Discovery metadata - Dublin Core, MODS, MARC, …

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Cataloguing Online Resources: an Introduction to Metadata for Librarians, Manchester, 26 April 2006

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Session overview

- Resource discovery
- Dublin Core
- The MARC formats
- MODS
Resource discovery (1)

- A basic function of metadata
- Part of information retrieval
- Cutter's principles from "Rules for a Dictionary Catalog" (1876), slightly paraphrased:
  - To enable a person to find a [book] of which either the author, title or subject is known
  - To show what a [library] has by a given author, on a given subject, or in a given kind of literature
  - To assist in the choice of a [book] as to its edition (bibliographically) or to its character (literary or topical)
Resource discovery (2)

- A particular challenge in Web environment
  - Resource providers have moved into a **shared** network space
  - Recognition that users wish:
    - “to refer to intellectual and cultural materials flexibly and transparently without concern for institutional or national boundaries” (Dempsey, 2000)
- This is the problem that Dublin Core is designed to address (cross-domain discovery)
Resource discovery (3)

– We will now look in more detail at three standards *primarily* developed to support resource discovery

• Dublin Core
• The MARC formats
• MODS
Dublin Core basics

- Perhaps the most well-known metadata initiative (there are many implementations)
- Named after a workshop held in Dublin, Ohio - a suburb of Columbus
- Mainly focused on cross-domain resource discovery
- A suite of standards (and other activities) organised as part of the Dublin Core Metadata Initiative (DCMI)
DCMI mission

– Providing simple standards to facilitate the finding, sharing and management of information, by:
  • Developing and maintaining international standards for describing resources
  • Supporting a worldwide community of users and developers
  • Promoting widespread use of Dublin Core solutions
DCMI brief history (1)

– Mid-1990s
  – Challenge of discovery on the Web
  – Search engines providing many hits, but little precision (pre Google)
  – Recognition that the traditional library approach to cataloguing could not scale to Web resources

– 1995 - first workshop
  – Hosted by OCLC at Dublin, Ohio
  – Primarily focused on Web resource discovery (document-like objects)
  – Resulted in interdisciplinary consensus on 13 metadata elements
DCMI brief history (2)

– 1996 - 2nd and 3rd workshops:
  • DC-2 (University of Warwick)
    – Recognised that DC elements would need to combine or co-exist with other types of metadata (modularity)
    – Warwick Framework devised to deal with this
  • DC-3 (Dublin, Ohio)
    – Workshop convened to deal with images (expanding beyond document-like objects)
    – Explicit focus now on cross-domain resource discovery
    – First identification of the 15 core elements

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DCMI standardisation

- Dublin Core Metadata Element Set

- DCMI Metadata Terms
  - DCMI Recommendation (latest version, 2005)
  - Specifies all metadata terms maintained by DCMI: elements, element refinements, encoding schemes, vocabulary terms

- DCMI Abstract Model
  - DCMI Recommendation (2005)
Dublin Core elements (1)

- Interdisciplinary consensus on simple element set for resource discovery
  - 15 elements
  - All optional
  - All repeatable
- Not intended for complex resource description
  - Initial idea of “simple document-like object”
  - Simplicity of semantics, ease of use
- Provides basic “semantic interoperability”
  - Across domains, across language communities
  - Does not provide detailed cataloguing rules
- A set of 15 broad “buckets”…

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Dublin Core elements (2)

- Title
- Subject
- Description
- Creator
- Publisher
- Contributor
- Date
- Type
- Format
- Identifier
- Source
- Language
- Relation
- Coverage
- Rights
Dublin Core elements (3)

- **Not** a replacement for richer descriptive standards
- Can provide 15 “windows” into richer resource descriptions
  - disclose rich description in simple form
  - semantic cross-walks, mappings to existing data
  - export rather than create
- If metadata is language ...
  - ... then DC is a “pidgin” language for use by “tourists on the Internet commons” (Thomas Baker)
Dublin Core elements (4)

– Small vocabulary, simple grammar/structure
  • Resource has Title “An Introduction to Dublin Core and the DCMI”
  • Resource has Subject “Metadata”
– Not as subtle/powerful as separate languages - but can be useful!

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Extending Dublin Core

– Element refinements:
  • Narrow the meaning of a DC element
  • e.g. "date modified" v "date"

– Encoding schemes:
  • Provide additional information about a value
  • e.g. can indicate that a subject value is a Library of Congress Subject Heading

– The "Dumb-Down" principle
  • Provides rules for transforming "qualified" description into "simple" description

– the "One-to-One" rule
  • A DC description describes exactly one resource
Dublin Core Application Profiles

– In practice, metadata implementers
  • **Combine** elements from different sources (e.g. DC plus elements from other schemas, “local” elements)
  • **Refine** definitions of elements
  • **Constrain** use of elements

– Application profiles
  • If simple DC is a “pidgin”, an application profile is a “regional idiom or creole”! (Thomas Baker)
  • Element set plus policies, guidelines
  • Some DCMI Working groups developing application profiles for specific domains (government, education)
DC Application Profiles: examples

- "Simple Dublin Core"
  - Use of the 15 properties of the DCMES
  - All optional and repeatable
  - Values represented by value strings
  - No vocabulary or syntax encoding schemes

- UK eGovernment Metadata Standard (eGMS)
  - Use of selected properties from DCMI vocabularies, additional properties
  - Guidelines on use of properties
  - Some properties mandated/recommended
  - Some vocabulary encoding schemes mandated/recommended
  - Guidance on content of value strings

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Some applications of Dublin Core

– Embedded in Web pages
– Integrated resource discovery services
  • For example
  – Subject Gateways - Resource Discovery Network
  – OAI Service Providers - OAIster
  – Image services - Picture Australia
DC embedded in X/HTML

– Search crawlers can extract metadata from individual pages
– However, little or no use by the major search engines
  • Robot spamming problems
  • Lack of metadata (or quality-control)
  • Availability of better indexing tools, e.g. Google's PageRank algorithm
– But, useful in controlled environments
Picture Australia

- Images "related to all things Australian" from 40+ cultural agencies
- Central search service based (initially at least) on crawling HTML-embedded DC metadata
- Providers currently migrating to OAI-PMH

http://www.pictureaustralia.org/
Army personnel being inoculated against influenza at a near Melbourne [picture] by - Mozilla Firefox

State Library of Victoria

Feedback on this image
State Library of Victoria is a contributor to PictureAustralia
Dublin Core and the OAI-PMH (1)

• Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)
  – Fairly simple mechanism for sharing metadata records between applications
  – Has origins in “e-prints” community
  – Built on HTTP, XML
  – Allows a harvester to ask a repository for all or some of its metadata records (in a specified metadata format)
    • e.g., "Give me all your records updated since yyyy-mm-dd"

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Dublin Core and the OAI-PMH (2)

- "OAI-DC" (Simple DC) is mandatory format
  - But no limitation on format that can be transferred (as long as can be described by XML Schema)
The MARC formats (1)

• Machine-Readable Cataloguing (MARC)
  – Will be familiar to most librarians
  – Integral to bibliographic cataloguing practice in many countries since the 1960s
  – Not a single standard, but a family of formats, e.g. MARC 21, UNIMARC, UKMARC
  – Facilitates the exchange of bibliographic data (shared cataloguing)
  – Determines search functionality in library catalogues (OPACs)
The MARC formats (2)

- Format first developed long before the term "metadata" was coined
- The MARC formats are standards for "the representation and communication of bibliographic and related information in machine-readable form" (MARC 21)
  - Machine-readable = data can be read, interpreted and manipulated by computers
  - Integrally linked with a range of standards that define field content, e.g. the International Standard Bibliographic Description (ISBD) series, cataloguing rules (e.g. AACR2, RDA)

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MARC 21 basics

– Format resulted from the "harmonisation" of USMARC and CANMARC
– Maintained by Library of Congress and Library and Archives Canada
– Separate formats defined for:
  • Bibliographic data
  • Authority data
  • Holdings data
  • Classification data
  • Community Information data
MARC 21 Structure (1)

- Structure (based on ISO 2709)
  - Leader (24 characters)
  - Directory
  - Control fields (fixed length, mostly codes)
  - Variable fields

- Variable fields include:
  - Bibliographic description (0XX, 2XX, 3XX, 4XX), including notes (5XX) - typically follows ISBD
  - Main Entry (1XX), Other Added Entries (7XX, 8XX)
  - Subject Entries and Classification (0XX, 6XX)
  - Electronic Location and Access (856)
MARC 21 Structure (2)

- Variable Fields in a typical bibliographic record will look something like:

  
  [...]
  100 1  Hardy, Thomas $d 1840-1928
  245 14 The return of the native $c Thomas Hardy
  260 0  London $b Macmillan $c 1927
  300   ix, 482 p $b map $c 19 cm.
  [...]

  Main Entry

  Description

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MARC 21 - main features

- Builds on 150 years of modern cataloguing practice
- Builds on external standards (e.g. ISBN) and controlled vocabularies (e.g., name authorities, subject headings)
- Used for many types of bibliographic item: books, serials, maps, music, electronic resources, ...
- The basis of shared cataloguing services (e.g. OCLC's WorldCat)
- Many million MARC records in library systems
MARC 21 in XML

- MARC is now quite an old standard:
  - Initially developed to automate the printing of catalogue cards in 1960s
  - Legacy of the card format remains, e.g. the concept of main entry, poor linking between related items
  - Other legacy issues related to structure and character sets, e.g. ISO 2709

- MARC 21 XML Schema
  - Library of Congress developing a framework for working with MARC 21 in an XML environment
  - More flexibility for internal linking, developing crosswalks with Dublin Core and other formats, etc.

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MODS basics (1)

• Metadata Object Description Schema
  – Maintained by Library of Congress Network Development and MARC Standards Office
  – More extensive than Dublin Core, 19 top-level elements, 64 at lower levels
  – Grounded in MARC 21
    • Includes a subset of MARC 21 fields (logically restructured), inherits some MARC semantics
  – Expressed in the XML Schema language
    • Is extensible
    • Can integrate with standards like METS
MODS basics (2)

- Specifically designed for library operations
  - e.g., Digital library systems, digitisation projects
- A possible alternative to Dublin Core?
  - Integrates better with the existing MARC corpus
  - Worth investigating for library-type operations
  - Untested in cross-domain contexts, MARC legacy may not be so useful here

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Summing up:

- **Three standards:**
  - **Dublin Core**
    - A "core" for discovery of wide range of resources, focus on cross-domain discovery
    - Limited functionality, unless extended, e.g. using Application Profiles
  - **MARC 21**
    - A proven role for bibliographic data; not particularly suitable (or designed) for other resource types
  - **MODS**
    - Promising new XML-based standard, less complex than MARC 21, will have applications in libraries
More information:

- DCMI: http://dublincore.org/
- MARC 21: http://www.loc.gov/marc/
- MARC 21 XML Schema: http://www.loc.gov/standards/marcxml/
- MODS: http://www.loc.gov/standards/mods/
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