Metadata Systems
A User Needs Perspective

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Metadata and Digital Information in the NDAP

• What is the role of Metadata?
  – Metadata plays a chief role to help organize digital information.
  – National Digital Archives Program (NDAP)

• Metadata Issues
  – The question “What are the needs of a metadata system?”
  – Creating a bridge of communication between parties
  – Creating an adequate metadata system with regard to content of metadata projects
Scope of the NDAP

- Domain Expertise
- Culture and Knowledge Background
- Being Digitized
- Born Digital
- Digital Archives
- Business Process and Lifecycle
- e-Research
- e-Learning
- Enterprise Intelligence
- General Knowledge Base

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Layers of Knowledge Management in the NDAP

Data Type Layer
- Rubbings, Files, Rare Books, Full Text, Specimens, Corpus, Maps, Photos, Painting and Calligraphy, Video Tapes, Score, Dress, Reports, Investigation, etc.

Discipline Layer
- History, Politics, Humanities, Archeology, Ethnology, Diplomacy, Zoology, Botany, Species, Genomics, Linguistics, Geology, Geography, Visual Arts, etc.

Functionality Layer
- Resource Discovery, Description, Exhibition, Preservation, Rights Management for e-Commerce, e-Learning, etc.

Community Layer
- Museum, Archives, Library, Herbarium, etc.

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A Common Set of Functional Requirements

• Why do we need it?
  – To conserve effort made by all parties
  – To achieve more cost-effective system development

• Different perspectives can be adopted when building the set of requirements
  – The software design perspective
  – The system evaluation perspective
  – The user needs perspective
Methodology—Step 1

• Step 1—Case Study (The 8 NDAP projects)
  – Digital Archives Project of Chinese Painting and Calligraphy at the National Palace Museum museum - CDWA
  – Digital Archives Project of Chinese Antiquities at the National Palace Museum museum - CDWA
  – Digital Archives of Rubbings and Archaic Texts museum - CDWA
  – Digital Archives for the Grand Secretariat Archives library - EAD
  – Digital Library Project for Official Economic and Diplomatic Archives archives - EAD
  – Digital Archives Project of Academia Historica archives - EAD
  – Zoological Research of Taiwan: Fish and Mollusks Species 2000
  – Digital Library of Taiwan Herbarium herbarium - HISPID
Methodology—Steps 2

• Step 2—Interviewing
  – Uses a questionnaire designed to learn about user needs
  – Questionnaire covers items such as current status, requirements for metadata elements, association diagram, context diagram, metadata instance, etc.
A re-examination of workflow for the digital library

- **Inventory** (Registration Dept.)
- **Object1**
- **Object2**
- **Photo** (Publication Dept.)
- **Slide** (Publication Dept.)
- **Image** (Information Centre)
- **Exhibition** (Painting & Calligraphy Dept.)
- **Ref** (Painting & Calligraphy Dept.)

Diagram:
- Photo-ed into
- Registered by
- Related to
- Related exhibition
- Researched by
- Copied into

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Methodology—Steps 3

• Step 3—Analysis and Prototyping
  – The results of the questionnaire are analyzed
  – A prototype based on system specification is developed
Results

• Requirement for a metadata system
  – 32 requirements and can be generalized into 6 categories
    • Input and maintenance
    • Retrieval
    • Display
    • Interoperability
    • Management
    • Automation of Operational Activities
Results

• Core Requirements
  – common system components and functions

• Criteria:
  – Demanded by more than 6 out of 8 projects (>=75%)
  – Requiring the metadata system to offer functionality immediately

• 13 core requirements (around 40%)

• Record creation
• Modification
• Deletion
• Multi-value attributes
• Select-list menu
• Simple search
• Advanced search
• Simple display
• Import and export using XML document
• Links to other databases
• Cataloguing history
• Setting private attributes
• Authentication management
Results

- 7 Potential Common functions
  - Provide different levels of information granularity
  - A mechanism to integrate external resources seamlessly
  - Convert legacy systems and records into new ones
  - Equip customized options for report generation
  - Incorporate miscellaneous tools, in terms of metadata creation, retrieval, display
  - Implement structured relations for existing metadata standards
  - Enable multi-lingual processing
Findings

• Coverage of functions
  – User requirements, software design, system evaluation
  – A web-based charging mechanism for future e-commerce application

• Gap between system implementation and requirements
  – Requirements: comprehensive description & rich relations

• Relationship between metadata systems and external resources
  – Eg. Person name, Place name

• A mechanism for metadata exchange and transfer
  – Cross-walking mechanism
Conclusion and Suggestion

Recommendations for communication

• Establish a service model for:
  – Content experts
  – Metadata professionals
  – System designers

[Diagram showing relationships between End User, Metadata Team, System Designer, and Content Expert, indicating direct and indirect relationships]
Conclusion and Suggestion

Recommendations for communication

• Content Experts
  – project scope, objectives, and requirements
  – revision should be confirmed by all related parties.
  – Requirements should be reasonable based on enough IT knowledge.

• System Designers
  – Provide Promotion: deliver appropriate IT at the right. (what I’ve got)
  – Provide Advice: examine the feasibility of metadata requirements (what I can do)
Conclusion and Suggestion

Recommendations for communication

• Metadata Professionals
  – A bridge role in relaying requirements to other members
  – Guide content expert toward a more integrated metadata system, in response to related workflow tasks of digital libraries in a whole lifecycle
Conclusion and Suggestion

*Spectrum of functional requirements for a metadata system*¹

- The web-based metadata representation has to offer different options for browsing, indexing, and searching for various targeted audiences.
- **External resources**, such as thesauri for "person name" and "place name", should be regarded as independent metadata systems. Synchronous data update and bi-directional linking are also required. Furthermore, projects should be able to share both metadata systems and external resources.
- Flexible customization is necessary to offer various options to accommodate a wide range of user needs.
- The ability of **multilingual processing** is required to handle Chinese and Japanese materials.
Conclusion and Suggestion

Spectrum of functional requirements for a metadata system

- A mechanism composed of more than two different metadata standards for import, export, and harvest, is an essential component of a metadata system, including conversion of legacy systems and records.
- The ability to control quality assurance for workflow and management.
- A management set of metadata elements for system and administrative management is also needed.
- Provide offline and online modes to promote the use of metadata systems widely.
- The facility of security functions for authentication and metadata exchange.
Conclusion and Suggestion

*Spectrum of functional requirements for a metadata system*

- The help facility should be equipped to guide users toward adoption of a metadata system.
- The metadata system can be planted across various platforms in order to interoperate with technology evolution.
- Dedicated personnel are required to keep system operations stable.
- The metadata system should be designed by a component-based approach to incorporate new software and hardware, to avoid obsolescence of information technology.
- **Recovery and storage devices** should be used to prevent data loss.
Thanks for your join
&
welcome any comments!

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