Tutorial 1: Basic Semantics

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Tutorial schedule

- Tutorial 1: Basic Semantics (Stuart Sutton)
- Tutorial 2: Basic Syntaxes (Mikael Nilsson)
- Tutorial 3: Vocabularies (Alistair Miles)
- Tutorial 4: Application Profiles (Diane Hillmann)
What’s covered in this tutorial

• An introduction to metadata
• Key features of the Dublin Core
• Dublin Core metadata in broader context
• Important aspects of the DCMI community
What do we mean by “Dublin Core”? 

1. An international **community** interested in interoperable metadata (DCMI) 
2. New **ways of thinking** about interoperable metadata
   - DCMI 
   - Application Profiles 
3. A **core set of 15 metadata elements**
4. A number of **additional elements and element refinements** beyond the core—e.g., audience—reflecting needs of different discourse and practice communities 
5. All of the above!
Why did the Dublin Core come to be in 1995?

- Dramatic increase in the number of document-like resources on the net
- Little improvement in indexing services made resources hard to discover
- Belief that descriptive metadata would improve discovery
- Perceived need for a descriptive standard that was simple to apply (even by non-professionals)
An Introduction to Metadata

- Definition
- Types & Functions
- Metadata Building Blocks
What is metadata?

• Metadata consists of *statements* we make about resources to help us find, identify, use, manage, evaluate, and preserve them.

• Answers come from three traditions:
  – Database Management Systems (“Schemas of relational databases”)
  – Library Cataloging Traditions (MARC & AACR2)
  – The World Wide Web (since the mid-1990’s)
    • The context for Dublin Core
Types and functions of metadata

Types of Metadata
• Administrative
• Descriptive
• Access/Use
• Preservation
• Technical/Structural
• Relational
• Etc. …

Functions of Metadata
• Discover resources
• Mark content structure
• Identify versions
• Manage resources
• Certify authenticity
• Situate geospatially
• Control IP rights
• Indicate status
• Describe processes
• Etc. …
1. The basic unit of metadata is a *statement*.
2. A statement consists of a *property* (element) and a *value* (i.e., a *property/value* pair)
3. Metadata statements describe *resources*.
Properties and values in action?

245 00  $a Romeo and Juliet $h [videorecording]
<title>Gone with the wind</title>
<Type>MovingImage</type>
Key Features of Dublin Core

– General Characteristics
– Dublin Core Principles
A note of caution before beginning…

Use of the word *element*—e.g., “Dublin Core Element Set”

“An *Element* is a property of a resource. As intended here, "properties" are attributes of resources -- characteristics that a resource may "have", such as a Title, Publisher, or Subject.”


- It is *not* used in the XML sense of *element* as a unit of XML data, delimited by tags
- *Element* is frequently used interchangeably in the Dublin Core community with the word *property*
The **DCMI Abstract Model**

- DC community realized early that rational development and machine-processing requires a coherent data model
  - *DCMI Grammatical Principles*
  - *DCMI Abstract Model*
    - Defines *resources* in terms of semantic relationships among *classes, properties, and values*
    - Defines a model for DCMI *descriptions, description sets, and records*
    - Serves as a foundation for future DCMI developments
    - Serves as a conceptual model for metadata initiatives outside DCMI
Characteristics of (or abstractions from) Dublin Core metadata

- Syntax independent
  - HTML/XHTML, XML, RDF/XML
- Flat, non-hierarchical element structure
- Extensible
  - By refinement (sub-properties of existing properties)
  - By combination (application profiles)
- Optional
- Repeatable
- Elements may occur in any order
**Simple DC: Fifteen core elements (1996)**

<table>
<thead>
<tr>
<th>Creator</th>
<th>Title</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributor</td>
<td>Date</td>
<td>Description</td>
</tr>
<tr>
<td>Publisher</td>
<td>Type</td>
<td>Format</td>
</tr>
<tr>
<td>Coverage</td>
<td>Rights</td>
<td>Relation</td>
</tr>
<tr>
<td>Source</td>
<td>Language</td>
<td>Identifier</td>
</tr>
</tbody>
</table>

ISO 15836-2003  
NISO Z39.85-2007
Resources for which DC is often used

<table>
<thead>
<tr>
<th>Collection</th>
<th>Dataset</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image</td>
<td>Interactive Resource</td>
<td>Moving Image</td>
</tr>
<tr>
<td>Physical Object</td>
<td>Service</td>
<td>Software</td>
</tr>
<tr>
<td>Sound</td>
<td>Still Image</td>
<td>Test</td>
</tr>
</tbody>
</table>

DCMI Type Vocabulary
http://dublincore.org/documents/2006/12/18/dcmi-terms/
DC elements and refinements since 2000

- **DC Simple (15 core elements)**

<table>
<thead>
<tr>
<th>Element</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>abstract</td>
<td>coverage</td>
</tr>
<tr>
<td>accessRights</td>
<td>language</td>
</tr>
<tr>
<td>accrualMethod</td>
<td>rights</td>
</tr>
<tr>
<td>accrualPeriodicity</td>
<td>source</td>
</tr>
<tr>
<td>accrualPolicy</td>
<td>subject</td>
</tr>
<tr>
<td>alternative</td>
<td>subject</td>
</tr>
<tr>
<td>audience</td>
<td>subject</td>
</tr>
<tr>
<td>available</td>
<td>subject</td>
</tr>
<tr>
<td>bibliographicCitation</td>
<td>subject</td>
</tr>
<tr>
<td>conformsTo</td>
<td>subject</td>
</tr>
<tr>
<td>contributor</td>
<td>type</td>
</tr>
<tr>
<td>format</td>
<td>valid</td>
</tr>
<tr>
<td>hasFormat</td>
<td></td>
</tr>
<tr>
<td>hasPart</td>
<td></td>
</tr>
<tr>
<td>hasVersion</td>
<td></td>
</tr>
<tr>
<td>identifier</td>
<td></td>
</tr>
<tr>
<td>mediator</td>
<td></td>
</tr>
<tr>
<td>description</td>
<td></td>
</tr>
<tr>
<td>isReferencedBy</td>
<td></td>
</tr>
<tr>
<td>isFormatOf</td>
<td></td>
</tr>
<tr>
<td>isPartOf</td>
<td></td>
</tr>
<tr>
<td>isRequiredBy</td>
<td></td>
</tr>
<tr>
<td>isReplacement</td>
<td></td>
</tr>
<tr>
<td>issues</td>
<td></td>
</tr>
<tr>
<td>replaces</td>
<td></td>
</tr>
</tbody>
</table>

http://dublincore.org/documents/2006/12/18/dcmi-terms/
Element refinements

- Element refinements **narrow** the meaning of DC elements
  - *medium* refines *format*
  - *bibliographicCitation* refines *identifier*
  - *tableOfContents* refines *description*

- Refinements are properties just like the properties they refine…they can stand alone
  - `<alternative>Nine queens</alternative>`
  - `<dateCopyrighted>2000-07-11</dateCopyrighted>`

  **NOT**
  - `<title.alternative>Nine queens</title.alternative>`
  - `<date.dateCopyrighted>2000-07-11</date.dateCopyrighted>`
Qualification of element values: encoding schemes

- Encoding schemes give context to element values
  - **Vocabulary encoding schemes**
    - Indicate that a value comes from a controlled vocabulary (e.g., that “Spanish American literature” is an LCSH term)
  - **Syntax encoding schemes**
    - Indicate that a string is formatted in a standard way (e.g., that “1956-11-12” follows ISO 8601)

- For the DC core elements, DCMI recommends using encoding schemes with *coverage*, *date*, *format*, *language*, *subject*, and *type*
Summary: Simple and qualified DC

• *Simple DC*: Varying definitions
  – Only the original 15 elements, *or*
  – All available elements, without encoding schemes or refinements
  – In each case only making use of *value strings*

• *Qualified DC*
  – Metadata that makes use of some or all the features of the *DCMI Abstract Model*
    • Element Refinements
    • Value Encoding Schemes
Dublin Core Principles

- Dumb-Down
- One-to-One
- Appropriate Values
Dumb-Down

- **Simple DC** does not use *element refinements* or *encoding schemes* and statements only contain *value strings*

- **Qualified DC** uses features of the DCMI Abstract Model, particularly *element refinements* and *encoding schemes*

- *Dumbing-down* is translating qualified DC to simple DC (*property dumb-down* and *value dumb-down*)
The One-to-One Principle

• Create one metadata *description* for one and only one resource
  – Do not describe a digital image of the Mona Lisa as if it were the original painting
  – Do not describe both a song and the song’s composer in the same *description*
    • Describe the composer and the work in two separate *descriptions*
• Group related *descriptions* into a *description set* (record)
Appropriate Values

- Use elements, element refinements and qualifiers to meet the needs of your local context, but . . .
- Remember that your metadata may be interpreted by machines and people, so . . .
- Consider whether the values you use will aid discovery outside your local context and . . .
- Make decisions about your local practices accordingly
DCMI Namespaces and Policies

- All DCMI metadata terms are given unique identity within three namespaces:
  - http://purl.org/dc/elements/1.1/ - the legacy DC-15
  - http://purl.org/dc/terms/ - all other elements/qualifiers
  - http://purl.org/dc/dcmitype/ - a Type vocabulary
  - Example: http://purl.org/dc/elements/1.1/title

- Policies promote long-term stability of namespace URIs
  - Changes not substantially “semantic” (i.e., corrections) will not result in change of namespace URIs
Dublin Core metadata in a broader context

–Metadata Creation and Distribution
  –Application Profiles and Interoperability
Metadata creation and distribution models

- **Federation**
  - Extensive specifications, standards, protocols, training

- **Harvesting**
  - Basic agreements, reliance on best practices

- **Gathering**
  - Automated indexing of content, algorithms yield results from search terms, less likely to use descriptive metadata per se
Harvesting model key features

- Integrating metadata from many sources calls for common element sets, record structures, and harvesting protocols
- Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) serves as a framework for sharing metadata and mandates ‘simple DC’ as a common metadata format
- Harvesting promotes metadata reuse
- Best practices balance cost and interoperability
- Communities add value to basic infrastructure (more complex metadata, new uses for protocol)
Application profiles & interoperability

“Application profiles consist of data elements drawn from one or more namespace schemas combined together by implementers and optimised for a particular local application.” [http://www.ariadne.ac.uk/issue25/app-profiles/](http://www.ariadne.ac.uk/issue25/app-profiles/)

Application profiles enable:

- Implementers to use DC metadata in conjunction with non-DC metadata
- Implementers to benefit from the experience of their peers
- Communities to harmonize metadata usage for greater interoperability
Important aspects of the DCMI community
Dublin Core grows and changes

• DCMI emphasizes *open participation*
  – Conferences, Communities, Task Groups, and discussion lists

• DCMI element set evolves as implementers coin new terms and usage patterns emerge

• DCMI Usage Board reviews proposals for new metadata terms
Dublin Core Usage Board

• Considers proposals for new terms (elements, refinements, encoding schemes, DCMI Type Vocabulary terms)
  – Evaluates proposals in light of the requirements of the DCMI Abstract Model

• Evaluates constructs that use DCMI terms, such as application profiles
Finding out more about DC

• DCMI Web Site
  – http://dublincore.org

• “Using Dublin Core”
  – http://dublincore.org/documents/usageguide/

• Participating in a Community or Task Group
  – http://dublincore.org/groups

• Ask a question!
  – http://askdcmi.askvrd.org/
Acknowledgement

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Questions?

Thank you for your attention!

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