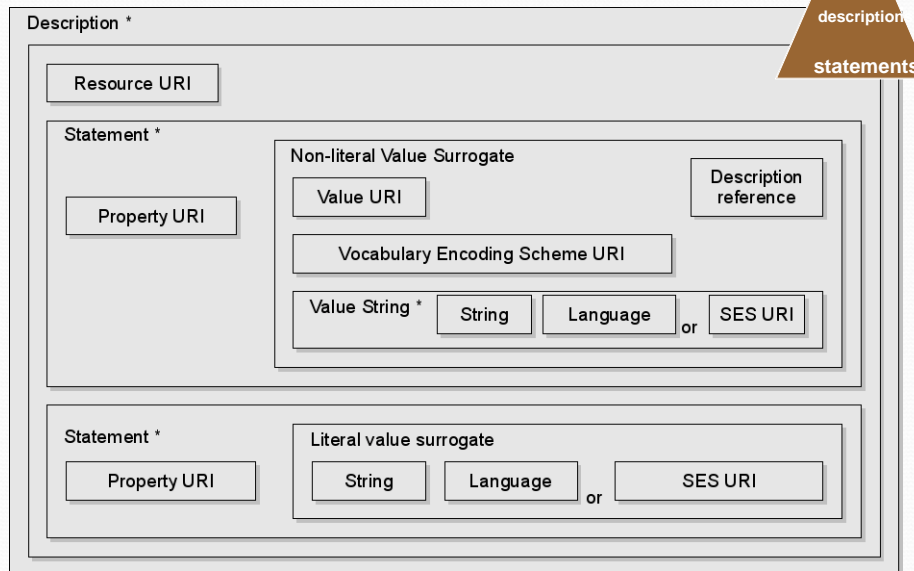
- Described resource
- Property = type of relationship
- Value = other resource

2.5 DCMI Abstract Model

- Formal modeling basis for Dublin Core metadata
- Like a “grammar” for Dublin Core
- Strong link with parallel development of RDF (Resource Description Framework)

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The constructs of a record



SES = Syntax Encoding Scheme

* = repeatable

Source: Nilsson, 2007: slide 12

DCMI-AM and FRSAD

- The FRSAD model corresponds to the DCMI Abstract Model by allowing any *thema* to be independent of any nomen, including any syntax that a *nomen* may use.
- Thus this conceptual model will facilitate the sharing and reuse of subject authority data amongst not only the subject vocabularies themselves, but also metadata resources.

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Conclusion

- The FRSAD model is developed with the goal to assist in an assessment of the potential for international sharing and use of subject authority data both within the library sector and beyond.
- The FRSAD model will:
 - enable the consideration of the functions of subject authority data and concept schemes at a higher level that is independent of any implementation, system, or specific context, and
 - allow us to focus on the semantics, structures, and interoperability of subject authority data.

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Draft Report available at:

- **FRSAR: Functional Requirements for Subject Authority Data (FRSAD)**
 - <http://nkos.slis.kent.edu/FRSAR/>

Working Group: Leda Bultrini, Lois Mai Chan, Jonathan Furner, Edward O'Neill, Gerhard Riesthuis, Athena Salaba, Diane Vizine-Goetz, Ekaterina Zaytseva, Marcia Lei Zeng, and Maja Zumer.

Advisory Group: Victoria Francu, Hemalata Iyer, Dorothy McGarry, David Miller, Päivi Pekkarinen, and Barbara Tillett.

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