

# Tutorial: Topic Maps for Library and Information Scientists

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## Presentation Outline

- ④ Representing DCMI Metadata Terms in Topic Maps
- ④ Topic Maps-Driven Semantic Services for National Library of Korea
  - ✦ Representing MARC21 as FRBR in Topic Maps
- ④ Topic Maps & Subject Classification Systems
  - ✦ SKOS
- ④ The role of Topic Maps in Digital Libraries

# Representing DCMI Metadata Terms in Topic Maps

## Presentation Outline

- Dublin Core Metadata Initiative
- Dublin Core in Topic Maps
  - Timeline
  - Rationale
  - Proposed approach
  - Issues
- Conclusion
  - The Subject-Centric Advantage

## Dublin Core Metadata Initiative

- A widely used metadata standard for Web documents
  - *The Dublin Core Metadata Initiative is an open organization engaged in the development of interoperable online metadata standards that support a broad range of purposes and business models.*
- Defines sets of abstract metadata “elements”
  - Supports multiple concrete representations
  - HTML/XHTML, RDF/XML, XML

## DC Approved Element Sets

- The Dublin Core Metadata Element Set
- Other Elements and Element Refinements
- Encoding Schemes
- The DCMI Type Vocabulary

## DC Namespace Policy

- 15 original element namespace:
  - <http://purl.org/dc/elements/1.1/>
  - <http://purl.org/dc/terms/>
- Element refinement, new term, and encoding scheme namespace:
  - <http://purl.org/dc/terms/>
- DCMI type vocabulary namespace:
  - <http://purl.org/dc/dcmitype/>

## <http://purl.org/dc/elements/1.1/>

- |                     |   |
|---------------------|---|
| 1. Title URI:       | <a href="http://purl.org/dc/elements/1.1/title">http://purl.org/dc/elements/1.1/title</a>             |
| 2. Creator URI:     | <a href="http://purl.org/dc/elements/1.1/creator">http://purl.org/dc/elements/1.1/creator</a>         |
| 3. Subject URI:     | <a href="http://purl.org/dc/elements/1.1/subject">http://purl.org/dc/elements/1.1/subject</a>         |
| 4. Publisher URI:   | <a href="http://purl.org/dc/elements/1.1/publisher">http://purl.org/dc/elements/1.1/publisher</a>     |
| 5. Description URI: | <a href="http://purl.org/dc/elements/1.1/description">http://purl.org/dc/elements/1.1/description</a> |
| 6. Contributor URI: | <a href="http://purl.org/dc/elements/1.1/contributor">http://purl.org/dc/elements/1.1/contributor</a> |
| 7. Date URI:        | <a href="http://purl.org/dc/elements/1.1/date">http://purl.org/dc/elements/1.1/date</a>               |
| 8. Source URI:      | <a href="http://purl.org/dc/elements/1.1/source">http://purl.org/dc/elements/1.1/source</a>           |
| 9. Identifier URI:  | <a href="http://purl.org/dc/elements/1.1/identifier">http://purl.org/dc/elements/1.1/identifier</a>   |
| 10. Coverage URI:   | <a href="http://purl.org/dc/elements/1.1/coverage">http://purl.org/dc/elements/1.1/coverage</a>       |
| 11. Rights URI:     | <a href="http://purl.org/dc/elements/1.1/rights">http://purl.org/dc/elements/1.1/rights</a>           |
| 12. Language URI:   | <a href="http://purl.org/dc/elements/1.1/language">http://purl.org/dc/elements/1.1/language</a>       |
| 13. Format URI:     | <a href="http://purl.org/dc/elements/1.1/format">http://purl.org/dc/elements/1.1/format</a>           |
| 14. Type URI:       | <a href="http://purl.org/dc/elements/1.1/type">http://purl.org/dc/elements/1.1/type</a>               |
| 15. Relation URI:   | <a href="http://purl.org/dc/elements/1.1/relation">http://purl.org/dc/elements/1.1/relation</a>       |

## <http://purl.org/dc/terms/>

1. Titel URI: <http://purl.org/dc/terms/title>
2. Creator URI: <http://purl.org/dc/terms/creator>
3. Subject URI: <http://purl.org/dc/terms/subject>
4. Publisher URI: <http://purl.org/dc/terms/publisher>
5. Description URI: <http://purl.org/dc/terms/description>
6. Contributor URI: <http://purl.org/dc/terms/contributor>
7. Date URI: <http://purl.org/dc/terms/date>
8. Source URI: <http://purl.org/dc/terms/source>
9. Identifier URI: <http://purl.org/dc/terms/identifier>
10. Coverage URI: <http://purl.org/dc/terms/coverage>
11. Rights URI: <http://purl.org/dc/terms/rights>
12. Language URI: <http://purl.org/dc/terms/language>
13. Format URI: <http://purl.org/dc/terms/format>
14. Type URI: <http://purl.org/dc/terms/type>
15. Relation URI: <http://purl.org/dc/terms/relation>
16. Audience URI: <http://purl.org/dc/terms/relation>

## <http://purl.org/dc/terms/>

- **Title Refinement**
  - <http://purl.org/dc/terms/alternative>
- **Description Refinements**
  - <http://purl.org/dc/terms/tableOfContents>
  - <http://purl.org/dc/terms/abstract>
- **Format Refinements**
  - <http://purl.org/dc/terms/extent>
  - <http://purl.org/dc/terms/medium>
- **Coverage Refinements**
  - <http://purl.org/dc/terms/spatial>
  - <http://purl.org/dc/terms/temporal>
- **Rights Refinement**
  - <http://purl.org/dc/terms/rightsAccess>
- **Audience Refinements**
  - <http://purl.org/dc/terms/educationLevel>
  - <http://purl.org/dc/terms/mediator>

## http://purl.org/dc/terms/

### 🔗 Date Refinements

- <http://purl.org/dc/terms/created>
- <http://purl.org/dc/terms/valid>
- <http://purl.org/dc/terms/available>
- <http://purl.org/dc/terms/issued>
- <http://purl.org/dc/terms/mdmodified>
- <http://purl.org/dc/terms/dateAccepted>
- <http://purl.org/dc/terms/dateCopyrighted>
- <http://purl.org/dc/terms/dateSubmitted>

### 🔗 Identifier Refinement

- <http://purl.org/dc/terms/bibliographicCitation>

### 🔗 Relation Refinements

- <http://purl.org/dc/terms/isPartOf> | <http://purl.org/dc/terms/hasPart>
- <http://purl.org/dc/terms/isVersionOf> | <http://purl.org/dc/terms/hasVersion>
- <http://purl.org/dc/terms/isFormatOf> | <http://purl.org/dc/terms/hasFormat>
- <http://purl.org/dc/terms/isReferencedBy> | <http://purl.org/dc/terms/references>
- <http://purl.org/dc/terms/isRequiredBy> | <http://purl.org/dc/terms/requires>
- <http://purl.org/dc/terms/isReplacedBy> | <http://purl.org/dc/terms/replaces>
- <http://purl.org/dc/terms/conformsTo>

## http://purl.org/dc/terms/

### 🔗 Encoding Schemes

- Source, Identifier and Relation
  - <http://purl.org/dc/terms/URI>
- Subject
  - <http://purl.org/dc/terms/DDC>
  - <http://purl.org/dc/terms/LCC>
  - <http://purl.org/dc/terms/LCSH>
  - <http://purl.org/dc/terms/MeSH>
  - <http://purl.org/dc/terms/UDC>
- Format and Medium
  - <http://purl.org/dc/terms/IMT>
- Type
  - <http://purl.org/dc/terms/DCMIType>
- Spatial
  - <http://purl.org/dc/terms/TGN>
  - <http://purl.org/dc/terms/ISO3166>
  - <http://purl.org/dc/terms/Box>
  - <http://purl.org/dc/terms/Point>
- Temporal
  - <http://purl.org/dc/terms/Period>
  - <http://purl.org/dc/terms/W3CDTF>
- Language
  - <http://purl.org/dc/terms/ISO639-2>
  - <http://purl.org/dc/terms/RFC3066>

## <http://purl.org/dc/dcmitype/>

- <http://purl.org/dc/dcmitype/Collection>
- <http://purl.org/dc/dcmitype/Dataset>
- <http://purl.org/dc/dcmitype/Event>
- <http://purl.org/dc/dcmitype/Image>
- <http://purl.org/dc/dcmitype/InteractiveResource>
- <http://purl.org/dc/dcmitype/MovingImage>
- <http://purl.org/dc/dcmitype/PhysicalObject>
- <http://purl.org/dc/dcmitype/Service>
- <http://purl.org/dc/dcmitype/Software>
- <http://purl.org/dc/dcmitype/Sound>
- <http://purl.org/dc/dcmitype/StillImage>
- <http://purl.org/dc/dcmitype/Text>

## Dublin Core in Topic Maps

- **A work item in SC34 / WG3 for a Technical Report**
- **Timeline**
  - Initial draft already available
    - ISO/IEC DTR 29111, 2007 (see references)
  - CD balloting already underway

## DC inTM - The Rationale

1. In order to add (standard) metadata to topic maps
2. In order to enable Topic Maps-based collation of Dublin Core information
  - ✦ Dublin Core description sets have limited usefulness unless they can be aggregated based on meaning
  - ✦ Topic Maps makes such aggregation possible
3. In order to combine DC data with other and non-DC data

## DC inTM - The Proposed Approach

- Basic Principles
  - ✦ Start from the Dublin Core Abstract Model (DCAM)
  - ✦ Map to the Topic Maps Data Model (TMDM)
  - ✦ Reuse the DC identifiers
  - ✦ Use minimum additional vocabulary
  - ✦ Only map what's really there: don't infer stuff
  - ✦ Topic Maps representation should be as natural as possible
  - ✦ Take a subject-centric approach



## DC inTM - The Proposed Approach

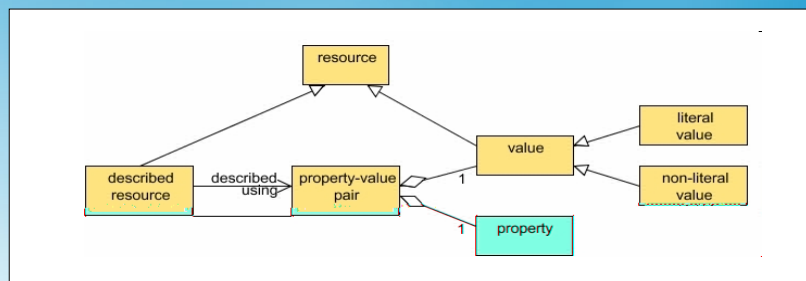
### Proposed Synthesis

1. Regard Dublin Core resources as subjects.
2. Use statements to assign DC properties.
3. For each property, specify which kind of statement to use.
4. Recommend the use of associations for all elements except —
  - elements that are naming properties and thus more naturally represented as topic names (e.g. title); and
  - elements whose values consist of descriptive text or structured data types and are thus more naturally represented as occurrences (e.g. description, date).
  - For each property, specify which kind of statement to use.
5. Reuse existing identifiers.

## The Dublin Core Abstract Model

### In short:

- Resources are described by property-value pairs in which the value may be a literal or non-literal:



## Basic DCAM to TMDM Mapping

### ○ Dublin Core (DCAM)

### ○ Topic Maps (TMDM)

▀ described resource	→	subject / topic
▀ property-value pair	→	statement name, association, or occurrence
▀ property	→	statement type name type, association type, or occurrence type
▀ property URI	→	subject identifier of typing topic
▀ literal value <sup>S</sup>	→	string (name or occurrence)
▀ non-literal value <sup>S</sup>	→	<i>Either</i> topic (when association) URI (when occurrence)

## Minimum of Additional Vocabulary

### ○ The solution reuses the DC vocabulary

- ▀ Property URIs become the subject identifiers of association types, etc.
- ▀ There is no unnecessary duplication of identifiers

### ○ However, TMs require role types in addition to name, occurrence and association types

- ▀ Vocabulary extensions handle this:

<http://psi.topicmaps.org/iso29111/resource>

<http://psi.topicmaps.org/iso29111/value>

## Dublin Core Metadata Element Set

- DCMES: A set of 15 core elements:
  - contributor, coverage, creator, date, description, format, identifier, language, publisher, relation, rights, source, subject, title, type
- Each element has 7 properties
  - URI, Label, Definition, Comment, Type of Term, Status, Date Issued
- The URI is an identifier, e.g.
  - <http://purl.org/dc/elements/1.1/contributor> (dc:contributor)

## Mappings (DCMES)

- The 15 core DCMES elements map to:
  - A. Names:* **title**
    - because it is clearly a naming property
  - B. Occurrences:* **date, description, identifier, rights**
    - because their values consist of descriptive text or structured data types
  - C. Associations:* **contributor, coverage, creator, format, language, publisher, relation, source, subject, type**
    - because associations are the default...

## DC inTM - CTM example

```
#prefix and template declarations omitted
*myTM # named wildcard creates reference-able item identifier
N →- title: "Norwegian Opera"
A →creator: Huchu
O →date: 2007-07-25
O →description: "A topic map about Norwegian opera, originally
created as a term assignment for the University of Oslo course
MUS2420."
O →identifier: http://www.ontopedia.net/huchu
A →language: English
O →rights: "Copyright (c) 2007, Ontopedia"
A →subject: Norwegian_Opera
A →type: topic_map
```

### Topic Map Metadata

- Creator: Huchu
- Date: 2007-07-25
- Description: A topic map about Norwegian opera, originally created as a term assignment for the University of Oslo course MUS2420.
- Language: English
- Rights: Copyright (c) 2007, Ontopedia
- Subject: English
- Type: Topic map

## Elements and Element Refinements

- A set of 40 additional **elements** and **refinements**
  - abstract, accessRights, **accrualMethod**, **accrualPeriodicity**, **accrualPolicy**, alternative, **audience**, available, bibliographicCitation, conformsTo, created, dateAccepted, dateCopyrighted, dateSubmitted, educationLevel, extent, hasFormat, hasPart, hasVersion, **instructionalMethod**, isFormatOf, isPartOf, isReferencedBy, isReplacedBy, isRequiredBy, issued, isVersionOf, license, mediator, medium, modified, **provenance**, references, replaces, requires, **rightsHolder**, spatial, tableOfContents, temporal, valid
- Each element has up to 8 properties
  - URI, Label, Definition, Comment, Type of Term, Refines, Status, Date Issued
- The URI is an identifier, e.g.
  - <http://purl.org/dc/terms/abstract> (dct:abstract)

## Mappings (Other Elements, etc.)

- The 40 elements map to
  - A. *Names*: **alternative**
    - because it is clearly a naming property
  - B. *Occurrences*: **abstract, accessRights, available, bibliographicCitation, created, dateAccepted, dateCopyrighted, dateSubmitted, educationLevel, extent, instructionalMethod, issued, license, medium, modified, provenance, tableOfContents, valid**
    - because their values consist of descriptive text or structured data types
  - C. *Associations*: **accrualMethod, accrualPeriodicity, accrualPolicy, audience, conformsTo, hasFormat, hasPart, hasVersion, isFormatOf, isPartOf, isReferencedBy, isReplacedBy, isRequiredBy, isVersionOf, mediator, references, replaces, requires, rightsHolder, spatial, temporal**
    - because associations are the default...

## Encoding Schemes

- A set of 18 encoding schemes:
  - Box, DCMIType, DDC, IMT, ISO3166, ISO639-2, LCC, LCSH, MESH, NLM, Period, Point, RFC1766, RFC3066, TGN, UDC, URI, W3CDTF
- Each term has up to 8 properties
  - URI, Label, Definition, See, Type of Term, **Qualifies**, Status, Date Issued
  - See property references documentation
  - **Qualifies** property specifies which property (or properties) the encoding scheme is intended to be used with
- The URI is an identifier, e.g.
  - <http://purl.org/dc/terms/box> (dct:box)

## Mappings (Encoding Schemes)

- Each encoding scheme is represented by a topic
- Qualifiers for occurrence properties:
  - ✦ DCMI Period, W3C-DTF (Date), URI (Identifier)
    - ▶ Datatype of the occurrence value
- Qualifiers for association properties:
  - ✦ DCMI Box (Spatial), DCMI Period (Temporal), DCMI Point (Spatial), DCMI Type Vocabulary (Type), DDC (Subject), IMT (Format), ISO 3166 (Spatial), ISO 639-2 (Language), LCC (Subject), LCSH (Subject), MeSH (Subject), NLM (Subject), RFC 1766 (Language), RFC 3066 (Language), TGN (Spatial), UDC (Subject), URI (Relation, Source), W3C-DTF (Temporal)
    - ▶ **belongs\_to** association between the “value” and the encoding scheme

## The DCMI Type Vocabulary

- A set of 12 media types:
  - ✦ Collection, Dataset, Event, Image, InteractiveResource, MovingImage, PhysicalObject, Service, Software, Sound, StillImage, Text
- Each term has up to 9 properties
  - ✦ Broader Than, Comment, Date Issued, Definition, Label, Narrower Than, Status, Type of Term, URI
  - ✦ **Broader Than & Narrower Than** properties apply to Image, MovingImage and StillImage

## Mappings (Type Vocabulary)

- Each type is represented as a topic
- These topics are candidates for the “value” role in **dc:type** associations

## Issues

- Identifiers
- Simplicity vs. naturalness
- Strict vs. loose

## The Issue of Identifiers

- ⊖ Note that **dc:identifier** is represented as an occurrence
  - Subject identifiers or subject locators would actually be more “topic-mappish”
  - But how would we know when to use which?
  - Dublin Core (like RDF) does not make the distinction between direct and indirect addressing
  - The only solution is to use occurrences as the default and allow either a subject identifier or a subject locator to be specified in addition, if the nature of the resource in question is known.

## Simplicity vs. Naturalness

- ⊖ We could have chosen a simpler route
  - “Just use occurrences for everything”
- ⊖ Why didn't we?
  - Partly because we wanted to leverage the built-in semantics of the Topic Maps model
    - distinction between names, occurrences, and associations
    - this is more “topic mappish” and more intuitive
  - Mostly because we want to encourage the adoption of a subject-centric approach wherever possible
    - This means using associations, not occurrences, wherever it makes sense



## Strict vs. Loose

- ⊖ This is also why we chose the more draconian approach:
  - "Thou SHALT NOT use occurrences"
- ⊖ We could have given the choice:
  - *Either* an association
    - creator: huchu
  - *or* an occurrence
    - creator: "Huchu"
- ⊖ But we didn't. The final short example will hopefully explain why.

## A Blog Entry (2 legs)

```
*e21 isa: entry
- title: "About Dublin Core in Topic Maps"
date: 2007-08-07
subject: "Subject-centric computing"
subject: "Dublin Core"
creator: "Steve Pepper"
contributor: "Dmitry Bogachev"
description: "Topic Maps definitely needs
Dublin
Core, but the reverse also holds..."
```

## A Blog Entry (4 legs)

```
*e41 isa: entry
- title: "About Dublin Core in Topic Maps"
date: 2007-08-07
subject: Subject-centric_computing
subject: Dublin_Core
creator: Steve_Pepper
contributor: Dmitry_Bogachev
description: "Topic Maps definitely needs
Dublin
Core, but the reverse also holds..."
```

## The Subject Centric Advantage

- Explicit identification of subjects
  - ✦ Enables collation of information based on what it is about
- This is what end-users (mostly) want
  - ✦ They are interested in a subject and want to find out more about it
  - ✦ If they could go to one place and find “everything” there is to know, the problem of infoglut would be under control
- This is the goal
  - ✦ It is the central message of subject centric computing

# Topic Maps-Driven Semantic Services for National Library of Korea

## Presentation Outline

- Research Objectives and Scope
- Understanding FRBR Model
- Converting MARC to FRBR
- Converting FRBR to Topic Maps
- Implementing a TM Prototype Enabling FRBR Model

## Research Objectives & Scope

- Establishing resource description structure based on international standard
- Making resource management smart and systematic
- Towards semantic DL service via user participation

## FRBR Model

- *The FRBR model is revolutionary. The (computer) catalogue is not seen as a sequence of bibliographic records and a replica of the traditional card catalogue, but rather as a network of connected data, enabling the user to perform seamlessly all the necessary functions. (Dr. Maja Žumer. National and University Library, Ljubljana, Slovenia)*
- FRBR = Functional Requirements for Bibliographic Records
  - Developed by cataloging experts working under the auspices of IFLA (International Federation of Library Associations and Institutions)
- FRBR is a conceptual model (not a standard!)
  - FRBR systematically models the bibliographic universe

## Value of FRBR

### ● FRBR study process and report:

- Fresh look at what functions bibliographic records perform
- FRBR systematically models the bibliographic universe

### ● Helps us answer important questions:

- What information is of the most value to users of the catalog?
- How can that most valuable information be used more effectively?

### ● Promises to inspire next generation catalogs and DL systems.

- Illuminates user tasks
- Clarifies how catalogs and DLs should function

## FRBR Study

### Primary objectives of the FRBR study:

- Provide a clearly defined, structured framework for relating bibliographic data to user needs
- Recommend a basic level of functionality for records created by national bibliographic agencies

### Modeling the bibliographic universe:

- Utilizes an entity-relationship framework:
  - Entities (a class of things)
  - Relationships (associations among entities)
  - Attributes (characteristics of the entities)

## What FRBR says USERS do:

### Four User Tasks:

- Find **entities that match the search criteria**
- Identify **entities** (confirm that the user has found what they were looking for)
- Select an **entity that matches the user's criteria**
- Obtain **access to the entity through purchase, loan, or through electronic remote access**

### And, maybe a fifth:

- Navigate

## FRBR 3 Groups of Entities

- Group 1
  - products of intellectual or artistic endeavor that are named or described in bibliographic records
    - work, expression, manifestation, item
- Group 2
  - entities responsible for the intellectual or artistic content, the physical production and dissemination, or the custodianship of such products
    - person, corporate body
- Group 3
  - entities that serve as the subjects of intellectual or artistic endeavor
    - concept, object, event, place

# FRBR Group 1

## Work

- A distinct intellectual or artistic creation

## Expression

- The intellectual or artistic realization of a work

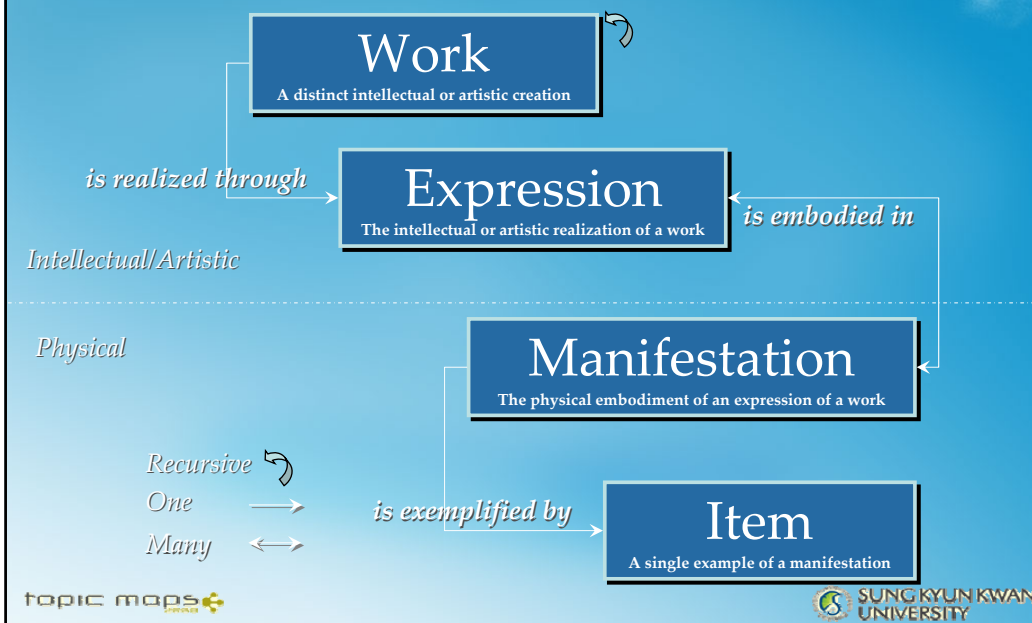
## Manifestation

- The physical embodiment of an expression of a work

## Item

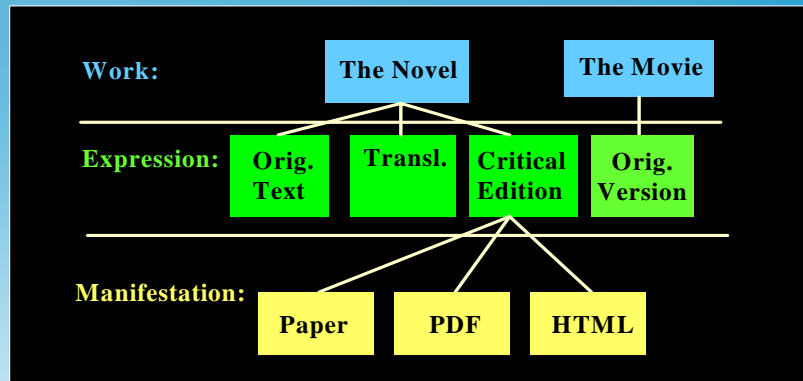
- A single example of a manifestation

# FRBR Group 1...



# FRBR Entity Levels

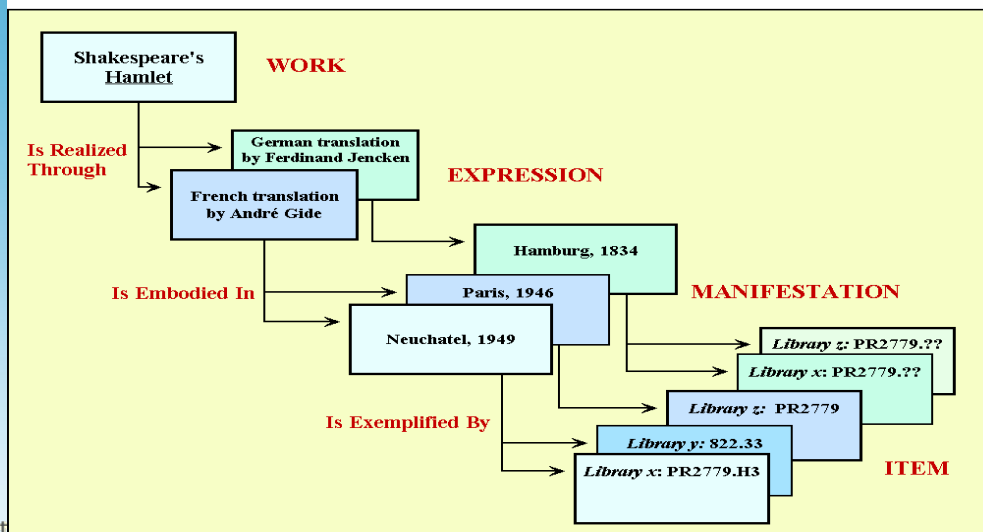
Group 1



From: Tillett, Barbara "AACR2's Strategic Plan and IFLA Work towards an International Cataloguing Code" (2002)

# FRBR Entity Levels

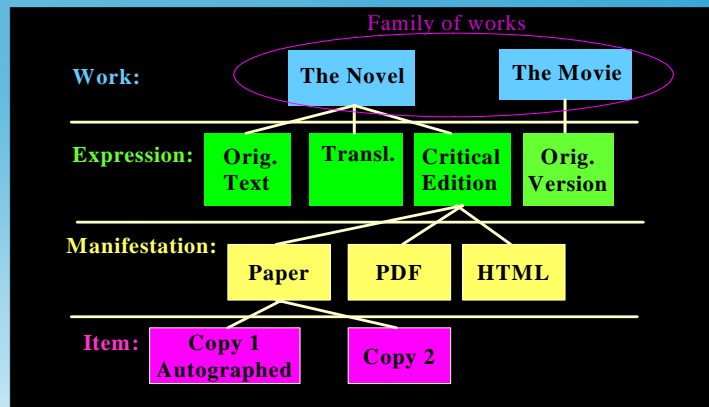
## 4-level FRBR Model





## FRBR Entity Levels

### Group 1



From: Tillett, Barbara "AACR2's Strategic Plan and IFLA Work towards an International Cataloguing Code" (2002)

## Group 1 Attributes

### Work

- Work title, form or genre, date, performance medium, intended audience

### Expression

- Expression title, form of the expression, language of the expression, type of score, scale of a map

### Manifestation

- Manifestation title, publisher, date of publication, form of carrier, dimensions, manifestation identifier (e.g. ISBN), terms of availability

### Item

- Location or call number, barcode, provenance, condition, access restrictions on an item

## Group 2 – Responsible Entities

- Entities responsible for the intellectual or artistic content, the physical production and dissemination, or the custodianship of such products

### Group 2 entities:

- Person
- Corporate Body

### And perhaps a third ...

- Family

## Group 2 Attributes

- Person
  - Names, dates, titles or other designations
- Corporate body
  - Name, number, place, date, other designation

## Group 3 - Subject Entities

- Entities that serve as the subjects of intellectual or artistic endeavor

Group 3 entities:

- Concept: **topical subject heading**
- Object: **name for an object**
- Event: **name for an event**
- Place: **name for a place**
- Plus the Group 1 and 2 Entities:
  - Works about Works/Expressions/Manifestations/Items
  - Works about Persons and/or Corporate Entities

## Relationships

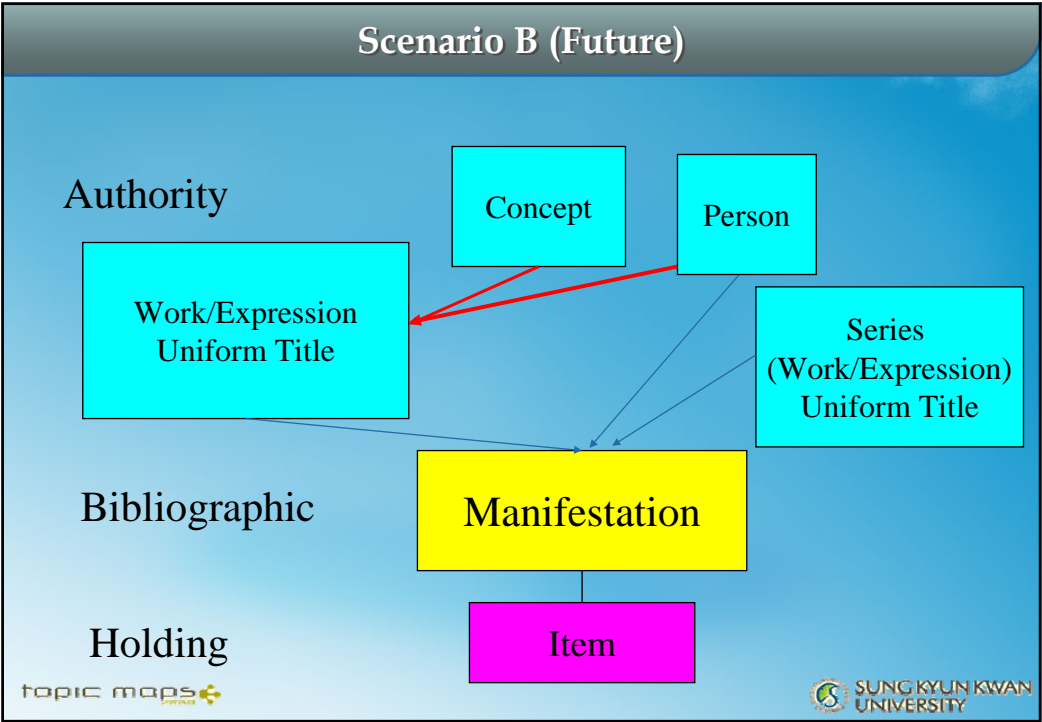
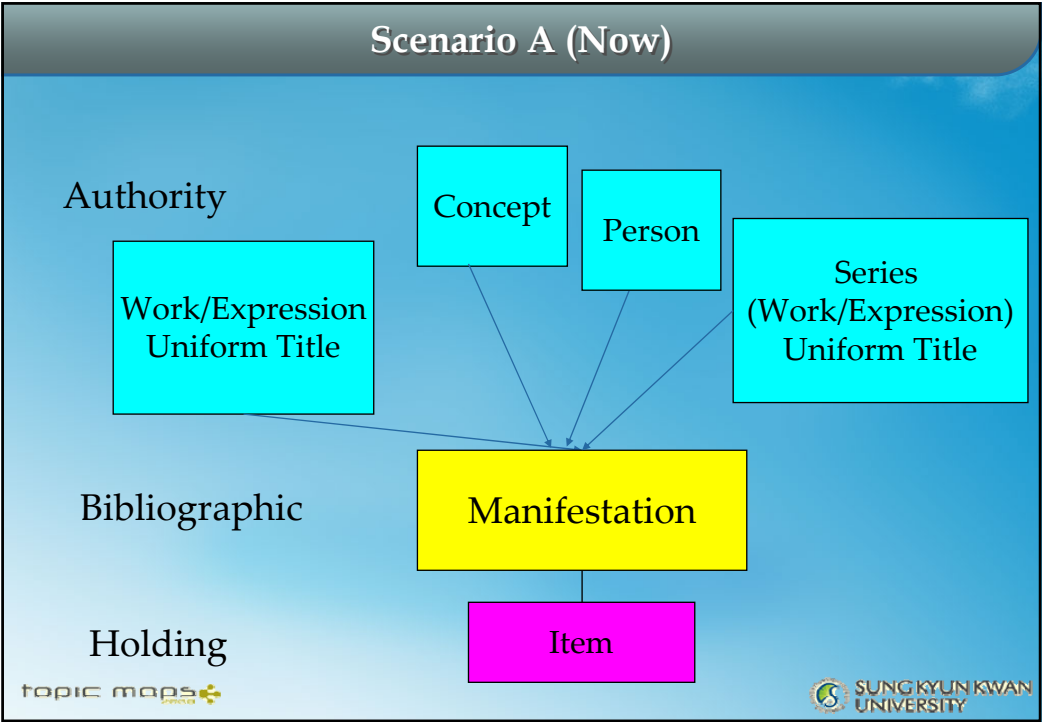
- Link entities to one another
  - Entities of different groups (person and work)
  - Entities of the same group (work and expression)
- Collocation and navigation

## Relationships Between FRBR Groups

- Work ↔ Person
  - Created by
- Expression ↔ Person
  - Translated by
- Manifestation ↔ Corporate body
  - Produced by
- Item ↔ Corporate body
  - Owned by
- Concept ↔ Work
  - Is subject of

## Relationships within a group

- Work to work
  - Successor
  - Supplement
  - Complement
  - Summarization
  - Adaptation
  - Transformation
  - Imitation
  - Whole/part



## Applying FRBR in services

### • Incorporating the concepts of the FRBR model in systems:

- Superior presentation of search results
  - Esp. in large files – more intuitive clustering
- May help streamline library cataloging
  - Reduces repeated keying of work-related info
- Bibliographic & management intelligence
  - New insights into works (e.g., [OCLC's 1000 list](#))
  - Libraries can operate at workset level (e.g., ILL)

## Show & tell

### • OCLC Research:

- Top 1000 titles <http://www.oclc.org/research/top1000>
- xISBN <http://www.oclc.org/research/researchworks/xisbn/>
- Fiction Finder <http://fictionfinder.oclc.org/>
- Curiouser <http://www.oclc.org/research/projects/curiouser>

### • OCLC production services

- Open WorldCat <http://www.oclc.org/worldcat/open>
- FRBR-inspired FirstSearch WorldCat (coming soon)

## Converting MARC to FRBR

### Mapping Between FRBR Attributes & MARC21 Elements

Entities	Attributes	MARC21 Elements	MARC21 Description
Work	created by	100/110/111 700/710/711 \$t,\$n,\$p,\$d,\$f,\$k,\$s,\$m,\$r,\$l,\$o,\$h	person/corporate body
	Title of work	130 \$a,\$n,\$p 240/243/245 \$a,\$n,\$p	Uniform title Collective uniform title Title statement
	Date of work	130 \$d 240/243 \$d 245 \$g	Date of treaty signing
	Form of work	130 \$k 240/243/245 \$k	Form subheading
	Medium of performance	130 \$m 240/243 \$m	Medium of performance for music
	Key	130 \$r 240/243 \$r	Key of music
	Coordinates	255 \$c	Statement of coordinates

## Converting MARC to FRBR

### Mapping Between FRBR Attributes & MARC21 Elements

Entities	Attributes	MARC21 Elements	MARC21 Description
Expression	Form of expression	leader/06	Type of record
	Language of expression	130 \$l 240/243 \$l 008/35-37	Language of a work language
	Other distinguishing characteristic	130 \$o 240/243 \$o 245 \$s	Arranged statement for music Revision
	Type of score	254 \$a Music 008/20	Musical presentation statement Format of music
	Scale	255 \$a 034 \$b,\$c,\$h	Statement of scale

## Converting MARC to FRBR

### Mapping Between FRBR Attributes & MARC21 Elements

Entity	Attribute	MARC21 Elements	MARC21 Description
Manifestation	Title of manifestation	245 \$a,\$n,\$p 242 \$a,\$n,\$p	Title Number of part Name of part
	Statement of responsibility	245 \$c 242 \$c	Statement of responsibility
	Edition/issue designation	250 \$a,\$b	Edition statement Remainder of edition statement
	Numbering	362 \$a	Dates of publication and sequential designation
	Publisher/distributor	260 \$b 533 \$c	Name of publisher, distributor Agency responsible for reproduction
	Date of publication/distribution	260 \$c 533 \$d	Date of publication, distribution Date of reproduction

## Converting MARC to FRBR

### Mapping Between FRBR Attributes & MARC21 Elements

Entity	Attribute	MARC21 Elements	MARC21 Description
Manifestation	Form of carrier, extent of carrier	300 \$a 533 \$e	Extent Physical description of reproduction
	Dimensions of carrier	300 \$c 533 \$e	Dimensions Physical description of reproduction
	Physical medium, capture mode, playing speed, groove width, kind of cutting, tape configuration, kind of sound, special reproduction characteristics, color, polarity, presentation format, file characteristics	300 \$b	Other physical details
	Reduction ratio	340 \$f 533 \$e(?)	Production rate/ratio Physical description of reproduction
	Manifestation identifier	BK:020,027,074 SE:022,030,074 Other:024,028,074	ISBN,STRN:BK, ISSN, Coden:SE Other standard identifier, publisher number:other, Form of musical composition code:074t



## Advantages of Topic Maps in Providing Semantic Services

- Provides excellent collocation capability – Katz's second purpose of cataloging
- TM implementation is relatively easy compared with RDF/OWL so one can expect a better return on investment.
- Excellent candidate in modeling FRBR-based data and provides great interoperability with other semantic data.
- You can easily change your ontology schema without modifying applications, which offers excellent advantage in terms of management cost.
- Provides flexible ways to model ontology.
- Provides flexible ways to convert any structured data, which makes it easy to utilize legacy data.
- Integrating TM with Web 2.0 technology is relatively easy and natural.

## Refining MARC-Ontology Using Topic Maps

- **Topic Types**
  - Among FRBR entities from group 1,2,3 and MARC metadata elements, select the elements that can create “useful” collocation, assign them as topic types.
  - Map FRBR model entities into MARC metadata elements and establish them as topic types.
- **Association Types**
  - Establish association types between topic types.
  - Apply FRBR relationships as TM associations between topics and also establish associations between metadata elements.
- **Occurrence Types**
  - Except for MARC metadata elements that were converted as topic types, the remaining MARC elements will be defined as TM occurrence types.
  - Classify occurrence types based on element values of FRBR model and assign them to appropriate topic types.
  - Since MARC records are usually based on manifestation, most MARC metadata elements and other occurrence types are assigned to manifestation.

## Defining Topic Types

Topic Types	FRBR Group & MARC Element
Work/Expression Manifestation/Item	FRBR Group 1, MARC Title
Person / Corporate Body	FRBR Group 2, MARC Personal name, Corporate Name
Object / Event / Place	FRBR Group 3
Country / Genre	MARC Subject (KORMARC 650tag)
Type	MARC leader's type of record (Expression Criterion)
Format	MARC Medium (245 \$h, Manifestation Criterion)
Language	MARC Language statement (Expression Criterion)
Classification	MARC KDC classification number
Context	FRBR Model의 개체 속성정보
Publisher, Date	MARC publication
Audience	MARC Target audience / User tagging info
Subject	User subject tagging info

## KORMARC Elements and TM Occurrence Types

KORMARC Elements	Topic Maps Occurrence Types
Title and related fields (1XX/24X/4XX/7XX)	Other words associated with a name, Remainder of title, Parallel title, Original title, series statement, uniform title
Publication (26X)	Edition statement, Place of publication, Frequency, Regularity
Physical description (3XX)	Extent, Other physical details, Dimensions, Accompanying materials, size of unit
Note (5XX), Subject(653)	Contents note, Restrictions on access, Immediate source of acquisition, keyword
Non-book bibliographic Note(5XX)	System details note, Music format, Participant or performer note, Exhibitions note, Date/time and place of an event note, Creation/production credits note, scale note
Control field (0XX)	DDC, KDC, ISBN, Price, Korean National Library call number, identifier number, language note
Other service Note	URL, book review, status of book circulation, abstract, image of title

## Occurrence Types by Topic Types

Topic Type	Occurrence Types
Work	uniform title
Expression	Original title, language note, Frequency, Regularity, Restrictions on access
Manifestation	Contents note, Immediate source of acquisition, Extent, Other physical details, Dimensions, Accompanying materials, size of unit, Edition statement, System details note, Music format, Participant or performer note, Exhibitions note, Date/time and place of an event note, Creation/production credits note, scale note, Other words associated with a name, Remainder of title, Parallel title, DDC, KDC, ISBN, Price,
Item	Korean National Library call number, identifier number
Publisher	Place of publication,
Classification	KDC, DDC
인물	Dates associated with a name?
Subject	keyword

## Defining Association Types

Topic Type	Association Type	Topic Type
Work	Work form	Genre
	Realized Through	Expression
	Created by	Person/ Corporate Body
	Context for	Context
	Work classified	Classification

## Defining Association Types

Topic Type	Association Type	Topic Type
Expression	Embodied in	Manifestation
	Realized by	Person/ Corporate Body
	Expression form	Type
	Expression language	Language
	Expression classified	Classification
	Expression context	Context
	Expression date	Publication Date
	Translated by	Person/ Corporate Body

## Defining Association Types

Topic Type	Association Type	Topic Type
Manifestation	Exemplified in	Item
	Produced by	Person/ Corporate Body
	Carrier form	Format
	Published by	Publisher
	Manifestation classified	Classification
	Intended audience	Audience
	Manifestation date	Publication Date
Subject	Has subject	Work
Country	Belongs to	Expression
		Manifestation



# OCLC Fiction Finder



**Gone with the wind.**  
Mitchell, Margaret, 1900-1949

293 editions in 27 languages, held by 11291 libraries

**Summary:** A monumental classic considered by many to be not only the

**Genres:** Historical fiction | War stories | Love stories | Epic fiction

**Characters:** O'Hara, Scarlett (Fictitious character)

**Settings:** 1861 - 1865 | United States | Georgia | 1800 - 1899 | Estado Georgia —Atlanta [+]  
[More]

**Subjects:** American Civil War, 1861-1865 | Women | Plantation life | Young women | Civil war | English literature | Russian language

**Audience:**  Kids  General  Special

**Work** | **Item**

LDR 00630cam au200217 a 4500  
001 0001133101▲  
005 20060709122518▲  
008 04011219641936nyu 000 1 eng d▲  
010 ▼z 36027394 ▲  
020 ▼a0025053902 ▲  
040 ▼aIPP wjPP wOCL wjWSU wdiFA▲  
050 ▼aPS3625.1972 wjg6 1964▲  
052 ▼aF wjMli ▲  
082 00 ▼a813/.52 ▼220▲  
090 ▼aA823.52 ▼bM694go ▲  
100 1 ▼aMitchell, Margaret. ▼d1900-1949. ▲  
245 10 ▼aGone with the wind / ▼cMargaret Mitchell. ▲  
260 ▼aNew York : ▼bMacmillan, c1961. c1966. ▲  
300 ▼a833 p. : ▼c22 cm. ▲  
651 0 ▼aUnited States ▼xHistory ▼yCivil War, 1861-1865 ▼xFiction. ▲

**Expressions** | **Manifestations**

Editions		Genres		Characters		Settings		Subjects	
Title / Author	OCLC #	Date	Format	Aud.	Narrow by Languages	Narrow by Format	Show: All		
1. Gone with the wind / by Margaret Mitchell	00290058	1936	Book	General	English (39)	Book (283)	Audio (8)		
2. Gone with the wind	07909619	1936	Book	General	Chinese (35)	Large print (2)			
3. Gone with the wind / by Margaret Mitchell	35240399	1964	Book	General	Russian (26)				
4. Gone with the wind	01279858	1973	Book	General	Polish (16)				
5. Gone with the wind / Margaret Mitchell	28491920	1936	Book	General	German (14)				
6. Gone with the wind / Margaret Mitchell	25412027	1992	Book	General	Korean (12)				
7. Gone with the wind / Margaret Mitchell ; with a new preface by Pat Conroy and an introduction by James A. Michener	33947306	1996	Book	General	Spanish (12)				
8. Gone with the wind / Margaret Mitchell	02931402	1936	Book	General	Vietnamese (12)				
9. Gone with the wind. Illustrated by Ben Stahl	00878256	1961	Book	General	Italian (11)				
10. Gone with the wind Margaret Mitchell	45950921	2001	Book	General	French (10)				




# NLK Prototype System: Main Screen



문학작품
저자
장르별
시대별





## Welcome

이 prototype 프로젝트는 국중 소설 부분의 자료를 저자명, 서명, 주제별, 장르별로, 시대별로도 접근할 수 있게 도와 줍니다.  
여러 분이 찾은 작품이 더 다양한 관계 속에 있다는 것을 아실 것입니다.  
여러 분의 관심의 정도에 따라 자유롭게 탐색하시면 다른 작품도 우연히 만날 수 있습니다.  
(예: 다른 언어로, 다른 매체로)  
또 여러 분이 직접 작품의 주제를 입력하실 수도 있습니다.  
함께 만들어 가는 우리 문학의 보고입니다.

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# NLK Prototype System: Display of Literary Works

The screenshot displays the '국립중앙도서관' (National Library of Korea) website. The main navigation bar includes '문학작품' (Literary Works), '저자' (Author), '장르별' (By Genre), and '시대별' (By Era). The '문학작품' section is active, showing a search bar and a list of 20 items. A yellow box highlights a specific work: '라디오 TV 드라마 **열매** / 표현형 (1) / 구현형 (1) / 한국방송작가협회 편'. Below this, a list of related items is shown, including '라디오 TV 드라마 열매 / (도서) / [1991] / (第三集)', '라디오 TV 드라마 열매 / (도서) / [1990] / (第三集)', and '라디오 TV 드라마 열매 / (도서) / [1989] / (第三集)'. A yellow box labeled 'Work list & expression, manifestation count' points to this list. To the right, the '관련항목보기' (View Related Items) section shows a list of related items, including '소설 분야 작품' (Novel Works), '관련태초기' (Related Early Works), '지자명명료 가 나 디 라 마 바 사' (Author Name List), '주제명료' (Subject Name List), 'Physical Education & ... (26)', '書籍명료' (Book Name List), 'Book (34)', and 'Sound Recording (4)'. A yellow box labeled 'Arranged by Genre' points to the '소설 분야 작품' section. The bottom of the page features the 'topic maps' logo and the 'SUNG KYUN KWAN UNIVERSITY' logo.

# NLK Prototype System: Display of Authors

The screenshot displays the '국립중앙도서관' (National Library of Korea) website. The main navigation bar includes '문학작품' (Literary Works), '저자' (Author), '장르별' (By Genre), and '시대별' (By Era). The '저자' section is active, showing a search bar and a list of 15 authors. A yellow box highlights a specific author: '나무신은사' (Namu Shin-un-sa). Below this, a list of related items is shown, including '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사', '나무신은사'. A yellow box labeled 'manifestation list by authors' points to this list. To the left, the '장르별 저자보기' (View Authors by Genre) section shows a list of related items, including '소설 분야 연명' (Novel Works), '연대시 분야 연명' (Contemporary Poetry Works), and '시각 분야 연명' (Visual Arts Works). To the right, the '관련항목보기' (View Related Items) section shows a list of related items, including '다른저자보기' (View Other Authors), '주제명명료' (Subject Name List), and '한국방송작가협회' (Korean Broadcasting Writers Association). The bottom of the page features the 'topic maps' logo and the 'SUNG KYUN KWAN UNIVERSITY' logo.





# Introduction to SKOS

(Simple Knowledge Organization Systems)

## The Goal of SKOS Core

- To provide a simple, machine-understandable, representation framework for Knowledge Organization Systems (KOS)

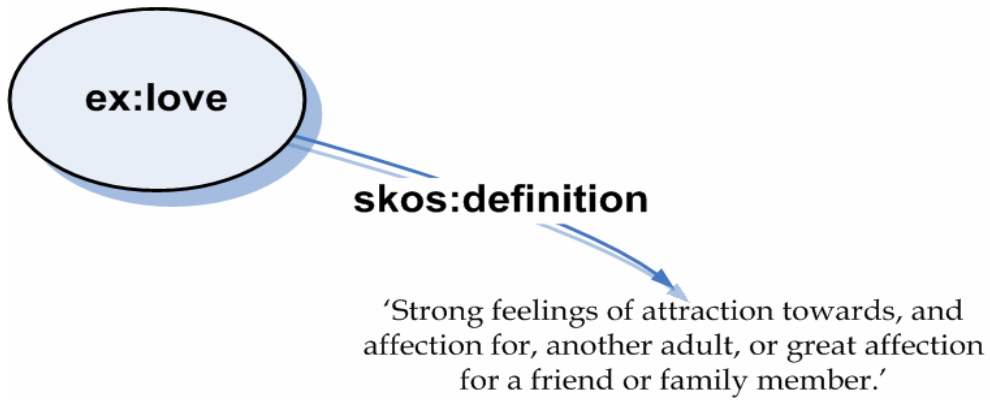
## The Scope of SKOS Core

- In scope...
  - **Controlled Vocabularies**
  - **Thesauri**
  - **Taxonomies**
  - **Classification Schemes**
  - **Subject Heading Systems**

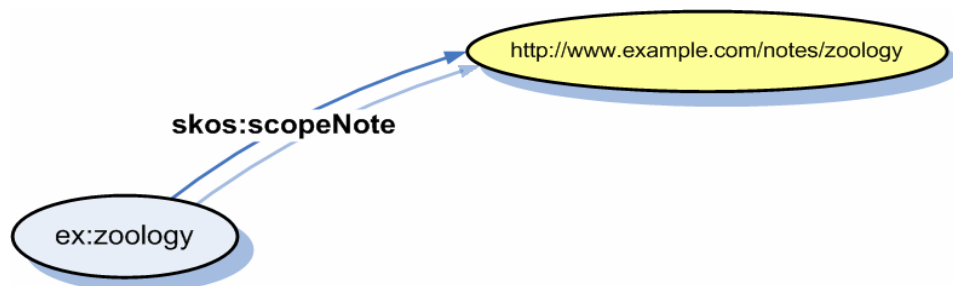
## Traditional Thesaurus to SKOS Mapping

- Concept gets a URI, not a name
- Lexical Labeling = names (not new concepts)
  - `skos:prefLabel`
  - `skos:altLabel` (Used For)
- Relationship Labeling between Concepts
  - `skos:broader`
  - `skos:narrower`
  - `skos:related`
- Documentation such as Scope notes
  - `skos:scopeNote`
  - `skos:definition`

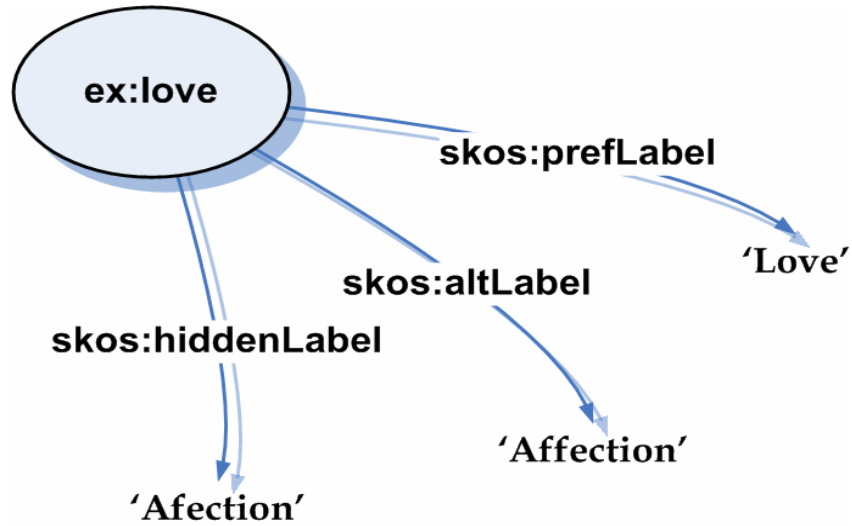
## RDF Literal



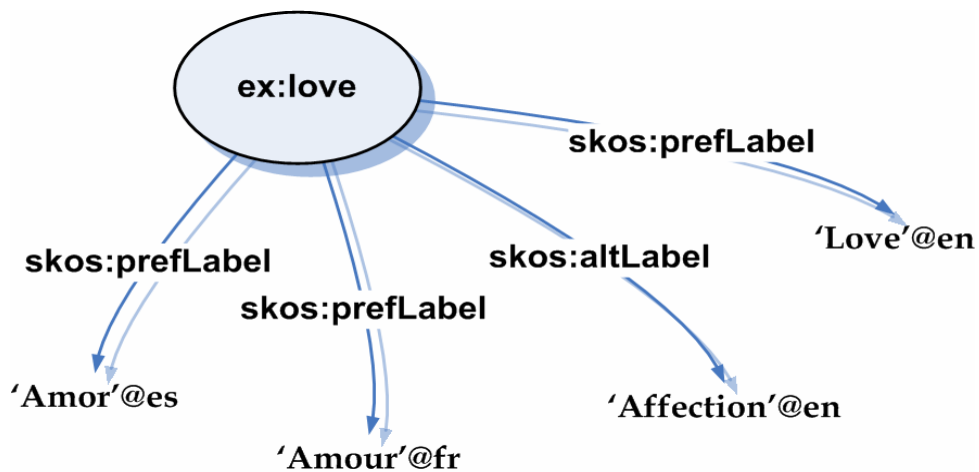
## Document Reference



## Lexical Labels

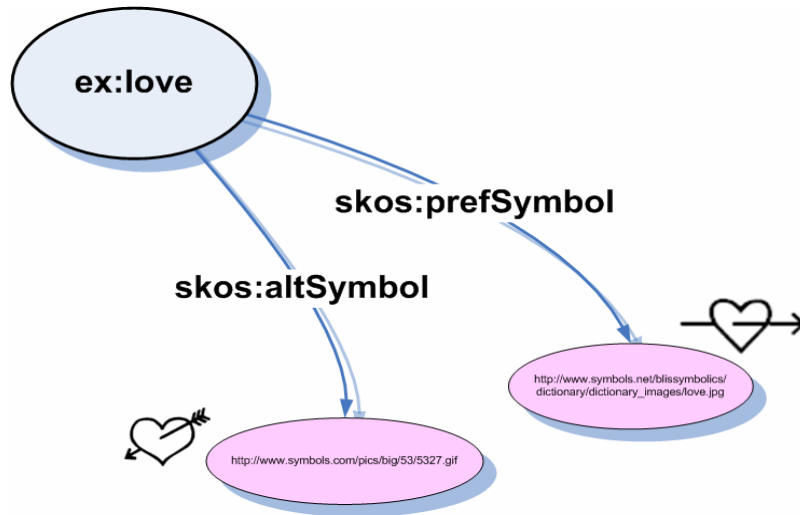


## Multilingual Labels



**N.B.** No more than one **skos:prefLabel** per language

## Symbolic Labels



## Thesaurus (BT/NT)

### Love

BT Emotion

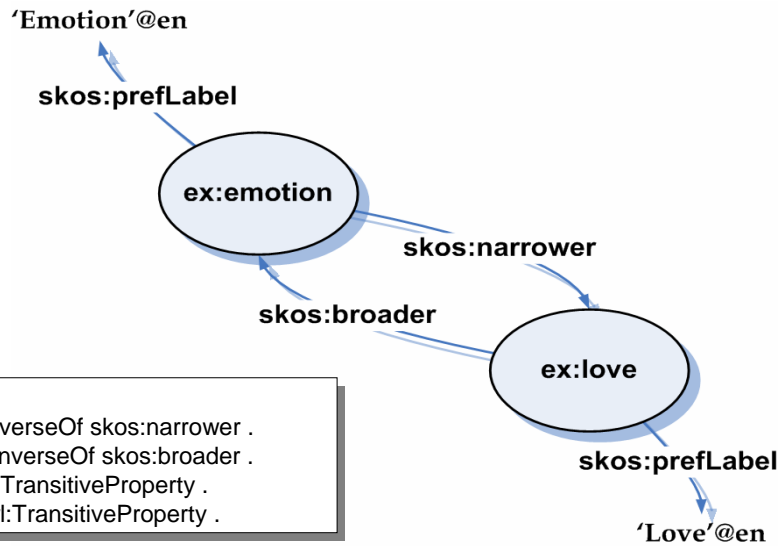
### Emotion

NT Love

NT Awe

NT Joy

## Broader/Narrower



**N.B.**  
skos:broader owl:inverseOf skos:narrower .  
skos:narrower owl:inverseOf skos:broader .  
skos:broader a owl:TransitiveProperty .  
skos:narrower a owl:TransitiveProperty .

## Thesaurus (RT)

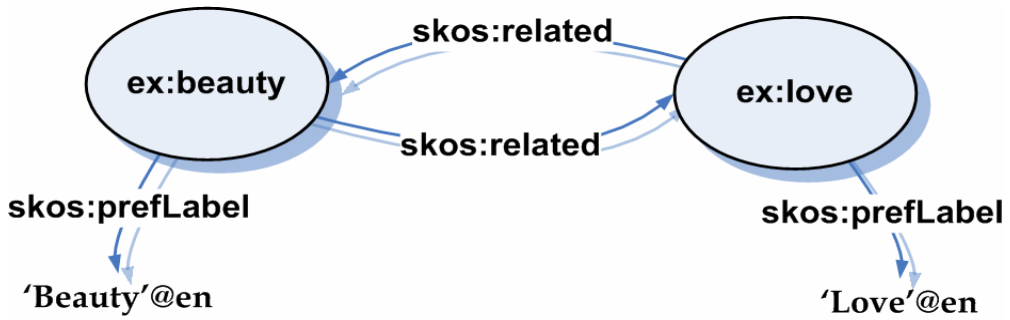
Love

RT Beauty

Beauty

RT Love

## Related



**N.B.**  
skos:related a owl:SymmetricProperty .

## ...Related Resource Description

