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Cataloging for the 21st Century ~ Course 4

Metadata and Digital Library Development

Metadata and Digital Library Development

Instructor Manual

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Metadata and Digital Library Development

Table of Contents

Foreword

General Introduction for Trainers

Content Slides

Introduction: Background, Goals, and Course Outline
Session 1: Introduction to Digital Library System Objectives, Functionality, and Metadata
Session 2: Understanding Functional Requirements
Session 3: Metadata and Functionality
Session 4: Metadata Conversion: Enhancement and Mapping
Session 5: Metadata Workflows
Session 6: Digital Library Development Project Exercise

Workshop Exercises

Exercise Notes for Trainers

Exercise 1-A: Library Bibliographic System Metadata	1
Exercise 1-B: Digital Library System Metadata	5
Exercise 2: Sample Use Case	9
Exercise 3: Metadata Analysis	11
Exercise 4: Metadata Mapping—OAI DC Record Creation	33
Exercise 5: Metadata Workflow—Library Publishing	57
Exercise 6: Digital Library Development Project—Slide Collection	77
Exercise 3 Answers	97
Exercise 4 Answers	103

Appendix I—Glossary

Appendix II—Selected Bibliography

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FOREWORD

In November 2000, the Library of Congress sponsored the *Bicentennial Conference on Bibliographic Control for the New Millennium* to bring together authorities in the cataloging and metadata communities to discuss outstanding issues involving improved discovery and access to Web resources. One of the resulting recommendations from that conference was the provision of appropriate training and continuing education to improve bibliographic control of selected Web resources, specifically by 1) identifying and enhancing core competences among library catalogers; 2) devising and conducting training to enhance practitioners' mind set and values, problem-solving, operations, management, and information technology skills; and 3) promoting the understanding, use, and refinement of metadata standards for describing and managing electronic and digital resources. In August 2001, ALA's Association for Library Collections and Technical Services (ALCTS) was appointed as the lead organization to plan and implement this recommendation.

To address the *Bicentennial Conference* recommendation on continuing education, a Continuing Education Task Force convened by ALCTS proposed a series of courses in Summer 2003 designed to prepare the cataloging community to provide improved bibliographic control of Web resources. In Fall 2003, the ALCTS Continuing Education Implementation Group (ALCTS/CEIG) was charged to develop and make available this course series, which the task force had named *Cataloging for the 21st Century*. ALCTS/CEIG is working with course developers to create the five-course series over approximately two years (2004 through 2006) and the Library of Congress' Cataloging Distribution Service (CDS) is making the course content available to the cataloging community.

The model for the development of and presentation of the *Cataloging for the 21st Century* course content was the *Serials Cataloging Cooperative Training Program*, which provides standardized training materials and skilled professionals to deliver training to continuing resource catalogers in the field. This model relies on library associations, networks, and institutions to sponsor the workshops and use the materials developed. The educational components of the program are designed to be basic, affordable, authoritative, and effective. The *Cataloging for the 21st Century* program will be evaluated on an ongoing basis to ensure cooperation among sponsoring agencies, ease of administration, adequate funding, and attainment of educational objectives.

The Library of Congress and ALCTS endorsed the *Cataloging for the 21st Century* training model and agreed to joint ownership of the content, with CDS serving as publisher and distributor of course materials. Each of the five courses will address a specific continuing education need within the cataloging community:

- Rules and Tools for Cataloging Electronic Resources
- Metadata Standards and Applications
- Controlled Vocabulary and Thesaurus Design
- Metadata and Digital Library Development
- Digital Project Management for the 21st Century

The objectives of the *Cataloging for the 21st Century* series are:

- To equip catalogers to deal with new types of resources and to recognize their unique characteristics
- To equip catalogers to evaluate competing approaches to and standards for providing access to resources
- To equip catalogers to think creatively and work collaboratively with others inside and outside their home institutions
- To ensure that catalogers have a broad enough understanding of the current environment to be able to make their local efforts compatible and interoperable with other efforts
- To assist catalogers' transition from pursuing perfect records under a single, traditional set of standards to creating and accepting (or recognizing) appropriate records under an evolving set of standards.
- To enable practicing catalogers to put themselves into the emerging digital information environment and to continue to play a significant role in shaping library services

To achieve these objectives, the ALCTS Continuing Education Implementation Group has selected course developers who are known for both their subject expertise and their skills in creating continuing education workshop materials. ALCTS/CEIG is grateful to them for the knowledge, creativity, and diligence they have brought to this course series. It is the sincere hope of the ALCTS/CEIG that the Cataloging for the 21st Century series will indeed address the continuing educations needs identified by the Bicentennial Conference on Bibliographic Control for the New Millennium.

Metadata and Digital Library Development
General Introduction for Trainers

Workshop Facilities

This workshop is exercise heavy and most of the exercises require working in groups. Try to ensure that workshop facilities have the space and furniture that will make group work manageable. Ideally, this means moveable tables and chairs. The best environment will have modular tables that can be easily pushed around and reconfigured. The worst will be a traditional classroom setup with fixed linear tables.

The small group sessions, especially on the second day, work well if each group has a flip chart and markers to record their work. This helps when the small groups report back to the larger group. If instructors want flip charts and markers, give the hosting facility plenty of advance warning to obtain these materials. In calculating how many groups you'll have, see Size of Workshop below.

A single, centrally visible screen for projecting Powerpoint slides is necessary. As currently conceived, the workshop does not require internet access.

Size of Workshop

Small group exercises are an important part of this workshop. The small groups seem to work best with 5-6 people in them (4 or 7 can work). If you have 12-14 attendees, two groups will work fine and give plenty of reporting time. The maximum number of groups is probably 4. Beyond that, reporting back after the exercise begins to take too much time and will be shortchanged. This means that the maximum size for the workshop is between 24 and 28 people.

Course Content, for Participants

For suggestions about printing the course materials, see "Course Content Printing Instructions" down below.

Workshop materials for participants include the following:

- Table of Contents (1 MS Word file)
- Content slides (7 Powerpoint slide presentations, one per session)
    - Introduction (session 0)
    - Sessions 1-6
- Exercises (1 PDF file)
    - Exercises are signaled in the Powerpoint slides. All the exercises, 1 through 6 (instructions, scenario descriptions, metadata examples, etc.), plus some exercise "answers," are contained in a single PDF file of 97 pages.
- Appendix I—Glossary (1 MS Word file)
- Appendix II—Selected Bibliography (1 MS Word file)

Course Exercises

One of the assumptions behind this workshop is that adults learn by "doing"—by engaging in participatory activities. In this context, that means exchanging ideas with others, listening, talking, trying to convince others or being convinced by others. Within this workshop, therefore, the exercises are a critical pedagogical component and appropriate time should be allotted to them.

Exercises 1-2 can be led by the trainer and carried out with the entire workshop. It may be possible to conduct Exercise 2 as a small group exercise, if desired. Exercises 3-6 are designed as small group exercises. For these in particular, besides the time required to complete the assigned work, there must be time for reporting back to the wider workshop. Reporting back is critical to get the most out of the small group exercises.

Suggestions:

- Group exercises will work best with 5-6 people per group (4 and 7 will work also).
- For the group exercises, get everyone to mix up their groups from exercise to exercise. It is probably best not to make this optional or leave it to chance. Before each of the groups exercises, have everyone count off by some number (depending on how many groups you will have), and get them to arrange themselves based on that.
- Have groups chose a "reporter" when they first form. Having a reporter will focus and speed up the reporting process somewhat. At the same time, everyone in a group should be encouraged to participate in the reporting.
- Be sure that the same people are not reporting back every time, even when in different groups. When arranging everyone in a group, ask that the group choose a "reporter," and to chose someone that hasn't yet reported.

Course Content Printing Instructions

Course content for participants should be printed and assembled in a manner that makes them easy to use. Experience has shown that participants like to be able to temporarily remove pages from the exercises while they work, reducing the amount of flipping back and forth in the printed material. The consensus is in favor of binding the materials, both the content slides and exercises, in a single three-hold folder. A spiral binding has proven to be frustrating to participants.

Unless otherwise noted below (see Content slides), all the materials should be printed in portrait orientation and can be printed double-sided if desired. The Exercises in particular have been formatted with the expectation of double-sided printing.

The printed materials (with file names) for workshop participants include the following, and should be assembled in this order:

1) Table of Contents (ceig4_TOC.doc)
2) Content slides, sessions 0-6 (ceig4_session0.ppt – ceig4_session6.ppt)

Two recommended printing options:

a) single slide per page, in landscape orientation (do not include slide notes)
b) three slides per page, handout format, portrait orientation (see N.B below)

3) Exercises 1-6 (ceig4_exercises.pdf).
4) Appendix I—Glossary (ceig4_glossary.doc)
5) Appendix II—Selected Bibliography (ceig4_bibliography.doc)

N.B. There are several slides that will not be clear enough to work with if printed in three-slide per page handout format. If printing in this format, these slides should also be printed separately as single-page slides and inserted for participants.

Alternatively, since 9 of the 21 slides in Session 3 require this, you may choose to print all of Session 3 as single-slide pages.

Slides that require single-slide per page treatment:
Session 3: Slides 7, 8, 9, 11, 12, 13, 15, 16, 17

Trainer Materials

Materials written specifically for trainers include:

- General Instructions for Trainers (the current document)
- Trainer notes associated with each slide in the Powerpoint content slides
- Exercise Notes for Trainers

Course Schedule

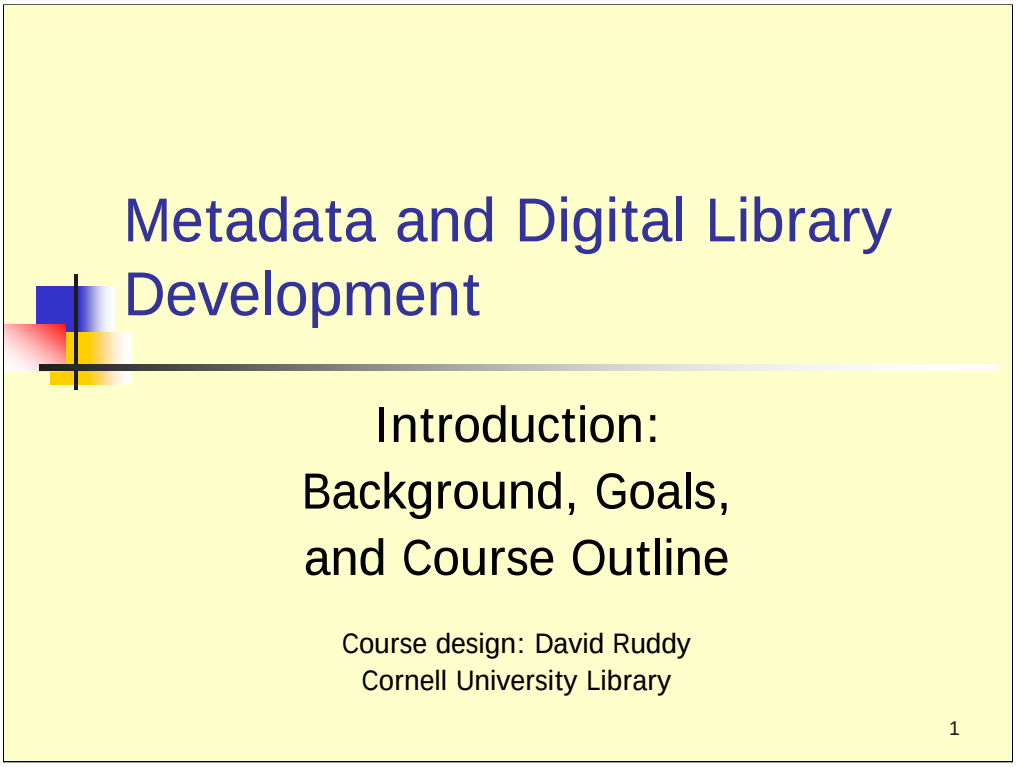
A suggested sequencing of the sessions and exercises, with breaks and lunches, for a two-day workshop schedule follows:

Day 1	
	Introduction: Background, Goals, and Course Outline (Session 0)
	Session 1: Introduction to Digital Library System Objectives, Functionality, and Metadata (Exercise 1A and 1B)
Break	
	Session 2: Understanding Functional Requirements (Exercise 2)
Lunch	
	Session 3: Metadata and Functionality (Exercise 3)
Break	
	Session 4: Metadata Conversion: Enhancement and Mapping (Exercise 4)
Day 2	
	Session 5: Metadata Workflows (begin Exercise 5)
Break	
	Session 5: Metadata Workflows continued (complete Exercise 5)
Lunch	

	Session 6: Digital Library Development Project (Exercise 6)
Break	
	Session 6: Digital Library Development Project continued (complete Exercise 6)
	Workshop conclusion, wrap up

Below is a possible schedule, with times:

Day 1	
8:00-8:30	Registration, continental breakfast (if provided)
8:30-9:00	Introduction: Background, Goals, and Course Outline (Session 0)
9:00-10:15	Session 1: Introduction to Digital Library System Objectives, Functionality, and Metadata (Exercise 1A and 1B)
10:15-10:30	Morning Break
10:30-12:00	Session 2: Understanding Functional Requirements (Exercise 2)
12:00-1:30	Lunch
1:30-3:00	Session 3: Metadata and Functionality (Exercise 3)
3:00-3:15	Afternoon Break
3:15-4:45	Session 4: Metadata Conversion: Enhancement and Mapping (Exercise 4)
4:45-5:00	Wrap up Day 1
Day 2	
8:30-10:15	Session 5: Metadata Workflows (begin Exercise 5)
10:15-10:30	Morning Break
10:30-12:00	Session 5: Metadata Workflows continued (complete Exercise 5)
12:00-1:30	Lunch
1:30-3:00	Session 6: Digital Library Development Project (Exercise 6)
3:00-3:15	Afternoon Break
3:15-4:15	Session 6: Digital Library Development Project continued (complete Exercise 6)
4:15-4:30	Workshop conclusion, wrap up



Suggested activities for getting started, before beginning slide content:

•Introduce instructors.

•Ask each participant to introduce him/herself, identifying his/her institution and position, and also, why they are there—saying a little about the connection between their job and interest in this course. You should be on the lookout here for any expectations that are not appropriate to this course—such as a survey of metadata schemes, or instructions on choosing the right metadata scheme for a particular project. Make this point when you discuss slide 2 or 3.

•Go over with participants the course contents:

- •Table of contents
- •Content slides, six sessions
- •Glossary
- •Selected bibliography
- •Exercises 1-6

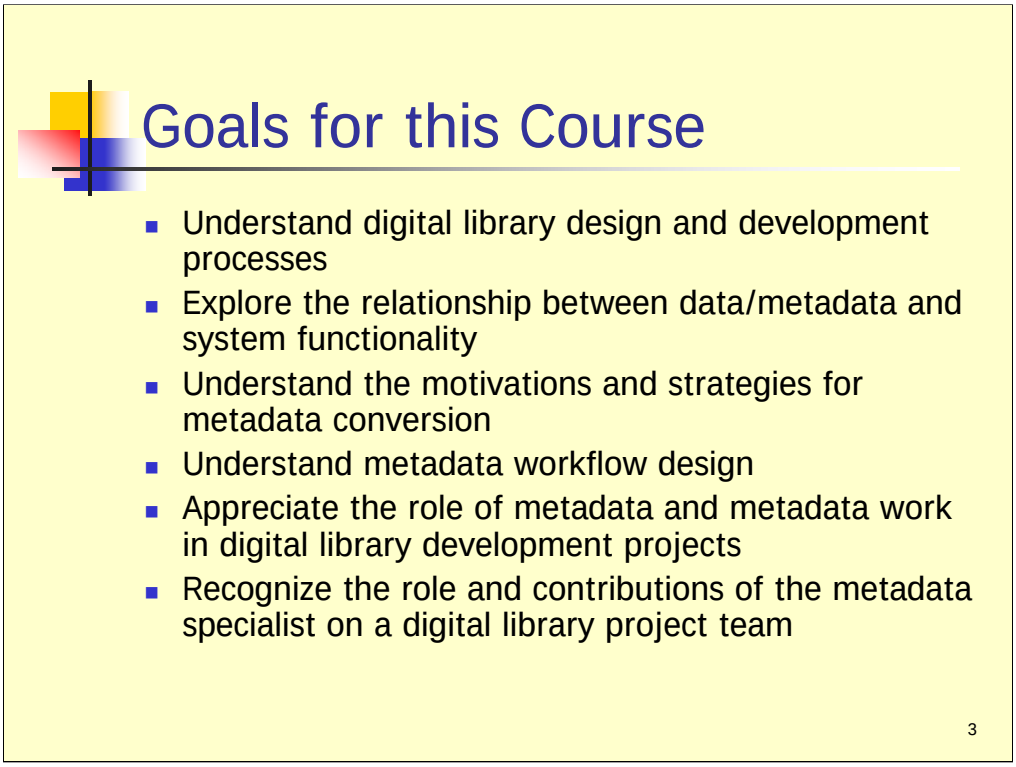
Cat21 Series Objectives

- To equip catalogers to deal with new types of resources and to recognize their unique characteristics
- To equip catalogers to evaluate competing approaches to and standards for providing access to resources
- To equip catalogers to think creatively and work collaboratively with others inside and outside their home institutions
- To ensure that catalogers have a broad enough understanding of the current environment to be able to make their local efforts compatible and interoperable with other efforts
- To prepare catalogers to be comfortable with ambiguity and being less than perfect
- To enable practicing catalogers to put themselves into the emerging digital information environment and to continue to play a significant role in shaping library services

2

This helps situate this particular workshop within the broader Cat21 goals.

Some comments or description of other Cat21 courses (e.g., Course 2 and 5) may be appropriate.



This course takes the perspective that digital library design and development is a process, rather than a recipe that can be followed.

Within that process, this workshop explores the important role of metadata, and the roles and responsibilities of the metadata specialist. Most of the exercises will ask participants to assume the role of the metadata specialist on a larger digital library team project.

Depending on what you heard from participants during introductions, regarding their expectations, you may want to say something about what this course does not explicitly cover. You can do that by referring to other Cat21 courses that cover topics like a survey of metadata schemes (and when to use them), and project management:

•Course 2: Metadata Standards and Applications

•Course 5: Project Management for the 21st Century

This course will use different metadata schemes in its examples and exercises (MARC, DC, EAD, VRA, etc.), but it is not focused on these schemes. The focus of this workshop is on the points made above—that digital library development is a process and that the metadata specialist has an important role in that process. This workshop tries to give participants a working sense of that process and the role of metadata and the metadata specialist in it.

Outline of this Course

Session 1: Digital Library System Objectives, Functionality, and Metadata

Session 2: Understanding Functional Requirements

Session 3: Metadata and Functionality

Session 4: Metadata Conversion: Enhancement and Mapping

Session 5: Metadata Workflows

Session 6: Digital Library Development Project Exercise

4

Each session, except the last, has some introductory presentation and discussion, followed by, or intertwined with, exercises. The last session, number 6, is entirely an exercise.

This course takes an exercise-based approach, relying a lot on group exercises and subsequent discussion. The assumption here is that adults learn by participating rather than merely listening.

Metadata and Digital Library Development

Session 1:

Introduction to Digital Library System Objectives, Functionality, and Metadata

1

Goals of Session

- Understand the relationship between system objectives and metadata
- Examine the objectives of the library bibliographic system and how those objectives impact system metadata
- Explore the connection between digital library systems and digital library metadata
- Underscore the importance of system objectives when working with metadata

2

This is an introductory session. It's meant to make the point that system metadata are intimately connected to system objectives. It starts with something familiar, the library bibliographic system, with the goal of remembering how system objectives have shaped our cataloging rules—we catalog in certain ways in order to support certain objectives. With digital library systems, the same connection applies—the metadata we create and collect, and the form we put it in, will be guided by the objectives the system is meant to achieve. One big difference is that the objectives for digital libraries systems vary enormously, just as the systems themselves vary.

The Library Catalog

- Why do we describe library materials in the way we do?
  - Why do we catalog in the way that we do?
  - Why do we assemble certain information (metadata) about library materials, and record this metadata in such a highly defined way?

3

The point here is that there's a reason for why catalogers do what they do. It's not to follow rules for rules sake, but because the rules support larger objectives. Sometimes those objectives are general (support known-item discovery), and sometimes they are more specific (present a alphabetized browse list of titles). Library bibliographic cataloging has become codified, and we sometimes forget the connection between objectives and metadata practices.

What follows is an absurdly short intellectual history outlining various proposals regarding the objectives of bibliographic systems. The point is less any one particular proposal and more just to remind people that this kind of articulation of system objectives did go on, and is going on, in the library world and that it is a necessary activity before anyone can build a particular system.

In the following slides, discussion beyond this main point probably isn't necessary. If you want more discussion, a number of discussion points are listed. It's important to get to the exercises and have plenty of time for them.

Cutter (1876)

Objectives of a bibliographic system

- To enable a user to find a book if the author, title, or subject is known
- To show what the library has by a given author, on a given subject, or of a given kind
- To assist in the choice of a book based on its edition (bibliographically) or its character (literary or topical)

4

Cutter seems to be generally recognized as the first to explicitly articulate the objectives of a bibliographic system.

The objectives or functions of a library bibliographic system are going to impact what data we need to collect about the materials in our library, and the way we record that data.

IFLA (1998)

- To find entities that correspond to the user's stated search criteria
- To identify an entity
- To select an entity that is appropriate to the user's needs
- To acquire or obtain access to an entity described

5

These are all prefaced by "To enable a user to…"

This is quite a leap, in time, from Cutter. You can ask why the object is now an "entity" rather than a "book" (likely because we're into the world of multiple format resources and electronic databases).

Select is Cutter's "choose" objective.

IFLA seems to collapse "find" and "collocate" objectives (separated by Svenonius). IFLA's "find" applies both to a known entity or to a set of entities.

On the other hand, IFLA's well-known distinction among entities (work, expression, manifestation, and item), would allow for many collocating objectives to be met by "finding" a work, an expression, or a manifestation.

Svenonius (2000)

- To locate
  - Known entity
  - Set of entities
- To identify an entity
- To select an appropriate entity
- To acquire or obtain access to an entity
- To navigate a bibliographic database

6

Builds on IFLA. Again, “To enable a user to…”

Alters IFLA’s “find” objective to distinguish between finding a known entity and finding a set of entities that meet some criteria (collocation).

A point that could be made here is the addition of a new objective: navigation. This is perhaps in recognition that many discovery operations are now taking place via electronic databases, which can utilize entity relationship information much more effectively than analog finding tools. In that sense, she is proposing an objective that technology has made feasible.

Exercise 1-A

- How does MARC metadata support the objectives of the Library Bibliographic System?
  - To find/locate
  - To identify
  - To select
  - To acquire
- What other system objectives can we detect from the system's metadata?

7

For the exercise, see the trainer notes.

The objectives listed here are just a summary of the previous 3 slides, useful to have in front of us when looking at the MARC records.

The Library Bibliographic System

- System objectives have led to specific practices in bibliographic description
  - Standards such as AACR2
- Uniform record creation is required by global bibliographic databases
  - Standard record formats (MARC21)
- Desired functionality requires precise cataloging rules and conventions

8

A summary of what we've been discussing.

System objectives and system data are intimately tied together. In library bibliographic systems, we see how very precise cataloging rules and practices have developed to support specific system objectives. This has taken years to develop.

Exercise 1-B

- Exercise 1-B is XML encoded metadata used by some type of digital information system
- What system objectives can we detect by examining this system's metadata?

9

See the trainers notes to the exercises.

Digital Library Systems

- No agreed upon definition or objectives
- No agreed upon standards or formats
- Very little interoperability
- A huge number of players, many of whom are not librarians
- What is a "Digital Library," anyway?
  - Digital (Electronic) Information Systems?

10

There is no one definition of a "digital library" or "digital library system," and definitions proposed have been rapidly evolving since first used in the 1990s. See the Glossary. You can also suggest a Google search.

Since digital library systems and their objectives vary so greatly, the metadata required to meet those objectives will necessarily vary greatly. There are no agreed upon record formats, record structures, element sets, etc., for digital libraries; and certainly no agreed upon content standards.

There is very little interoperability among systems, as a consequence of so few shared standards. And thus not much possibility of sharing records among systems (such as proposed and made possible by OAI).

Huge number of players: the business opportunities of the internet have given rise to a lot more commercially driven information systems. Lots of competition for libraries.

Perhaps a broader term, without "library" in it, is more useful and raises fewer questions? A term such as electronic/digital information system. Are we trying to claim some special status for the library's information systems by calling them "library" systems? On the other hand, does "library" imply certain values and objectives that are not necessarily part of general electronic information systems, such as bibliographic control and long-term retention of data.

Digital Library Systems

- A different world from the Library Bibliographic System, but not an alternate universe
- Digital library system development...
  - Still requires the articulation of objectives (desired system functionality)
  - And those objectives will depend upon certain characteristics of available or generated metadata

11

The connection between functionality and metadata is the same.

The big point of this session, and in some sense the workshop, is this: we can't really talk about metadata independent of a discussion of system objectives and functional requirements. This point should be made in summing up the second exercise, 1-B (see the trainer notes for exercise 1-B). The point gets emphasized again in Session 2.

Digital Library System Objectives

- To support...
  - Discovery
  - Navigation
  - Presentation, display
  - Access control
  - Administration, management
  - Preservation
  - Others?

12

The objectives listed should sound familiar to librarians.

This is a functional view of metadata. These functions can be associated with types of metadata (discussed in the next session):

•Discovery: descriptive metadata

•Navigation (of an object and its components): structural metadata

•Access control: rights metadata

Other objectives that a digital library might have, besides those listed? Someone will probably come up with some. Here are some possibilities, if no one thinks of any others.

•Interoperability

•Certification (of document authenticity)

•Status (or perhaps that's under admin/management metadata, depending on how that's defined)

•Version control

Could think about different contexts: libraries within archives, museums, schools, businesses. And whether different contexts might generate different objectives.

System Objectives?

- Who decides on the objectives of the digital library system?
- Who decides what functionality to support?
- Who are the players or stakeholders on digital library projects?

13

These are a bit rhetorical. We’ve said that much will depend on objectives, and so it’s logical to ask who comes up with the objectives. The next slide has some answers. If you want interaction, you could ask for ideas before moving to the next slide.

Starts making the point that in libraries, digital projects typically are carried out by a team of people, coming from different areas and bringing different expertise.

Project owner might be faculty member coming to the library with a project, or a librarian that has received grant money for a project.

The project manager might be the "owner", but might also be assigned by administration, depending on the project.

This workshop will focus a lot on the role of the metadata specialist.

You can ask about "end users". How many have been involved in projects where the end user was actually a part of the system design and implementation process? We have typically had end users represented in this process by subject specialists or others, who "speak for" the end user. Evaluation and assessment procedures may actually bring end user feedback into the design process. Those adherents to "user centered design" will claim that the end user must be included earlier in the process.

Someone will think of other stakeholders. Possibilities:

•Library digital preservation officer or others charged with ensuring that digital content meets some preservation requirements or standards. Or is the metadata specialist responsible for this? This will depend on the organization.

•Interface specialist, or library interface police? Good interface design is essential and the project may be able to draw on those that specialize in this, or an interface specialist may routinely be assigned to web-based projects. The same person or others may also have responsibilities for maintaining a unified web presence to the public—a unified look-and-feel to all the libraries public pages.

System Objectives?

- How do the stakeholders decide on system objectives?
- How is system functionality developed?
- What's the process by which decisions are reached?

15

So, we have all the stakeholders. How will they come up with a set of objectives? That's what we'll discuss in Session II.

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Metadata and Digital Library Development

Session 2:
Understanding Functional Requirements

1

Goals of Session

- Understand functional requirements and their usefulness
- Recognize how functional requirements inform system metadata decisions
- Understand “use cases” and how they define and record functional requirements
- Learn how a use case should be “read” by a metadata specialist

2

General goal is to demystify “functional requirements,” and give people a flavor of what is meant by that term. In the end, functional requirements are pretty simple. Generating them can be a complex process and may require certain expertise, but the actual requirements, and their expression, should be straightforward and easy to understand.

Functional Requirements (1)

- What are functional requirements?
  - In this context, functional requirements are those of a software system, not of bibliographic records (FRBR)
  - A more specific and detailed description of system objectives
  - They describe and define specific, required system behaviors
  - Ideally, they are developed through a requirements analysis process
  - They guide system implementation and programming work

3

Functional Requirements (2)

- How do project stakeholders develop functional requirements?
- Ideally, system designers use some reasonably formal design process
- Examples of design processes:
  - Rational Unified Process (RUP)
  - User Centered Design
  - Agile Software Development

4

Each of these example design processes are referenced in the bibliography. The point isn't on any one of these, but just that such design and process technologies exist. Those charged with developing functional requirements will want to investigate.

The processes listed here are not mutually exclusive. Agile can and does use Unified Process concepts and methods. User Centered is almost a philosophy, but it does tend to have certain methodologies (user observations, interviews, etc.). A Unified Process approach can be carried out employing very User Centered methodologies.

Software Design Processes

- Systematic methods for generating and defining functional requirements
- Different design processes emphasize different methodologies, but there are often many similarities among them
- Most processes employ “use cases,” though they may exploit different methods to generate and develop them

5

A design process isn’t purely technical, and it’s not magic. Software design, including requirements analysis, is a social activity, and thus involves a negotiation among stakeholders. This is particularly true when setting priorities. Due to limited time and resources, the system won’t be able to do everything.

This workshop isn’t about software development, so the focus here isn’t software design processes. To give us a more tangible sense of functional requirements, however, we’ll look at “use cases,” which are a fairly typical methodology for recording functional requirements.

Use Cases

- Each use case describes a single function of the system
- Each function is an interaction between the system and an external USER
- Each use case describes functionality, but not how that functionality will be accomplished
- The entire system may have dozens or hundreds of use cases
- Taken altogether, the use cases define the system's functional requirements

6

Each interaction between an external USER and the system will become a use case. USERs are discussed in the next slide.

One important point about use cases is that they do not explain how the functionality being described will be accomplished. For example, a use case would never stipulate that data should be stored in XML or in a relational database, or that some particular search tool should be used.

Avoiding implementation issues simplifies the requirements phase and the generation of use cases. In precisely describing a functional requirement, it doesn't matter at this stage how that requirement is met (what programming methods are to be used, what software tools, etc.). Those are later decisions made by software engineers. At this stage, the system is treated as a black box, and the functional requirements only describe the interactions between that box and USERs.

The USER in a Use Case

- USERs are anything external to the system that will interact with it
- A USER may represent a class of users
  - Data entry staff
  - System admins
  - General public users
- A USER may represent another system
  - An OAI harvester

7

Uppercase letters are used for USER to remind us that in use cases, the USER isn't necessary a person. And if human at all, the USER is more a class of users, or a role. But the USER can also be another system.

These example USERs all interact with the system (there will be others):

•Data entry staff must put data into the system

•System admins must install and configure the system.

•Public USERs will represent a whole range of possible interactions: searching, browsing, downloading, asking questions, etc. This will depend a lot on what the system is for.

•An Open Archives Initiative harvester is a computer somewhere else that can make requests for records from our system. This assumes that one capability of our system is that it is OAI compliant and can respond to OAI requests.

•A statistics generation tool, which must interact with the system but is not part of it (it's external).

Sample Use Case

- Exercise 2: Sample Use Case
- Typical use case components:
  - Priority
  - Preconditions
  - Flow of Events (scenario)
  - Alternative Events (exceptions)
- What in this use case will depend on or impact system metadata?

8

See the trainer notes on the exercises.

Start by looking at the Sample Use Case together, and walk through its typical components.

After we're comfortable with what the use case is, its components and structure, then we're going to "read" it as a metadata specialist would need to read it—looking for what will depend upon or impact metadata. On this, see the trainer notes.

Generating Use Cases

- The design process used will likely guide how use cases are generated
- A typical approach is to enumerate all the possible USERs of the system (everyone and everything that will interact with it), and then list every interaction
- Each of these interactions will become a use case

9

Generating use cases, on one level, is a time-consuming slog. You can invite participants to imagine how they would come up with a use case like the one in Exercise 2. Different design processes will emphasize different methods. For example, a user centered design approach may study actual user search behavior to determine what's important and what's not. In any event, the process is never a solo affair—it's a social negotiation, haggling over what's important.

You can enumerate USERs by asking:

•Who will install the system?

•Who will maintain the system?

•Who will put data into the system?

•What end users will interact with the system?

•What other systems will interact with the system? For example, an OAI harvester? Some external search service?

Then you list every way in which these users can interact with the system. Being inclusive at this point is generally encouraged (on this point, see Exercise 2, about Priority).

A Complete Set of Use Cases

- Together, they define the functional requirements of the proposed system
- Documented, they form a contract among stakeholders about what the system will do and not do
- Requirements help in the inevitable "panic phase" of a project
- Requirements inform our decisions about metadata, standards, software, vendors...

10

Imagine that you have a document like Exercise 2 for every conceivable feature of the system. Participants should be able to recognize the value of that.

Functional requirements form a contract among stakeholders about what the system will do, and importantly, what it will not do. This is a critical communication component of a digital library development project. It has a lot to do with managing expectations and getting informed buy-in, sign-off, etc., so that surprises are avoided and successes can be recognized.

Panic phase: the six phases of a project (only half-joking):

•Enthusiasm

•Disillusionment

•Panic

•Search for the guilty

•Punishment of the innocent

•Praise and honors for the non-participants

There are usually always times during a project when things seem out of control, and when original goals have been obscured by current pressing matters. Having documented functional requirements, even if they need some revision, can give everyone some solid ground to return to, to regroup, plan, and move forward.

Build or Buy?

- Build or buy decisions are typical in digital library development projects
- Building a digital library system
  - Defining one's own functional requirements
  - Hiring programmers to build the system
  - Testing, evaluation, maintenance, updates
- Acquiring a pre-built digital library system
  - Finding a system with functionality that meets your requirements as nearly as possible

11

"Buying" here may mean "acquiring" Open Source software. Open Source software is software that is typically "free" to download and use, but it may require programming staff to setup, configure, and maintain.

Having well-define requirements is useful not just when developing software but when acquiring existing systems. The more fully your institution has articulated and agreed on a complete set of requirements, the more adequately you can evaluate whether externally developed software is going to meet your needs. If you don't know what you want, or there's no agreement on that, then it will be difficult to find a system that ends up being satisfactory.

Build or Buy

- Both cases require articulating and documenting desired objectives and functionality
- If Build, these will develop into complete use cases
- If Buy, they will be used in the RFP process, and later to evaluate competing systems

12

See notes, last slide.

Also with Buy—many software systems that are acquired can be modified (DSpace, ContentDM, etc.), in order to gain additional functionality or modify existing functionality. So even if you acquire software, your organization may do development work on it.

Requirements and Metadata

- Certain functional requirements will depend upon or impact system metadata
- The requirements will inform our decisions about system metadata
  - What data elements are required
  - What content value practices need to be adopted
  - Whether metadata standards can or should be used
- If we have existing metadata, requirements will inform our analysis and conversion of it

13

In Exercise 2, we saw the way that requirements will impact and depend upon system metadata. This is a one of the key workshop assumptions. Metadata and metadata decisions do not exist in a vacuum. One of the take-away goals of the workshop is that when participants next hear the question “What metadata standard should we use?”, they will immediately ask “what are the system objectives, what are you trying to achieve?”

The final bullet point works off this key assumption and leads toward the next two sessions. The metadata context we’ve been discussing in this session is the system and its functional requirements. What’s required of the metadata? Can it meet the requirements of the system? To answer those questions and make that connection between requirements and metadata, we’ll need to analyze metadata, to determine what functionality it can support. Then, if it requires alteration, we’ll need to figure out whether and how it can be converted.

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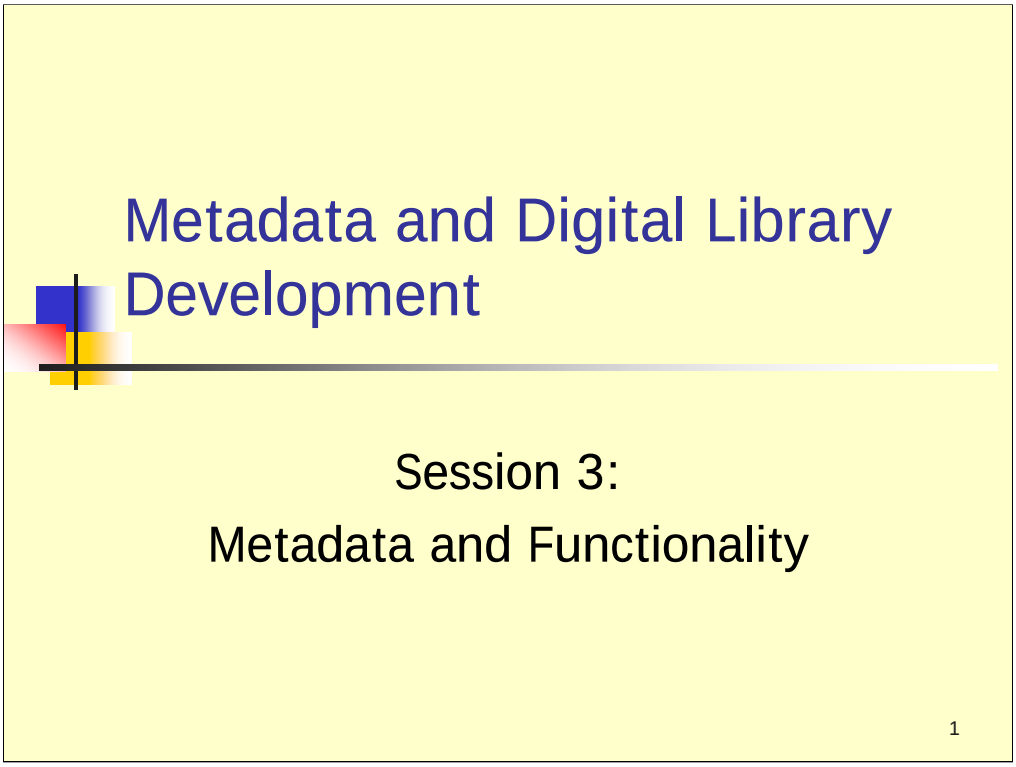
FOR DOUBLE SIDED COPY



Trainer should have plans for Exercise 3—read the exercise notes. If you want to squeeze in Part II of Exercise 3, you will need to move quickly through the slides, not asking questions as you go but just making the points you want to about each.

In the typical two-day format for this workshop, this session falls after lunch on the first day. It's a tough time, no matter what the content.

Goals of Session

- Review or familiarize ourselves with concepts and vocabulary of metadata assessment and analysis
- Explore the connection between metadata and functionality

2

Metadata Specialist Scenario

- The typical digital library development situation facing the metadata specialist:
  - We have some functional requirements to meet, AND we have some metadata
  - BUT the metadata must be altered in some way (cleaned-up, augmented, enhanced, mapped…) so that it will meet our requirements

3

This is the typical situation facing the metadata specialist in digital library development. There is usually some metadata, but it requires work to make it effectively support our system objectives—the desired functionality.

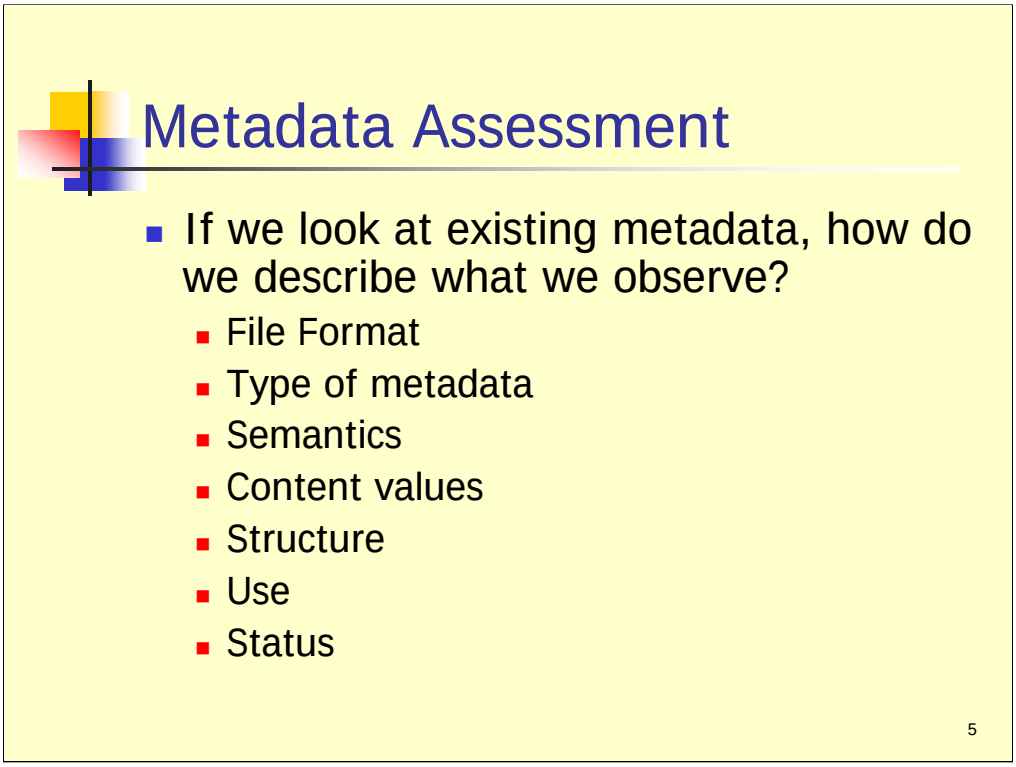
It's rare that your existing metadata perfectly fits what an existing digital library system requires, or that a digital library system developed in-house is tailored precisely for an existing set of metadata.

Metadata and Functionality

- In order to match metadata with functionality, we need first to assess, or analyze, our existing metadata
- Then we can begin to evaluate whether our metadata will or won't support particular functionality and how it will need to be converted

4

This just presents the logic for why we’re going to discuss and practice analyzing metadata. The ability to assess, or analyze, metadata is fundamental to making use of metadata. We can’t evaluate whether some set of metadata will meet certain functional requirements, or determine how certain metadata will need to be converted, unless we can effectively analyze the metadata before us.



These are some analytic categories for assessing metadata, and we'll walk through them in subsequent slides.

Important point: The vocabulary here is somewhat arbitrary—that is, there's no standardized vocabulary for talking about these things. Trainers and participants may have encountered other terms for the same or similar concepts. The emphasis here should be on these underlying concepts and on the process of metadata analysis, not on any particular terminology. If trainers are more comfortable with other terms, they should mention that, by way of making the above point.

Metadata Analysis: File Format

- File, or data exchange, formats:
  - SGML / HTML
  - XML / XHTML
  - MARC
  - “Delimited” plain-text file
  - Binary (not plain-text) formats, either open or proprietary

6

The concept here is: How is the metadata encoded, or communicated/conveyed?

This is not the same question as asking, is this a METS or MODS file. Data exchange format is not about the data elements or data values per se, but rather about how they are expressed (encoded). Sort of like asking, is this French or is this English?

There are different ways of expressing, or encoding, the same metadata:

•Dublin Core terms and values in a delimited plain-text file (term/value pairs) vs. an XML encoding vs. a proprietary spreadsheet format (MS Excel).

• MARC (binary file) vs. MARCXML (XML file)

A delimited text file means that there’s some structure to the file (see the notes to slide 19 ahead, about structure)—some way to take it apart programmatically.

Technically, SGML and XML files are plain text files—you can open and view them in any common text editor.

On binary files, see notes at slide 9. MARC is a binary file format.

```
<?xml version="1.0" encoding="UTF-8" ?>
- <mets:mets xmlns:mets="http://www.loc.gov/METS/" xmlns:xlink="http://www.w3.org/1999/xlink"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:mods="http://www.loc.gov/mods/v3"
    xmlns:rts="http://cosimo.stanford.edu/sdr/metsrights/"
    xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/mets.xsd
    http://www.loc.gov/mods/v3 mods-3-0.xsd http://cosimo.stanford.edu/sdr/metsrights/
    http://cosimo.stanford.edu/sdr/metsrights.xsd" OBJID="ark:/13030/kt0h4nc5tp" TYPE="text"
    LABEL="Proceedings of the Third Berkeley Symposium on Mathematical Statistics and Probability"
    PROFILE="http://sunsite.berkeley.edu/mets/profiles/UCBApplicationContentProfile.xml">
  - <mets:dmdSec ID="DMD1">
    - <mets:mdWrap MDTYPE="MODS">
      - <mets:xmlData>
        - <mods:mods>
          - <mods:titleInfo>
              <mods:title>Proceedings of the Third Berkeley Symposium on Mathematical Statistics
                and Probability (1954/1955)</mods:title>
            </mods:titleInfo>
          - <mods:name type="corporate">
              <mods:namePart>University of California Press</mods:namePart>
            - <mods:role>
                <mods:roleTerm authority="marc">Publisher</mods:roleTerm>
              </mods:role>
            </mods:name>
            <mods:typeOfResource>text</mods:typeOfResource>
            <mods:genre authority="aat">proceedings</mods:genre>
          - <mods:originInfo>
            - <mods:place>
                <mods:placeTerm type="text">Berkeley, California</mods:placeTerm>
              </mods:place>
              <mods:dateCreated>1956</mods:dateCreated>
              <mods:dateCreated encoding="iso8601" point="start">1956</mods:dateCreated>
            </mods:originInfo>
          - <mods:language>
              <mods:languageTerm type="code" authority="iso639-2b">eng</mods:languageTerm>
            </mods:language>
```


7

XML: We know this is XML because of the XML Declaration, on the first line, which is true of all XML documents.

It's also a plain-text file; you can open it in any text editor and see all the data. You need special XML capable software to do certain things with an XML file (parsing it, validating it, etc.), but there's a low-barrier to accessing the information in it.

Both SGML and HTML are similar: text files with angle bracket delimited data.

Advantages of XML: it's common and thus there's a wide range of tools available, free and commercial, for working with XML (parsing it, validating it, picking out specific pieces of it, etc.).

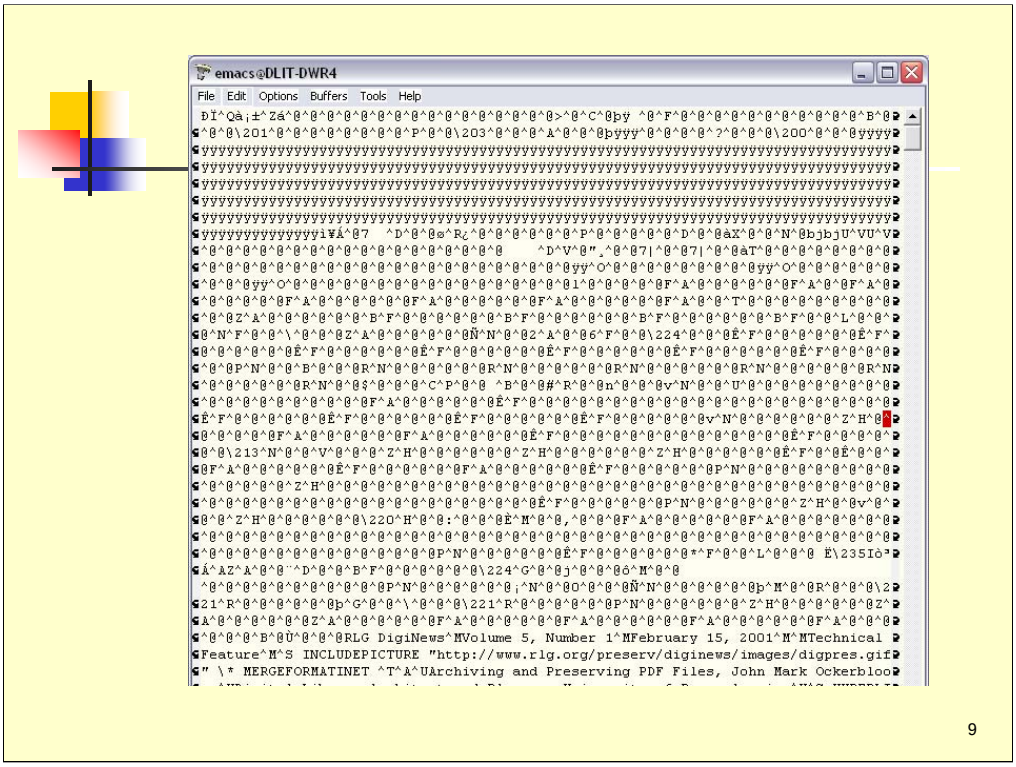
```
|1|000A|1|1001|
|1|000B|2|1002|
|1|R001|3|1003|
|1|R002|4|1004|
|1|R003|5|1005|
|1|R004|6|1006|
|1|0001|7|1007|
|1|0002|8|1008|
|1|0003|9|1009|
|1|0004|10|1010|
|1|0005|11|1011|
|1|0006|12|1012|
|1|0007|13|1013|
|1|0008|14|1014|
|1|0009|15|1015|
|1|0010|16|1016|
|1|0011|17|1017|
|1|0012|18|1018|
|1|0013|19|1019|
|1|0014|20|1020|
|1|0015|21|1021|
|1|0016|22|1022|
|1|0017|23|1023|
|1|0018|24|1024|
|1|0019|25|1025|
|1|0020|26|1026|
|1|0021|27|1027|
|1|0022|28|1028|
|1|0023|29|1029|
|1|0024|30|1030|
|1|0025|31|1031|
|1|0026|32|1032|
|1|0027|33|1033|
|1|0028|34|1034|
|1|0029|35|1035|
```

8

Plain-text file (you can read it, no apparent garbage characters). You don't need any specialized software merely to read the file—any text editor can open the file. We can also observe that it appears to be delimited with "pipe" character (|). The fact that it's delimited gives it some structure (another analytic category that we'll get to), and structure will allow some degree of machine processing. You may want to ignore discussion of structure, until you get to that section, up ahead. Then come back to this and some other slides as examples of what we mean by structure.

It's hard to say what the data really is without knowing. The second column contains page numbers, some encoded in ways to capture non-numbered pages or those with roman numerals. The last two column hold sequencing data.

Main point: data appears to be regularly structured and a programmer could write some software to "process" it. But that software created would likely not be reusable, since the data structure is probably idiosyncratic.



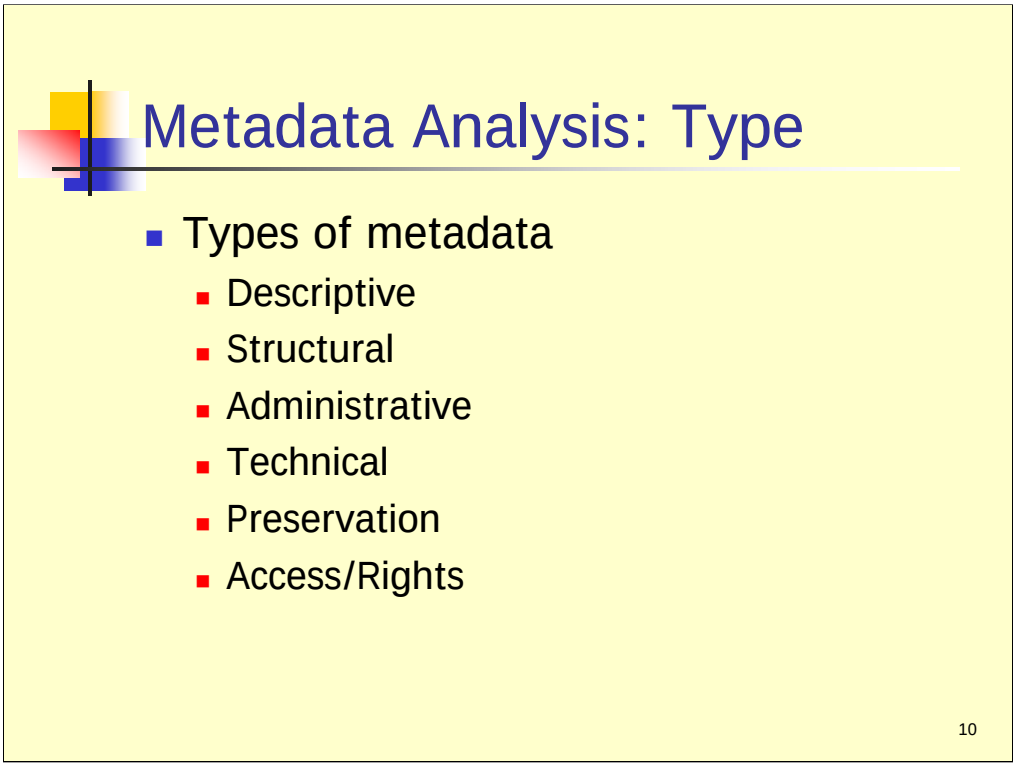
If you look at a PDF file in a text editor, this is what you see. The fact that there are all these “garbage” characters is an indication that it’s a binary file and not plain-text. The garbage characters are instructions to specialized software for how to present the data in the file.

The file above will not look nice unless you view it with software designed to understand the PDF markup. There is such software, other than that produced by Adobe, because there is a public PDF format specification, making PDF more or less and open format.

But for Microsoft Office files, for example (which would also look like this in a text editor), the format specification is controlled by Microsoft. They may license it or sell it to other software vendors, but they don’t make it publicly available.

Image files, even image files in an open standard, are binary files. Some image files may have “headers” or other sections with some metadata, and it may be possible to extract that metadata.

Point? If your metadata is in binary files, it may be tricky to extract it. There may be software tools that can help, but some customized solution may have to be developed.



“Type” in this sense has to do with the question “what’s the metadata about,” “what is it concerned with.”

These categories aren’t fixed. Some people might see Preservation metadata as a kind of Technical metadata. Administrative metadata could be construed very broadly to include Technical, Preservation, and Rights metadata.

```
_vn 2.2ml
_pd 19970307
_mi M
_t1 CM000257 ANZ7371
_ml 01012081
_ma Goodwin, John Abbot,
_mu
_mt The Pilgrim republic;   an historical review of the colony of New Plymouth, with
sketches of the rise of other New England settlements, the history of Congregationalism,
and the creeds of the period.
_mo
_me
_ci Boston,
_pu Ticknor and Company; [etc., etc.]
_md 1888.
_mc
_mr
_ms New England -- History -- Colonial period, ca. 1600-1775.
_ms Puritans.
_t2 CM000257 ANZ7371 t2
_mn 712
_mp 000A 000B R001 R002 R003 R004 R005 R006 R007 R008 R009 R010 R011 R012 R013
    R014 R015 R016 R017 R018 R019 R020 R021 R022 R023 R024 R025 R026 R027 R028
    R029 R030 R031 R032 R033 R034 R035 R036 R037 R038 R039 R040 R041 R042 R043
    R044 R045 R046 0001 0002 0003 0004 0005 0006 0007 0008 0009 0010 0011 0012
    0013 0014 0015 0016 0017 0018 0019 0020 0021 0022 0023 0024 0025 0026 0027
    0028 0029 0030 0031 0032 0033 0034 0035 0036 0037 0038 0039 0040 0041 0042
    0043 0044 0045 0046 0047 0048 0049 0050 0051 0052 0053 0054 0055 0056 0057
    0058 0059 0060 0061 0062 0063 0064 0065 0066 0067 0068 0069 0070 0071 0072
    0073 0074 0075 0076 0077 0078 0079 0080 0081 0082 0083 0084 0085 0086 0087
    0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102
    0103 0104 0105 0106 0107 0108 0109 0110 0111 0112 0113 0114 0115 0116 0117
    0118 0119 0120 0121 0122 0123 0124 0125 0126 0127 0128 0129 0130 0131 0132
    0133 0134 0135 0136 0137 0138 0139 0140 0141 0142 0143 0144 0145 0146 0147
    0148 0149 0150 0151 0152 0153 0154 0155 0156 0157 0158 0159 0160 0161 0162
```

11

Primarily descriptive metadata, some sort of monograph record. The bottom half has what look like page numbers, and thus that would be considered structural metadata (metadata that tells you something about the structure of the object).

(File format here is plain-text, delimited somewhat by codes which you can sort of figure out; so it’s got some structure, but a peculiar/unique structure—to process would require someone to write a unique parsing tool for. You may want to come back to the structure discussion when you treat structure up ahead.)

```
- <mets:structMap TYPE="mixed">
  - <mets:div LABEL="Proceedings of the Third Berkeley Symposium on Mathematical Statistics and
      Probability" TYPE="text" DMDID="DMD1">
    - <mets:div LABEL="Volume 1: Statistics" TYPE="volume" DMDID="DMD2">
      - <mets:div LABEL="Frontmatter" TYPE="frontmatter">
          <mets:fptr FILEID="FID1" />
        </mets:div>
      - <mets:div LABEL="Estimation of Least Squares and by Maximum Likelihood" TYPE="article"
          DMDID="DMD3">
          <mets:fptr FILEID="FID5" />
        </mets:div>
      - <mets:div LABEL="On a Use of the Mann-Whitney Statistic" TYPE="article" DMDID="DMD4">
          <mets:fptr FILEID="FID6" />
        </mets:div>
      - <mets:div LABEL="Index" TYPE="index">
          <mets:fptr FILEID="FID3" />
        </mets:div>
      </mets:div>
    - <mets:div LABEL="Volume 2: Contributions to probabilty theory, part 1" TYPE="volume"
        DMDID="DMD5">
      - <mets:div LABEL="Frontmatter" TYPE="frontmatter">
          <mets:fptr FILEID="FID2" />
        </mets:div>
      - <mets:div LABEL="On a Class of Probability Spaces" TYPE="article" DMDID="DMD6">
          <mets:fptr FILEID="FID7" />
        </mets:div>
      - <mets:div LABEL="Stationarity, Boundedness, Almost Periodicity of Random-valued
          Functions" TYPE="article" DMDID="DMD7">
          <mets:fptr FILEID="FID8" />
        </mets:div>
      - <mets:div LABEL="Index" TYPE="index">
          <mets:fptr FILEID="FID4" />
        </mets:div>
      </mets:div>
      <mets:div LABEL="Volume 2: Contributions to probability theory, part 2" TYPE="volume"
        DMDID="DMD8" />
    </mets:div>
```


12

Example of structural metadata, the structMap section of a METS document. This is different than asking whether the metadata itself has structure! (Which it does, since it's nested XML.) Again, metadata "type" is about the information convey by the metadata, not how the metadata is conveyed.

The structMap uses s to nest all the various components, pointing to the appropriate files for each component.

There is some descriptive metadata here, but there doesn't really need to be. They are just labels, intended to make it easier to create a browse list of contents.

(File format here is XML.)

```
  <DeviceSource>digital still scanner</DeviceSource>
- <ScanningSystemCapture>
  - <ScanningSystemHardware>
      <ScannerManufacturer>Scitex</ScannerManufacturer>
    - <ScannerModel>
        <ScannerModelName>Leaf Volare</ScannerModelName>
        <ScannerModelNumber>100SX</ScannerModelNumber>
        <ScannerModelSerialNo>1122334455</ScannerModelSerialNo>
      </ScannerModel>
    </ScanningSystemHardware>
  - <ScanningSystemSoftware>
      <ScanningSoftware>Leaf</ScanningSoftware>
      <ScanningSoftwareVersionNo>4.0</ScanningSoftwareVersionNo>
    </ScanningSystemSoftware>
  - <ScannerCaptureSettings>
      <PixelSize>3</PixelSize>
    - <PhysScanResolution>
        <XphysScanResolution>0.307</XphysScanResolution>
        <YphysScanResolution>0.435</YphysScanResolution>
      </PhysScanResolution>
    </ScannerCaptureSettings>
  </ScanningSystemCapture>
- <DigitalCameraCapture>
    <DigitalCameraManufacturer>PhaseOne</DigitalCameraManufacturer>
    <DigitalCameraModel>H_20</DigitalCameraModel>
  </DigitalCameraCapture>
- <CameraCaptureSettings>
    <FNumber>5</FNumber>
    <ExposureTime>.5</ExposureTime>
    <Brightness>2.2</Brightness>
    <ExposureBias>3.5</ExposureBias>
    <SubjectDistance min="4.9" max="5.3">5</SubjectDistance>
    <MeteringMode>Average</MeteringMode>
    <SceneIlluminant>D75 Illuminant</SceneIlluminant>
    <ColorTemp>20</ColorTemp>
    <FocalLength>3</FocalLength>
    <Flash>No</Flash>
```


13

Type = technical metadata.

This is a very small portion of a MIX document. MIX is a standard for capturing technical data elements for digital still images.

Metadata such as this would not likely be encoded by hand. More likely, it would be prepared automatically by scanning or digital photography equipment.

http://www.loc.gov/standards/mix/

(File format is XML.)

Metadata Analysis: Semantics

- Metadata element sets (“schemes”)
  - MARC21
  - Dublin Core (DC)
  - EAD
  - MODS
  - VRA Core
  - METS

14

Standard element sets form a kind of alphabet soup, typical in the library.

These are covered in Course 2.

If data is in XML, it’s usually easy to detect the metadata scheme: look at the “root” element, the element at the top of the file that holds all other element inside of it.

Some of these schemes are bound very closely with a particular data exchange format, to the point where they seem inseparable. For example, METS is expressed in XML; EAD is expressed in SGML or XML; But what we are looking at right here are the data element definitions, which at least in theory can be separated from an exchange syntax. This distinction is much easier to make with DC and VRA, which can be expressed, or encoded, in different file formats.

```
<?xml version="1.0" encoding="UTF-8" ?>
- <mods xmlns:xlink="http://www.w3.org/TR/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
    instance" xmlns="http://www.loc.gov/mods/" xsi:schemaLocation="http://www.loc.gov/mods/
    http://www.loc.gov/standards/mods/mods.xsd">
  - <titleInfo>
      <title>Arithmetic /</title>
    </titleInfo>
  - <name type="personal">
      <namePart>Sandburg, Carl,</namePart>
      <namePart type="date">1878-1967.</namePart>
      <role>creator</role>
    </name>
  - <name type="personal">
      <namePart>Rand, Ted,</namePart>
      <role>ill.</role>
    </name>
    <typeOfResource>text</typeOfResource>
  - <publicationInfo>
      <placeCode authority="marc">cau</placeCode>
      <place>San Diego :</place>
      <publisher>Harcourt Brace Jovanovich,</publisher>
      <dateIssued>c1993.</dateIssued>
      <dateIssued encoding="marc">1993</dateIssued>
      <edition>1st ed.</edition>
      <issuance>monographic</issuance>
    </publicationInfo>
    <language authority="iso639-2b">eng</language>
  - <physicalDescription>
      <extent>1 v. (unpaged) : ill. (some col.) ; 26 cm.</extent>
    </physicalDescription>
    <abstract>A poem about numbers and their characteristics. Features anamorphic, or distorted,
      drawings which can be restored to normal by viewing from a particular angle or by viewing the
      image's reflection in the provided Mylar cone.</abstract>
  - <targetAudience>
      <listValue>juvenile</listValue>
    </targetAudience>
    <note type="statement of responsiblity">Carl Sandburg ; illustrated as an anamorphic adventure by Ted
      Rand.</note>
```


15

A MODS record; we can tell because the root element identifies it as such. The file format is XML.

```xml
<?xml version="1.0" ?>
- <dc xmlns="http://purl.org/dc/elements/1.1/">
  <title>Arithmetic /</title>
  <creator>Sandburg, Carl, 1878-1967.</creator>
  <creator>Rand, Ted, ill.</creator>
  <type>text</type>
  <publisher>San Diego :Harcourt Brace Jovanovich,</publisher>
  <date>c1993.</date>
  <language>eng</language>
  <description>A poem about numbers and their characteristics. Features anamorphic, or
    distorted, drawings which can be restored to normal by viewing from a particular angle or by
    viewing the image's reflection in the provided Mylar cone.</description>
  <description>One Mylar sheet included in pocket.</description>
  <subject>Arithmetic</subject>
  <subject>Children's poetry, American.</subject>
  <subject>Arithmetic</subject>
  <subject>American poetry.</subject>
  <subject>Visual perception.</subject>
</dc>
```


16

A Dublin Core record of same object as the last slide.

(File format is XML.)

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html
    PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
     "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en-US" xml:lang="en-US">
<head>
<title>Arithmetic</title>
<meta name="ROBOTS" content="INDEX, FOLLOW" />
<meta name="DC:title" content="Arithmetic" />
<meta name="DC:creator" content="Sandburg, Carl, 1878-1967" />
<meta name="DC:creator" content="Rand, Ted, ill." />
<meta name="DC:publisher" content="San Diego :Harcourt Brace Jovanovich" />
<meta name="DC:date" content="c1993" />
<meta name="DC:language" content="eng" />
<meta name="DC:description" content="A poem about numbers and their characteristics.
Features anamorphic, or distorted, drawings which can be restored to normal by viewing from
a particular angle or by viewing the image's reflection in the provided Mylar cone." />
<meta name="DC:description" content="One Mylar sheet included in pocket." />
<meta name="DC:subject" content="Arithmetic" />
<meta name="DC:subject" content="Children's poetry, American" />
<meta name="DC:subject" content="Arithmetic" />
<meta name="DC:subject" content="American poetry" />
<meta name="DC:subject" content="Visual perception" />

<script type="text/javascript">//<![CDATA[
        function preload_image(args)
        {
        var myimages=new Array();
        var i = 1;
        args++;
        while (i != args)
        {
        myimages[i] = new Image();
        myimages[i].src = preload_image.arguments[i];
        i++;
        }
        }
```

17

This is a “source” view of an HTML page. It shows what would not normally be seen within a browser—the HTML meta tags.

The metadata here is Dublin Core, expressed in HTML meta tags, as name/content pairs.

(File format is XML. The format is XHTML, which is HTML that adheres to some basic XML restrictions.)

Metadata Analysis: Content

- Does the metadata…
  - Adhere to any published content standards or best practices?
    - AACR2/RDA, EAD Best Practice (RLG), CCO
  - Use any known and shared vocabularies?
    - LCSH, AAT, TGM
  - Adhere to any application profiles?
- Degree of conformance to any employed standards, practices, or vocabularies?

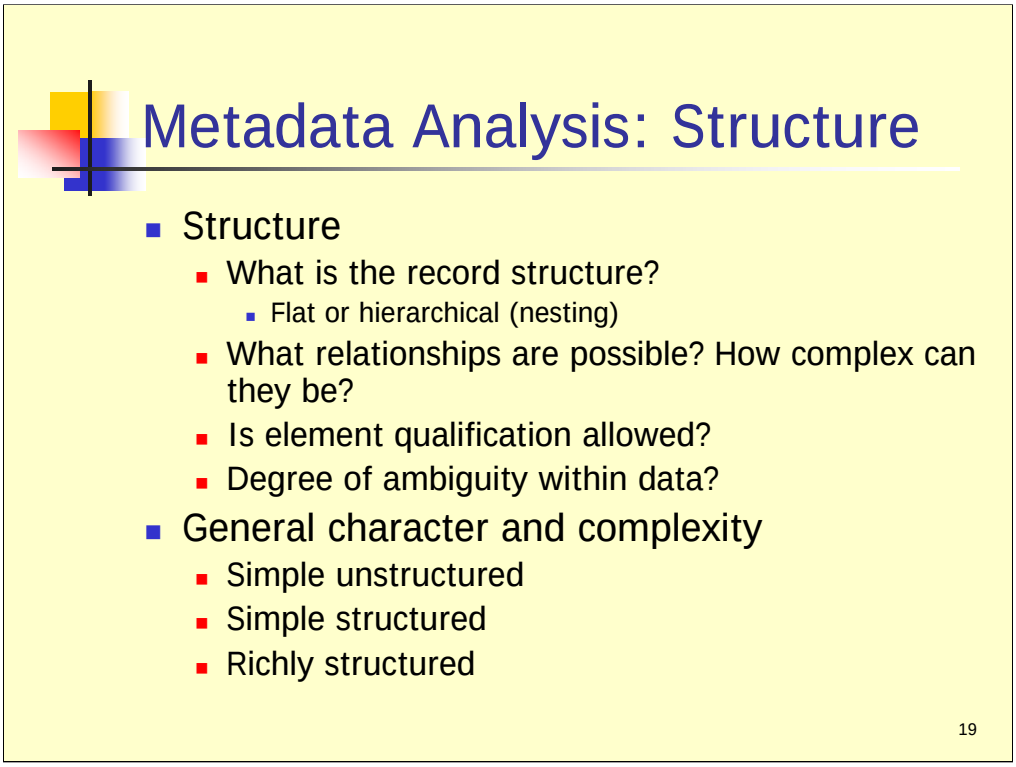
18

Content value standards. Participants are likely very familiar with the concept and several of the instances.

"Application profile" is used here in the way the DCMI-Libraries Working Group uses it: "as a way to declare which elements from which namespaces are used in a particular application or project. Application profiles are defined as schemas which consist of data elements drawn from one or more namespaces, combined together by implementors, and optimised for a particular local application." Application profiles are community-driven initiatives aimed at metadata interoperability.

See: http://dublincore.org/documents/library-application-profile

Important point: Many technical people involved with digital library development are not familiar with these standards and practices at all. This is another reason why people with a technical services background make good metadata specialists and have a lot to contribute to digital library development projects.



Structure is a somewhat fuzzy or impressionistic concept, with no fixed distinction between “simple” and “rich” structure.

But it is useful to take note of what structure any particular metadata may have, especially when there isn’t much. Structure allows for machine processing. If the data has no structure, then it will require hand processing to convert it to some other format or scheme.

You can illustrate structure by looking back at these slides (or perhaps you developed the concept of structure as you worked through the slides):

8: plain-text with delimiters. Two structural elements in the file. Line breaks, dividing on line from another. And | delimiters separating parts of a line. Together these allow for a table with rows and columns. That’s useful structure, and can certainly be taken apart and converted to something else fairly easily. Simple structured.

11: also simple structured. This could be machine parsed with simple but customized software.

17: the meta tags make for simple structured data. Simple Dublin Core, however it’s expressed (even as an XML file), is simple structured data; it’s flat, non-hierarchical, few relationships conveyed by the structure.

Examples of richly structured: slides 7, 12, probably 13 and 15.

Simple unstructured: no example, but imagine slide 11 without the codes on the left. It would require a human to understand what the different data elements were.

Metadata Analysis: Use

- What is, or was, the intended or potential use of this metadata?
  - Understanding why metadata was created and how it was used can help tell you what you can expect from it, in terms of consistency, reliability, interoperability...

20

This may require some speculation, or sort of detective analysis.

Metadata Analysis: Status

- Static vs. dynamic
  - Static metadata will not be updated, augmented, etc.—it is essentially “dead”
  - Dynamic metadata is “living,” maintained by someone, updated when needed, perhaps regularly supplemented
- This distinction will have an impact on conversion strategies and workflows

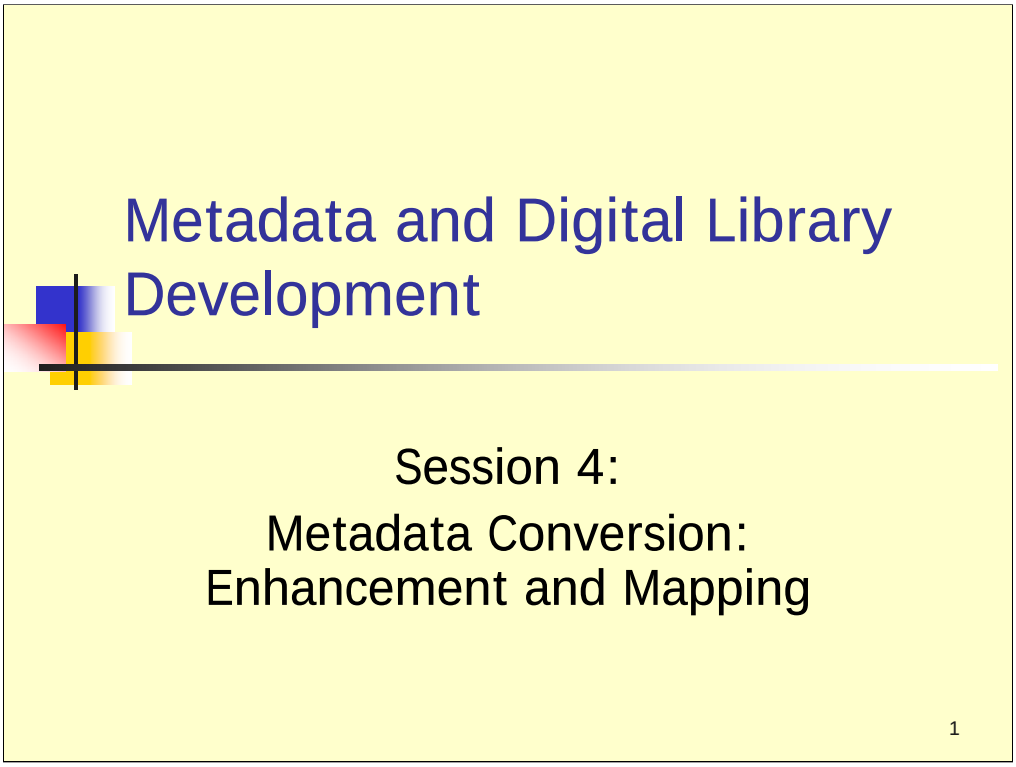
21

This distinction (static vs. dynamic) will be picked up in Session 5, on workflows.

Metadata Analysis Exercise

- Exercise 3: Metadata Analysis
  - Metadata assessment
  - Functional evaluation of metadata
    - Will this metadata support the required functionality?

22



Trainers could begin by asking whether any participants are involved in any "database enrichment" or "database maintenance" activities within their library. Basically, any efforts to fix, improve, clean-up MARC records in their catalogs.

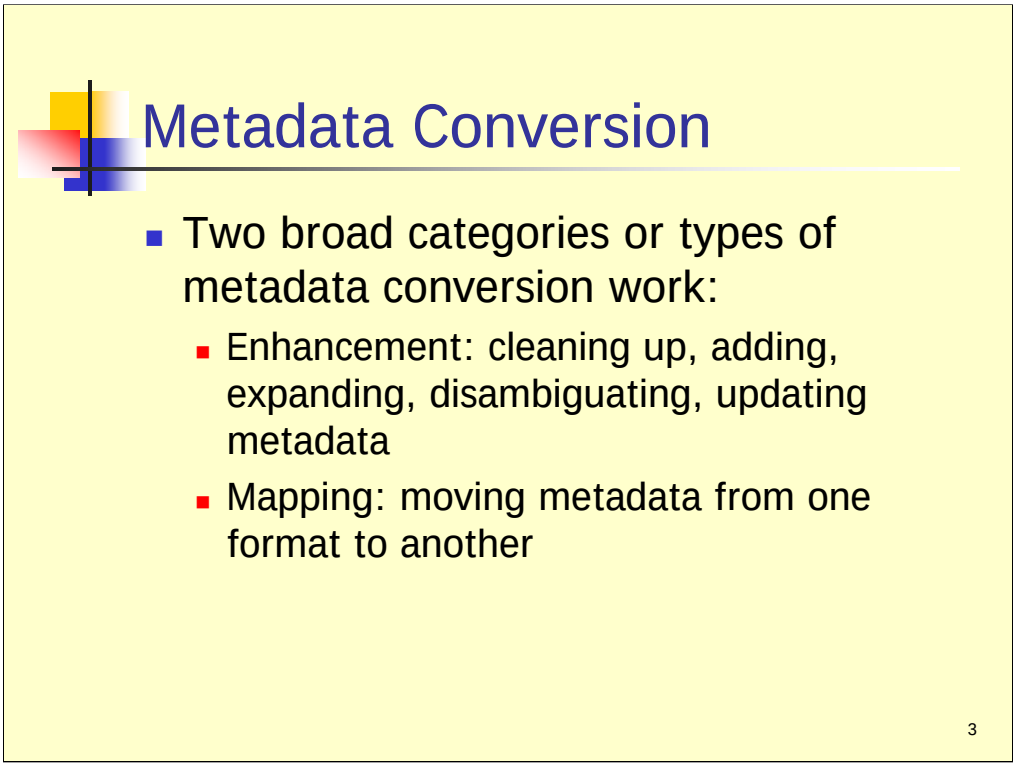
What this session is about is something very similar, but in the digital library context, where we have less history and fewer defined practices for what we do. In any event, doing this work with the catalog is very useful experience when working with non-MARC and non-MARC systems.

Alternatively, you could wait and make this point at slide 3.

Goals of Session

- Explore the reasons for converting metadata
- Discuss measures for assessing and ensuring the quality of metadata
- Examine metadata mapping and its purposes
- Learn how to create a metadata map

2



Enhancement is any kind of record improvement. The point about this being a common tech services activity (see slide 1) could be made here.

This Session, and the workshop, adopt a fairly simple vocabulary when it comes to mapping:

•Mapping is an activity, the one of moving metadata from one format to another

•A map is a thing, an instrument of some sort that makes the mapping activity possible.

The term “crosswalk” is avoided here only to avoid confusion. Many (including some later slides here) would likely equate crosswalk to map, and crosswalking to mapping, but some people will make subtle distinctions among all these terms, none of which seem particularly relevant to the general ideas discussed in this workshop. See the bibliography for more in-depth discussions.

Why Enhance Metadata?

- To correct inaccuracies
- To achieve consistency
- To improve “quality”
- To fill gaps
- To provide greater or different functionality
- To foster interoperability

4

The first three and the last are covered in the following slides.

Metadata Accuracy

```
<DC_record>
  <creator>Mitchell, William J.</creator>
  <creator>Stevenson, Daniel C.</creator>
  <creator>Schoonover, Regina</creator>
  <title>Urbanowski, Frank</title>
  <subject>City of Bits: Space, Place, and the Infobahn</subject>
  <subject>Electronically mediated environments</subject>
  <subject>Cyberspace</subject>
  <type>Urbanism</type>
  <format>Text</format>
  <date>text/html</date>
  <identifier>1995</identifier>
  <language>http://press.opt.edu/CityOfBits.html</language>
</DC_record>
```

5

What's wrong here? Clearly this record is messed up. It's inaccurate, as opposed to inconsistent.

We can speculate on what happened. Probably it was produced by a mechanical process, and perhaps that process didn't expect more than three creators. But we don't really know.

Metadata Consistency

- DC records with a <dc:date> element
- Most formatted in full W3C-DTF format (e.g., <dc:date>YYYY-MM-DD</dc:date>),
- except for:

  <dc:date>2000-08</dc:date>
  <dc:date>1996</dc:date>
  <dc:date>July 5, 2001</dc:date>
  <dc:date>2000 Revision</dc:date>
  <dc:date>July 19, 1996</dc:date>
  <dc:date>2001.06.04</dc:date>

6

A simple example of metadata enhancement.

These are not inaccuracies, but illustrate potential inconsistencies, which could create problems in handling and using this metadata. If the metadata is shared, these may become barriers to interoperability.

The first two are not necessarily data inconsistencies. The W3C-DTF format allows for truncated forms: YYYY or YYYY-MM. So this has more to do with being sure the system can handle such truncated forms properly.

“Quality” Metadata

“Objects, metadata, and collections must now be viewed not only within the context of the projects that created them but as building blocks that others can reuse, repackage, and build services upon.”

A Framework of Guidance for Building Good Digital Collections. 2nd ed.
NISO, 2004.
http://www.niso.org/framework/framework2.html

7

In today's digital environment, the context of content is a vast international network of digital materials and services. Objects, metadata and collections should be viewed not only within the context of the projects that created them but as building blocks that others can reuse, repackage, and build services upon. Indicators of goodness correspondingly must now also emphasize factors contributing to interoperability, reusability, persistence, verification and documentation.

Example: if metadata is too narrowly defined for a particular project, it may not be useable, or easily useable, for other projects. The loss of contextual information, with regard to metadata, is sometimes called the “on a horse” problem. Say you have many photographs, all of Teddy Roosevelt. One of them is of Roosevelt on a horse, and the metadata title that photo is given is “On a horse”. The title has meaning in its immediate context, but only there. If the record of that photo is taken out of that context, the title is of little value. On this, see: Robin Wendler, “The eye of the beholder: Challenges of image description and access at Harvard,” In Diane I. Hillmann and Elaine L. Westbrooks, eds. *Metadata in Practice*. Chicago: American Library Association, 2004. (Hillmann & Westbrooks is in the Bibliography.)

Metadata “quality” is a topic of Cat21 Course 2.

Indicators of Metadata Quality

- Appropriate to the collection, its users, and the use of the objects in it
- Supports interoperability
- Uses standard controlled vocabularies
- States conditions and terms of use
- Possesses the qualities of good objects
- Supports long-term management

8

These points are from the *Framework* document of the previous slide.

We're not creating metadata in a vacuum. This should be a collaborative process. Digital library development increasingly takes a team approach to implementation.

Approaches to Interoperability

- Convert to a single metadata scheme
- Allow diverse metadata schemes and map to a common scheme for particular purposes
  - For example: access, or sharing metadata
- Use a hybrid approach that involves some uniformity and some mapping

9

Assuming we wish to foster interoperability….

Again, this is largely about thinking outside the immediate context. See “Best Practices for OAI Data Provider Implementations and Shareable Metadata” in the Bibliography.

Tools for Interoperability

- Metadata standards
- Application profiles
- Community developed best practices
- Community accepted metadata maps (crosswalks)

10

"Application profile" is used here in the way the DCMI-Libraries Working Group uses it: "as a way to declare which elements from which namespaces are used in a particular application or project. Application profiles are defined as schemas which consist of data elements drawn from one or more namespaces, combined together by implementors, and optimised for a particular local application." Application profiles are community-driven initiatives aimed at metadata interoperability.

See: http://dublincore.org/documents/library-application-profile and

http://www.ariadne.ac.uk/issue25/app-profiles/

Metadata Mapping

- A formal, repeatable conversion of metadata
  - A potentially ongoing or regularly repeated conversion process
  - Assumes consistent incoming metadata
- Requires a specification (called a “map” or “crosswalk”) that describes how to convert one metadata scheme format to another

11

DC Element	MARC Fields	Implementation notes
Title	245	
Creator	100, 110, 111, 700, 710, 711	See Appendix 1 below; Contributor element not used.
	720	
Subject	600, 610, 611, 630, 650, 653	
Description	500-599, except 506, 530, 540, 546	
Contributor		See Appendix 1 below; Contributor element not used.
Publisher	260ab	
Date	260$c	
Type	Leader06, Leader07	See Appendix 2 for Leader-Type rules
	655	
Format	856$q	
Identifier	856$u	
Source	786ot	
Language	008/35-37	
	546	
Relation	530, 760-787ot	
Coverage	651	
	752	
Rights	506, 540	

http://www.loc.gov/marc/marc2dc.html

12

A good example of a metadata map.

Note, this maps from MARC to simple DC, not the other way around. That is typical of simple DC mapping, moving from a richer data format to the simpler (DC).

You can also note that this is only a start. To actually implement such a mapping at the local level would require discussion of strategies and many detailed decisions. For example, in mapping the 245 field into Title, do we include subfield c? There are many such decisions that can only be answered at the local level.

Why Map Metadata?

- To accommodate a change or upgrade in an existing system
- To “ingest” metadata into another system, but maintain original metadata format
- To share metadata with a wider community, improving interoperability
  - Metadata is diverse—we will never all use the same metadata formats

13

Metadata Mapping Caveats

- Requires good knowledge of both source and target metadata formats
- Often not a one-to-one correspondence between elements
- Typically involves some conversion operations
  - Data types and values may differ
  - Structure, hierarchy may differ
  - Element optionality/repeatability may differ

14

Mapping Exercise

- Exercise 4: Metadata Mapping
  - Creating “shareable” metadata
  - Designing a detailed metadata map
  - Converting from relatively rich metadata to simple Dublin Core records

15

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Metadata and Digital Library Development

Session 5:

Metadata Workflows

1

Goals of Session

- Understand the components of workflow design
- Understand the management aspects of metadata workflows (tasks, costs, constraints)
- Examine practical aspects of metadata conversion workflows
- Design a metadata workflow

2

Trainer can begin by asking how many have created or been involved in workflows in their current jobs. Probably close to 100%, and that's the point. Data workflows are fundamental to library technical services. This session therefore deals with what the participants probably have a fair bit of experience with. The slides here may take a more analytic approach to an activity that participants are engaged with by common sense and experience. Some of this analytic approach may therefore be useful to their appreciation for what they are already doing.

The first half the slides take a more analytic approach to workflows. The second half cover some practical questions about metadata conversion workflows.

Workflow Fundamentals

- The movement of data through a work process

  Input → Transformations → Output
- A work process will typically involve multiple components or individual steps (tasks and subtasks)
  - Each task also has its own data movement:
    - Input → Transformations → Output

3

This is the 2,000 mile high view of workflow, a theoretical perspective.

The idea is that there is, typically, one main (perhaps very large) work process, with generally defined input and output.

Then you start breaking that large task into subtasks, each with their own inputs and outputs.

And then breaking each of those sub-tasks into sub-tasks, and so on and so forth until you are working at a level where a task can actually be implemented.

The Output of one task will be the Input of the following task, within a workflow.

Components of Workflow Design

- Workflow definition and goals
- Identifying constraints
- Defining the metadata workflow tasks and subtasks
- Designing the workflow
- Maintaining the workflow
- Cost considerations and opportunities

4

This is an outline of what will be considered in the first half of this sessions slides (#5-12). This is presented at a somewhat abstract and theoretical level. The last half of the session will look at more concrete and mechanical considerations.

Workflow Definition and Goals

- Defining the workflow objectives
- Analysis of overall work process input and output
  - Understand the characteristics of the workflow input (e.g., source metadata)
  - Understand the characteristics of the workflow output (e.g., target metadata)
- Specifying the required transformation

5

First step is definition of the overall objectives. For metadata conversion projects, this will involve analysis of the source and target metadata (the workflow's input and output). With that knowledge, we can develop a specification for transforming the input to output.

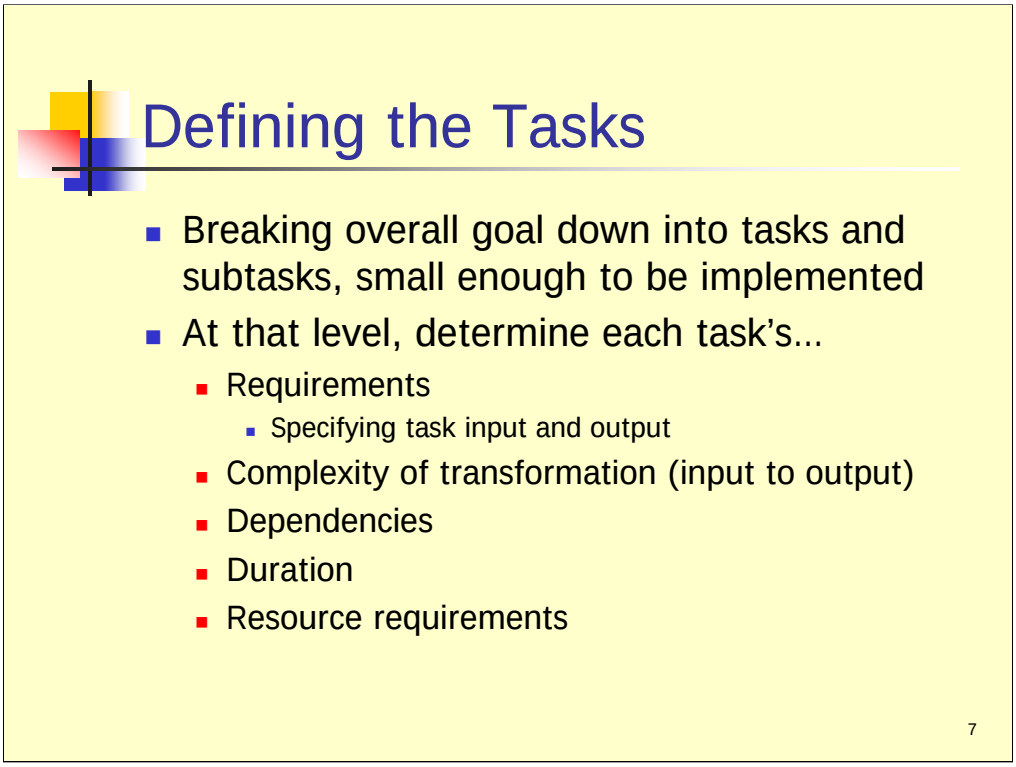
We need a complete picture of what the constraints are before we can begin to design a workflow, since the constraints, by definition, are going to constrain what we can do and how we do it. Resources and time are the usual suspects, but there are other considerations.

•A fundamental problem is whether we have the resources to carry out a workflow. Do you have the staff to perform the required work? If not, do you have the funds to hire additional staff? Is there potential revenue in the work being carried out to pay for additional staff or current staff time (see slide on Opportunities).

•Often, we have the staff to do the work, but they are not currently available. It may not be feasible to hire additional staff. Then it is a question of time and the scheduling of work.

•Environmental constraints are typically those imposed by the containing institution—like other demands on staff time, the need to share material resources (such as computer processing), or issues arising from the need to interface with other departments/units that may be part of this workflow (perhaps you depend upon them for deliveries of material, and they only deliver on Tuesdays).

•A particular metadata workflow may require more knowledge and expertise than we currently have. We will have to allot time to gain this knowledge, or perhaps funds for consultants or for travel to interview experts, etc.



From the project description, and an appreciation of the constraints you face, you begin to break apart what needs to get done into large areas of work, then break these down into smaller (sub)tasks, and eventually you get to tasks that are at a level where they can be implemented by someone or some process. At that level (implementable tasks), you can analyze and define each task by asking about its requirements….etc.

These different aspects of a task are interrelated:

Greater task complexity adds to duration, and/or makes it less predicable.

Complexity also adds to resource requirements (such as manual review of output).

Task dependencies: there is always at least one dependency…the task input. But the task may have many others, including computing or human factors. Workflow constraints and task dependencies are related. Perhaps only certain software can perform certain tasks, and it can only be put on one computer. Perhaps only one staff member has the expertise to apply specialized subject terms. Human dependencies add to greater uncertainty in predicting duration. People can be sick, quit, go crazy.

You can likely get examples from participants to illustrate any of these aspects of a task.

Designing the Workflow

- Given the constraints, how do we put all the pieces of the workflow puzzle together in the most optimal way?
- How should tasks be structured in workflow?
  - Sequencing and scheduling of tasks
- Who or what will perform each task?
- What are the communication needs of the workflow?

8

Workflow design is like a puzzle. Many different tasks and players. What is the optimal, most cost-effective way to put all these pieces together.

Communication needs: how does one task know that its inputs are ready? (Remember the input-to-output analysis can be applied to every little sub-task. So the outputs of one task will be the inputs of the next.) How do tasks (or the people performing them) communicate with each other?

These are presented as considerations in the design of a workflow. Alternatively, you can think of them as considerations in the analysis of an existing workflow, perhaps leading to redesign.

Maintaining the Workflow

- How will the workflow and its tasks be tracked and evaluated?
  - Who is responsible for the workflow?
  - How will improvements or other changes to the workflow be made?
- Once operational, what are the workflow's ongoing management requirements?
  - How much human oversight is needed?
  - How much tracking can be automated?

9

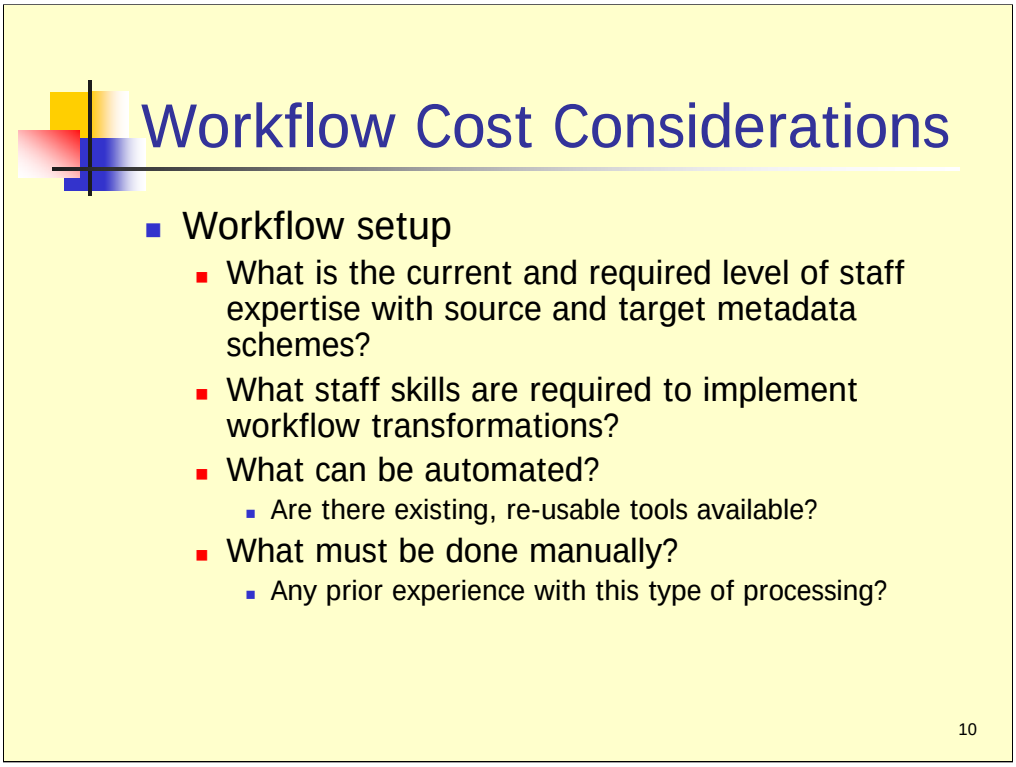
We can think of the workflow as a living thing, requiring some degree of "care and feeding".

Tracking is to determine whether transformations are being done as expected. Are the outputs what we wanted?

Evaluation is similar, but asks also whether any task transformation can be optimized to improve productivity. Evaluation may lead to redesigning, or tweaking, the workflow puzzle.

How much management oversight is necessary to carry out routine tracking? Are there a lot of human factors involved in the workflow, and thus more task complexity? Or is it only a computer process running nightly?

Can management be automated by a programmatic approach to tracking? For example, if we have an automated process running nightly, can we define potential problems systematically enough such that software analysis will be able to detect problems and send alerts? Or does the data need to be manually inspected? Each day? Every so often? Do we inspect all output or can we sample?



Staff expertise with the relevant metadata schemes is valuable, not just in carrying out the work and/or serving as a resource for other metadata staff, but for the initial evaluation and assessment necessary to define accurate time/cost estimates. The ability to quickly spot deficiencies is extremely valuable.

Bringing staff up to speed, or giving them the time to investigate on their own, is a cost.

What staff resources and skills will you have for effecting the actual transformations required? Programmers? Those familiar with bibliographic control? Those that are good with detailed manual work?

Can you identify what you don't know? If you are not familiar with a metadata transformation, for instance, you will tend to be overly optimistic about the time required. Same for familiarity with metadata types. If you are unfamiliar, you will probably underestimate the time required.

Workflow Cost Considerations

- Workflow maintenance
  - We need to quantify the type and extent of ongoing support and maintenance the workflow will require
  - Cost differences in maintaining manual vs. automated workflows
  - How much management oversight does the workflow require?

11

Maintaining a workflow requires resources. Those responsible for department budgets need to know the workflow's costs over the period which it will be maintained. This in fact may become a decisive factor in whether to take on this work or not.

Managers need to be aware of how much of their time will be devoted to oversight.

Opportunities and Benefits

- Increased knowledge and expertise
- Revenue potential
- Greater use of collections and resources
- Greater visibility of institution

12

Putting together and executing a workflow has its costs, but also its benefits.

The first two items here are opportunities/benefits that may accrue to the metadata specialist, or the metadata specialist's immediate unit/department.

Obviously, when cost-effective and successful workflows are in place, benefits accrue also to the entire organization and the communities/users served by the library (additional services, better meeting the needs of users, etc.).

•Increasing use of collections, resources

•Increasing visibility of institution

So much metadata expertise is really just experience, including making mistakes. Some of the most experienced metadata practitioners are those that have made the most "mistakes," (or, if not mistakes, just things they would now do differently).

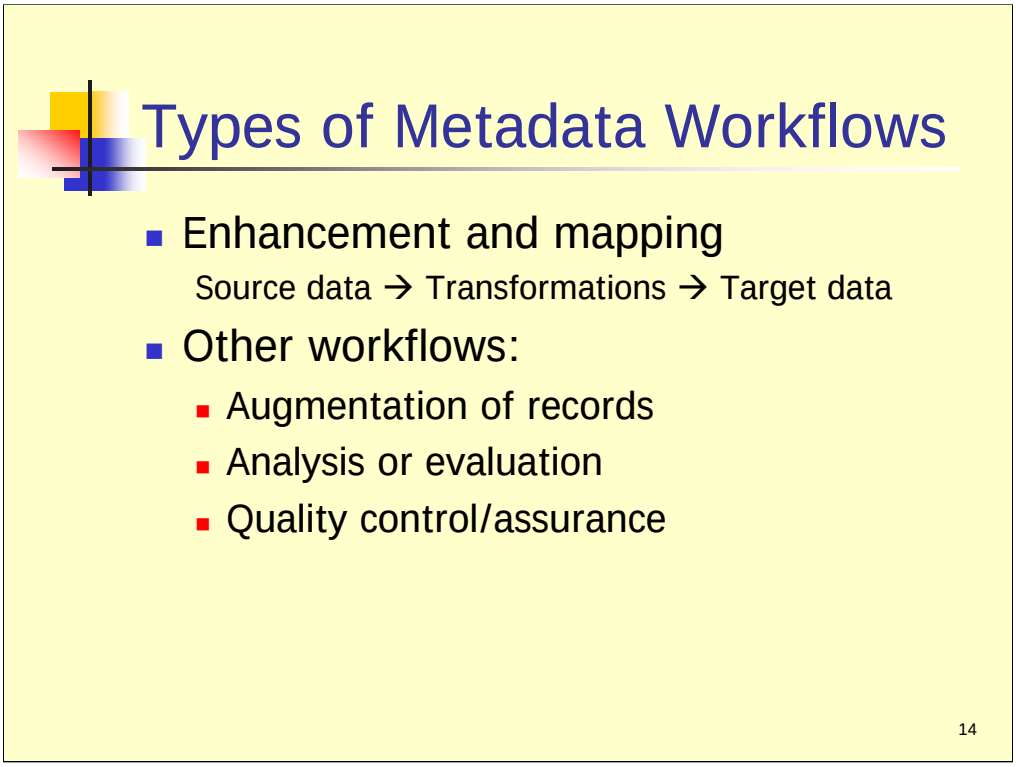
Practical Aspects of Workflows

- Types of workflows
- Characteristics of source and target metadata, and the impact on workflow design
- When to convert metadata
- How to convert metadata

13

This slide is an outline of the remainder of the slides in this session.

We’re moving to a more practical level, talking about more mechanical aspects of metadata workflows, and specifically workflows that deal with the conversion of metadata.



Metadata enhancement activities included cleaning up, adding, expanding, disambiguating, updating metadata. Mapping is moving metadata from one format to another. Both of these have the basic notion of transforming one set of data to another.

There are other metadata workflows/tasks that could be considered not to involve conversion or transformation, at least strictly:

•Augmentation would be some sort of regular process for adding additional records to a pile of existing records.

•Metadata analysis or evaluation may be carried out regularly as part of larger processes.

•QA may also be a regular set of tasks applied to particular sets of metadata.

All of these activities require a set of defined tasks and thus workflows. Both analysis and QA may be an end in themselves (perhaps for hire, consulting work), may be in preparation for some specific conversion activity, or may be regular insurance activities built into larger data maintenance processes.

What about data creation? Many digital projects will require the generation of metadata. Is metadata creation it's own category of workflow, or can it be considered a type of conversion workflow?

In the rest of the session, we'll talk mostly about workflows and tasks related to metadata conversion.

Metadata Conversion Workflows

- Many aspects of the workflow will depend on the characteristics of the source and target metadata
  - Static vs. dynamic source metadata
  - Other source metadata considerations
  - Target metadata

15

This sets up the next few slides, which discuss the bulleted points.

Static vs. dynamic: we discussed this in Session 3, under Metadata Analysis. Now we'll look at the impact this has on designing metadata workflows.

Source Metadata

- Static source metadata suggests...
  - A one time transfer of metadata from the creator or supplier
  - The creator or supplier is, or will eventually be, out of the picture
- Dynamic source metadata implies...
  - An ongoing, periodic transfer of the same, updated, or augmented metadata

16

static vs. dynamic: a refresher from Session 3.

•Static implies that that your conversion workflow will be a one time process. It may be a huge conversion project, but the conversion won't have to be repeated.

•Dynamic implies that your workflow is, in a sense, in the midst of some ongoing data pipeline. You are doing some data conversion that will need to be repeated every time refreshed data comes to you.

The Impact on Workflow of...

- Static source metadata
  - Manual processing is at least feasible
    - No disincentive to apply manual work, except for cost
  - A more extensive and subtle range of data enhancement is possible
  - Workflow may not be *directly* reusable

17

With static source metadata, there is more potential for refined “value add” work, since it could be done by people.

The Impact on Workflow of...

- Dynamic source metadata
  - Much depends upon the nature and rate of change of the source metadata
  - There is a disincentive to use manual processing
    - Correcting errors
    - Manual “value-add” features
  - There is an incentive to apply programmable transformations
  - Workflow processes must be re-usable to be cost-effective

18

The incentive to apply programmatic transformation is a cost incentive.

There is no incentive to do manual work. For example, you don’t want to correct data values that will be continually refreshed, clobbering your correction. The incentive in this case is to get the correction made in the source metadata, which is upstream from, and not part of, your workflow.

You can refer to the DC mapping exercise in Session 4 as an example. The journal article data is presumably dynamic—corrections could be made, articles might acquire a DOI identifier in the future, etc. So our mapping would not want a step in it where a human was required to evaluate something and convert the value (say, the publication dates were not in a standard form). There would be no incentive to that since that work may be overwritten.

Now, if that journal source metadata were for some reason static, and we were sure it would never change, then the disincentives against manual enhancement of the metadata go away (except cost, of course). Perhaps we would then chose to add special subject terms or convert data in some way that required more human intervention, knowing that this investment would not be lost.

Source Metadata: Other Considerations

- What or who created or supplied the metadata?
  - Is there a clear and single owner?
  - Multiple suppliers?
- Is the source metadata complete?
- Why was this metadata created?
  - Was it created to meet specific functional needs?

19

Some other questions to consider about source metadata, which will impact how we design workflows to convert this metadata. These are related to the analysis of metadata in Session 3.

•Single supplier or producer: the metadata will tend to be more uniform. There is one person or organization to go to with questions. The workflow may require less normalization work.

•Multiple suppliers: This is the situation of many places are contributing metadata to a common project (perhaps a union catalog of Dublin Core records). Data will be less uniform, unless contributors have agreed to some standards and/or practices. And even then, there will be differences. Workflow will likely require normalization steps.

Is the metadata complete or was something not finished, or some parts of it not delivered? This may impact scheduling of work. You don't want to run processes on data and then find that you don't have half of it.

Why was the metadata created: the intended use factor in the metadata analysis session. Knowing what and how the metadata supported functional objectives will tell you about its reliability, and whether uniformity was important or not to creators.

Target Metadata

- What purposes are the metadata serving?
- Is this a locally defined element set or larger community standard?
- Is the metadata format supported, and by whom?
  - Is there documentation?
  - Is the format maintained and evolved over time?

20

In the mapping exercise of Session 4, Dublin Core was the target metadata.

Questions to ask with regard to target metadata, to help us determine the nature or characteristics of that data and what will be involved in working with it.

By supported we mean, is it documented? Are there instructions for applying it and examples of its use?

Knowledge about the target metadata scheme is important. Is it possible to get a DTD or XML Schema that defines the element set? Is there documentation and/or help available? For DC, there is an entire community devoted to its use.

When/How to Convert Metadata

- Will depend on the type of metadata conversion required
- Two broad categories or types of metadata conversion work:
  - Enhancement: cleaning up, adding, expanding, disambiguating, updating metadata
  - Mapping: moving metadata from one format to another

21

The two broad types of metadata conversion were discussed in the last session (Session 4).

When to Convert Metadata?

- Once and only once
  - Abandon source metadata in favor of improved set
- Continuously
  - On-the-fly, when requested
  - To feed some downstream processes
- Only when you have to
  - Fixing problems when they are pointed out

22

This is very broadly speaking. Different approaches to converting metadata, each with there own type of workflow.

Once and for all applies to a one time data conversion project. Source data is probably static.

Continuous conversion suggests that your conversion workflow is just one part of a data pipeline, and the same data will be coming again. This will probably be some sort of mapping solution.

“Only when you have to” may be a cost effective way to detecting and making corrections in data—wait until someone notices the problem and draws your attention to it. This is probably useful where data problems are not systematic or regular and thus defy batch cleanup processes.

How to Convert Metadata?

- Manually, record-by-record
- In batch, with automated processes
  - Planning, testing, evaluation, more planning...
  - Conversion
  - Final, or ongoing, evaluation
- A hybrid approach, with some manual and some automated processing

23

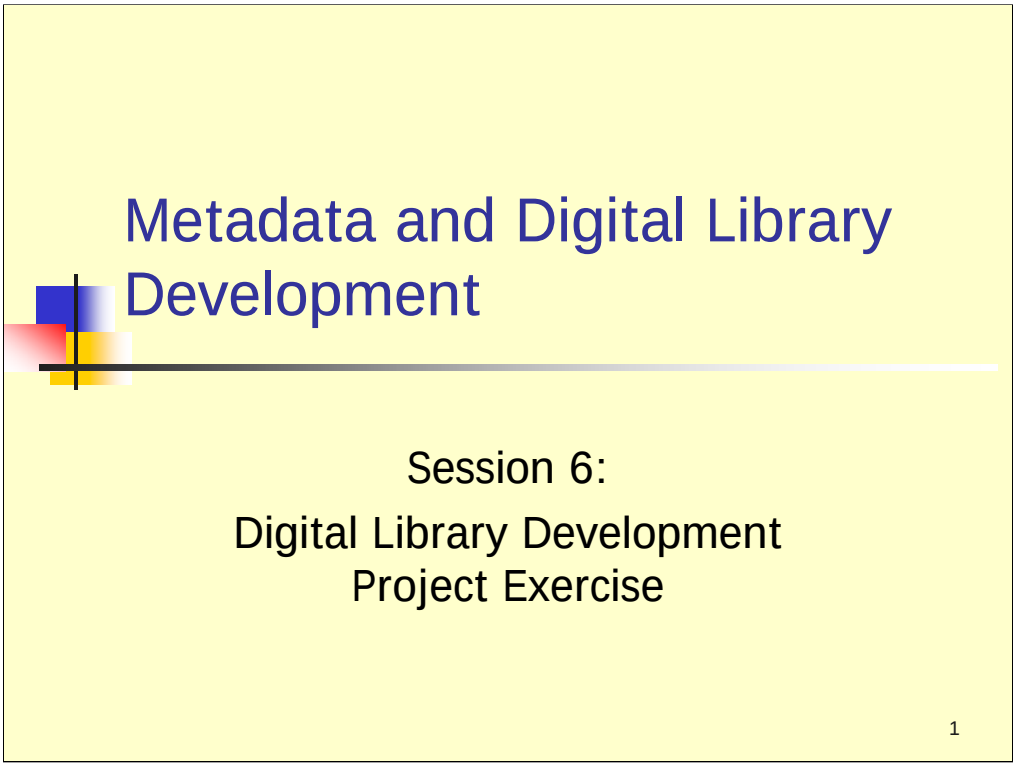
When and how to convert metadata will, again, depend enormously on the type of conversion you're doing. Record cleanup may require manual record-by-record work, although some systematic problems can be corrected in batch. Mapping conversion will be done by some automated process.

The hybrid approach is very common in digital library projects.

Workflow Exercise

- Exercise 5: Metadata Workflow
  - Library Publishing—designing a workflow for a metadata conversion project

24



This session is entirely an exercise. These two slides are intended for the participants materials, but probably do not require projecting.

The Slide Library Project

- Exercise 6: Digital Library Development Project—The Slide Library

2

Metadata and Digital Library Development
Exercise Notes for Trainers

Exercise 1-A: Library Bibliographic System Metadata (Session 1, Slide 7)

The point of Exercise 1-A and 1-B is to detect and discuss the interdependency of system objectives and system metadata. They are intimately tied together. We may have lost some of our sense of this with MARC bibliographic data, since the

Exercise 1-A is a pair of MARC records describing films (Exercises, pp. 1-4), so we're looking at the MARC data and asking:

- How are the objectives of a bibliographic system, i.e., the library catalog (and we've just completed a brief historical review of these objectives) supported by the bibliographic system metadata in front of us.
- What other system objectives can we detect from the system metadata.

Some common objectives for the library bibliographic system are listed on the slide (#7), as a summary of the brief historical survey.

1. Ask how the rules governing this data support system objectives.
    - Which objectives do the descriptive rules and practices for titles and personal names support, and how?
        - Titles support find, identify, select. A lot gets packed into the 245.
        - Names in 700 fields support find; perhaps other objectives? But who would conduct a search on the term "Downey, Robert"? What objectives are served by authority control?
    - Rules for subject description?
    - Rules governing elements to support the "select" objective? How far to take this? What bibliographic details might a potential user wish to base a choice on? This illustrates the need for ultimately achieving a clear definition of objectives supported by a particular system (vs. open-endedness).

2. Some additional questions:
    - From a bunch of similar MARC records for film, could we create a browse list of director names?
        - It would be difficult, unless all directors were cataloged as in Kiss Kiss, with a special subfield marker.
        - Would you expect or want to see Wong Kar-wai's name presented as "Wong, Kar-wai"? MARC and Asian names?
    - Do you think the use here of the 500, 508, 511, and 520 fields is driven by how users may prefer or need information delivered in order to identify/select? Some of the information in these fields (such as the cast members) is also repeated elsewhere. What does this suggest?
        - I'm not sure, and participants probably know better. Does it indicate a weakness of MARC with film metadata?

- What other system objectives can we detect from the system metadata? What other system objectives are revealed by data elements in the MARC records? Look at the control fields (001-008), number and code fields (01X-04X), classification and call number fields (05X-09X), and locally defined fields (9XX). We've been focusing on the discovery of library materials by library patrons. What about librarians as users, and all the system objectives in support of inventory management and control.
    - Other potential objectives?
        - Acquisitions (ordering, invoicing, etc.)
        - Serials tracking
        - Circulation
        - Authority control
        - Classification
        - Identifying source of data
        - Presentation, display

        These objectives also require that data be collected and recorded in highly defined and precise ways.

Exercise 1-B: Digital Library System Metadata (Session 1, Slide 9)

The point of this exercise is the same as the last. In Exercise 1-A, we looked at system metadata designed for a system that all the participants are no doubt quite familiar with. Exercise 1-B is metadata designed for a system we know nothing about (Exercises, pp. 5-8). But because metadata always serves some purpose, we're going to ask what purposes or objectives does it support, and not support. In a sense, we are "reading" or interpreting the metadata to detect something about the system it operates within.

You can get into this data in different ways.

A. One way is to ask a large question first: How do you imagine this metadata being used, and why? Some possibilities:

- To generate a list of films showing?
- Advertising for films?
- Publication information for a calendar?

B. The other approach would be to ask more detailed questions about some of the elements, and what that indicates about system objectives. Some specific data questions:

- Director names and cast member names are all given in non-inverted form. What are you <u>not</u> going to be able to do with such names?
    - Answer: create a list of names alphabetized by surname (at least very easily—if someone says you can split names apart based on comma, look at "Robert Downey, Jr."). Evidently, creating such a list was not an objective of the system designers. The view of the names they wanted was a presentational view, per record.
- Could you make an alphabetized list of film titles?
    - Answer: some real challenges here, with the initial articles, in several languages. It again suggests such a list was not an objective, and that the system was meant to store individual film metadata without browse access to titles or names.
- What do the descriptions sound like they were created for?
- What's a large difference between one of these film records and a MARC record (the first two have MARC parallels in Exercise 1-A). There's the level of detail of course, but more broadly, there's no concern with item description in the film records. This isn't about specific items (a particular DVD), or media types. Inventory control doesn't seem to be a concern here.

It appears, by examining the system's metadata, that all the system objectives are aimed toward publication, the display of information to users—pushing information out as opposed to users sifting through it for themselves. The system certainly doesn't appear to be about bibliographic control. And the metadata illustrates no inventory control objectives either and very little data administration (except perhaps the creationDate element?). In fact, this metadata comes from a film database for a cinema house—they temporarily acquire films for showings, and thus have no inventory. They use the data to populate campus calendars and to create fliers advertising upcoming films.

The point here is not that this metadata is poor or that its uses are limited (even though from a library perspective, it is). Let's assume that the data adequately fulfilled the objectives of the system it went into. The system was a simple one and had simple objectives, and it therefore required fairly simple metadata. Would participants recommend more complex metadata? Why, and what would be the additional cost? There may be some good points made, but if we assume that the system is doing everything its users currently want, then to provide a lot richer metadata for such a system would be unnecessary and likely even wasteful (nearly always, richer metadata equals greater cost).

In digital library work, we take a practical approach to metadata, since there is no single, widely implemented data standard as there is with library bibliographic data. We ask, what metadata is required to support system objectives? And we let those answers guide the development of metadata. Of course, in some cases our system objectives may be complex, and they may include goals such as interoperability or the use of community standards. So it's not as if we are arguing for simple metadata. We're saying that questions about metadata cannot be answered in a vacuum—they must be answered in the context of system objectives.

Exercise 2: Sample Use Case (Session 2, Slide 8)

This should at least be started as a large group exercise. If desired, after general observations have been made, small groups could work on the question of what the metadata specialist will need to pay attention to. My experience suggests, however, that this exercise works better as a large group—it seems to be fairly new terrain for a lot of people. For that reason, the trainer should be as familiar as possible with this use case and comfortable with the goals of the exercise—introducing participants to one way of articulating functional requirements, and getting discussion on how these particular functional requirements impact metadata decisions. The point isn't that we'll need to write use cases, but that, as the metadata specialist, we should be able to understand requirements and determine what metadata will be required to support them.

Explain what a "pre-print" system is: Pre-prints are unpublished articles that a scholar has submitted, or is about to submit, to a publication for review. Therefore, pre-prints typically have not undergone any peer-review. In many respects, a pre-print system is merely a file sharing mechanism—a large database of pre-prints that have been submitted directly by authors. This allows scholars to search for and download their colleagues' writings. One of the advantages of a pre-print system is quickness of "publication." An author can lay claim to a particular subject area or discovery without waiting the months it may take for formal publication. Nearly all authors also submit their articles to a formal publication with review processes. But in some fields where pre-print sharing is wide-spread (such as high-energy physics), by the time the article is formally published everyone with an interest in the article will have read it long before. A well-known and heavily used pre-print system is arXiv.org (for physics, mathematics, and related areas).

A pre-print system can potentially be quite simple, and let's assume this one is. An author will be submitting a file (the full-text of his/her article). The question we deal with here is, what other metadata will be necessary to support the kind of search functionality described in this use case.

Look over the sample use case and make some general observations about what we see. You could start with "who's the USER", given the last slide. On that question, see below under "other general observations."

You should note that this is a fairly detailed and complete use case, which appears to follow a formal structure. Often, functional requirements are not expressed so formally, and use cases may be less detailed than this one. Librarians may encounter functional requirements expressed in a wide variety of ways.

Use cases can be expressed in many different ways. There is no fixed language or format. The sample use case shows typical components of a use case, which are:

- Priority: When developing use cases in the requirements phase, most system planners try to get all possible use cases listed, even ones that represent an "in the best of all worlds" approach. Having everything down allows project planners to then take a comprehensive view of all development possibilities, present a complete range of possibilities to decision makers, and avoids surprises and misunderstandings later ("I

thought this system was going to do X!!”). Once all possibilities are in front of the project team, priorities are assigned. This can be done in different ways depending on the project. Perhaps the choices are merely “essential | non-essential”, meaning the use case will be implemented or it won’t. A tough choice, but the project timeline and budget may require that sort of in/out decision making. Or perhaps, if a project has a longer potential development period, priorities are assigned by project phases: “Phase I | Phase II | later.”

- Preconditions: A use case describes one discrete interaction between system and USER. Preconditions describe the state of affairs, or necessary environment, that needs to be in place before the USER can interact with the system in the particular way described by this use case.
- Flow of Events: This describes the use case scenario as individual steps. This could be expressed in narrative form, though numerical steps are easier to follow. Since there will often be ways in which the scenario could take a different turn, this one is considered the “main” or “ideal” flow of events. Exceptions are then listed elsewhere (here, in the Alternative Events section).
- Alternative Events: This is a list of exceptions to the main scenario, things that may happen to cause the main scenario to go in a different direction, be cut short, etc. There are almost always potential exceptions, particularly when the USER is a human. All USERs are external to the system and are therefore out of the system’s control. A final point about Alternative Events is made down below. You could raise that here, if desired.

Other general observations:

- Who is the USER in this use case. The USER here represents a class of general public (human) users, those searching the system.
- Use cases are used by system programmers to guide their work. The more that use cases are broken down into discrete interactions, with each interaction precisely spelled out, the more useful they are for programmers to work from. Imagine if the requirement was merely that users should be able to search the system. We don’t know if this is a simple or advanced search, and without knowing that, implementation would be guess work. Or imagine if this use case wasn’t very precise and merely stated that “Advanced Search” was necessary (the first two sentences and the priority), without the scenario steps. If that is give to the programmer, there are a lot of unanswered questions. Either the programmer has to seek out someone to answer them, or will have to come up with his/her own answers. One of the goals of generating functional requirements is to be sure that system design is not carried out by single individuals working alone.
- The use case has a number on it, “8.3.2,” suggesting that it is one use case among many describing the functions of this system. There’s also some classification grouping in use. So, we could speculate that “Simple Search” might be 8.3.1. The main point is that a system could have dozens of use cases describing every interaction an external USER may have with the system. Large enterprise systems may have hundreds.

After general observations about the use case, you can begin to ask questions that will concern the metadata specialist.

Ask participants to take on the role of the metadata specialist on the digital library project team that is designing and implementing this system. The metadata specialist is going to be responsible for the shape of metadata flowing into this system and will have to ensure that this metadata can fulfill the objectives of the system. So what we want to do is walk through the Flow of Events and ask which of these will depend on or impact system metadata decisions. These are the ones the metadata specialist needs to focus on and perhaps raise questions about.

The notes below are fairly detailed in order to give trainers as much information as possible. Trainers will need to assess how far to take discussion, given the particular workshop participants and their interests.

- Step 1: Doesn't have anything to do with the metadata specialist, strictly speaking. Librarians often tend toward interface issues and some may say that five boxes are too many, etc. But that's an interface and usability issue, not metadata—that's for a different role on the project team. Throughout, steer people away from questions strictly related to the interface.
- Step 2: This won't normally have to do with the metadata specialist.
- Step 3: The metadata specialist will be involved in this one. On a simple level, the metadata records for each pre-print will have to allow for at least these metadata fields: author, title, abstract, subject(s. You may want to leave it at that. But there's a second, more complex interaction with system metadata here. The metadata specialist will, eventually, have looked at all the system's use cases, and will have some sense of the general metadata requirements for records in the system. This knowledge may impact this use case. For example, perhaps multiple titles are going to have to be allowed per record, because another use case requires the display of title in different languages, if available. In that case, is a title search here on all titles, or just one, and which one? This is an implementation issue and not dealt with in a use case, but it's an example of how the metadata specialist will need to track these sorts of things and be involved in the actual implementation work when that is carried out. That is, he/she may need to be sure that programmers receive instructions to take all titles when building the search index. Another example: if not all records are required to have abstracts or subjects, what's the impact going to be on searches on these fields? Should users be made aware that not all records have all fields (a question the metadata specialist can put to a usability or interface specialist).
- Step 4: No metadata issues here.
- Step 5: Indicates that records need to record a submission date, with at least month/year granularity. Also means the date must be recorded in a way that it can be machine processed. That is, the system must be able to understand and sort dates by month. Argues for using a standard for such dates (such as ISO8601).
- Step 6: This step requires that each record have a date (required above already), author, and title. Author is the interesting one here, and where the metadata specialist could point out a need for clarification and more detail in the use case. Are we sorting by surname? If so, this needs to be made clear, and the implications for system

metadata are that names need to be recorded so that they can be sorted by surname. So, is inverted order sufficient? Here again, a broader knowledge of all the system's use cases will be required. Perhaps another use case requires that author names be presented in non-inverted order, such as on an individual record page where interface people want "pretty" presentation views of the author's name. Then, the implications are that name metadata will need to be more complex. This could get messy, if professional titles and name suffixes (Jr., MD., etc.) are considered. The metadata specialist needs to wade through all the use cases and ultimately decide how name data will need to be captured and stored to meet the requirements of the system.

- Step 7-9: No metadata issues here.
- Step 10: This will again involve the metadata specialist. Among metadata fields to display, it proposes "extent," defined here as the total number of pages in the pre-print. So this will need to be captured on submission or somehow calculated. Also, for display of author names, it's clear that if there are multiple authors, all are to be displayed. What order does the system put them in (not just here but other places where pre-print authors are displayed)? Is the order of author names on a pre-print important, and if so, how is this information recorded in the metadata? And finally, each name is to be linked to a search on that author, presumably to return all pre-prints in the system by that author. This raises big questions about name authority control. If an author is once "John Doe," and another time "J. Doe," and yet another "J.E. Doe," what impact will this have on author searching? What metadata related decisions will the project team be facing? Some possible solutions:
    - Urge/enforce authors to use the same form of their name on every pre-print. This will be an unrealistic requirement in any sizable system where authors submit their own papers. And it doesn't avoid legitimate name collisions.
    - Require that author's register with the system in order to submit, and thus their unique ID can be associated with that paper. Yet this doesn't take into account multiple authored papers, which would require the submitting author to somehow know and indicate the IDs of all the other authors of the paper (some of whom may not be registered in the system).
    - Have some sort of name authority police that review every submission and unambiguously identify ("tag") every author. Expensive.
    - Don't attempt name authority control. Try to do some fancy things with fuzzy searching and figure false positives will occur. This is certainly the least expensive route to go.

  The metadata specialist would be very involved in this kind of discussion, since most of the solutions will depend on author metadata. For these, the specialist would need to lay out the various options and related costs (including any potential workflow and staffing requirements).

Final observations:

- Notice that only the interactions between USER and system are described. There is no description of how the system will accomplish any of the actions it takes.

- Look at the Alternative Events. USERs are external to the system and their behavior can be constrained but not controlled. The Alternative Events describe exceptions, or other events, that might happen during the scenario of this Use Case. Many of these will result from some USER action, but not all (such as a system error). You can ask if anyone can think of other possible events that could happen to change the main flow of events. Basically, what other crazy things might a USER potentially do? There may be several, but one prominently missing one is:
    - The USER submits the search with no search terms entered in the query boxes.

You can make the point again, from above, that this is a formal expression of a use case, and that librarians will likely encounter functional requirements expressed far less precisely. We'll see this in later exercises.

Exercise 3: Metadata Analysis (Session 3, Slide 22)

If this is a two-day workshop, and Session 3 runs about 1.5 hours, it is not likely that there will be enough time to complete both parts of the exercise. Under the two-day workshop format, if you really want to do both parts, you'll need to speed through the slides.

So the recommendation is to do only Part I. I've left Part II because the workshop could be reformatted across several half-days, etc. Or some trainers may prefer it to Part I.

Benefits of doing Part Two: It is scenario based, and in that sense is a good introduction to the methodology of the final 3 exercises of the workshop. It is an application of the analysis portion of the exercise, and thus illustrates how one might apply the results of metadata analysis to making some real life decisions. It connects the issues of metadata and functionality much more than Part One alone.

Disadvantages to doing Part Two: will take time to treat adequately, and you'll be forced to speed through the slide content, limiting discussion, and push through Part One of the exercise.

Part One: Analysis

Don't let attendees get bogged down in minutia here. They shouldn't over think answers. As the instructions say, evaluating adherence to content value standards isn't the point, but rather what standards might be examined in a more in-depth evaluation.

The Exercises should have been printed so that the template is a separate page. If in 3-hole binder, then it can be physically removed.

"Answers" are in the back of the attendee's exercise booklet.

Part Two: Scenarios

Discussion of potential solutions to the various scenarios is included in the back of the participants' exercise materials. So if you don't have time for this part of the exercise, participants can go through this on their own, if they wish.

If you do have time for Part II, but have only two groups, Scenarios B and C provide a nice contrast. They are identical except for the resource constraints. This of course completely changes the solutions possible.

Exercise 4: Metadata Mapping Exercise (Session 4, Slide 15)

This is intended as a small group exercise. You may want to establish the groups, give everyone a chance to read the introduction, and then go over the assignment altogether. Main points:

- This is a mapping exercise. We're mapping from one scheme (the source metadata) to another (the target).
- The source metadata is rich but non-standard. There are three examples of the source metadata, provided on pages 35-37, with each page holding a separate example. Each example is a journal issue, and includes metadata about the issue as a whole, and then individual records about each article in the associated issue. But only one, or two, articles are shown per issue, to keep the samples short. Imagine that there may be as many as ten articles per issue.
- The target metadata is simple Dublin Core, which has only 15 possible elements. These are the only elements allowed. They are all optional and all repeatable.
- Each Dublin Core record created should describe an article in the journal hosting system. We could decide to map differently (say, every DC record is a journal issue), but article-level records makes the most sense for increasing visibility and discoverability of journal content.

Depending on the group and their familiarity with Dublin Core, trainers may need to summarize:

- Simple Dublin Core, 15 elements only. Each is optional and each can repeat. But none of them can contain additional, child elements of any kind (this will become important in deciding how to deal with abstracts/Description).
- Qualified Dublin Core, or DC element refinements: these DC terms "refine" (they don't extend) the 15 core DC elements.
- The "dumb down" principle: in a Simple DC environment, element refinements are lost, and any refined data value is associated only with the core element being refined. For example, the DC term "alternative" is a refinement of DC Title. It gives more precise information about what sort of title you have. But when reduced to simple DC, the refinement goes away and the alternative title is described only as Title. We've lost precision (dumbed down), but the data value is still appropriate as a DC Title.

A few other points about the source metadata that people may ask about:

- If not familiar with XML: nesting is important in XML, and this is XML. Nesting is made apparent in the example metadata by indentation. Nested, or child elements, belong most directly to their parent elements. For example, the affiliation information in the first sample applies to a single author only, not directly to the article.
- A "doi" identifier is a Digital Object Identifier, a universally recognized identifier that can be used to locate the item identified via the WWW. So, is this identifier appropriate for shared metadata concerned with increasing the discoverability of resources?
- A "pii" identifier is a Publisher Item Identifier. PII's are peculiar to individual publishers, used for internal purposes, and likely have no meaning outside of a

particular publishing operation. Is this the sort of identifier to include in shared metadata?

Once participants get going, if they are struggling with making decisions, trying to determine the "right" answer, then you can ask: why are we making this map? What's the purpose of the target metadata scheme? How will it be used? (In other words, what are the functional objectives of the target metadata scheme?)

The answer to this is the last "hint" on the Instructions (p. 34). The main reason for creating simple DC records from rich metadata is in order to share it, and the typical objective in doing so is to aid resource discovery. So let discovery guide decisions. Choose to include data most helpful to end-users in finding and selecting this resource. For an example of where this may impact decision making, see the discussion of the "date" element in the answers.

For when the groups report back to the entire workshop, trainers should have carefully read the "answers" to this exercise, which are in the back of the participants' exercises.

Some good points for summary, after reporting back of the groups (or if people are struggling over these issues while they work):

- This mapping isn't about bibliographic control. We can convert metadata for all sorts of reasons, some of which may be to exert more control over the data and the resources. But this metadata conversion project isn't about that. It is for interoperability, metadata sharing, increasing the visibility of resources, etc.

- Along the same lines, an important point to make: This is a one-way mapping. We are converting metadata from a rich source to a fairly "dumb" target. We will lose information in the mapping process (you can ask what gets lost). It is therefore understood that this mapping is done only to allow us to export records in some common format, to share the data. The source data is not going away. The system that it lives in presumably requires the richness it exhibits in order to provide the functionality it does provide. So the hosting service will continue to use their native, source metadata format.

- Some people may have heard of "round-tripping," of data, where you can map to a format with no data loss, and thus map back again. This should be true for MARC and MARCXML. But it is not true for this exercise. There is data loss and thus a round-trip is impossible.

Possible mapping answers and points of discussion are found in the back of the attendee's Exercise booklet.

If time is short, or folks are struggling, here are some DC elements that are fairly straightforward but nevertheless illustrate what's involved in mapping:

Creator, Subject, Date, Language,

More complex considerations will be required for these elements:

Description, Identifier

Exercise 5: Metadata Workflow Exercise (Session 5, Slide 24)

Have different groups work on different scenarios. If you have 4 groups, have two of them work on Scenario A and two on Scenario B. This provides interesting contrasts when reporting back at the end. Allow plenty of time for reporting back. This is an important part of the exercise, as it will raise interesting questions and discussion.

If you are operating with the standard workshop schedule, try to end the slides to allow some time to break into groups and familiarize themselves with the exercise and its materials, before the morning break. This will give the entire second session of the day to completing and reporting back. For familiarization, one approach is give everyone time to read through their scenario and the deliverables, and to look over the sample metadata. And then, in a large group, you may want to ask for questions and/or go over some things.

Source metadata:

- Many of these MARC records are old. Participants will likely notice that they do not adhere to current cataloging rules. This is a good think to notice, and updating MARC records may figure into a workflow design (or not). But as source metadata to work with, such records are typical—you rarely have perfect data, and you have to create processes that deal with what you have. What you want to avoid is having attention get sidetracked by a discussion of the quality of the MARC records. If this happens, it is valuable to point it out—that participants are focusing on what they know best (assuming they are catalogers), and not on the problem at hand, which is one of data conversion and the workflows that support that.

Target metadata:

- Depending on participants comfort level with XML, you may need to go over the target metadata scheme on pages 71-72. This is a blank template with XML tags showing where content values would be entered (between the start and end tags). The nesting shows child/parent relationships. The top level element, monograph, has two child elements. The first is monograph_data, which holds monograph-level information. The second is monograph_parts, which holds repeating section elements. This is where the individual sections (probably chapters) of the monograph would be described.

- Required elements: if you use monograph, you must use monograph_data, and if you use monograph_data, you must at least have a title inside of it. So a monograph title is basically the only absolute requirement when submitting this data. If you do use monograph_sections, then similarly, you must use at least one section, and that must have at least a title in it.

- The main point to be sure people grasp is that this metadata scheme is very permissive in terms of how much metadata you actually use in it, and thus the libraries have huge latitude as to how much metadata to provide. Valid metadata records can be created with only a monograph title in them. That’s the minimum, and it is therefore an option. What are the project objectives that encourage us to provide more than the minimum, or the project constraints that keep us closer to the minimum?

Deliverables:

- The list of deliverables for Exercise 5 may appear daunting. Emphasize that most of these deliverables can and should be answered quickly—tell them to just march along and bang out answers as best they can. As participants work through this exercise, if they are struggling with what terminology to use, or how to answer the questions, direct them back to the slides. The deliverables list is more or less straight from the slides (esp. Session 5, slide 4-12).

- It is worth emphasizing the point made at the top of the deliverables: they are only responsible for the metadata operation here. Other team members will be responsible for figuring out selection, scanning workflows, etc. There can be a tendency to think of this as "project management" rather than metadata workflow design and management.

- Depending on the groups, you may need to spend time with them as they work. Some groups will get it and some won't. Ask groups to get your attention if any one part is taking them very long, if they are getting bogged down.

- Don't let anyone do deliverable 8, the metadata mapping, before they've finished everything else. You may want to tell participants that step 8 is only for "fun" if they finish everything else. Some people like maps, but this exercise is primarily about workflow design. The point of have the mapping deliverable is just to emphasize that part of setting up and running this workflow will involve creating some metadata maps.

- If time is short, then skip 3 (b) (or only have them do 3 (b) for one or two tasks), and 8.

<u>For trainers: the differences between the two scenarios</u>:

These differences will probably become clear during the reporting back and you should point them out at that time. As long as participants understand their own scenario, it's not necessary for them to understand how theirs differs from the other. That's instructive in reporting back and summarizing the exercise, but not useful in trying to complete it.

The two scenarios have the same source and target metadata, and so the primary distinction between them is one of environmental or contextual constraints. Essentially, B has greater resource constraints than A. The incentive to participate in B is that, in time, and if successful, it will serve the greater good—access to more full-text titles than would be possible by most single institutions. There is no commercial incentive in B, as there is with A. B will require spending resources (member fees, staff time for work), with no financial return, and so these libraries will always be evaluating opportunity costs (what they could do with these resources if they weren't being spent on this project), and trying to keep those costs as low as possible. In contrast, A has some financial incentives to participate, potentially returning to the library money which at a minimum could be used to support the operation (low or no opportunity costs), and might even support other library operations, if things were wildly successful.

Scenario A is not constraint free, however. What we might call an environmental constraint is the inability to make any substantial modifications to the MARC records in the catalog. If this library wants to augment the MARC metadata, this means they will have to figure out how to do this outside the catalog.

Notes on the deliverables:

1 (a): What is important here is how clearly the conversion articulated objectives demonstrate a full appreciation of what it is they are trying to accomplish. See the final point under "Target metadata," above. Has there been a definite decision to augment the metadata? Do the broad objectives summarize the activity? Has there been a definite decision not to go beyond supplying any metadata not already within a MARC record? The tendency will be to say that "the MARC records will be converted to the target metadata," which may be accurate, if that's all that's going to happen, but if augmenting the metadata is part of the project, then it's incomplete as a description of the overall workflow.

1 (b), (c): These are pretty straightforward, relying on what we did in Session and Exercise 3. There's nothing too tricky here. The interesting points may be:

- We don't know too much about the target metadata format, but it seems to be simple enough though not a standard. On the other hand, if a number of other libraries are using it, there are likely to be others with knowledge of it who could share their experiences (or even data—such as author bios).

- The target metadata's intended use appears to be to advertise and/or sell books. That is, the data model includes possible author bios, author photos, and cover images. These are the sorts of things that a business like Amazon would likely be interested in. In scenario A, we know this sort of metadata helps sell books, so there's some incentive to come up with it. The question for that group will be what are the opportunities and costs of doing so. For scenario B, they aren't selling books, so it's unlikely they would justify spending resources on this type of metadata.

- The status of the source metadata is important. These are MARC records and thus, in terms of their use within a catalog, they need to be considered dynamic. They may rarely change, but they are in a working, production system that allows them to be changed. On the other hand, if the records are going to be divorced from the catalog (as they may with Scenario A), then that data is in a sense static. The two scenarios will likely differ here:

    - Scenario A will likely pull the MARC records from the catalog (perhaps after some scan to correct any obvious problems that you would want to correct in MARC, or to tag them in some way). At that point, assuming the library wants to augment the metadata, and knowing that they cannot put that extra data in the catalog, the data is basically divorced now from the catalog. This gives the metadata specialist more room to move in terms of how the metadata might be modified, enhanced, etc. See the slides on "static source metadata." It is possible of course that Scenario A participants

will play it safe and decide not to augment the MARC data, and thus they could do catalog record extractions and automatic mappings to the target metadata format.

- Scenario B is wedded to the records in the catalog. They really do need to figure out how to do regular record extractions, and then map those records to the target metadata. It is possible they could figure out a system that would allow store supplemental record metadata, and after a catalog extract, that supplemental data could be threaded into the appropriate records. But this raises the question of what their motivation would be to do this. There doesn't seem to be much. The big challenge for Scenario B is the source-to-target mapping. They could just submit very minimal metadata, but might they be more creative in what they do with some of the MARC fields?

2: See the notes above, under "the differences between the two scenarios."

3: This will depend on the overall workflow they come up with, and the way they break it down into tasks. There is no right answer, and different people will bring different experiences, leading to different results. Things to watch out for:

- Are we straying away from metadata? If one of the workflow tasks is "selection," then yes, we have.
- Are the tasks broken down far enough? Do the individual tasks seem like they could be implemented as a single operation, or do they really involve several subtasks (sub-steps).

4: This will raise the issue of setup tasks versus ongoing, operational tasks. Creating a metadata map is an essential task, but in theory, it is done just once, prior to any automated conversion of data. Setup, in fact, may be its own higher level task (develop an automated metadata conversion process), which has its own set of subtasks, such as developing metadata maps, testing the conversion, etc. Setup tasks will be one-time tasks, hopefully. Depending on their nature, they may require different types of maintenance. Creating a metadata map, as noted, is over when it's over and doesn't require maintenance. Automated metadata conversion processes, using these maps, will likely need some monitoring and periodic evaluation.

5: It seems like both scenarios will have ongoing workflows, operating as long as the libraries participate in the book publishing project. This is especially true of Scenario B, which will likely come up with a nearly fully automated workflow, and yet one that merely needs some form of monitoring after setup, preferably automated monitoring. Assuming Scenario A goes for some metadata augmentation, then their workflow can probably not be fully automated and they'll have more traditional metadata enrichment workflows to support, using human resources.

6: This could be all over the map. The important point is to be sure that resource costs, especially people, are on the table, and an important part of the considerations. During reporting, you can be on guard for 6 (e). Scenario B is pretty much in a box as far the resources they can contribute to this workflow down the road. Does the group get this? Be sure they aren't proposing a workflow that assumes ongoing human resources.

7: This should be straightforward. See Session 5, slide 12. But no doubt someone will come up with more clever things to add.

8: It is likely there won't be time for much detailed work on maps.

- What about author dates from MARC? Where might these go? Or editor's given name?
- Is there any way to use the 500 notes? Is there any incentive? How will the two scenarios use these notes differently?

Summary points:

One point of the exercise is that it should demonstrate that workflows are often not all fully automated or all fully manual, but typically a hybrid.

Another summary point could be made from some of the distinctions between the two scenarios (see above, the "differences between scenarios"), and how different objectives and constraints will lead to quite different solutions. Metadata decisions will depend on the project, or system, objectives.

Exercise 6: Digital Library Development Exercise—The Slide Library

Like Exercise 5, this one can appear daunting. But we've now been through the material and once the participants sort through the details of the scenarios, the deliverables should fall into place. Again, the trainers should plan to spend some time with each group, especially early, to make sure they've read the scenarios accurately and aren't going down some strange path.

Differences among the scenarios:

The primary difference between the A and B scenarios is that between buying software and developing it in-house. Scenario A will buy a commercial product, ArtBox, and they must both evaluate to what degree it supports desired functionality and ask whether they can live with what it may not provide. Scenario B involves developing a solution within the library, giving the library much more control over achieving desired functionality.

Three of the scenarios involve significant constraints that create some sort of transition period impacting metadata decisions. In the A scenarios, ArtBox won't be VRA capable for two years, and thus there is no way to get out of the original metadata model used by the Filemaker Pro database for two years. (The assumption is that it would be better to dump the original metadata model in favor of VRA—see below under 1 (a).) In scenario B-2, they are also stuck with the original database and its data model, since they are not able to devote staff to additional software development for two years. (In B-1, they do decide to devote the resources to develop the capability that will allow them to move away from the Filemaker Pro database altogether. At most, there's a three month transition period.)

All the scenarios must deal with the problem of how to input data into the system, since this data is active and will continue to be produced. The question of data input is what distinguishes A-1 from A-2, and B-1 from B-2. A-1 has a data input method, but since one can only input DC records, the art librarian won't use it. A-2 has no current method of data input. [This effectively makes A-1 and A-2 the same.]

In B-1, the decision is made to move ahead and develop a database capable of accepting VRA data input and storing native VRA records, thus allowing them to move away from the Filemaker Pro database altogether. There may be some relatively short transition period, but this scenario is the only one that allows the library to get away from the original metadata model. In B-2, the capability of a VRA database and data input must be put off for two years, so data input will continue via the Filemaker Pro database. Thus the original metadata model will continue to be behind all the operations of this scenario, and the work will be in mapping from this metadata to the two others required: VRA and DC.

Notes on the deliverables:

1 (a): The requirements that will depend on metadata are:

- The ability to search on the title of a work and bring up all images of that work.
- The ability to search by period or date and bring up all works of that period or date.

- The ability to search by type of work, like “painting,” or “temple,” and bring up all images pertaining to that type.

1 (a) (i-iii): The issues are similar for all three requirements. Ensuring that all records have a completed title, period, date, and work type element would be straightforward. But how do we satisfy the collocating objective that is being requested? For title, unless there is some way of collocated all images of a work (which VRA offers), then this collocation will need to be achieved by ensuring that all images of a given work share an identical title. Some analysis of the data would have to be done to evaluate how much work this would involve. An alternative to changing titles would be to insert an additional uniform title in all records. Conceivably the classification code may be of some help here. Period and date present a similar problem, if not more serious, since the date and period data values appear to be rendered in various ways, and some are missing entirely.

VRA Core, with its separation of work and image, its ability to collocate all images of a work, and its formalized methods of rendering data such as dates and work types, could meet the functional objectives for the searching desired. It is also a well-supported and documented standard that is as rich as the current metadata in use. So, given other project objectives, and all things being equal, we ought to get out of the current Filemaker Pro metadata, mapping it all to VRA Core and only maintaining VRA going forward. All things are not equal, however, due to the various constraints.

1 (b): Decision has to be made about how to solve the collocating objective. Probably should choose to make corrections or enhancements to the metadata that we’d be making even if we were converting our data directly to VRA.

We are ignoring copyright issues completely.

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Metadata and Digital Library Development

Workshop Exercises

Contents **Page**

Exercise 1-A: Library Bibliographic System Metadata	1
Exercise 1-B: Digital Library System Metadata	5
Exercise 2: Sample Use Case	9
Exercise 3: Metadata Analysis	11
Exercise 4: Metadata Mapping—OAI DC Record Creation	33
Exercise 5: Metadata Workflow—Library Publishing	57
Exercise 6: Digital Library Development Project—Slide Collection	77
Exercise 3 Answers	97
Exercise 4 Answers	103

Kiss kiss bang bang Warner Bros. Pictures presents a Silver Pictures ;...

000 02820cgm a2200553Ka 450

001 5834341

005 20060731152637.0

007 vd cvaizq

008 060216p20062005cau103 e vleng d

035 __ **|a** (OCoLC)ocm63931059

040 __ **|a** TEFMT **|c** TEFMT **|d** TEF **|d** RCS **|d** GK8 **|d** GK6 **|d** WHP **|d** OUN

020 __ **|a** 0790799944

024 10 **|a** 012569586710

028 42 **|a** 58671 **|b** Warner Home Video

037 __ **|b** Midwest Tape **|n** http://www.midwesttapes.com

041 1_ **|a** eng **|b** fre **|b** spa **|g** eng

043 __ **|a** n-us-ca

245 00 **|a** Kiss kiss bang bang **|h** [videorecording] / **|c** Warner Bros. Pictures presents a Silver Pictures ; produced by Joel Silver ; screen story and screenplay by Shane Black ; directed by Shane Black.

250 __ **|a** Widescreen ed.

260 __ **|a** Burbank, CA : **|b** Warner Home Video, **|c** 2006.

300 __ **|a** 1 videodisc (ca. 103 min.) : **|b** sd., col. ; **|c** 4 3/4 in.

538 __ **|a** DVD, region 1, widescreen presentation; Dolby Digital 5.1 surround.

546 __ **|a** English, French or Spanish dialogue with optional English, French or Spanish subtitles; closed-captioned.

511 1_ **|a** Robert Downey Jr., Val Kilmer, Michelle Monaghan, Corbin Bernsen.

508 __ **|a** Director of photography, Michael Barrett ; edited by, Jim Page ; music by, John Ottman ; costume designer, Christopher J. Kristoff ; production designer, Aaron Osborne.

500 __ **|a** Based, in part, on the novel "Bodies are where you find them" by Brett Halliday.

521 8_ **|a** MPAA rating: R; for language, violence and sexuality/nudity.

520 __ **|a** While fleeing from the cops, small time hood Harry Lockhart stumbles into an acting audition. He does so well he gets to go to Hollywood. While there, Harry pursues a girl he loved in high school and ends up geting caught up in twisted murder mystery. His only chance of getting out alive is a private detective named Gay Perry, who also works as a consultant for movies.

500 __ **|a** Special features: gag reel; commentary with Val Kilmer, Robert Downey Jr. and Shane Black; theatrical trailer.

650 _0 **|a** Acting **|x** Auditions **|v** Drama.

650 _0 **|a** Man-woman relationships **|z** California **|z** Los Angeles **|v** Drama.

650 _0 **|a** Private investigators **|z** California **|z** Los Angeles **|v** Drama.

650 _0 **|a** Feature films.

650 _0 **|a** Comedy films.

650 _0 **|a** Detective and mystery films.

650 _0 **|a** Video recordings for the hearing impaired.

700 1_ **|a** Downey, Robert, **|d** 1965-

700 1_ **|a** Kilmer, Val, **|d** 1959-

700 1_ **|a** Monaghan, Michelle.

700 1_ **|a** Bernsen, Corbin, **|d** 1954-

700 1_ **|a** Halliday, Brett. **|t** Bodies are where you find them.

700 1_ **|a** Silver, Joel. **|4** prd

700 1_ **|a** Black, Shane. **|4** aus **|4** drt

710 2_ **|a** Warner Bros. Pictures (1969-)

710 2_ **|a** Silver Pictures.

994 __ **|a** C0 **|b** COO

2046 Chun guang ying hua ; Ze dong dian ying you xian gong si zhi zuo ;...

000 02679cgm a2200565 a 450

001 5414449

005 20050218162152.0

007 vd cvaizs

008 050119s2004 cc 129 0vlchi d

028 41 **|a** VCD2758 **|b** Mei Ah Entertainment

035 __ **|a** (CStRLIN)NYCO05-F5

040 __ **|a** NIC **|c** NIC

066 __ **|c** $1

090 __ **|i** 02/18/05 N

245 00 **|6** 880-01 **|a** 2046 **|h** [videorecording] / **|c** Chun guang ying hua ; Ze dong dian ying you xian gong si zhi zuo ; bian ju, dao yan Wang Jiawei.

260 __ **|6** 880-02 **|a** Xianggang : **|b** Mei ya yu le you xian gong si, **|c** 2004.

300 __ **|a** 2 videodiscs (129 mins.) : **|b** sd., col. ; **|c** 4 3/4 in.

538 __ **|a** VCD.

520 __ **|a** Loosely a sequel to Wong's film "In the mood for love", the writer Chow in this film become a womanizer. The film tells his various relationships with a group of women. His affair with a callgirl, who resident in room 2046 in a hotel. Is 2046 a hotel room number? A train to the future? A momory? The year before China's fifty-year of self-governing promise for Hong Kong expires? It is up to you to find its own meaning.

546 __ **|a** Chinese (Cantonese or Mandarin) dialogue, Chinese subtitles.

511 1_ **|a** Liang Chaowei, Wang Fei, Gong Li, Zhang Ziyi, Liu Jialing.

538 __ **|a** VCD.

500 __ **|a** A foreign film.

650 _0 **|a** Feature films **|z** China **|z** Hong Kong.

700 1_ **|a** Wong, Kar-wai, **|d** 1958-

700 1_ **|a** Leung, Tony Chiu Wai, **|d** 1962-

700 1_ **|6** 880-03 **|a** Wang, Fei, **|d** 1969-

700 1_ **|6** 880-04 **|a** Gong, Li, **|d** 1965-

700 1_ **|6** 880-05 **|a** Zhang, Ziyi, **|d** 1979-

700 1_ **|6** 880-06 **|a** Liu, Jialing, **|d** 1964-

710 2_ **|6** 880-07 **|a** Chun guang ying hua.

710 2_ **|6** 880-08 **|a** Ze dong dian ying you xian gong si.

710 2_ **|6** 880-09 **|a** Mei ya yu le you xian gong si.

880 00 **|6** 245-01/$1 **|a** 2046 **|h** [videorecording] / **|c** 春光　映畫 ; 澤東　電影　有限公司　制作 ; 編劇,　導演　王　家衛.

880 __ **|6** 260-02/$1 **|a** 香港 : **|b** 美亞　娛樂　有限　公司, **|c** 2004.

880 1_ **|6** 700-03/$1 **|a** 王　菲, **|d** 1969-

880 1_ **|6** 700-04/$1 **|a** 巩　俐, **|d** 1965-

880 1_ **|6** 700-05/$1 **|a** 章　子怡, **|d** 1979-

880 1_ **|6** 700-06/$1 **|a** 劉　嘉玲, **|d** 1964-

880 2_ **|6** 710-07/$1 **|a** 春光　映畫.

880 2_ **|6** 710-08/$1 **|a** 澤東　電影　有限　公司

880 2_ **|6** 710-09/$1 **|a** 美亞　娛樂　有限　公司.

948 0_ **|a** 20050208 **|b** r **|d** wt32 **|e** cts **|h** ?

957 __ **|a** yesasia.com/bw

998 __ **|a** 02/18/05 **|t** c **|s** 9114 **|l** NYCO **|n** NIC **|w** NYCO05F5 **|d** 01/19/05 **|c** TM **|b** CJK

987 __ **|a** PINYIN **|b** NIC **|d** c

950 __ **|l** WASAV **|a** videodisc 2187 (Chi)

955 __ **|l** WASAV **|c** 1:(disc 1-2) **|s** \Olin Media Center\ **|i** 02/18/05 C

948 1_ **|a** 20050218 **|b** o **|d** tkm2 **|e** cts

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    <director>Shane Black</director>
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    <country>USA</country>
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    <director>Wong Kar Wai</director>
    <release>2004</release>
    <country>China</country>
    <description>Tony Leung reprises his role as the frustrated romantic of In the Mood for Love in this nominal sequel, "a complex, visually rich, pull-out-all-stops rumination on memory, regret, relationships and the creative process." (SF Chronicle) In Cantonese, Japanese and Mandarin.</description>
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    <director>Kurt Neuman</director>
    <release>1958</release>
    <country>USA</country>
    <description>The Fly is the story of one man's quest to perfect a teleporter. Unfortunately, a fly gets in the machine with him in the test phase and he emerges with the fly's head on his body and his head on the fly's body.</description>
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    <director>Wolfgang Petersen</director>
    <release>1981</release>
    <country>Germany</country>
    <description>This internationally acclaimed account of a German submarine
    crew was the first film to examine the ordinary German recruit's experience
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    (New York Times). The new director's cut features almost an hour of extra
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    Dine produces an exhibition of huge, bold charcoal drawings directly on the
    walls of the Ludwigsburg Kunstverein near Stuttgart, Germany. It is an
    unusual and transitory exhibition in that the drawings remain on the walls for
    only six weeks before being painted over. All About Looking depicts Dine
    teaching drawing (from male and female nude models) at the famed
    Internationale Sommerakademie fur Bildene Kunst in Salzburg, Austria. The
    class (and the viewer) learns that the effort is not geared toward the creation
    of a finished product; it is the process that is all important -- an
    understanding that is both liberating and fortifying and designed to enable
    the student to look and to see. Cosponsored with the History of Art Majors'
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    <director>Jean Vigo</director>
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    <country>France</country>
    <description>Jean Vigo's genius emerges from this enchanting story of a
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    artistic vison and life-affirming spirit animate multiple emotional
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    <director>Philippe Garrel</director>
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    <director>Michelangelo Antonioni</director>
    <release>1962</release>
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    <description>The last part of Antonioni's trilogy of spiritual dissolution,
    Eclipse follows a young woman of twenty-two wandering among the
    changing streets of Rome and addressing the transient affairs of her
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    Hurdes</title>
    <director>Luis Bunuel</director>
```

```
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    Salvador Dali, that audiences mistook the film for poetry, when in fact it was
    "basically a desperate, passionate call to murder." 75 years later, Bunuel
    might still be disappointed in our mad love for this inexplicable anti-montage,
    one of the great experiments in cinematic sleight of hand (or slap in the
    face). With L'Age d'Or, their next missive, came true avant-garde status:
    condemnation, disgust and state censorship of its sexual candor and death
    instinct. A radical demand for freedom amidst increasing institutionalization -
    - see it to misbelieve it. Two years later Bunuel, this time with full directorial
    control, produced the deceptive, bitter Las Hurdes (Land Without Bread). A
    documentary at first sight, a mock documentary with a second glance;
    alternatively a shallow tourist account and hyper-rational social issue film;
    ultimately a thorn in the hide of non-fiction history that asks, does your
    fantastic horror at the plight of the dispossessed really keep you up at
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8.3.2 Use Case for advanced search

Description: Access to the advanced search page will be available from all pages within the article pre-print system. The system's advanced search searches the entire database of pre-print records and all associated full-text.

Priority: Critical. Advanced search functionality is considered essential to the system's usability.

Preconditions:
- The system has content in it (metadata records, one per pre-print, and associated full-text).
- The system and all search tools are operational.
- The USER has selected the "advanced search" option from some page.

Flow of Events:

1. The system displays an Advanced Search form, with five query boxes and all other options displayed.
2. The USER enters search terms in one or more query boxes.
3. For each query box, the USER may accept or alter the default search fields associated with that box. The possible search fields on each query box are:
   - author [default in query box 1]
   - title [default in query box 2]
   - abstract [default in query box 3]
   - subject terms [default in query box 4]
   - full-text [default in query box 5]
   - all fields
4. The USER may accept or alter the boolean operator radio buttons between each query box. The possible selections are:
   - and [default, all buttons]
   - or
   - not
5. The USER may accept or alter date (pre-print submission to system) restrictions on searched content by selecting months and years from pull-down menus in "search from" and "search to" boxes. The month pull-down has all twelve months, in three-letter format. The year pull-down has year values from “2000” to the current year. Default values, which place no date restriction on searched content, are:
   - Search from: Jan | 2000 [month and year of earliest pre-prints in system]
   - Search to: MMM | YYYY [current month and year]
6. The USER may accept or alter search results sorting criteria. Possible search result sort orders are:
   - by date [default]
   - by author
   - by title

7. The USER may accept or alter the “search results per page" selection. The options are:
- 25 per page [default]
- 50 per page
- 100 per page
- 200 per page

8. The USER submits search to system by clicking a “Search” button.

9. The system executes search.

10. The system displays appropriately formatted search results meeting the USER’s search criteria. Each search result includes:
- author names, individually linked to a single-author search
- title of pre-print, linked to pre-print record
- extent of pre-print, in pages
- subject terms

Alternative Events:
- The USER clicks “Reset” button.
  The Advanced Search form is refreshed, with empty search query boxes and setting returned to default values.
- The USER selects another system page from navigational options.
  No search request is sent. The USER is taken to the selected page.
- No content records match search criteria entered by USER.
  The system displays the advanced search form to the USER, with USER's search criteria displayed. A message says explains that no records match criteria and that criteria should be altered.
- A system error occurs.
  The system displays an error page (standard error message), with a button to the advanced search form.

Exercise 3 – Metadata Analysis Exercise Instructions

Part One:

On the following pages (pp. 13-27) are six examples of metadata having to do with archival collections. Your job is to assess each example of metadata, filling in the template on page 29. For vocabulary to use in the template, there is a short summary on page 31, drawn from the slides. Look at each example of metadata independently, ignoring the fact that they all describe the same set of archival papers. Assess each one as if it is all you have. Note that the two final examples are not in electronic form—they're only on paper.

You should try to fill out the template fairly quickly—don't spend too much time on this, there are no trick questions! For "Content Values," indicate any content data standards or best practices that you know are relevant. You don't need to evaluate the degree of adherence to a standard. For "Structure," give a general structural characterization of the metadata. "Intended Use" may invite some consideration.

Part Two:

Scenario A:

Your University belongs to a broad consortium of cultural heritage institutions that include universities, museums, and state and local historical societies. The consortium would like to create a centralized discovery system for the consortium's vast range of archival collections. Your University Archives currently creates a MARC collection record and a paper archival guide for each of their archival collections, but it is clear that many of the consortium's smaller institutions have nothing more than an accession record for many of their collections.

As an advisor to the consortium's efforts, what metadata will they need in order to create their centralized discovery system?

Constraints and requirements:

- Not much in the way of resources (funding/staff) to devote to this.
- They would like something as quickly as possible.

Scenario B:

Your organization belongs to a broad state-wide consortium of cultural heritage institutions that include universities, museums, and state and local historical societies. The state government would like to create a centralized system with in-depth descriptions about all of the consortium's vast range of archival collections. Your organization, like most others in the consortium, have been creating, in MS Word, detailed archival guides for their archival collections and then converting these to HTML for web publication (a simple conversion operation, in MS Word).

Other than an accession record, these guides are the only information available about the collections.

As an advisor to the consortium's efforts, what metadata will they need in order to create their system?

Constraints and requirements:

- The state wants archival descriptions at least as detailed as the HTML guides they have now.
- The state wants sophisticated fielded searching capability in their system, such as the ability to limit searches to particular repositories, to collections that contain specific types of materials (such as letters or diaries), or to materials of a certain date range.
- It appears that that state is willing to provide whatever funds are required.

Scenario C

Your organization belongs to a broad state-wide consortium of cultural heritage institutions that include universities, museums, and state and local historical societies. The state government would like to create a centralized system with in-depth descriptions about all of the consortium's vast range of archival collections. Your organization, like most others in the consortium, have been creating, in MS Word, detailed archival guides for their archival collections and then converting these to HTML for web publication (a simple conversion operation, in MS Word). Other than an accession record, these guides are the only information available about the collections.

As an advisor to the consortium's efforts, what metadata will they need in order to create their system?

Constraints and requirements:

- The state wants archival descriptions at least as detailed as the HTML guides they have now.
- The state will commit very little funding to this project, so if it is done at all, the project must be carried out at the lowest cost possible.
- The state would like something as quickly as possible.

Scenario D

Your University Archives would like to gather management information about their archival collections in an electronic system, so that they can easily retrieve data and generate reports about collection donors, collection values, restricted content, and other management information. The Archives currently creates a MARC collection record and an EAD encoded archival guide for each of their archival collections.

What additional metadata, if any, will the University Archives need to collect to meet their objectives?

Vietnam War: statistical analysis and evaluation projects,

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001 2088649

005 20021213151108.0

008 890420i19681972nyu eng d

035 __ **|a** (CStRLIN)NYCV89A51

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040 __ **|a** NIC **|c** NIC **|e** appm **|d** NIC **|d** NIC

100 1_ **|a** Prince, William G.

245 00 **|a** Vietnam War: statistical analysis and evaluation projects, **|f** 1968-1972.

300 __ **|a** .7 cubic ft.

545 __ **|a** Documentation was compiled by Prince as part of an Analysis of Vietnamization project, conducted by the Dept. of Applied Science and Technology, Bendix Aerospace Systems Division, sponsored by the Defense Advanced Research Projects Agency, and completed in 1973.

520 __ **|a** Documentation for various automated systems designed to provide data about the war in Vietnam. Systems include Project Corona Harvest to evaluate the effectiveness of airpower in Southeast Asia; Hamlet Evaluation System (HES), a reporting system designed to gather data on the progress of the rural pacification effort; SEAPRS (Southeast Asia Province file), designed to facilitate analysis of friendly and enemy military and pacification activity at the province level; PAAS (Pacification Attitude Analysis System), an automated system to provide a means of processing and reporting the results of surveys to determine the attitudes of the Vietnamese people toward pacification, the war, and political, social, and economic development; SEER (System for Evaluating the Effectiveness of RVNAF), designed to provide quantified evaluations of Vietnamese armed forces unit combat effectiveness in performance of assigned missions; AIRSUM (Air Summary Data Base), an historical record of all offensive air activity in Southeast Asia from 1965 to

1972; and Project Corona Harvest, an Air Force project designed to evaluate the effectiveness of air power in Southeast Asia from 1954.

555 0_ **|a** Folder list.

544 __ **|3** Additional pamphlets and reports by William G. Prince are **|a** housed in the Echols Collection, Kroch Library, Cornell University.

524 __ **|a** Prince, William G. Vietnam War: Statistical Analysis and Evaluation Systems, #4406. Division of Rare and Manuscript Collections, Cornell University Library.

650 _0 **|a** Vietnamese Conflict, 1961-1975.

650 _0 **|a** Combat **|x** Statistics **|x** Information sources.

650 _0 **|a** Internal security **|z** Vietnam.

650 _0 **|a** Insurgency **|z** Vietnam.

650 _0 **|a** Military art and science **|x** Data processing.

650 _0 **|a** Military art and science **|x** Automation.

650 _0 **|a** Military assistance, American **|z** Southeast Asia **|x** Computer programs.

856 40 **|3** Finding aid **|u** http://resolver.library.cornell.edu/cgi-bin/EADresolver?id=RMM04406

905 __ **|a** 19920617120000.0

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        System (HES), a reporting system designed to gather data on the progress of
        the rural pacification effort; SEAPRS (Southeast Asia Province file), designed
        to facilitate analysis of friendly and enemy military and pacification activity at
        the province level; PAAS (Pacification Attitude Analysis System), an
        automated system to provide a means of processing and reporting the results
        of surveys to determine the attitudes of the Vietnamese people toward
        pacification, the war, and political, social, and economic development; SEER
        (System for Evaluating the Effectiveness of RVNAF), designed to provide
        quantified evaluations of Vietnamese armed forces unit combat effectiveness
        in performance of assigned missions; AIRSUM (Air Summary Data Base), an
        historical record of all offensive air activity in Southeast Asia from 1965 to
        1972; and Project Corona Harvest, an Air Force project designed to evaluate
        the effectiveness of air power in Southeast Asia from 1954.</p>
    <p>Documentation was compiled by Prince as part of an Analysis of
        Vietnamization project, conducted by the Dept. of Applied Science and
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HTML Source Code (incomplete)

Exercise 3

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 <br><h3>Division of Rare and Manuscript Collections <br>Cornell University
Library</h3>
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 Division of Rare and Manuscript Collections<br>
 2B Carl A. Kroch Library<br>
 Cornell University<br>
 Ithaca, NY 14853<br>
 (607) 255-3530<br>
 Fax: (607) 255-9524<br>
 <a HREF="mailto:rareref@cornell.edu">rareref@cornell.edu</a><br>
 <a HREF="http://rmc.library.cornell.edu">http://rmc.library.cornell.edu</a><br>

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 E. Engst
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 October 1989
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 Martin Heggestad, January 2002
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 <strong>Quantity:</strong> .7 cubic ft.<br>
 <strong>Forms of Material:</strong> Manuals, reports, questionnaires,
correspondence, and other documents.<br>
 <strong>Repository:</strong> Division of Rare and Manuscript Collections,
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automated systems designed to provide data about the war in Vietnam. Systems
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gather data on the progress of the rural pacification effort; SEAPRS (Southeast
```

```
Asia Province file), designed to facilitate analysis of friendly and enemy
military and pacification activity at the province level; PAAS (Pacification
Attitude Analysis System), an automated system to provide a means of processing
and reporting the results of surveys to determine the attitudes of the
Vietnamese people toward pacification, the war, and political, social, and
economic development; SEER (System for Evaluating the Effectiveness of RVNAF),
designed to provide quantified evaluations of Vietnamese armed forces unit
combat effectiveness in performance of assigned missions; AIRSUM (Air Summary
Data Base), an historical record of all offensive air activity in Southeast Asia
from 1965 to 1972; and Project Corona Harvest, an Air Force project designed to
evaluate the effectiveness of air power in Southeast Asia from 1954.</P>
<P>Documentation was compiled by Prince as part of an Analysis of Vietnamization
project, conducted by the Dept. of Applied Science and Technology, Bendix
Aerospace Systems Division, sponsored by the Defense Advanced Research Projects
Agency, and completed in 1973.</P> <br>
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 <li>Internal security -- Vietnam.</li>
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Guide to the Vietnam War: Statistical Analysis and Evaluation Projects, 1968-1972

Collection Number: 4406

Division of Rare and Manuscript Collections
Cornell University Library

Contact Information:
Division of Rare and Manuscript Collections
2B Carl A. Kroch Library
Cornell University
Ithaca, NY 14853
(607) 255-3530
Fax: (607) 255-9524
rareref@cornell.edu
http://rmc.library.cornell.edu

Compiled by:
E. Engst

Date completed:
October 1989

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DESCRIPTIVE SUMMARY

Title:
Vietnam War: statistical analysis and evaluation projects, 1968-1972
Collection Number:
4406
Creator:
William G. Prince
Quantity:
.7 cubic ft.
Forms of Material:
Manuals, reports, questionnaires, correspondence, and other documents.
Repository:
Division of Rare and Manuscript Collections, Cornell University Library
Abstract:
Documentation for various automated systems designed to provide data about the war in Vietnam.

COLLECTION DESCRIPTION

Documentation for various automated systems designed to provide data about the war in Vietnam. Systems include Project Corona Harvest to evaluate the effectiveness of airpower in Southeast Asia;

Hamlet Evaluation System (HES), a reporting system designed to gather data on the progress of the rural pacification effort; SEAPRS (Southeast Asia Province file), designed to facilitate analysis of friendly and enemy military and pacification activity at the province level; PAAS (Pacification Attitude Analysis System), an automated system to provide a means of processing and reporting the results of surveys to determine the attitudes of the Vietnamese people toward pacification, the war, and political, social, and economic development; SEER (System for Evaluating the Effectiveness of RVNAF), designed to provide quantified evaluations of Vietnamese armed forces unit combat effectiveness in performance of assigned missions; AIRSUM (Air Summary Data Base), an historical record of all offensive air activity in Southeast Asia from 1965 to 1972; and Project Corona Harvest, an Air Force project designed to evaluate the effectiveness of air power in Southeast Asia from 1954.

Documentation was compiled by Prince as part of an Analysis of Vietnamization project, conducted by the Dept. of Applied Science and Technology, Bendix Aerospace Systems Division, sponsored by the Defense Advanced Research Projects Agency, and completed in 1973.

SUBJECTS

Names:
Prince, William G.
Subjects:
Vietnamese Conflict, 1961-1975.
Combat--Statistics--Information sources.
Internal security--Vietnam.
Insurgency--Vietnam.
Military art and science--Data processing.
Military art and science--Automation.
Military assistance, American--Southeast Asia--Computer programs.

INFORMATION FOR USERS

Cite As:
Vietnam War: Statistical Analysis and Evaluation Projects, #4406. Division of Rare and Manuscript Collections, Cornell University Library.

RELATED MATERIAL

Additional pamphlets and reports by William G. Prince are housed in the Echols Collection, Kroch Library, Cornell University.

SERIES LIST

Series I. Project Corona Harvest	Box 1
Series II. HES 70	Box 1
Series III. SEAPRS	Box 1
Series IV. PAAS	Box 1

Series V. SEER	Box 1
Series VI. AIRSUM	Boxes 1 and 2

CONTAINER LIST

Description	Container
Series I. Project Corona Harvest	
System to evaluate the effectiveness of airpower in Southeast Asia, encompassing all airpower employed from 1954 to the end of the conflict (Air Force project).	
Operating instructions, 1968	Box 1 Folder 1
Series II. HES 70	
Hamlet Evaluation System--reporting system designed to gather data on the progress of the rural pacification effort.	
Data gathering instrument--formatted, multiple choice questionnaire:	
1. Respondent--U.S. advisors in the field	
2. Sample size--Every inhabited hamlet and village in south Vietnam	
3. Frequency of reporting--Every hamlet and village reported each month	
Comparison of HES 70 and PAAS	Box 1 Folder 2
Memo, 1970	Box 1 Folder 3
Appendix A--Question codes, question responses	Box 1 Folder 4
Hamlet level HES statistics and plots by NMCSSC for village program analysis (1)	Box 1 Folder 5
VSSG IDX (2)	Box 1 Folder 6
Security (3)	Box 1 Folder 7
Econ. str. (4)	Box 1 Folder 8
Econ. stm. (5)	Box 1 Folder 9
[unlabeled] (6)	Box 1 Folder 10
Soc. ben. (7)	Box 1 Folder 11
GVN pol. inf. (8)	Box 1 Folder 12
VC pol. inf.	Box 1 Folder 13
Prog. effort	Box 1 Folder 14
Misc. ques.	Box 1 Folder 15
Series III. SEAPRS	
Southeast Asia Province file--designed to facilitate analysis of friendly and enemy military and pacification activity at the province level. Summarized data is organized by month for Province Corps, Viet Cong Military Regions, Division Tactical Areas, Special Tactical Zones, and Countrywide. Some fields use data from or indicators developed by HES.	
Southeast Asia Province (also includes Hamlet Evaluations System Handbook), 1969	Box 1 Folder 16
Series IV. PAAS	
Pacification Attitude Analysis System. Automated system to provide the Military Assistance Command Civil Operations and Rural Development Support, Pacification Study Group a means of processing and reporting the results of surveys	

ACCESSION SHEET

Tentative Title or Brief Statement of Content:

Vietnam Statistical Analysis Projects

Final Title (if different from above):

Vietnam War: Statistical Analysis and Evaluation Projects

Name and Address of Donor, Office of Origin, or Other Source:

John Wagner, Bendix Document Storage, 415 Logan Ave., Bld. 10
San Diego, CA

Approximate Inclusive Dates:

1968-1972

Accession Date:

July 29, 1989

Approximate Quantity Upon Arrival:

2 16″ boxes

Physical Condition Upon Arrival:

_X_Good ___Fair ___Poor ___Other (explain)

Related MSS Collections or Archival Holdings:

Other reports by Prince in Echols

Processing Dates, Personnel, Activities:

Sept 15, 1989 – Oct 10, 1989
Fred Flintstone, Barney Rubble
Arranged, foldered, listed

Number and Size of Boxes and Linear Footage After Processing:

.7 cubic feet

Additional Comments:

See attached damaged and discarded list

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Exercise 3—Metadata Analysis Template

	File Format	Type of Metadata	Metadata Scheme	Content Values	Structure	Intended Use
MARC Record (pp. 13-14)						
Dublin Core Record (p. 15)						
EAD Document (pp. 16-20)						
HTML source code (pp. 21-23)						
Paper Archival Guide (pp. 24-26)						
Paper Accession Record (p. 27)						

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Metadata Analysis Summary

File or data exchange format

Examples:

SGML / HTML; XML / XHTML; MARC; Plain-text file, perhaps “delimited”; Binary (not plain-text) formats, either open or proprietary.

Type of metadata

Examples:

Descriptive; Structural; Administrative; Technical; Preservation; Access/Rights.

Considerations:

What is the informational content of the metadata concerned with?

Semantics (metadata scheme, element set)

Examples:

MARC21; Dublin Core (DC); EAD; MODS; VRA Core; METS; etc.

Content values

Examples:

Of content standards or best practices: AACR2/RDA; EAD Best Practice (RLG); CCO; etc.
Of published and shared vocabularies: LCSH; AAT; TGM; etc.
Of application profiles: DCMI Libraries AP; DCMI Education AP; DCMI Government AP; etc.

Considerations:

What is the degree of conformance to any employed standards, practices, or vocabularies?

Structure

Examples:

Simple unstructured; Simple structured; Richly structured

Considerations:

Is the record structure flat or hierarchical (nested)?
How complex are the relationships among data elements?
Is element qualification allowed?
What degree of ambiguity exists within the metadata?

Intended Use

Considerations:

Why was this metadata created? What functional requirements did this metadata support?
How was it used by its creators?
What can its intended use tell us about its consistency, reliability, or interoperability?

Status

Examples:

Static: metadata that is no longer updated, augmented, or maintained. It may be inherited from some source that will no longer contribute to it. It is not likely to change (unless repurposed).
Dynamic: metadata that is “living,” in the sense that it is maintained by someone, updated when needed, regularly supplemented. Dynamic metadata may change over time.

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Exercise 4—Metadata Mapping Exercise

Your task is to create a metadata map that takes relatively rich source metadata and converts it to simple Dublin Core. This map will be used by a programmer to create a conversion routine that will automatically translate the source metadata to simple DC.

This is a fairly typical mapping requirement in the library world. In order to create a union catalog of disparate resources, or share metadata from various different sources and systems, we need a common metadata format to map into. Simple DC is often selected for such purposes. Simple DC is also the minimum metadata format for metadata harvesting via the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). In other words, if you wish to allow information about the content of your collections to be harvested via OAI, you must at least provide a simple DC record for every resource (you can provide richer metadata).

Source metadata format: on pages 35-37 are three samples of source metadata native to a journal hosting system. Each page represents a single journal issue, and each issue contains child elements that hold metadata about articles. Only one or two articles per issue are listed, as samples of the metadata available in the system.

Target metadata format: simple, or unqualified, Dublin Core. Assume that the appropriate level at which to provide DC records is the article level—one simple DC record per article in the hosting system. Also assume that the simple DC records will be expressed in XML and available for OAI harvesting.

Mapping task: use the map template on pages 55-56 to create your metadata map. This mapping exercise has a fixed target, so begin with the DC elements and ask what source element or elements will be required to populate it. Describe any transformations necessary to get from source to target, or warnings or considerations that a programmer (who will have to implement the map in software code) must know about. The first element is filled in. Feel free to disagree with what has been proposed.

More about Dublin Core: on the following pages (pp. 38-42), you will find basic descriptions of each of the 15 DC elements possible in a simple, or unqualified, DC record. These are followed (pp. 43-54) by a set of DC element refinements, or qualifiers, which cannot be used in simple DC, but can be useful in determining which elements of the core set to use. This is because DC refinements provide more precision than the core elements, and you may find among them the data definition you are looking for. This then tells you which core element to use—the one which the qualifying term is refining.

Some things to keep in mind about simple Dublin Core:

- All elements are optional
- All elements are repeatable
- Simple DC can contain only the core 15 elements.
- In XML, simple DC elements cannot contain any sub-elements. In other words, no XML or HTML markup is allowed inside of simple DC elements.

On the following page are some hints about specific DC elements.

Type element: the DC element Type refers to the DCMI Type Vocabulary. That vocabulary includes only the following list of terms. You should choose the most appropriate term.

- Collection
- Dataset
- Event
- Image
- InteractiveResource
- MovingImage
- PhysicalObject
- Service
- Software
- Sound
- StillImage
- Text

Source element: this element is a tricky one. The Dublin Core Libraries Working Group says to use Source "only when the described resource is the result of digitization of non-digital originals. Otherwise, use Relation." For this exercise, assume that these journals have two separate dissemination streams: one is (still, for now) paper and one is electronic. In other words, the digital version doesn't result from the digitization of the paper copy—one is not the source of the other.

bibliographicCitation element refinement: important for serial literature is the DC element refinement called "bibliographicCitation." The DC community has decided that this is the best place to hold typical citation type data (journal name, volume number, year of publication, page range).

General hint: typically, simple DC metadata records are generated in order to increase the discovery of resources by end-users. This is certainly true of most OAI record harvesting. Let's assume that's our main goal here. So when faced with any particular mapping decision where several alternatives may be possible, choose to convey information most relevant to the discovery of the resource.

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  <issue_number>1</issue_number>
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  </identifiers>
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      competition and debt</title>
  <author order="1">
    <name>
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    <email>zang@us.ibm.com</email>
    <affiliation>
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      <address>
        <addressline>IBM T. J. Watson Research Center</addressline>
        <addressline>PO Box 218</addressline>
        <addressline>Yorktown Heights</addressline>
        <addressline>NY 10598</addressline>
        <addressline>USA</addressline>
      </address>
    </affiliation>
  </author>
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      <p>Consider an optimization of the <i>Swigler</i> problem, first
      formulated by Kunst in <i>Liability Constant Rates</i>: a constant
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      <b>N</b>xy proportional to the size of the business unit.</p>
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      a stretching surface with a uniform free stream</title>
  <author order="1">
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        <surname>Soud</surname>
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  </author>
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        <surname>Hartbary, Jr.</surname>
      </name>
  </author>
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      isothermal stretching sheet. This has been done under the simultaneous
      action of buoyancy, radiation, and transverse magnetic field. The
      governing equations are solved by the shooting method. The velocity and
      temperature functions are represented graphically for various values of
      the flow parameters: radiation parameter <math
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      parameter <math alttext="M"><mi>M</mi></math>, Prandtl number <math
      alttext="$\mathrm{Pr}$"><mrow><mtext>Pr</mtext></mrow></math>, and the
      parameter of relative difference between the temperature of the sheet, and
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The Dublin Core Metadata Element Set

Term Name: contributor	
URI:	http://purl.org/dc/elements/1.1/contributor
Label:	Contributor
Definition:	An entity responsible for making contributions to the content of the resource.
Comment:	Examples of a Contributor include a person, an organisation, or a service. Typically, the name of a Contributor should be used to indicate the entity.
Term Name: coverage	
URI:	http://purl.org/dc/elements/1.1/coverage
Label:	Coverage
Definition:	The extent or scope of the content of the resource.
Comment:	Coverage will typically include spatial location (a place name or geographic coordinates), temporal period (a period label, date, or date range) or jurisdiction (such as a named administrative entity). Recommended best practice is to select a value from a controlled vocabulary (for example, the Thesaurus of Geographic Names [TGN]) and that, where appropriate, named places or time periods be used in preference to numeric identifiers such as sets of coordinates or date ranges.
Term Name: creator	
URI:	http://purl.org/dc/elements/1.1/creator
Label:	Creator
Definition:	An entity primarily responsible for making the content of the resource.
Comment:	Examples of a Creator include a person, an organisation, or a service. Typically, the name of a Creator should be used to indicate the entity.

Term Name: date	
URI:	http://purl.org/dc/elements/1.1/date
Label:	Date
Definition:	A date associated with an event in the life cycle of the resource.
Comment:	Typically, Date will be associated with the creation or availability of the resource. Recommended best practice for encoding the date value is defined in a profile of ISO 8601 [W3CDTF] and follows the YYYY-MM-DD format.
Term Name: description	
URI:	http://purl.org/dc/elements/1.1/description
Label:	Description
Definition:	An account of the content of the resource.
Comment:	Description may include but is not limited to: an abstract, table of contents, reference to a graphical representation of content or a free-text account of the content.
Term Name: format	
URI:	http://purl.org/dc/elements/1.1/format
Label:	Format
Definition:	The physical or digital manifestation of the resource.
Comment:	Typically, Format may include the media-type or dimensions of the resource. Format may be used to determine the software, hardware or other equipment needed to display or operate the resource. Examples of dimensions include size and duration. Recommended best practice is to select a value from a controlled vocabulary (for example, the list of Internet Media Types [MIME] defining computer media formats).

Term Name: identifier	
URI:	http://purl.org/dc/elements/1.1/identifier
Label:	Resource Identifier
Definition:	An unambiguous reference to the resource within a given context.
Comment:	Recommended best practice is to identify the resource by means of a string or number conforming to a formal identification system. Example formal identification systems include the Uniform Resource Identifier (URI) (including the Uniform Resource Locator (URL)), the Digital Object Identifier (DOI) and the International Standard Book Number (ISBN).
Term Name: language	
URI:	http://purl.org/dc/elements/1.1/language
Label:	Language
Definition:	A language of the intellectual content of the resource.
Comment:	Recommended best practice is to use RFC 3066 [RFC3066], which, in conjunction with ISO 639 [ISO639], defines two- and three-letter primary language tags with optional subtags. Examples include "en" or "eng" for English, "akk" for Akkadian, and "en-GB" for English used in the United Kingdom.
Term Name: publisher	
URI:	http://purl.org/dc/elements/1.1/publisher
Label:	Publisher
Definition:	An entity responsible for making the resource available
Comment:	Examples of a Publisher include a person, an organisation, or a service. Typically, the name of a Publisher should be used to indicate the entity.

Term Name: relation	
URI:	http://purl.org/dc/elements/1.1/relation
Label:	Relation
Definition:	A reference to a related resource.
Comment:	Recommended best practice is to reference the resource by means of a string or number conforming to a formal identification system.
Term Name: rights	
URI:	http://purl.org/dc/elements/1.1/rights
Label:	Rights Management
Definition:	Information about rights held in and over the resource.
Comment:	Typically, a Rights element will contain a rights management statement for the resource, or reference a service providing such information. Rights information often encompasses Intellectual Property Rights (IPR), Copyright, and various Property Rights. If the Rights element is absent, no assumptions can be made about the status of these and other rights with respect to the resource.
Term Name: source	
URI:	http://purl.org/dc/elements/1.1/source
Label:	Source
Definition:	A reference to a resource from which the present resource is derived.
Comment:	The present resource may be derived from the Source resource in whole or in part. Recommended best practice is to reference the resource by means of a string or number conforming to a formal identification system.

Term Name: subject	
URI:	http://purl.org/dc/elements/1.1/subject
Label:	Subject and Keywords
Definition:	The topic of the content of the resource.
Comment:	Typically, a Subject will be expressed as keywords, key phrases or classification codes that describe a topic of the resource. Recommended best practice is to select a value from a controlled vocabulary or formal classification scheme.
Term Name: title	
URI:	http://purl.org/dc/elements/1.1/title
Label:	Title
Definition:	A name given to the resource.
Comment:	Typically, a Title will be a name by which the resource is formally known.
Term Name: type	
URI:	http://purl.org/dc/elements/1.1/type
Label:	Resource Type
Definition:	The nature or genre of the content of the resource.
Comment:	Type includes terms describing general categories, functions, genres, or aggregation levels for content. Recommended best practice is to select a value from a controlled vocabulary (for example, the DCMI Type Vocabulary [DCMITYPE]). To describe the physical or digital manifestation of the resource, use the Format element.

Element Refinements

Term Name: abstract	
URI:	http://purl.org/dc/terms/abstract
Label:	Abstract
Definition:	A summary of the content of the resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/description
Term Name: accessRights	
URI:	http://purl.org/dc/terms/accessRights
Label:	Access Rights
Definition:	Information about who can access the resource or an indication of its security status.
Comment:	Access Rights may include information regarding access or restrictions based on privacy, security or other regulations.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/rights
Term Name: alternative	
URI:	http://purl.org/dc/terms/alternative
Label:	Alternative
Definition:	Any form of the title used as a substitute or alternative to the formal title of the resource.

Comment:	This qualifier can include Title abbreviations as well as translations.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/title
Term Name: available	
URI:	http://purl.org/dc/terms/available
Label:	Available
Definition:	Date (often a range) that the resource will become or did become available.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date
Term Name: bibliographicCitation	
URI:	http://purl.org/dc/terms/bibliographicCitation
Label:	Bibliographic Citation
Definition:	A bibliographic reference for the resource.
Comment:	Recommended practice is to include sufficient bibliographic detail to identify the resource as unambiguously as possible, whether or not the citation is in a standard form.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/identifier
Term Name: conformsTo	
URI:	http://purl.org/dc/terms/conformsTo

Label:	Conforms To
Definition:	A reference to an established standard to which the resource conforms.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: created	
URI:	http://purl.org/dc/terms/created
Label:	Created
Definition:	Date of creation of the resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date
Term Name: dateAccepted	
URI:	http://purl.org/dc/terms/dateAccepted
Label:	Date Accepted
Definition:	Date of acceptance of the resource (e.g. of thesis by university department, of article by journal, etc.).
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date
Term Name: dateCopyrighted	
URI:	http://purl.org/dc/terms/dateCopyrighted

Label:	Date Copyrighted
Definition:	Date of a statement of copyright.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date
Term Name: dateSubmitted	
URI:	http://purl.org/dc/terms/dateSubmitted
Label:	Date Submitted
Definition:	Date of submission of the resource (e.g. thesis, articles, etc.).
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date
Term Name: educationLevel	
URI:	http://purl.org/dc/terms/educationLevel
Label:	Audience Education Level
Definition:	A general statement describing the education or training context. Alternatively, a more specific statement of the location of the audience in terms of its progression through an education or training context.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/terms/audience
Term Name: extent	
URI:	http://purl.org/dc/terms/extent

Label:	Extent
Definition:	The size or duration of the resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/format
Term Name: hasFormat	
URI:	http://purl.org/dc/terms/hasFormat
Label:	Has Format
Definition:	The described resource pre-existed the referenced resource, which is essentially the same intellectual content presented in another format.
Type of Term:	element-refinement
Date Issued:	2000-07-11
Term Name: hasPart	
URI:	http://purl.org/dc/terms/hasPart
Label:	Has Part
Definition:	The described resource includes the referenced resource either physically or logically.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: hasVersion	

URI:	http://purl.org/dc/terms/hasVersion
Label:	Has Version
Definition:	The described resource has a version, edition, or adaptation, namely, the referenced resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: isFormatOf	
URI:	http://purl.org/dc/terms/isFormatOf
Label:	Is Format Of
Definition:	The described resource is the same intellectual content of the referenced resource, but presented in another format.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: isPartOf	
URI:	http://purl.org/dc/terms/isPartOf
Label:	Is Part Of
Definition:	The described resource is a physical or logical part of the referenced resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: isReferencedBy	

URI:	http://purl.org/dc/terms/isReferencedBy
Label:	Is Referenced By
Definition:	The described resource is referenced, cited, or otherwise pointed to by the referenced resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: isReplacedBy	
URI:	http://purl.org/dc/terms/isReplacedBy
Label:	Is Replaced By
Definition:	The described resource is supplanted, displaced, or superseded by the referenced resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: isRequiredBy	
URI:	http://purl.org/dc/terms/isRequiredBy
Label:	Is Required By
Definition:	The described resource is required by the referenced resource, either physically or logically.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation

Term Name: issued	
URI:	http://purl.org/dc/terms/issued
Label:	Issued
Definition:	Date of formal issuance (e.g., publication) of the resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date
Term Name: isVersionOf	
URI:	http://purl.org/dc/terms/isVersionOf
Label:	Is Version Of
Definition:	The described resource is a version, edition, or adaptation of the referenced resource. Changes in version imply substantive changes in content rather than differences in format.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: license	
URI:	http://purl.org/dc/terms/license
Label:	License
Definition:	A legal document giving official permission to do something with the resource.
Comment:	Recommended best practice is to identify the license using a URI. Examples of such licenses can be found at http://creativecommons.org/licenses/.
Type of	element-refinement

Term:	
Refines:	http://purl.org/dc/elements/1.1/rights
Term Name: medium	
URI:	http://purl.org/dc/terms/medium
Label:	Medium
Definition:	The material or physical carrier of the resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/format
Term Name: modified	
URI:	http://purl.org/dc/terms/modified
Label:	Modified
Definition:	Date on which the resource was changed.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date
Term Name: references	
URI:	http://purl.org/dc/terms/references
Label:	References
Definition:	The described resource references, cites, or otherwise points to the referenced resource.

Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: replaces	
URI:	http://purl.org/dc/terms/replaces
Label:	Replaces
Definition:	The described resource supplants, displaces, or supersedes the referenced resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: requires	
URI:	http://purl.org/dc/terms/requires
Label:	Requires
Definition:	The described resource requires the referenced resource to support its function, delivery, or coherence of content.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/relation
Term Name: spatial	
URI:	http://purl.org/dc/terms/spatial
Label:	Spatial
Definition:	Spatial characteristics of the intellectual content of the resource.

Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/coverage
Term Name: tableOfContents	
URI:	http://purl.org/dc/terms/tableOfContents
Label:	Table Of Contents
Definition:	A list of subunits of the content of the resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/description
Term Name: temporal	
URI:	http://purl.org/dc/terms/temporal
Label:	Temporal
Definition:	Temporal characteristics of the intellectual content of the resource.
Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/coverage
Term Name: valid	
URI:	http://purl.org/dc/terms/valid
Label:	Valid
Definition:	Date (often a range) of validity of a resource.

Type of Term:	element-refinement
Refines:	http://purl.org/dc/elements/1.1/date

Metadata Map

Source Metadata (native publisher metadata)	Transformation Rules	Target Metadata (simple DC)
journal_issue/record/title	Take source element as is. If multiple title elements in source, take all; each source title gets a separate dc:title element.	title

Metadata Map

Source Metadata (native publisher metadata)	Transformation Rules	Target Metadata (simple DC)

Exercise 5: Metadata Workflow
Scenario A—Big Dreams for Library Publishing

The library is considering whether to participate in a publishing operation run by a successful commercial internet company, Doodle. Doodle offers full-text access to on-line versions of public domain books to participating academic libraries and their communities. The number of titles in the system is now approaching twenty million.

Access to all titles in Doodle's system is free to all participating libraries. Doodle also lets the general public search and browse its metadata holdings and purchase the full-text of books or parts of books if desired. A portion of the revenue from these book sales are distributed back to the participating libraries. The pay-out distribution is based on the volume of books sold contributed by each library. In other words, if your library contributes books that sell many copies, then your library will receive a corresponding greater amount of the distributed revenue. For some libraries, this has been quite lucrative, allowing for the digital reformatting of hundreds of books a year and the hiring of additional staff to manage and carry out this work.

As part of the library's obligation, they would need to provide Doodle with electronic files of the scanned books, together with metadata for these titles in a specified format. The titles must be in the library's permanent collection.

The library has established a digital library team to come up with a proposal for working with Doodle. On this team is a metadata specialist, and she has been asked to come up with a plan for establishing an efficient workflow to generate the metadata files required by Doodle.

The library has assigned a group of selectors to decide on which books to contribute. This group will work with a publishing market consultant from Doodle to establish criteria. At this point, they plan to identify and provide (including metadata) up to 50 titles every quarter. If all goes well, they anticipate doubling this after the first year.

Doodle has shared one important piece of information with the library. Their statistics have clearly demonstrated a direct correlation between the amount of metadata provided and number of book sales. In other words, books with relatively more metadata are not only more likely to be purchased, but to be purchased multiple times. Since the library administration would like to see this venture succeed ($$$), they have encouraged the metadata specialist to take this into consideration. They have also said, recognizing this relationship between metadata richness and sales, that they are willing to find some extra staff time for metadata work during the next two years (this time would come from technical services, and they've asked the metadata specialist what she needs). After that, metadata staff associated with this project would need to be funded from project revenues.

The metadata specialist begins her investigations and has thus far learned…

- that any updates to records already shipped to Doodle are to be handled by resubmitting the monograph again. Every monograph has an ID value, and Doodle will completely replace any monograph in its system, if a new submission has the same ID.

- that the head of technical services is being very uncooperative. He has agreed to update catalog records to reflect that an electronic version of a monograph is available. But he absolutely refuses to allow additional data to be inserted into MARC records. His reasoning has to do with record consistency across all holdings. The metadata specialist knows the library administration will never go against his wishes.

The deliverables for Exercise 5 are described on pages 61-62.

Exercise 5: Metadata Workflow
Scenario B—Small Steps toward Library Publishing

The library is considering whether to participate in a publishing operation, Books-R-Us, coordinated by a university consortium. The books accessible through its system are full-text electronic versions of public domain books, which have been selected and contributed by participating libraries but are actually hosted locally by the contributing library. Books-R-Us merely provides a portal to the entire collection of scanned books by merging book records into a searchable union catalog and allowing it to be searched.

Access to the online versions of these books is free to all participating library members. As of yet, the number of participants is fairly small, but the hope is that in time, this consortium project would allow participating libraries access to much larger book collections than possible on their own.

The consortium collects fees from member libraries. It then uses this money to finance the scanning of books in a centralized location. Once scanned, the files go back to the contributing library. The library's obligation is to host the resulting electronic files on local servers, and also to provide Books-R-Us with metadata for these titles in a specified format. Books-R-Us creates its union catalog from these records.

The library has asked its metadata specialist to come up with a plan for establishing an efficient workflow to generate the metadata files required by Books-R-Us.

The library has assigned a group of selectors to decide on which books to contribute. This group expects to identify about 200 titles initially. The plan is to convert 25 of these each quarter. After two years, the project will be re-evaluated.

The library has said they have programming staff that they can dedicate to this project, in order to see it successfully setup. Once established, however, there are no plans for ongoing technical support. Further, it does not look like the library will be able to devote other ongoing staff resources to this project.

The metadata specialist begins her investigations and has thus far learned…

- that Books-R-Us expects to harvest complete metadata shipments monthly from participating libraries. This is how record updates and additions are handled. Books-R-Us completely rebuilds its entire aggregated metadata collection every month.
- that Books-R-Us insists that the metadata they receive be kept in sync with the library catalog. They do not themselves provide direct access to online books, but rather link back to a contributing library's catalog record, which in turn will link to the electronic files. In this sense, Books-R-Us only serves as a union catalog of all online books available to participating libraries.
- that Books-R-Us is using a book metadata format more typical of the commercial publishing industry, and that they are encouraging participating libraries to provide them with as much metadata per title as possible.

The deliverables for Exercise 5 are described on pages 61-62.

Exercise 5: Scenario A & B Deliverables

You are the metadata specialist on a larger team that will carry out this project. The workflow you are designing now (for this exercise) is concerned only with the metadata portion of the project. There will likely be places where your workflow will need to "interface" with other activities of the project, perhaps another workflow, but don't get sidetracked by developing non-metadata aspects of the project into your workflow (such as selection, or scanning, etc.).

1. Workflow Definition and Goals, Input/Output Analysis

   a) In a sentence or two, define the overall metadata workflow objective. Remember, this workflow is only concerned with the metadata portion of the project.
   b) Using the worksheet on page 73, briefly describe the characteristics of the workflow source metadata (samples of source metadata on pages 63-70).
   c) Using the worksheet on page 73, briefly describe the characteristics of the workflow target metadata (samples of target metadata on pages 71-72).

   Work through 1 (b) and (c) quickly. The characteristics to pay attention to are those that will impact workflow, such as, "status," especially.

   The source and target metadata examined here are at the overall project level. As you define the tasks below, there may be "transitional" metadata, and thus transitional source and target metadata requiring their own mappings. In other words, it may not be feasible or efficient to convert, in one step, the project's source metadata to the project's target metadata.

2. Identifying constraints

   a) List the constraints that you face in setting up and maintaining this metadata workflow. (See slide 6.)

3. Defining the workflow tasks

   a) Start with the overall workflow objective and begin to break it down into smaller and smaller tasks and subtasks. What you should end up with is a list of discrete and manageable tasks, ones that could feasibly be carried out within an actual workflow operation.
   b) For each of the tasks above, answer the following:
      - What are the task's requirements? Specify what is required to begin this task (what input must the task have? what is required of that input?). Specify what is required of the task output (what requirements must it fulfill?).
      - What is the level of complexity required to transform input to output?
      - What are the task dependencies? What is the task dependent upon in order to successfully transform input to output? (Your understanding of workflow constraints should help here.)
      - What is the projected duration of this task? Is it a one-time task (writing software to do something), or is it a recurring, ongoing activity? How certain is the projected

duration of the task? Do workflow constraints or task dependencies make duration difficult to predict?
- What are the resource requirements of this task? What or who needs to be involved in accomplishing this task? If people, how many and what level of expertise and experience is required?

4. Designing the workflow
   a) How should all the tasks defined in step 3 above be sequenced? Which tasks can occur simultaneously and which are dependent on a previous task?
   b) What are the communication needs of the workflow?

5. Maintaining the workflow
   a) Is this workflow a one-time data conversion project, or will it be an ongoing, regular part of library operations?
   b) If ongoing, what type of tracking and oversight is required to ensure the workflow is successfully meeting its objectives?
   c) How much human oversight will the workflow require and what will it involve?
   d) How much automated tracking is possible, and how would that tracking process work?

6. Workflow cost considerations
   a) Make an estimate of how many FTEs over what period of time would be required to setup this metadata workflow. (FTE is "full-time equivalent"—1.0 FTE equals one person working full-time on this project.)
   b) What level of staff expertise and experience will be required to setup this workflow.
   c) Make an estimate of how many FTEs would be required to maintain this metadata workflow going forward (after setup and initial operation), if that is required.
   d) What level of staff expertise and experience will be required to maintain this workflow.
   e) Do these staffing requirements match with workflow constraints? If not, how are you planning to deal with the mismatch?

7. Opportunities and benefits
   a) List all the benefits you can think of that may result from setting up and maintaining this workflow.

8. Metadata workflow conversion maps
   a) It is likely that at least one of the tasks in step 3 above involved some metadata mapping. Choose one of the mapping tasks and, using the metadata map template on pages 74-75, develop the source-to-target mapping rules.

Report on the manuscripts of Allan George Finch, esq., of...

000 01867cam a2200349 450

001 3645091

005 20060504103643.0

008 750522m19139999enk f000 0 eng c

010 __ **|a** ac 35001225 //r

035 __ **|a** (NIC)notisASL2364

035 __ **|a** (OCoLC)ocm01350566

040 __ **|a** New York. Public Libr. **|c** TOL **|d** SER **|d** OCL **|d** OUN **|d** OCL **|d** NIC

050 0_ **|a** DA25.M2 **|b** F4

082 __ **|a** 942.06

110 1_ **|a** Great Britain. **|b** Royal Commission on Historical Manuscripts.

245 00 **|a** Report on the manuscripts of Allan George Finch, esq., of Burley-on-the-Hill, Rutland ...

260 __ **|a** London, **|b** Published by H.M. Stationery Off., **|c** 1913-

300 __ **|a** v. **|c** 25 cm.

500 __ **|a** Vols. 1-2 issued in the Parliamentary series as Cd. 6508, 8383; v. 3 issued as no. 71 of the commission's Publications.

500 __ **|a** At head of title: Historical manuscripts commission.

500 __ **|a** Title varies slightly.

500 __ **|a** Vols. 1-2 edited by Mrs. S. C. Lomas, v. 3- by F. Bickley.

500 __ **|a** Vols. 1-2 deal with 16th and early 17th century letters of the Finch family; the correspondence of Heneage, earl of Winchilsea, during his embassy to Constantinople, 1660-1668; letters and papers of his cousin, Sir John Finch, who followed him as ambassador to Turkey; letters and papers of Heneage, earl of Nottingham, and his family; and the correspondence of Daniel, earl of Winchilsea and Nottingham, secretary of state from 1688-1693. cf. v. 1, p. [v]

651 _0 **|a** Great Britain **|x** History **|y** 1485- **|v** Sources.

651 _0 **|a** Turkey **|x** History **|y** 1453-1683 **|v** Sources.

651 _0 **|a** Great Britain **|x** Foreign relations **|z** Turkey.

651 _0 **|a** Turkey **|x** Foreign relations **|z** Great Britain.

700 1_ **|a** Finch, Allan George, **|d** 1863-1914.

905 __ **|a** 19991204120000.0

950 __ **|l** OLIO1 **|x** 175 **|a** DA25.M2 **|b** F49 **|d** \+\

955 __ **|l** OLIO1 **|a** DA25.M2 **|b** F49 **|c** 1:v.1-4

999 __ **|l** OLIO1 **|a** DA25.M2 **|b** F49 **|d** \+\ **|c** 1 **|v** v.1-4

Projektive geometrie der ebene, unter benutzung der punktrechnung...

000 01052cam a2200325 450

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008 851011m19091927gw 000 0 ger d

035 __ **|a** (CStRLIN)NYCX85B113967

035 __ **|a** (NIC)notisABT9133

035 __ **|a** (OCoLC)13463437

035 __ **|a** 408612

040 __ **|a** MnU **|c** MnU **|d** RPB **|d** NIC

100 1_ **|a** Grassmann, Hermann Ernst, **|d** 1857-1922.

245 10 **|a** Projektive geometrie der ebene, **|b** unter benutzung der punktrechnung...

260 __ **|a** Leipzig, **|b** B. G. Teubner. **|c** 1909-27.

300 __ **|a** 3 v. **|c** 24 cm.

500 __ **|a** Nachwort, von G. Wolff: p. [VI]

505 0_ **|a** Bd. 1. Binäres.--Bd. 2. Ternäres, 2 v.

650 _0 **|a** Geometry, Projective

650 _0 **|a** Forms, Binary

650 _0 **|a** Forms, Ternary

700 1_ **|a** Wolff, Georg. **|d** 1881-

905 __ **|a** 19880623120000.0

948 __ **|a** c:RET

950 __ **|l** MATH **|a** QA554 **|b** .G76 **|f** BASIC **|i** 10/11/85 N

955 __ **|l** MATH **|c** 1:v.1 **|i** 10/11/85 C

955 __ **|l** MATH **|c** 1:v.2 **|i** 10/11/85 C

998 __ **|a** 10/11/85 **|t** c **|s** 9124 **|n** NIC **|w** MNUG83B19018 **|d** 10/11/85 **|c** RET **|b** YOB

The war of the rebellion: a compilation of the official records of the...

000 04656cam a2200505 a 450

001 4943960

005 20061002074755.0

008 000413m18801901dcu f001 0 eng d

010 __ **|a** 03003452

040 __ **|c** NBiSU **|d** NBiSU **|d** MiU **|d** TxFACM **|d** NIC **|d** NcAvBC **|e** dcrb **|d** NIC

043 __ **|a** n-us---

050 0_ **|a** E491 **|b** .U6

110 1_ **|a** United States. **|b** War Dept.

245 14 **|a** The war of the rebellion: **|b** a compilation of the official records of the Union and Confederate armies / **|c** Pub. under the direction of the secretary of war ...

260 __ **|a** Washington : **|b** Govt. Print. Off., **|c** 1880-1901.

300 __ **|a** 123 v. ; **|c** 24 cm.

500 __ **|a** Found also in the House Miscellaneous documents of the 52d to the 56th Congress.

500 __ **|a** Each number has special index. Inserted in each volume: Additons and corrections ... Washington, Govt. Print. Off., 1902.

500 __ **|a** Series 1, v. 1-53, series 3, v. 1-5, and series 4, v. 1-3 include "Alternate designations of organizations mentioned."

500 __ **|a** Vol. 54-55 of series 1 [serial no. 112-113]" have not been published, and no material for them is in hand." cf. General index, p. xl. Series 2, v. 1 [serial no. 114] with imprint 1894, was not issued until 1898.

500 __ **|a** Edited in the War Records Office, 1880-July 1899; in the Record and Pension Office, July 1899-1901.

500 __ **|a** Incomplete set: missing volumes 1-5 of the first series. **|5** NcAvBC

500 __ **|a** Bdg.: navy blue publisher’s cloth binding, all volumes worn with some damage

to inner hinges; paper browned throughout set. |5 NcAvBC

500 __ |a Robert N. Scott compiled and edited v. 1-18, 1880-87, and also collected the greater part of the material for v. 19-36, 1887-91. After his death in 1887 the work was continued by Henry M. Lazelle, 1887-89, and by a board of publication, 1889-99, consisting of George B. Davis, 1889-97, Leslie J. Perry, 1889-99, Joseph W. Kirkley, 1889-99, and Fred C. Ainsworth, 1898-99; from 1899-1901 edited by Fred C. Ainsworth and Joseph W. Kirkley.

505 0_ |a ser. I. v. 1-53 [serial no. 1-111] Formal reports, both Union and Confederate, of the first seizures of United States property in the southern states, and of all military operations in the field, with the correspondence, orders and returns relating specially thereto. 1880-98. 111 v.--ser. II. v. 1-8 [serial no. 114-121] Correspondence, orders, reports and returns, Union and Confederate, relating to prisoners of war ... and to state or political prisoners. 1894 [i. e. 1898]-1899. 8 v.--ser. III. v. 1-5 [serial no. 122-126] Correspondence, orders, reports and return of the Union authorities (embracing their correspondence with the Confederate officials) not relating specially to the subjects of the first and second series. It embraces the reports of the secretary of war, of the general-in-chief and of the chiefs of the several staff corps and departments ... 1899-1900. 5 v.--ser. IV. v. 1-3 [serial no. 127-129] Correspondence, orders, reports and returns of the Confederate authoriites, similar to that indicated for the Union officials, as of the third series, but includeing the correspondence between the Union and Confederate authorities, given in that series. 1900. 3 v.--[serial no. 130] General index and additions and corrections. Mr. John S. Moodey, indexer. Preface [by Elihu Root, secretary of war] Explanations. Synopsis of the contents of volumes. Special index for the principal armies, army corps, military divisions

505 8_ |a and departments. General index. Additions and corrections ... 1901.

651 _0 |a United States |x History |y Civil War, 1861-1865 |x Maps.

651 _0 |a United States |x History |y Civil War, 1861-1865 |x Sources.

651 _0 |a United States |x History |y Civil War, 1861-1865 |x Regimental histories.

610 20 **|a** Confederate States of America **|x** History **|x** Sources.

710 1_ **|a** United States. **|b** Record and Pension Office.

710 1_ **|a** United States. **|b** War Records Office.

700 1_ **|a** Moodey, John S. **|q** (John Sheldon), **|d** b. 1842.

710 1_ **|a** United States. **|b** Congress. **|b** House.

700 1_ **|a** Cowles, Calvin D. **|q** (Calvin Duvall), **|d** b. 1849.

700 1_ **|a** Ainsworth, Fred C. **|q** (Fred Crayton), **|d** 1852-1934.

700 1_ **|a** Scott, Robert N. **|q** (Robert Nicholson), **|d** 1838-1887.

700 1_ **|a** Davis, George B. **|q** (George Breckenridge), **|d** 1847-1914.

700 1_ **|a** Perry, Leslie J.

700 1_ **|a** Kirkley, Joseph W. **|q** (Joseph William), **|d** 1841-1912.

740 0_ **|a** Official records of the Union and Confederate armies.

773 0_ **|7** nnbc **|t** Burt Green Wilder papers. **|w** (CStRLIN) NYCV86-A116.

948 1_ **|a** 20031211 **|b** c **|d** lbb4 **|e** rmc **|f** ? **|h** ?

948 2_ **|a** 20040811 **|b** m **|d** jm17 **|e** cts

948 2_ **|a** 20061002 **|b** m **|d** bmt1 **|e** cts

History of the city of New York, from its earliest settlement to the...

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005 19970920120000.0

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010 __ **|a** 01014304

035 __ **|a** (NIC)notisAPZ5299

040 __ **|c** NNC **|d** NNC **|d** NNU **|d** NIC

043 __ **|a** n-us-ny

050 0_ **|a** F128.3 **|b** .B72

100 1_ **|a** Booth, Mary L. **|q** (Mary Louise), **|d** 1831-1889.

245 10 **|a** History of the city of New York, from its earliest settlement to the present time. **|c** By Mary L. Booth. Illus. with over one hundred engravings.

260 __ **|a** New York, **|b** W.R.C. Clark & Meeker, **|c** 1859.

300 __ **|a** xix, <21>-846 p. incl. illus., plates, ports. front. **|c** 24 cm.

651 _0 **|a** New York (N.Y.) **|x** History.

905 __ **|a** 19970920120000.0

Celestine, being the diary of a chambermaid. By Octave Mirbeau. Translated...

000 01107cam a22003131 450

001 1699480

005 20050419095459.0

008 891005s1930 nyu 000 0 eng

010 __ **|a** 31008215

035 __ **|a** (CStRLIN)NYCX89B29529

035 __ **|a** (NIC)notisAHY8430

040 __ **|a** DLC **|c** OKentU **|d** *SER* **|d** m.c. **|d** FU **|d** CStRLIN **|d** NIC

041 1_ **|a** eng **|h** fre

050 0_ **|a** PZ3.M674 **|b** Ce

100 1_ **|a** Mirbeau, Octave, **|d** 1848-1917

240 10 **|a** Journal d'une femme de chambre. **|l** English

245 10 **|a** Celestine, **|b** being the diary of a chambermaid. **|c** By Octave Mirbeau. Translated by Alan Durst.

260 __ **|a** New York, **|b** W. Faro, inc., **|c** 1930.

300 __ **|a** 317 p. **|c** 25 cm.

500 __ **|a** At head of title: By Octave Mirbeau.

500 __ **|a** Translation of Le journal d'une femme de chambre.

700 1_ **|a** Durst, Alan.

740 0_ **|a** Diary of a chambermaid.

905 __ **|a** 19970917120000.0

950 __ **|l** URIS **|a** PQ2364.M67 **|b** J8 1930 **|i** 10/05/89 N

955 __ **|l** URIS **|c** 1 **|s** 4th prtg.,1933 **|i** 10/05/89 C

998 __ **|a** 10/05/89 **|t** c **|s** 9125 **|n** NIC **|w** FLUGACR2289B **|d** 10/05/89 **|c** RET **|b** LJH **|i** 891005 **|l** NYCX

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          </subjects>
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```

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     </monograph_data>

     <monograph_parts>
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               <subjects>
                    <subject scheme=""></subject>
               </subjects>
          </section>
     </monograph_parts>

</monograph>
```

```
All elements in the target format are optional, except:
     monograph
     monograph_data
     title [required when parent element is used]
     section [at least one required when parent element is used]

Repeatable elements include:
     identifier
     author
     contributor
     affiliation
     abstract
     p (paragraph)
     subject
     section
```

Characteristics of Workflow's Source and Target Metadata

Characteristics of Source Metadata (pages 63-70)
File format:
Type of metadata:
Metadata scheme:
Scheme Support and Documentation:
Content values:
Structure:
Intended use:
Status:

Characteristics of Target Metadata (pages 71-72)
File format:
Type of metadata:
Metadata scheme:
Scheme Support and Documentation:
Content values:
Structure:
Intended use:
Status:

Metadata Map

Source	Transformation	Target

Metadata Map

Source	Transformation	Target

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The Slide Collection Digital Library Project—Background

University College has about 12,000 slides in its Art & Architecture Library slide collection, and the A&A Librarian, Mark Michelson, would like to make these accessible via the web. Most of the A&A faculty use slides in their classes and many are mentioning some system that they've heard of that allows faculty to select slides (while at home!) from a database and then show them in class, somehow. Mark isn't too sure how this would work, but he is sure there must be some software system that does all this.

One professor of Architecture in particular, Bram Bristle, is quite vocal about this and he has written to Mark and the Library Director. In an effort to appease him, the Library Director has asked the Digital Library Group (DLG) to meet with the A&A Librarian and see if there's something that can be done. Sarah Scanner, the head of DLG, meets with Mark and Bram and several other A&A faculty one afternoon. Here's what she learns:

- Currently, the Art Library has a simple Filemaker Pro database of all the slides in the collection. This was created several years ago, from a card file that was begun in the 1950s. All new slides added since the creation of the database are entered directly into the Filemaker Pro database. The database grows by about 100 entries per year.

- Each database record has about 20 elements. Records are not keyed to each other, although many, especially of the same building or place, share the same terms. The A&A Librarian seems very knowledgeable about each of the record elements, regarding what information they contain and how that information should be recorded. Mark admits, however, that there are unfortunate problems with some of the data, which he attributed to the lack of data standards in the early days of the slide collection catalog (before his time!), or to students, who occasionally enter data for him. One point that Mark kept insisting on was the accurate use, throughout the entire set of records, of the classification code. The code seemed impenetrable to Sarah, but Mark said that although the code was arcane, it was packed with information and uniformly applied throughout, since he personally applied it. When Sarah asked Mark if anyone else used the code and how, Mark said no, it was used to classify every image.

- What Sarah hears that the faculty want most are these functions:

    - The ability to access the image database over the web from their offices or homes.
    - The ability to search on the title of a work and bring up all images of that work.
    - The ability to search by period or date and bring up all works of that period or date.
    - The ability to search by type of work, like "painting," or "temple," and bring up all images pertaining to that type.
    - The ability to see small thumbnails in search results and browse mode.
    - The ability to select images and view all the metadata associated with that image.
    - The ability to select and save images to some sort of work list, so that they could be easily recovered during a classroom presentation.

Sarah assembles a team to carry out this project. The Library Director agrees that Kat Krammer, the library's metadata specialist, can be on the team. Sarah also enlists Paul Plotter, a programmer.

On the following pages (79-82) are four scenarios for how this project continues. Read the one that is assigned to your group.

Then read the list of deliverables assigned to the metadata specialist, on pages 83-84.

The Slide Collection Digital Library Project—**Scenario A-1**

The head of the Digital Library Group, Sarah Scanner, does not have an existing system that will meet the needs of this project. From peers at other universities, however, she's aware of ArtBox, a digital library system that is increasingly seeking the art library market. She thinks she can convince the Library Director to license ArtBox.

The current version of ArtBox only accepts simple Dublin Core (DC) records. The vendor apparently believes this is a drawback and has promised that the software will accept VRA Core (Visual Resources Association Core Categories) records within the next two years.

Sarah asks Kat to evaluate the Filemaker Pro metadata as well as DC and VRA Core, about which Sarah knows very little other than that these seem to be accepted standards. Kat spends some time looking at the native database records and at VRA Core. As an exercise, she creates a potential VRA Core record from a typical record in the native A&A database (see sample VRA Core record). She also begins to understand VRA Core's distinction between "work" and "image," and thinks this distinction may be useful to the project.

Sarah asks her programmer, Paul Plotter, to make an initial evaluation of ArtBox features, to see if the system has the functionality desired by the A&A faculty. Paul reports back that ArtBox supports web access worldwide (with proper authentication); the ability to associate thumbnails with every image, which are then visible in search results and browsing; the ability for authenticated users to create profiles and save image lists there for later use; and the ability to see all metadata (currently only simple Dublin Core) associated with an image. Paul says that ArtBox can be easily configured to search on any metadata field in the Dublin Core records and return all matching records. As to whether a search on a work will return all images of that work, Paul says "sure, no problem, as long as all the images have the same title." He says the same thing about searching on date and type of work.

Prompted by a question from Kat about metadata workflow and data ingest, the team takes a look at the ArtBox cataloging client. This client provides a way to create and modify individual database entries directly into ArtBox. Since ArtBox currently uses simple Dublin Core records, that's what the cataloging client guides the data imputer to create. Sarah and Kat show this client to the A&A Librarian, and he is troubled by it. The data fields are not nearly as sophisticated as those in his database, he feels, and he doesn't like the idea of using it. Besides this method of data ingest, ArtBox can also accept any number of simple DC records via a batch process.

The Slide Collection Digital Library Project—**Scenario A-2**

The head of the Digital Library Group, Sarah Scanner, does not have an existing system that will meet the needs of this project. From peers at other universities, however, she's aware of ArtBox, a digital library system that is increasingly seeking the art library market. She thinks she can convince the Library Director to license ArtBox.

The current version of ArtBox only accepts simple Dublin Core (DC) records. The vendor apparently believes this is a drawback and has promised that the software will accept VRA Core (Visual Resources Association Core Categories) records within the next two years.

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Prompted by a question from Kat about metadata workflow and data ingest, the team discovers that, remarkably, ArtBox has no cataloging client. They question the vendor on this and are told that work on a client is underway. But after more questioning, they discover that development of the cataloging client is tied to the move to VRA Core. In other words, the client won't be available before the VRA Core compliant release of ArtBox. The software does have, of course the ability to ingest any number of DC records via a batch process.

The Slide Collection Digital Library Project—**Scenario B-1**

The head of the Digital Library Group, Sarah Scanner, does not have an existing system that will meet the needs of this project. Further, the Library Director tells her that they do not have much money to devote to the project, especially on an ongoing basis. On the other hand, the Director feels strongly that they must make an effort to satisfy Bram Bristle.

After talking to her programmer, Paul Plotter, Sarah decides that it is feasible to create a web interface into the existing Filemaker Pro database. This would allow the Filemaker Pro database to continue to be used. Paul is convinced that he can add all the desired functionality through such a system, such as web access worldwide (with proper authentication); the ability to associate thumbnails with every image, which are then visible in search results and browsing; the ability for authenticated users to create profiles and save image lists there for later use; and the ability to see all metadata associated with an image. As far as searching, Paul says he can search on any of the data in the database and deliver search results. As to whether a search on a work will return all images of that work, Paul says "sure, no problem, as long as all the images have the same title." He says the same thing about searching on date and type of work.

In the midst of their initial explorations, Bram goes to the Library Director with a new idea he has just heard about. It involves participating in a larger network of university art and architecture department slide collections. After the meeting, the Library Director writes an email to Sarah telling her about this and asking her to investigate what would be involved. Sarah finds the project's web site and discovers what the requirements for participation are: participating institutions need to make metadata records for their collections available for harvesting via OAI (Open Archives Initative) in both the simple Dublin Core and VRA Core (Visual Resources Association Core Categories) standards.

Sarah asks Kat to evaluate the Filemaker Pro metadata as well as DC and VRA Core, about which Sarah knows very little other than that these seem to be accepted standards. Kat spends some time looking at the native database records and at VRA Core. As an exercise, she creates a potential VRA Core record from a typical record in the native A&A database (see sample VRA Core record). She also begins to understand VRA Core's distinction between "work" and "image," and thinks this distinction may be useful to the project.

Prompted by a question from Kat about metadata workflow and data input, the team discusses this topic. Paul is convinced that in a month or less he can move the Filemaker Pro data to another database, one that can store and ingest VRA Core records. Sarah decides that she will clear Paul's schedule so that he can concentrate exclusively on this over the next three months. Paul also plans to build an OAI component to export the DC and VRA Core records, but that should be easy, he says.

The Slide Collection Digital Library Project—**Scenario B-2**

The head of the Digital Library Group, Sarah Scanner, does not have an existing system that will meet the needs of this project. Further, the Library Director tells her that they do not have much money to devote to the project, especially on an ongoing basis. On the other hand, the Director feels strongly that they must make an effort to satisfy Bram Bristle.

After talking to her programmer, Paul Plotter, Sarah decides that it is feasible to create a web interface into the existing Filemaker Pro database. This would allow the Filemaker Pro database to continue to be used. Paul is convinced that he can add all the desired functionality through such a system, such as web access worldwide (with proper authentication); the ability to associate thumbnails with every image, which are then visible in search results and browsing; the ability for authenticated users to create profiles and save image lists there for later use; and the ability to see all metadata associated with an image. As far as searching, Paul says he can search on any of the data in the database and deliver search results. As to whether a search on a work will return all images of that work, Paul says "sure, no problem, as long as all the images have the same title." He says the same thing about searching on date and type of work.

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Prompted by a question from Kat about metadata workflow and data input, the team discusses this topic. Paul thinks that he can move the Filemaker Pro data to another database, one that can store VRA Core records. But Sarah realizes that she won't be able to devote Paul to this work for another two years, given all the other projects needing attention. So for now, it seems they must accept the Filemaker Pro database for data entry. Sarah does see that she will need to allow Paul to build an OAI component to export the DC and VRA Core records.

The Slide Collection Digital Library Project—Deliverables

You are the metadata specialist (Kat Krammer) on this project team, and you are being asked to contribute your expertise and understanding of metadata and metadata processing work to help the project leader develop appropriate and feasible plans for accomplishing the overall project objectives. Remember to keep your focus on aspects of the project related to metadata (and there are plenty of them), as opposed to overall project management. Specifically, the metadata specialist is asked to take responsibility for the following deliverables:

1. System functional requirements and metadata

   a) Work through the desired functional requirements described in the Project Background and list those requirements that will depend on descriptive metadata. For each…
      i) List the metadata element or elements involved in fulfilling this functional requirement.
      ii) Describe what demands the desired functionality will make on these metadata elements.
      iii) Are there different strategies for meeting this functional requirement, especially in terms of metadata?
   b) List any decisions you are aware of that the project team must make regarding functionality and metadata. You can add to this list as you work through the rest of the exercise.

2. Metadata conversion/mapping

   a) Make a list of all the metadata conversion processes that will be required for this project. For each conversion process on the list…
      i) Is this a one-time conversion of metadata, or an ongoing, recurring conversion? If an ongoing conversion, is it for a defined or indefinite duration?
      ii) Using the template on page 91, briefly describe the characteristics of the source metadata.
      iii) Using the template on page 92, briefly describe the characteristics of the target metadata.
   b) Make a list of all the metadata maps required for the metadata work on this project.
      i) For each, use the map templates on pages 93-96 to describe the transformation rules necessary for the mapping.

3. Metadata workflow design

   a) Make a list all the metadata conversion workflows, both immediate and future, that this project will require. Does this match 2 (a) above? For each workflow…
      i) Give a very brief description of the main objective (transformation) of this workflow.

ii) Identify the constraints that will impact carrying out this workflow.

iii) Begin to break down the main objective of this workflow until you have a list of manageable tasks and subtasks that can feasibly be implemented.

iv) Define the sequencing of the tasks listed in (iii) above. Which can be scheduled simultaneously and which require the completion of some prior task?

v) For any ongoing, regularly recurring conversion workflows, describe what tracking and oversight is required to maintain it. What sorts of automated tracking is feasible? How much and what type of human oversight is needed?

vi) What level of staff expertise and experience will be required to setup and/or maintain this workflow? Are these staffing needs in line with the constraints identified in (ii) above?

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PERIOD: Nayak Rulers
CURRENT LOCATION: Madurai
REGION: Tamil Nadu
COUNTRY: India
TITLE_1: Meenakshi Sundaresvara Temple
TITLE_2:
WORK_TYPE: temple; gate; reservoir
DATE: ca. 1500-1700
VIEW: Ext.: East towers and Golden Lily tank from Southwest
KEYWORDS: reservoirs; gopura; columns
NOTES: Tank is mentioned in the legend of the siting of Madurai. Dates: 16th to 17th C. Built by Nayak Rulers.
SOURCE_DONOR: Francis Max Collection
FILM_TYPE: Color: K5073, 1981
CITATION_1: Thiagarajan, K.; Meenakshi Temple, Masurai; Madurai: Meenakshi Sundareswarar Temple Renovation Committee; 1965; Fine Arts; NA6008.M28 T42
CITATION_2: Grove Dictionary of Art
CITATION_3:

ACCESSION_NO: 91000090
IMAGE_FILE_ID: MDD_02251
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PERIOD: Nayak Rulers
CURRENT LOCATION: Madurai
REGION: Tamil Nadu
COUNTRY: India
TITLE_1: Meenakshi Sundaresvara Temple
TITLE_2:
WORK_TYPE: temple
DATE: ca. 1500-1700
VIEW: Ext.: West gopuram
KEYWORDS: gopura; streets; people
NOTES: The temple comprises two east-facing shrines dedicated to the goddess Meenakshi and to Sundareshvara.The gopuras at madurai are known for their sweeping concave profiles and profusion of images. Dates: 16th to 17th C. Built by the Nayak Rulers.
SOURCE_DONOR: Francis Max Collection
FILM_TYPE: Color: K, 1984
CITATION_1: Thiagarajan, K.; Meenakshi Temple, Masurai; Madurai: Meenakshi Sundareswarar Temple Renovation Committee; 1965; Fine Arts; NA6008.M28 T42
CITATION_2: Grove Dictionary of Art
CITATION_3:

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IMAGE_FILE_ID: MDD_02252
CLASSIFICATION: B-Q5 Mdu 3.4 Meenk 5-4
PERIOD: Nayak Rulers
CURRENT LOCATION: Madurai
REGION: Tamil Nadu
COUNTRY: India
TITLE_1: Sundaresvara Meenakshi Temple
TITLE_2:
WORK_TYPE: temple
DATE: 16th-18th century

VIEW: Ext.: one end of the Golden Lily tank
KEYWORDS: reservoirs; gopura; columns
NOTES: The temple comprises two east-facing shrines dedicated to the goddess Meenakshi and to Sundareshvara.The gopuras at madurai are known for their sweeping concave profiles and profusion of images. Dates: 16th to 17th C. Built by the Nayak Rulers.
SOURCE_DONOR: Francis Max Collection
FILM_TYPE: Color: K5073, 1981
CITATION_1: Balaram Iyer, T. G. S.; History & Description of Sri Meenakshi Temple; Madurai: Sri Karthikeiya Publication; 1976.
CITATION_2: Grove Dictionary of Art
CITATION_3:

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CLASSIFICATION: B-Q5 Mdu 3.4 Meenk 5-1
PERIOD: Nayak Rulers
CURRENT LOCATION: Madurai
REGION: Tamil Nadu
COUNTRY: India
TITLE_1: Meenakshi Temple
TITLE_2:
WORK_TYPE: temple
DATE: ca. 17th century
VIEW: Ext.: a prakara with devotees resting on the floor
KEYWORDS:
NOTES:
SOURCE_DONOR: Miles Blimmer
FILM_TYPE: Color: K5034*
CITATION_1:
CITATION_2:
CITATION_3:

ACCESSION_NO: 91000303
IMAGE_FILE_ID: DVB_08723
CLASSIFICATION: B-Q5 Pal 3.4 Shat/AdiB/AdiB 5-1
PERIOD:
CURRENT LOCATION: Palitana
REGION: Gujarat
COUNTRY: India
TITLE_1: Adisvara Bhagavan Temple
TITLE_2:
WORK_TYPE: temple
DATE: ca. 925-975
VIEW: Ext.: from Southwest, Adisvara Bhagavan w/corner of Samet Sikhar on right
KEYWORDS: sanctums; shrines
NOTES: Located at end of S summit, shrine is basically of chaumukh type. Dates: mid 10th C., before 961. Built by Javada Sah.
SOURCE_DONOR: Francis Max Collection
FILM_TYPE: Color: K5032, 1978
CITATION_1: Burgess, James; The Temples of Satrunjaya; Calcutta: Jain Bhawan; 1977
CITATION_2:
CITATION_3:

ACCESSION_NO: 91000683
IMAGE_FILE_ID: DVB_08365
CLASSIFICATION: B-Q5 Sri 6.3 Dal 4
PERIOD:
CURRENT LOCATION: Srinagar
REGION: Jammu and Kashmir
COUNTRY: India
TITLE_1: Dal Lake
TITLE_2:
WORK_TYPE: lake; market
DATE:
VIEW: Close up of vegetable vendor weighing vegetables
KEYWORDS: shikara; markets; lakes
NOTES: The 6.4 km long and 4 km wide natural lake is divided into four man-made causeways: Gangribal, Lokut Dal, Bod Dal, and Nagin. Small islands on the lake are willow-covered. The Mihrbari people have traditionally lived around and on the lake in boats.
SOURCE_DONOR:
FILM_TYPE: Color: E, 1985
CITATION_1:
CITATION_2: Grove Dictionary of Art
CITATION_3: http://srinagar.nic.in/

ACCESSION_NO: 91000646
IMAGE_FILE_ID: DVB_02736
CLASSIFICATION: B-Q5 Sri 1.1 Dal 7
PERIOD:
CURRENT LOCATION: Srinagar
REGION: Jammu and Kashmir
COUNTRY: India
TITLE_1: Dal Lake
TITLE_2:
WORK_TYPE: lake
DATE:
VIEW: Travelling on a shikara through Dal Lake
KEYWORDS: shikara; lakes; flora
NOTES: The 6.4 km long and 4 km wide natural lake is divided into four man-made causeways: Gangribal, Lokut Dal, Bod Dal, and Nagin. Small islands on the lake are willow-covered. The Mihrbari people have traditionally lived around and on the lake in boats.
SOURCE_DONOR:
FILM_TYPE: Color: K, 1985
CITATION_1:
CITATION_2: Grove Dictionary of Art
CITATION_3: http://srinagar.nic.in/

ACCESSION_NO: 91000647
IMAGE_FILE_ID: DVB_00436
CLASSIFICATION: B-Q5 Sri 1.1 Dal 8
PERIOD:
CURRENT LOCATION: Srinagar
REGION: Jammu and Kashmir
COUNTRY: India
TITLE_1: Dal Lake
TITLE_2:
WORK_TYPE: lake

DATE:
VIEW: Tourist shikaras on Dal Lake
KEYWORDS: shikara; houseboats; lakes
NOTES: The 6.4 km long and 4 km wide natural lake is divided into four man-made causeways: Gangribal, Lokut Dal, Bod Dal, and Nagin. Small islands on the lake are willow-covered. The Mihrbari people have traditionally lived around and on the lake in boats.
SOURCE_DONOR: Miles Blimmer
FILM_TYPE: Color: E5074, 1985
CITATION_1:
CITATION_2: Grove Dictionary of Art
CITATION_3: http://srinagar.nic.in/

ACCESSION_NO: 91000622
IMAGE_FILE_ID: DVB_07564
CLASSIFICATION: B-Q5 Sri 1.1 Dal 4
PERIOD:
CURRENT LOCATION: Srinagar
REGION: Jammu and Kashmir
COUNTRY: India
TITLE_1: Dal Lake
TITLE_2:
WORK_TYPE: lake; documentary photograph
DATE:
VIEW: Weed collecting on Dal Lake
KEYWORDS: shikara; weeds; gardens; people
NOTES: Locals tend to floating vegetable beds that are shielded with weeds. Natural lake is 6.4 km long and 4 km wide, and is divided into four man-made causeways: Gangribal, Lokut Dal, Bod Dal, and Nagin.
SOURCE_DONOR: Miles Blimmer
FILM_TYPE: Color: K5034, 1985*
CITATION_1:
CITATION_2: Grove Dictionary of Art
CITATION_3: http://srinagar.nic.in/

ACCESSION_NO: 91000204
IMAGE_FILE_ID: missing
CLASSIFICATION: B-Q5 Had 3.4 Stu 1-1
PERIOD:
CURRENT LOCATION: Hadda
REGION:
COUNTRY: India
TITLE_1: Stupa
TITLE_2:
WORK_TYPE: shrine
DATE:
VIEW: Plan: Tepe shutur
KEYWORDS: stupas
NOTES:
SOURCE_DONOR: Miles Blimmer
FILM_TYPE: Color: E5017
CITATION_1:
CITATION_2:
CITATION_3:

ACCESSION_NO: 91000691
IMAGE_FILE_ID: DVB_00326

CLASSIFICATION: B-Q5 Kas 2.171 Hor 2
PERIOD:
CURRENT LOCATION:
REGION: Kashmir
COUNTRY: India
TITLE_1: Packed Horses on Road in Kashmir in 1985
TITLE_2:
WORK_TYPE: transportation
DATE:
VIEW:
KEYWORDS: transportation; horses
NOTES:
SOURCE_DONOR:
FILM_TYPE: Color: E5034, 1985
CITATION_1:
CITATION_2:
CITATION_3:

ACCESSION_NO: 91000110
IMAGE_FILE_ID: missing
CLASSIFICATION: B-Q5 Kum 3.4 SSrg 9a-1
PERIOD:
CURRENT LOCATION: Kumbakonam
REGION: Tamil Nadu
COUNTRY: India
TITLE_1: Sri Sarangapani Temple
TITLE_2:
WORK_TYPE: temple
DATE: ca. 1100-1175
VIEW: Ext.det.: front gopuram
KEYWORDS: Vaishnavite temple
NOTES: Among the most important temples dedicated to Vishnu. The gopura is 11 stories and 44 meters high. Dates: early to mid 12th C., 1121 onward. Built by a Chola Ruler (possibly Vikrama Chola).
SOURCE_DONOR:
FILM_TYPE: Color: K5032, 1978
CITATION_1: Meena, V.; Temples of South India; Kanyakumari: Hari Kumari Arts; 1976; Fine Arts; NA6007.S6 M51
CITATION_2:
CITATION_3:

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        <source>
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            History, Art, and Architecture; New Delhi: Abhinav Publications;
            1975.</name>
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            <subject>reservoirs</subject>
            <subject>mandapa</subject>
            <technique id="300237903" vocab="AAT">digital imaging</technique>
            <title type="full view">Ext.: Anantasaras tank viewed from along pillared
            Kalyana Vandapa</title>
        </image>
    </work>
</vra>
```

Characteristics of Source Metadata

Characteristics of Source Metadata

File format:

Type of metadata:

Metadata scheme:

Scheme Support and Documentation:

Content values:

Structure:

Intended use:

Status:

Characteristics of Source Metadata

File format:

Type of metadata:

Metadata scheme:

Scheme Support and Documentation:

Content values:

Structure:

Intended use:

Status:

Characteristics of Target Metadata

Characteristics of Target Metadata

File format:

Type of metadata:

Metadata scheme:

Scheme Support and Documentation:

Content values:

Structure:

Intended use:

Status:

Characteristics of Target Metadata

File format:

Type of metadata:

Metadata scheme:

Scheme Support and Documentation:

Content values:

Structure:

Intended use:

Status:

Metadata Map

Source	Transformation	Target

Metadata Map

Source	Transformation	Target

Metadata Map

Source	Transformation	Target

Metadata Map

Source	Transformation	Target

Exercise 3: Metadata Analysis

Part One:

MARC Record

File Format: MARC (technically, it's presented here in some nicely formatted way and thus not really what a MARC record would look like without MARC-capable software).
Type of Metadata: Descriptive primarily, some Admin. Others?
Metadata Scheme: MARC21.
Content Values: AACR2, LCSH.
Structure: Richly structured? Some might debate this. It likely depends on how devoted you are to MARC.
Intended Use: for use in a library bibliographic system. Can we call this single use data?

Dublin Core Record

File Format: XML.
Type of Metadata: Descriptive only.
Metadata Scheme: Unqualified, or simple, Dublin Core.
Content Values: Not clear from record itself. Note that Date element isn't in a DC recommended encoding (as we'll see in Exercise 4).
Structure: Simple structured, flat, no hierarchical relationships (nesting).
Intended Use: Hard to say, but the typical use of simple DC is for resource discovery and/or interoperability with other systems (in the sense of metadata sharing, potentially beyond the library world).

EAD Document

File Format: XML.
Type of Metadata: Descriptive; there is structural information about the analog collection. There is some but not much administrative metadata, for collection management—a shortcoming of EAD.
Metadata Scheme: Encoded Archival Description (EAD).
Content Values: Overall, it perhaps follows some best practices, such as RLG's Best Practices for EAD. This would need to be determined. Some data values are labeled such that we can see they are LCSH.
Structure: Richly structured.
Intended Use: Multiple potential uses: Sophisticated discovery system possible, with fielded searching. Potential interoperability of rich archival descriptions (contributing EAD documents to common, union database). Control of archival descriptions. Publishing (print or web) of archival guides.

HTML Source Code

File Format: HTML (not all HTML is XML, and there is no indication that this is).
Type of Metadata: Descriptive.
Metadata Scheme: None, really; at least in its present form. The markup, the encoding, is almost entirely "presentational," indicating to the browser how to render a document on a

computer screen. It is not "descriptive" markup, in that it makes any semantic distinctions among data elements ("this is a date," "this is a subject," etc.).

Content Values: Difficult to say from what we have. There are guidelines to describing archival collections, and perhaps they were followed.

Structure: Simple unstructured.

Intended Use: Web publication (pretty much the only thing HTML is useful for).

Paper Archival Guide

File Format: Well, this isn't a file, but a piece of paper. How is data exchanged? Visually. Document structure is conveyed by means of page layout and character formatting.

Type of Metadata: Descriptive, a little Admin.

Metadata Scheme: Some commonly accepted practices for archival description?

Content Values: May follow accepted standards or guidelines for archival descriptions. We would probably need to see more archival descriptions from the same source, or talk with the generating repository, to be sure.

Structure: Since it's on paper, any structure to the information is revealed visually. This would assist in the digital conversion of such guides, but such conversion would be a manual process.

Intended Use: Publication (traditional, paper-based).

Paper Accession Record

File Format: Paper—see above.

Type of Metadata: Administrative mostly.

Metadata Scheme: Some common archival descriptive terms, but the particular format may or may not be unique to a single archive.

Content Values: Some standard archival terminology.

Structure: Assuming such sheets were used over many years, and that their form didn't change too much (a big assumption), then the data might be considered fairly structured. But again, to capture it in electronic form would most likely be done manually (keyboarding the data).

Intended Use: Internal workflow administration and management, record keeping.

What about the Status for all metadata examples here? All these examples of metadata would probably be more in the "dynamic" category. Although such records may rarely change, they all support active use. If an error were detected, it no doubt would be corrected. They have not become detached from their creator or their intended use.

Part Two:

Scenario A: A lot will depend on the "centralized discovery system." Since nothing is said about what the system may be, we can assume the consortium has not thought this through. What will we advise, given that we know they do not have a lot of resources to devote to this (money/staff), and that they'd like something fairly quickly? These constraints suggest that we need to focus on collection-level description, as opposed to more complete or in-depth collection inventories (such as EAD might provide). We know that moving the entire consortium beyond collection-level description would likely become too expensive and time consuming. But even if there is a

decision to stick with collection-level description, there is still the question of what metadata to use for such descriptions.

Here are two options:

1) Prepare collection-level MARC records for all collections. The larger institutions are ready to go and could perhaps help smaller organizations prepare records—either doing the work or offering training. There may be some question about uniformity of such records, and thus some time and energy may be spent on existing records, although this probably would not be absolutely necessary.

   Once a process was in place to obtain MARC records for all collections, then questions about the discovery system could be addressed. The records could be loaded into individual systems, for local discovery. Perhaps one larger institution could create a centralized system, receiving and loading all records, and offering accessible search services.

2) Decide to collect simple, or "slightly" qualified, Dublin Core records describing each collection. The larger institutions might extract archival collection MARC records and convert these to DC. Perhaps they could even share maps and conversion tools. Those institutions without any collection-level descriptions would need to create such records. The advantage, if any, of this option over #1 is that DC records may be easier for some organizations to create than a collection-level MARC record, and some institutions in the consortium may not have any need or use for MARC records. Also, if a discovery system does not already exist and must be developed or acquired, the range of solutions will be much greater, and probably less expensive, if the input data is DC as opposed to MARC (why? MARC is a library-centric data format and data model; it's true that MARC can be expressed in XML, getting away from the format problem, but it's still much more "peculiar" than DC, meaning that there won't be as many non-library solutions).

Scenario B: The key functional requirements here are that the state wants "in-depth descriptions" of archival collections, and they want "sophisticated fielded searching capability." Thus collection-level records alone will not do—we need a more complete description of the components of collections, such as you'd get in an archival guide or collection registry. The good news is that such guides are currently being produced, so the expert practice and knowledge about in-depth descriptions is already in place. The other good news is that the state is apparently willing to devote funds to this (as opposed to Scenario C).

What's the bad news? The current guides are being published on paper, for local inspection, and in HTML for web delivery. The guides are produced in MS Word and then easily converted by that software to HTML. The problem is that HTML will not provide good fielded searching. There is no reliable way for a machine to distinguish and separately index the different components of a guide encoded in HTML. You can see this in the HTML example—the HTML "tags" dictate page and character formatting, they don't make the kind of semantic distinctions as we see in EAD. This kind of problem is compounded when the guides are being produced by

multiple sources (any uniform HTML encoding practices that may result merely from being generated by a single producer will be lost when you have many producers).

We are thus pushed in the direction of EAD to satisfy the desired functional requirements. EAD would give us in-depth descriptions, as well as the rich XML encoding that would support fielded searching.

EAD is quite promiscuous, in the sense that it is extremely flexible in how content is encoded in it—there are many different ways one can encode an archival guide in EAD. So once the decision is made to use it, the first business of the consortium will be to bring together archivists from all member organizations and decide on an EAD best practice. This would describe the elements to be used, with various content value recommendations. Help in this area is available from such documents as RLG's "Best Practice Guidelines for Encoded Archival Description."

Scenario C: This scenario is identical to Scenario B, except for the constaints, which in effect changes the functional requirements for this project. The difference here is that the state does not insist on fielded searching, and they don't have resources to put into this project. They want something done quickly and inexpensively.

The solution here is fairly easy: establish a method for collecting HTML archival guides from all organizations, and index these together in a searchable system. It would be a bit like a Google search—simple entry form, no field selection possible—and you'd get back a simple hit list of archival guides. Clicking on one of these would take you to the complete HTML guide.

It would be nice to get an accurately rendered title for every collection, to display in search results or perhaps on a browse list. This might be built into the submission process (submitters fill in the title of the collection in some form), or if everyone in the consortium agreed to a common encoding practice (such as putting the collection title in the HTML <head><title> element), then the title could be captured even more easily.

You could provide at least one search field limitation very inexpensively. That would be for repository—where the content is held. You would have this information because you would know where the guide was submitted from. So users could, if they wanted, ask to search only archival materials held at University X, for example.

Scenario D: This is an interesting scenario and points out some weaknesses, or limitations, of EAD. EAD was designed to encode (to capture the information of) published archival guides. But there is a lot of additional information that is necessary to the assessment and management of archival collections, as a custodian. Some of this information is what this particular institution is interested in: information about donors or the estimated worth of archival materials.

So those working on this scenario should notice that EAD does not appear (from the example) to be capable of capturing this type of collection management information. There is no very clear solution. Some participants may be familiar with some software that offers more management capabilities. In any event, this is what the solution would likely involve—obtaining a system that

allowed for this extra information. Ideally such a system would be capable of including EAD within it, or generating it, so that a publishable guide could be pulled from the system as well.

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Exercise 4: Metadata Mapping Exercise

Source Metadata (native publisher metadata)	Transformation Rules	Target Metadata (simple DC)
journal_issue/record/title	Take source element as is. If multiple title elements in source, take all; each source title gets a separate dc:title element.	**Title**
Discussion: Multiple titles can occur (see one of the articles on page 37). Should both go in? It would likely improve discovery, so why not. Is order important? This will depend on how the resulting DC data is used. The most "important" title should probably go first. Should we worry about initial articles (removing them, moving them, leaving them alone)? Initial articles can be difficult to deal with in a reliable manner, especially across languages. Like all decisions here, we can ask why we would remove them. If we, or a group we are sharing these DC records with, wants to create title browse lists, then there may be a good reason to consider this. But otherwise, it's probably better to avoid if possible.		
		Contributor
Discussion: There are no examples of anything that would go into dc:contributor, so it will be difficult to define the mapping for this element. This illustrates the difficulty of creating metadata maps without complete examples illustrating every possibility within the source data, or, what is probably better, the source metadata rules themselves (a DTD or XML Schema), where all possible elements are defined. Without this, we can only guess how a contributor (a translator perhaps, or editor) might get encoded in the source data, if it is encoded at all. There is talk within the DC community, particularly among librarians, about the problems associated with Creator and Contributor, and to some extend Publisher. The argument is that these are roles having more to do with the agent in question than with the resource being described. Some have suggested using only the Contributor element for all "agents" (in lieu of a DC Agent element). Such a solution, however, illustrates the tension between "correctness" and "usefulness." The problem is that many users of DC are not librarians and will continue to use Creator for author names (since that makes the most common sense). If most DC users put author names in the Creator element, but the library community puts them in the Contributor element, what impact will this have on sharing DC data?		
		Coverage
Discussion: Probably not used here. According to the DC definition and comment, there is no appropriate use for this element with this material (mathematics literature). "Mathematics" itself is a subject.		

journal_issue/record/author/name/…	Surname element first, comma, space, then given_name. Every author name in its own dc:creator element.	**Creator**

Discussion:

The source data here is rich enough that we have some options on how we render names. We can easily go with an inverted or non-inverted format. How we decide will depend on our intended use of this data, community practice, and with whom we will be sharing this DC metadata. Most DC recommendations are for inverted order, or whatever order will sort appropriately in an alphabetized list.

Note that on page 36, an author has a name suffix: Jr. What to do with that, particularly if we go with inverted names. Catalogers will have a particular way to handle this, but one could propose just dropping such suffixes. What are the reasons not to? (It may provide important distinguishing information. Since it is not encoded separately, it may be hard to reliably detect all name suffixes.) With DC, there's often no right answer, but there may be better and worse answers.

journal_issue/issue_date/ issue_publ_date	Use the iso8601 attribute value	**Date**

Discussion:

There are two dates in this data, and one of them is rendered in two ways. One date is the issue publication date, and it has two formats. The other date is some sort of timestamp, probably when the resource was entered into the system. Going back to the overall guideline of improving discovery, it is the issue publication date that is of use to end-users. A system timestamp won't be of much help to anyone trying to discover this resource.

As to which of the two formats of the publication date to use, the DC community recommends using a standard format. Since we have that, we should use it, as is.

journal_issue/record/abstract/p	Collapse all <p> elements into the same dc:description. Replace all <math> elements with alttext attribute value. Remove HTML tags, <i> and <b>.	**Description**

Discussion:

DC Abstract is an element refinement, refining Description. This strongly suggests that if we want to include the source data's abstract in a DC record, it should go in Description. One thing that often gets overlooked…what to do if an abstract has multiple paragraphs? You could use another description element, but that implies it is another description, when in fact it's part of the same one. You could just cram them together, separated by a space. Or cram them together separated by some other symbol, like a paragraph mark. Again, there is no right answer.

Another issue that this data raises is what to do with any internal markup, such as on page 35 and 36. Such markup is not allowed inside a simple DC element. The internal markup on page 36 has the easier solution. This particular markup is MathML (Mathematical Markup Language), and the trick here is to notice that every math expression, enclosed in a <math> element, has an "alttext" attribute. This attribute holds something called the LaTeX encoding of the math expression. This is an ASCII text version that is equivalent to the MathML version, and it could thus be substituted for each MathML <math> element.

But what if there is HTML in the abstract, as on page 35? This is character formatting, for italic and bold. You have to make a hard decision whether to delete the character formatting and leave bare text, or omit the entire abstract. In this case, we'd probably decide to strip it out, because what is left is still intelligible, and having an abstract in the record improves discoverability. But what if the character markup was a bit more complex, like "E=mc²". Would you be comfortable reducing this to "E=mc2"? Is that preferable over leaving the entire abstract out of the record? There is no easy solution.		
journal_issue/record/ record_filename	Map type attribute value to appropriate MIME type.	**Format**
Discussion: There is a clue in the source metadata about file type. Presumably there might be different file types. But these indicators ("pdf") would need to be mapped within the conversion program to the appropriate MIME Type. For PDF files, that is "application/pdf". So one would have to assemble a table, with a complete list of file types used in the source data, paired with the correct MIME type.		
Various journal_issue/issue_data elements, and page elements from first and last records. journal_issue/record/ identifier@type=doi	Build a single dc:identifier element in this way: [journal_citation_name] [journal_vol_number], No. [issue_number] ([issue_publ_date]), [start_page of first record]—[end_page of last record]. Include all DOIs, prefaced with "doi:"	**Identifier**
Discussion: An important identifier will be citation information. Looking through element refinements, we can see that the DC community has accepted that this type of information is considered a type of Identifier (the element refinement bibliographicCitation is a refinement of Identifier). This is where you would put journal title, volume number, issue number, date of publication, and page range, in some formation. Disciplines may have particular citation styling conventions. The Digital Object Identifier, if present, is a universally accepted and understood identifier and should be included in a DC record. To be correct, the DOI should begin with "doi:", but this could easily be done in the conversion. Another identifier in the source metadata is a "pii" or Publisher Item Identifier. PII's are peculiar to individual publishers, used for internal purposes, and likely have no meaning outside of a particular publishing operation. Therefore, there is not much reason to include them in a widely distributed DC record.		
journal_issue/record	Use lang attribute value	**Language**
Discussion: This is a little tricky, since there are lang attributes on a number of elements. The most likely indicator of the language of the article, which is what we're after, is the lang attribute on the record element. These codes are already in a recommended form (ISO 639-1, alpha-2), so they could be used as is. Perhaps they should be lowercased—ISO 639 is case insensitive, though it suggests lowercase.		

journal_issue/issue_data/ publisher	Use as is.	**Publisher**
Discussion: Straightforward.		
journal_issue/issue_data/issn	Use as is.	**Relation**
Discussion: The DC record describes an article. That's why the ISSN should not be included as an Identifier, since the ISSN identifies the journal, not the article. But Relation includes the element refinement "is part of", which accurately fits this relationship between an article and its journal (article "is a part of" a journal).		
Various journal_issue/issue_data elements.	Build a dc:rights element in this way: © [first 4 digits of issue_publ_date iso8601 attribute value] [publisher]	**Rights**
Discussion: There is nothing in the source that directly maps to this. You would have to decide on what was appropriate for the rights statement. One typical usage is to include a copyright symbol or statement, year of publication, and the publisher name. But other options exist, such as a generic statement about what is and is not permissible without further authorization, or even a link to such a statement.		
		Source
Discussion: DC Source has a fairly restricted use—the analog source for digitized material. If that distinction isn't important, or even valid, then we shouldn't use Source. With the journal material at hand, it is not clear that the analog, or print, is really a "source" for the electronic at all.		
journal_issue/record/keywords/… journal_issue/record/subjects/…	Make every keyword and subject element a separate dc:subject element.	**Subject**
Discussion: The subject terms in the source data clearly come from some sort of controlled vocabulary scheme, but simple DC offers no easy way to identify particular vocabularies.		
Not in source data.	Use "Text"	**Type**
Discussion: The interesting thing about this element is that it cannot be directly obtained from the source data. It will be added programmatically to every DC record we generate. We know the element value to use because most all journal literature by nature falls into the DCMI Type category of "Text".		

Metadata and Digital Library Development
Appendix I—Glossary

Agile Software Design A software development methodology and framework that emphasizes short development horizons, maintaining workable software, and intensely collaborative development work (such as pair programming). Agile methodologies are particularly good at adapting to changing environments or user/customer needs.

Application Profile "In DCMI usage, an application profile is a declaration of the metadata terms an organization, information resource, application, or user community uses in its metadata. In a broader sense, it includes the set of metadata elements, policies, and guidelines defined for a particular application or implementation. The elements may be from one or more element sets, thus allowing a given application to meet its functional requirements by using metadata elements from several element sets including locally defined sets. For example, a given application might choose a specific subset of the Dublin Core elements that meets its needs, or may include elements from the Dublin Core, another element set, and several locally defined elements, all combined in a single schema. An application profile is not considered complete without documentation that defines the policies and best practices appropriate to the application." M. Woodley, DCMI Glossary. 2004.
Available at: http://www.dublincore.org/documents/usageguide/glossary.shtml

Crosswalk "A table that maps the relationships and equivalencies between two or more metadata schemes. Crosswalks or metadata mapping support the ability of search engines to search effectively across heterogeneous databases." M. Woodley. DCMI glossary. 2004.
Available at: http://www.dublincore.org/documents/usageguide/glossary.shtml

Digital library "One thing digital libraries will not be is a single, completely digital system that provides instant access to all information, for all sectors of society, from anywhere in the world. This is simply unrealistic. This concept comes from the early days when people were unaware of the complexities of building digital libraries. Instead, they will most likely be a collection of disparate resources and disparate systems, catering to specific communities and user groups, created for specific purposes. They also will include, perhaps indefinitely, paper-based collections." Gary Cleveland. "Digital Libraries: Definitions, Issues and Challenges." *UDT* Occasional Paper #8. International Federation of Library Associations and Institutions. 1998.
Available at: http://www.ifla.org/VI/5/op/udtop8/udtop8.htm

Digital library "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities." Digital Library Federation. 1998.
Available at: http://www.diglib.org/about/dldefinition.htm

Digital library "A collection of information packages in digital form that are selected, brought together, organized, preserved, and to which access is provided over digital networks for a

particular community of users." Arlene G. Taylor. The Organization of Information. 2nd edition. Englewood, Colo.: Libraries Unlimited, 2004.

Digital library "…a library in which a significant proportion of the resources are available in machine-readable format (as opposed to print or microform), accessible by means of computers. The digital content may be locally held or accessed remotely via computer networks." Digital library. (2006, August 8). In Wikipedia, The Free Encyclopedia. Retrieved 18:42, August 13, 2006, from http://en.wikipedia.org/w/index.php?title=Digital_library&oldid=68320437.

Digital library *See also*: Association of Research Libraries definition, from 1995: http://www.arl.org/arl/proceedings/126/2-defn.html

ILS (Integrated Library System), or LMS (Library Management System) Enterprise level software used in libraries to manage all aspects of information resources, both digital and physical. Assists in various functions, such as acquisitions, cataloging, circulation, and many others. Will typically include a public interface (OPAC).

Interoperability "The ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, in order to exchange information in a useful and meaningful manner. There are three aspects of interoperability: semantic, structural and syntactical." M. Woodley. *DCMI glossary*. 2004. Available at: http://dublincore.org/documents/usageguide/glossary.shtml

Library Bibliographic System A very abstract term for the system (electronic or analog) in place within libraries to allow users to access materials. A conceptual system allowing users to access library materials. Manifestations of a library bibliographic system would be a card catalog, an OPAC, and Integrated Library System, etc.

Metadata mapping See **crosswalk**.

OAI (Open Archives Initiative) An initiative to provide and maintain a protocol (OAI-MHP) that allows for machine harvesting of metadata records.

OPAC (Online Public Access Catalog) An electronic version of the library catalog. It has replaced the card catalog in most libraries, often providing much greater functionality and features. An OPAC is part of most modern Integrated Library Systems.

Rational Unified Process A software design and development process emphasizing iterative development, requirements tied to end-user needs, component-based software design, and the management of expected transition and change (in users' needs, technical environment, and supporting systems).

Use case A method of articulating the precise requirements for a single, specific system feature. A use case will typically describe a scenario, which represents a single complete interaction between the system and some external "user." The user may represent a class of users (general users, data entry staff, administrators, etc.), or another system (a statistics gathering system, a

backup system, an authentication system, etc.). Use cases do not explain how the requirements described are carried out or implemented. Taken together, all the use cases of a proposed system represent the functional requirements of that system.

User centered design An approach to design, including software design, which emphasizes and privileges actual users and their behavior in the design process. The idea is that systems so designed will better meet the real needs of users, as opposed to asking users to adjust their behavior to a specific system. User centered design processes include extensive user behavior analysis in their requirements analysis phase, combined with substantial follow-up testing and assessment with real-world users.

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CDWA Lite (Categories for the Description of Works of Art)
http://www.getty.edu/research/conducting_research/standards/cdwa/cdwalite.html

Dublin Core Metadata Initiative
http://dublincore.org

EAD (Encoded Archival Description)
http://www.loc.gov/ead

See also: RLG Best Practice Guidelines for Encoded Archival Description
http://www.rlg.org/en/page.php?Page_ID=450

MARC
http://www.loc.gov/marc

METS (Metadata Encoding and Transmission Standard)
http://www.loc.gov/standards/mets

MODS (Metadata Object Description Schema)
http://www.loc.gov/standards/mods

VRA Core (Visual Resources Association)
VRA Core Categories,Version 3.0
http://www.vraweb.org/vracore3.htm

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http://www.getty.edu/research/conducting_research/standards/intrometadata/path.html

See also:
http://www.loc.gov/marc/marcdocz.html
http://libraries.mit.edu/guides/subjects/metadata/mappings.html
http://staffweb.library.northwestern.edu/dl/metadata/standardsinventory

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Evaluation Form
Metadata and Digital Library Development

Your evaluation of this workshop is very important to the future development of this course and other similar courses. Your honest, candid answers to the following questions will assist us in providing quality programs.

Please rate the following aspects of today's workshop by checking the box that best reflects your evaluation:

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1. The overall content of the workshop:

	5	4	3	2	1	
a. was extremely valuable						was of little value
b. provided enough detail						was too general
c. was current & relevant						was outdated
d. was cohesive & logical						was fragmented/difficult to follow
e. was appropriate to my needs						was not at all appropriate
f. met its stated objectives						did not meet objectives

2. Presenter:

	5	4	3	2	1	
a. was knowledgeable						was unsure of the material
b. had good presentation skills						had poor presentation skills
c. encouraged participation						discouraged participation
d. addressed my level of understanding						did not consider my level
e. answered questions directly						did not answer questions
f. was prepared						was not prepared
g. understood the audience dynamics						ignored audience dynamics

3. Presenter:

	5	4	3	2	1	
a. was knowledgeable						was unsure of the material
b. had good presentation skills						had poor presentation skills
c. encouraged participation						discouraged participation
d. addressed my level of understanding						did not consider my level
e. answered questions directly						did not answer questions
f. was prepared						was not prepared
g. understood the audience dynamics						ignored audience dynamics

4. The handouts:

	5	4	3	2	1	
a. are excellent						are poor
b. followed course content						are disjointed/out of sequence
c. are valuable for future reference						are of no value

5. The PowerPoint slides:

	5	4	3	2	1	
a. were clear and easy to read						were hard to read
b. were well organized						were poorly organized
c. illustrated concepts clearly						were confusing
d. covered an appropriate amount of information						contained too much or not enough information
e. were visually effective						were not effective
f. were enhanced by and supported the presenter's remarks						were poorly related to the presenter's remarks

Please give the following information about yourself:

6. Your level of knowledge in the subject of this workshop before today: expert 5 4 3 2 1 novice

7. Your level of experience in the subject of this workshop before today: very experienced 5 4 3 2 1 beginner

8. Other comments:

Comments on specific sessions:

THANK YOU!