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Metadata for e-Learning Objects

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APAN/PRAGMA 2003 Conference
in Fukuoka
22 Jan., 2003

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Outline

- **Definition**
- **Scope of e-Learning**
- **Overview of Current Metadata Standards**
- **Position of Metadata**
- **Snapshot on Metadata Standards**
- **Case study : NSDL**
- **Issues and Future Works**

Definition[1]

- **Learning Object**
  Leverage database, Internet, and other digital technologies to prepare learning content as discrete small "chunk," or "Learning Objects," that can be used alone or dynamically assembled to provide "just enough" and "just in time" learning.

Definition²

- **Learning Object**
  A re-usable, media-independent chunk of information used as a modular building block for e-Learning content. Learning objects are most effective when organized by a metadata classification system and stored in a data repository such as a Learning Content Management System (LCMS). (The MASIE Center, 2002)

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Scope of e-Learning[1]

- **Person – instructor, and learner**
- **Platform – a content management system for e-Learning (LCMS)**
- **Content**
  - **Curriculum**
  - **Course**
  - **Lesson**
  - **Learning objects**
  - **Information objects**
  - **Raw content items**

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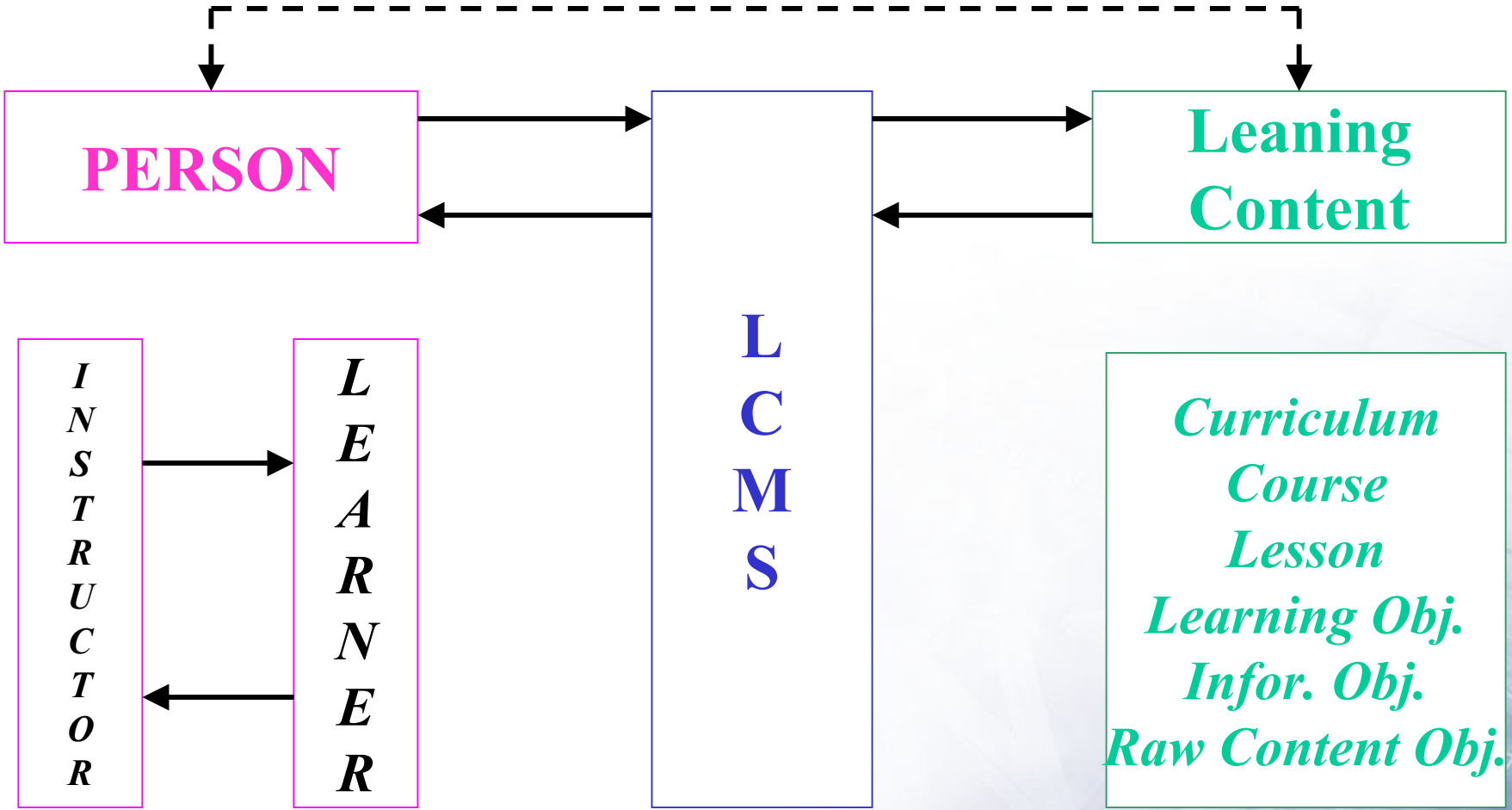
Scope of e-Learning²



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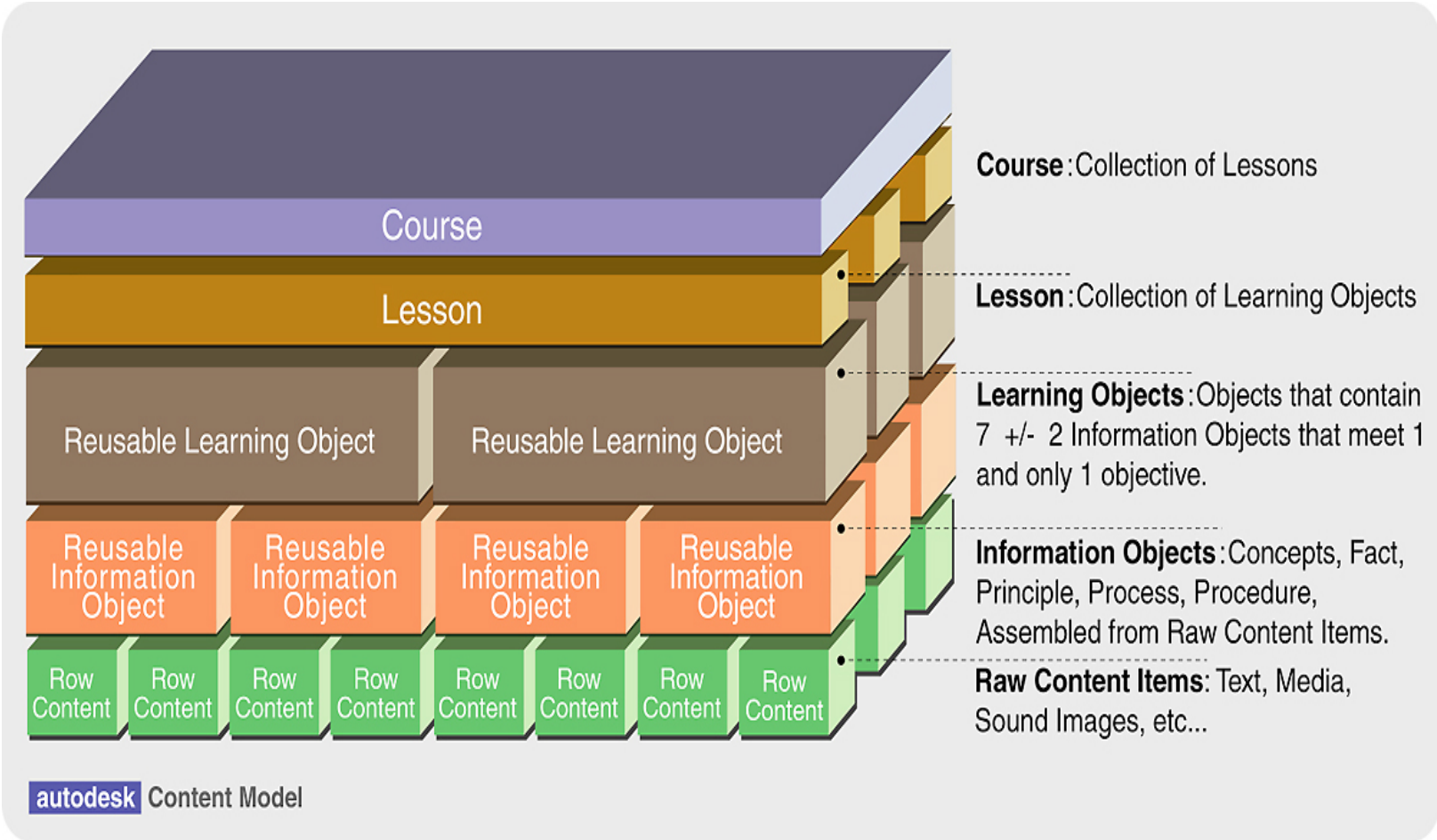
Scope of e-Learning³ Content Model



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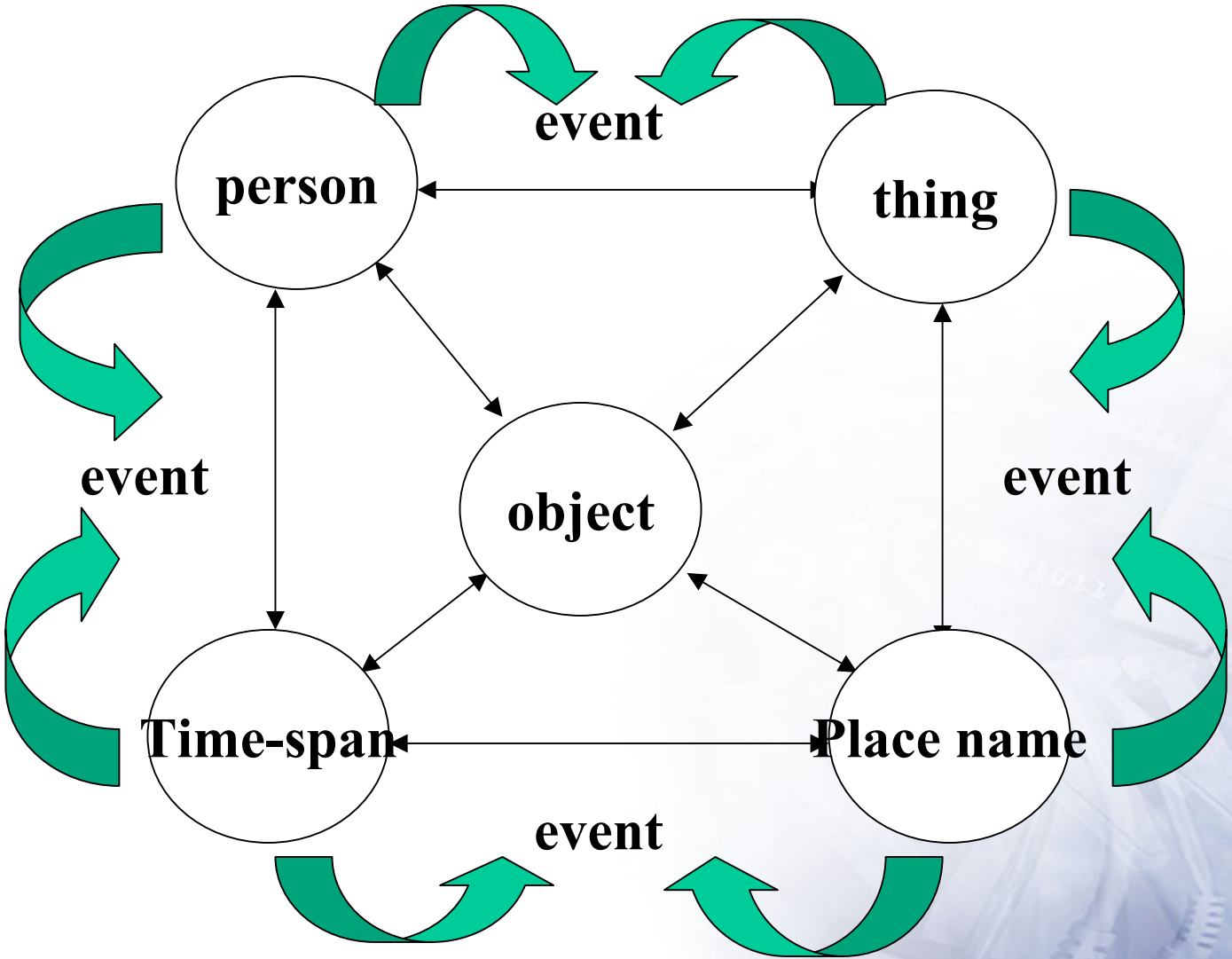
Scope of e-Learning[4]
Generic Metadata Attributes



Overview of Current MD Stds.[1] Functions of Standard

- **Standard helps e-Learning in achieving to**
  - **Interoperability**
  - **Re-usability**
  - **Manageability**
  - **Accessibility**
  - **Durability**

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Overview of Current MD Stds.[2]

- **Technical Specifications such as AICC, IMS, ARIADNE**
- **Implementation Reference Models such as ADL SCORM (sharable content object reference model)**
- **Accredited Standards such as IEEE, ISO, and CEN/ISSS**
- **De facto Standards**

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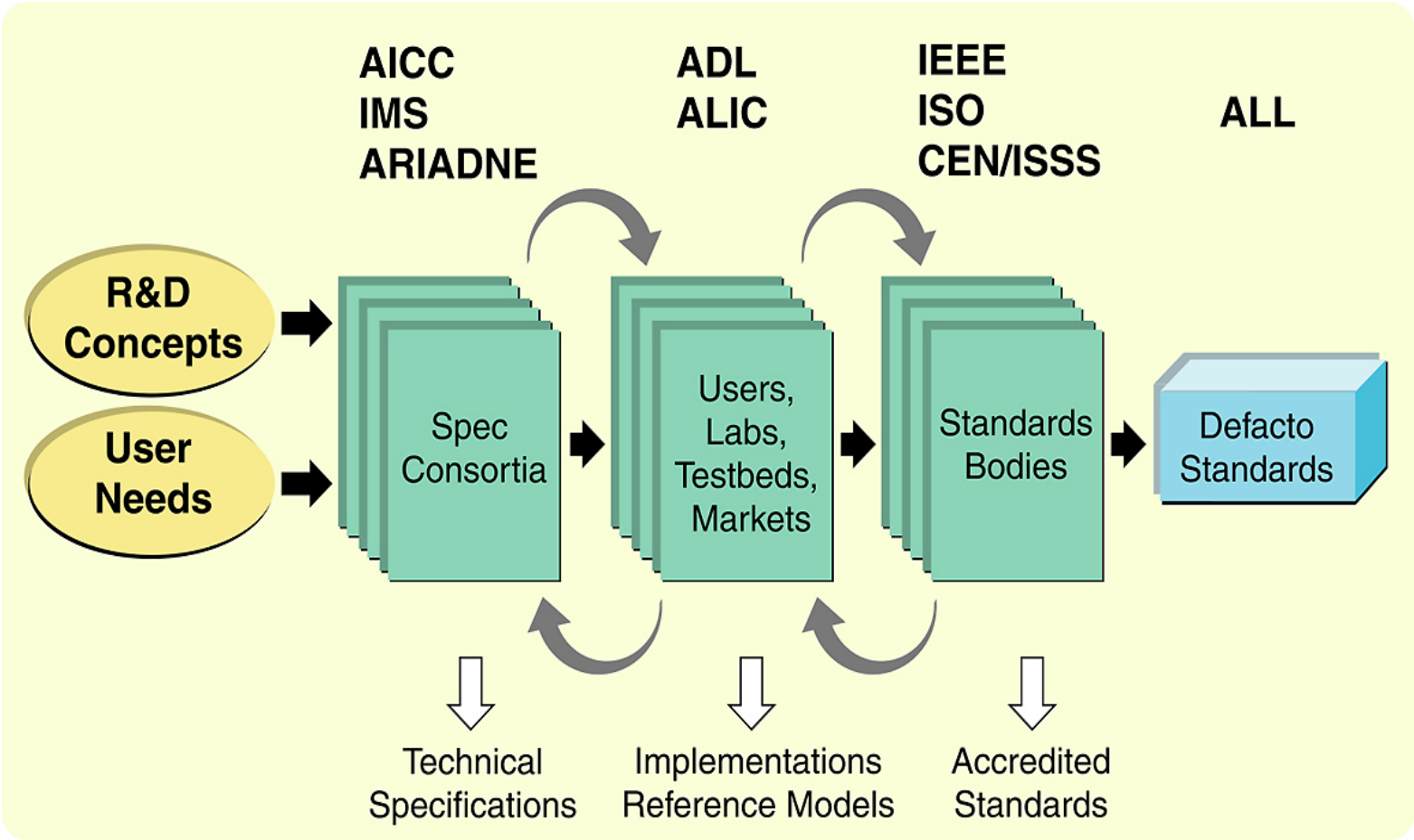
Overview of Current MD Stds.[3]



Source from ADL's SCORM

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Position of Metadata[1] Definition

- **Metadata**
  - **Data about data.**
  - **Structural data about data.**
  - **To structure and annotate data which can then be easily reused, transformed, accessed, etc., in order to gain more information and knowledge on demand (ASCC, 2002).**

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Position of Metadata²
Sample of Metadata

- the author of a book
- the file size of an animation
- the location of a file in a database
- learning preferences or styles of an individual
- the collective opinion of a group who has seen the same movie

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Position of Metadata³
Vision – 6R

- **Just the right *CONTENT*, to**
- **Just the right *PERSON*, at**
- **Just the right *TIME*, on**
- **Just the right *DEVICE*, in**
- **Just the right *CONTEXT*, and**
- **Just the right *WAY***

In order to identify and locate the right Services, Objects, People and Content Resources at the right time.

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Position of Metadata[4] Function

- **Metadata can help e-Learning attain to**
  - **Find**
  - **Select**
  - **Retrieve**
  - **Combine**
  - **Use/re-use**
  - **Target**
    it for appropriate use.

  - **Furthermore, categorization and taxonomy can be also attained.**

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Snapshot on MD Standard[1] ADL Initiative: SCORM[1]

- **In 1999, ADL (Advanced Distributed Learning) was initiated by DoD and established ADL Co-Laboratory (Co-Lab).**
- **ADL Vision**
  - **Sharable content objects from across the world wide web**
  - **Assembled in real-time, on-demand**
  - **To provide learning and assistance anytime, anywhere**

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Snapshot on MD Standard² ADL Initiative: SCORM²

- **High-level requirements**
  - **Accessibility, interoperability, durability, and reusability**
- **Web-based design assumption**
- **Describing "Learning management Systems" (LMS)**
- **Tracking the Learner**
- **Toward adaptive and intelligent tutoring**

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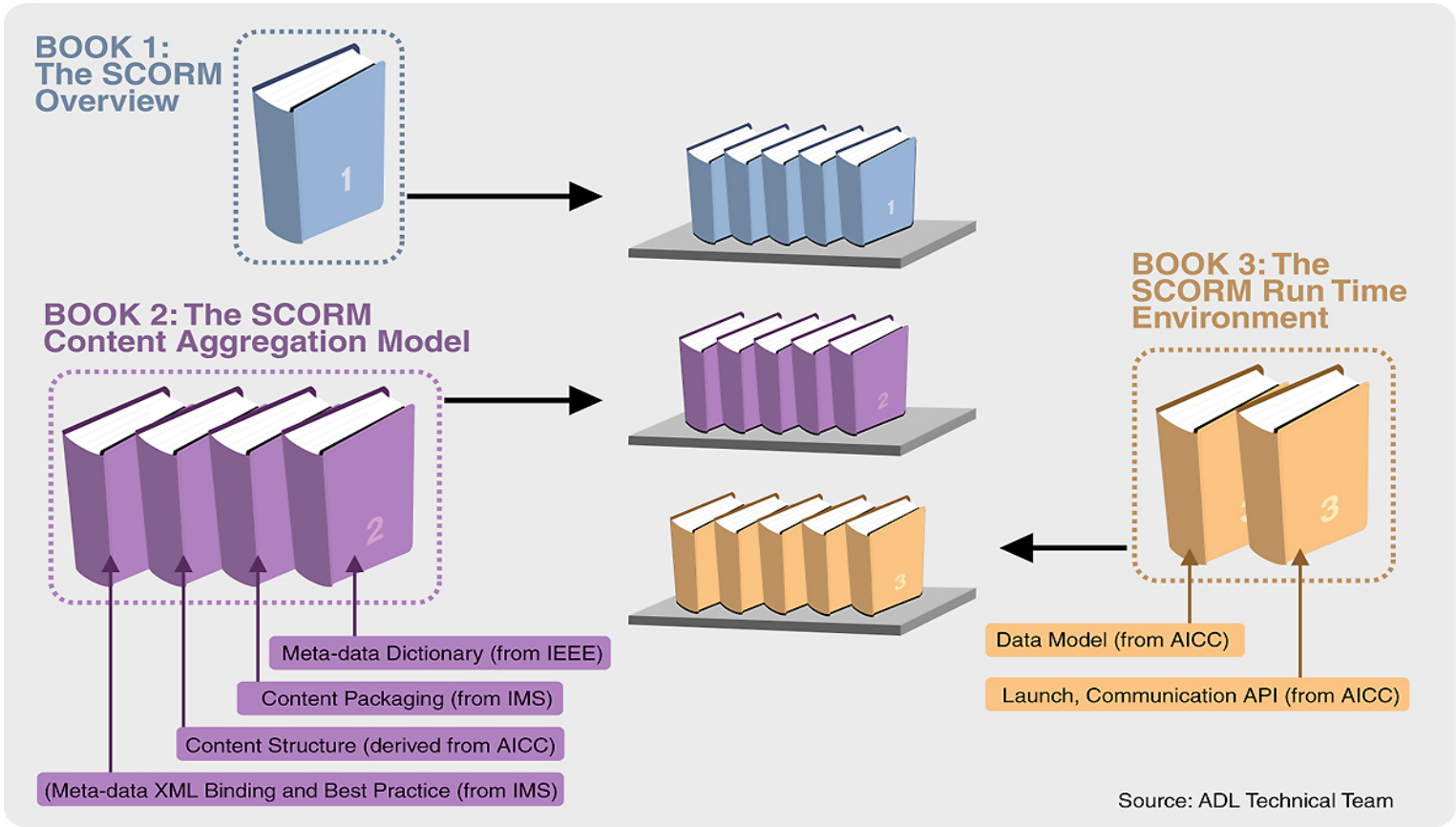
Snapshot on MD Standard^3 ADL Initiative: SCORM^3



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Snapshot on MD Standard[4]
IEEE LTSC: LOM[1]

- **Initiated date: 1996**
- **Achievement:**
  1484.12.1-2002 has been approved as an IEEE – SA Standard on Jun. 12, 2002.
- **Collaboration**
  - **A formal connection between IEEE's LOM and DC has been formulated.**

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Snapshot on MD Standard[5]
IEEE LTSC: LOM[2] –Category

- **General**
- **Life Cycle**
- **Meta-Metadata**
- **Technical**
- **Educational**
- **Rights**
- **Relation**
- **Annotation**
- **Classification**

Snapshot on MD Standard[6] IEEE LTSC: LOM[3] –Case

- **IMS Global Learning Consortium**
  - **A global consortium of members an interest in providing access to online learning resources for facilitating online distributed learning activities, such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging records.**
  - **http://www.imsglobal.org/**
- **CanCore**
  - **Was developed by a group of educators and technology developers with funding and support from Industry Canada/CANARIE and other groups.**
  - **Is intended to facilitate the interchange of records describing educational resources and the discovery of these resources.**
  - **http://www.cancore.ca/**

Snapshot on MD Standard[7]

DCMI: Education Working Group[1]

- **Launched Date: 9 August, 1999**
- **Current Progress**
  - **Dec. 2001: Audience Level Proposal**
  - **Feb. 2002: Complete discussion of audience characteristics data**
  - **Jun. 2002: Complete work gathering teaching processes and characteristics data**
  - **Aug. 2002: Proposal for 'type' vocabulary**
  - **Jun.-Aug. 2002: Discussion: Intrinsic learning objectives (DCMI 2002 Annual Meeting)**
  - **Jun. 2003: Vocabulary development process (audience, type, pedagogy)**
  - **Jul. 2003 : LOM and DC Application Profile**

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Snapshot on MD Standard[8] DCMI: Education Working Group[2]

- **Completed documents**
  - **Audience Characteristics – draft**
  - **Teaching Methods/Strategies – draft**
- **Collaboration**
  - **A formal connection between IEEE's LOM and DC has been formulated.**

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Snapshot on MD Standard[9] DCMI: Case

- **GEM**
  - **a consortium effort to provide educators with quick and easy access to thousands of educational resources found on various federal, state, university, non-profit, and commercial Internet.**
  - **http://www.thegateway.org/**
- **EdNA**
  - **is a network of and for the Australian education and training community.**
  - **http://www.edna.edu.au/**

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Case Study — NSDL[1]

- **NSDL – National Science Digital Library**
  - **is a digital library of exemplar resource collection and service, organized in support of science education at all levels.**
  - **is emerging as a center of innovation in digital libraries as applied to education, and community center for groups focused on digital-library-enabled science education.**
  - **http://www.nsdl.org**

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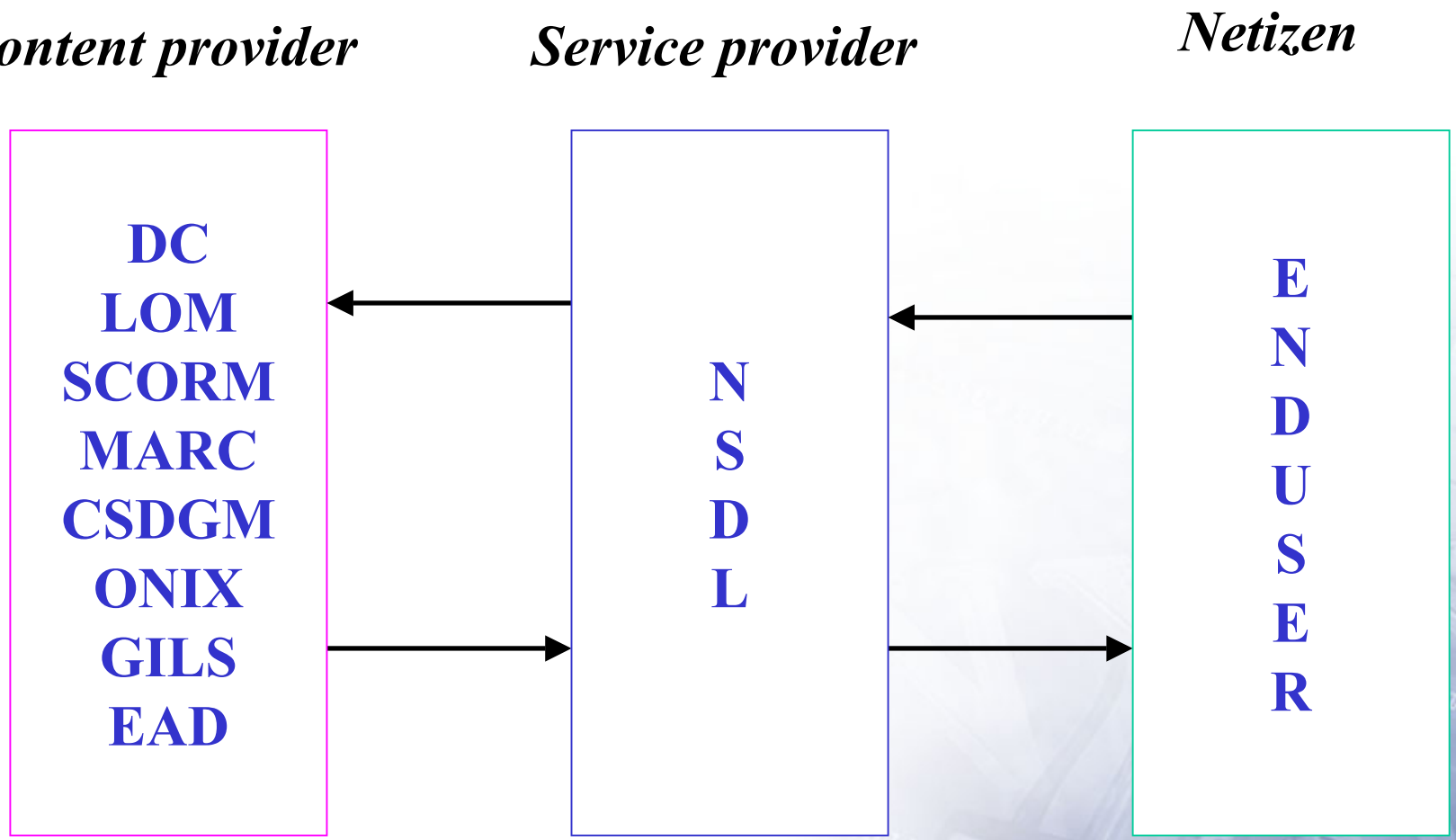
Case Study — NSDL²
Metadata View



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Case Study – NSDL³ Metadata View

- **The NSDL uses Metadata to**
  - **Support resources discovery**
  - **Assist the user in selecting an appropriate resource based on his or her needs**
  - **Be an investment in future interoperability**
  - **Be an effective marketing tool in order to increase traffic on websites as well as awareness of available resources**
  - **Aggregate metadata in a well-supported repository**

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Issues[1]

- **Integration among**
  - **Thing: such as curriculum, course, lesson, learning objects, information objects, raw content items.**
  - **Person: including profiles of individual and institute.**
  - **Time-span: for a specified date or duration is required.**
  - **Place name: facilitate finding and selecting the right e-learning materials.**
  - **Event: how to get information and participant in the workshop or seminar at the right time.**

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Issues²

- **Interoperability**
  - **Information object**
  - **Information unit/granularity**
  - **Level**
    - **Syntax**
      - **Expression pattern and structure**
    - **Semantic**
      - **Element and Value**
  - **Technical standard**
    - **XML approach (such as SOAP)**
    - **Z39．50**
    - **OAI**
    - **Or others**

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Future Works[1]

- **A LOM-based Metadata Element Set will be designed for the Ministry of Education in Taiwan in March 2003, in order to construct an integrated platform for instructors and learners, ranging from curriculum, course, lessons, learning objects, information objects, and raw content items.**

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Future Works[2]

- **A deeper metadata description of classification and thesaurus value system will also be built up, in order to facilitate ontology-based navigation and interoperability.**

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Future Works[3]

- **The digital contents of the National Digital Archives Program in Taiwan will be driven into e-Learning domain in the near future, and metadata is one of essentials to achieve this goal seamlessly.**
- **On-demand metadata service on a clearinghouse approach will soon be offered in 2003, and is a fundamental base for future international collaboration.**

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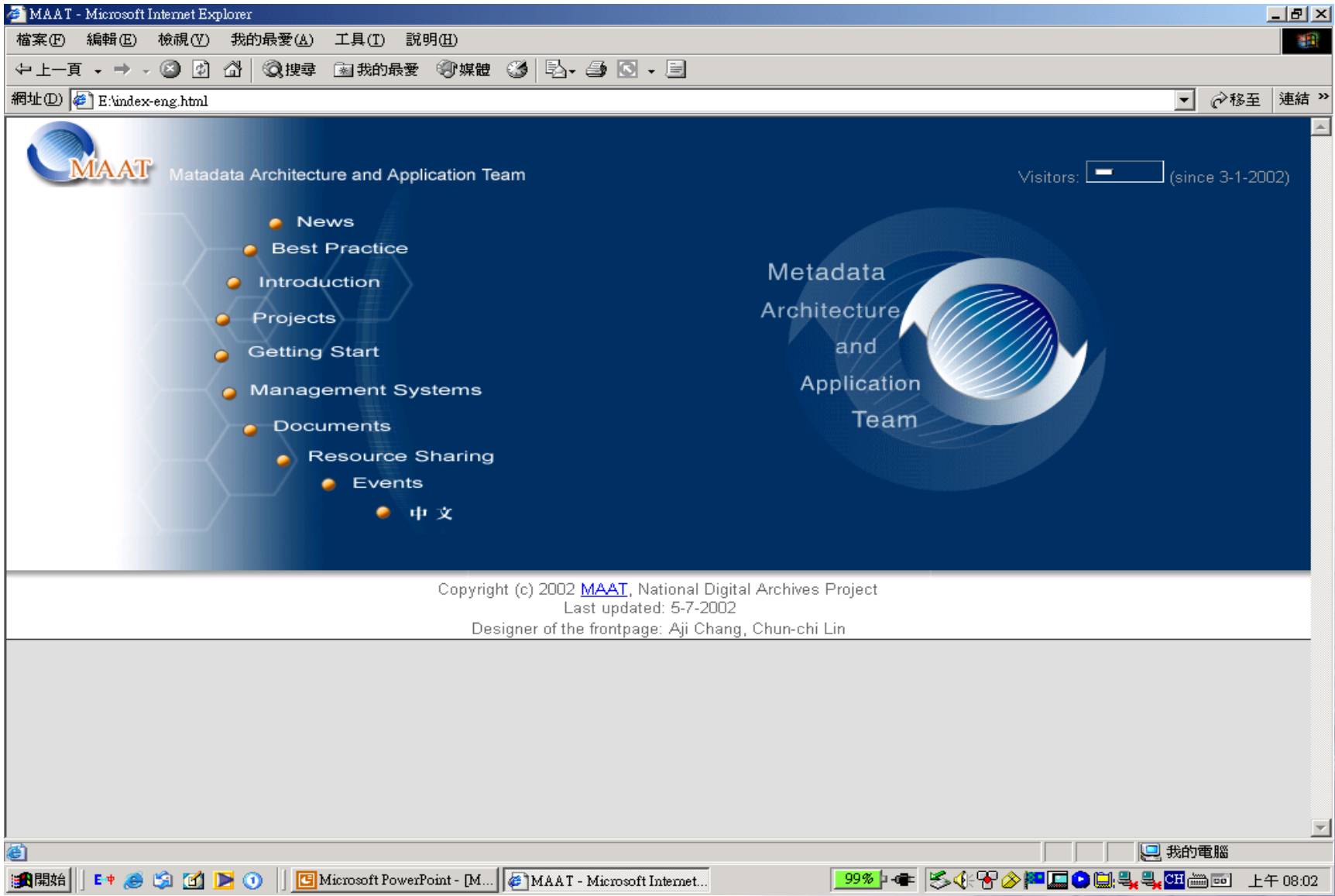

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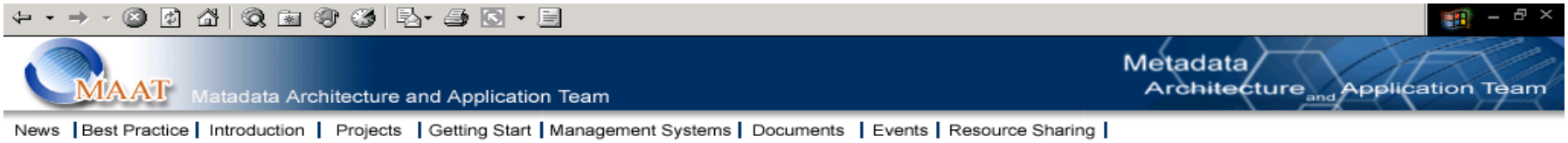
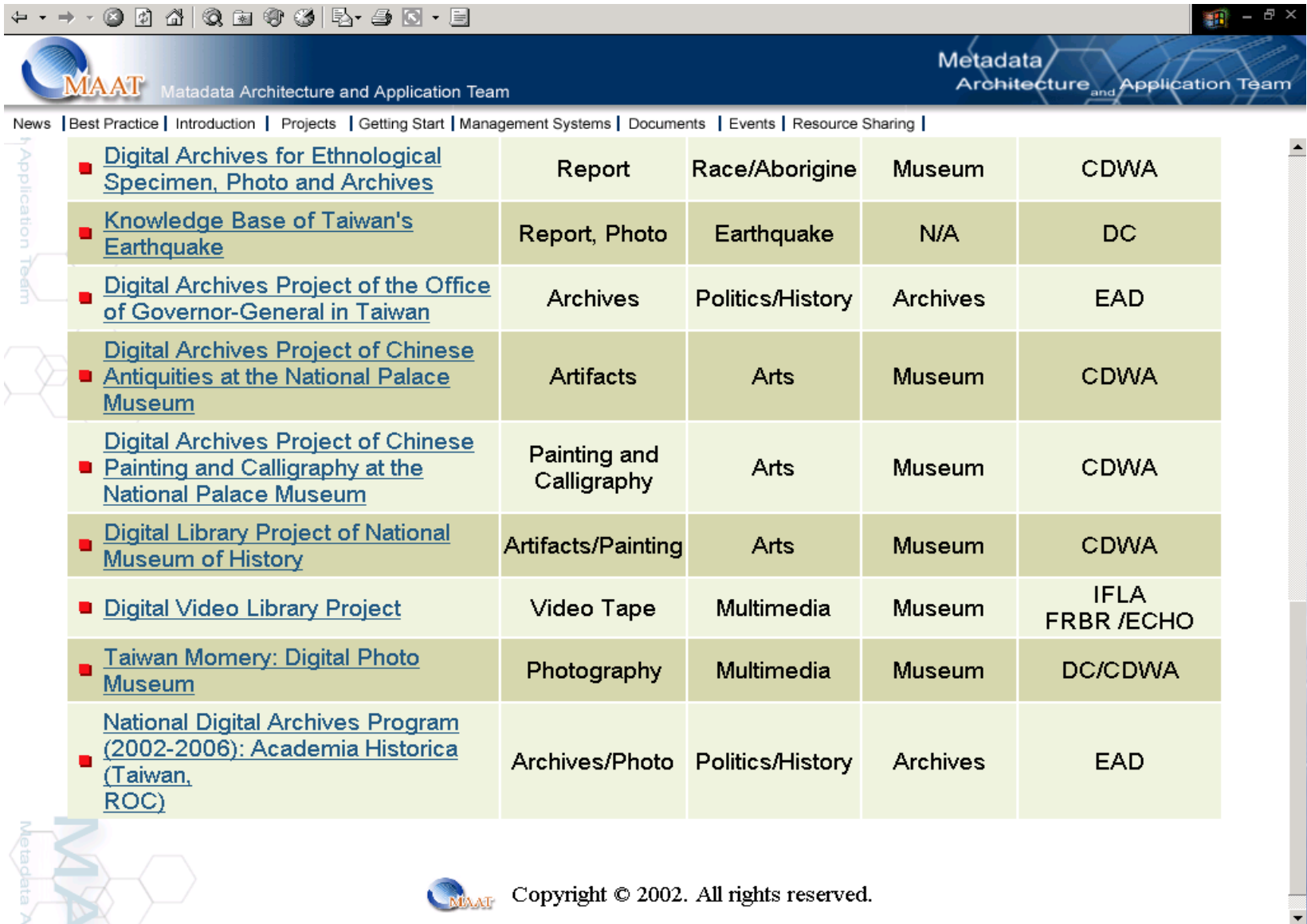


Projects	Attributes			
	Data Types	Subjects	Communities	Metadata Standards
The Digital Archives of Rubbings and Archaic Texts	Rubbings	History	Museum	CDWA
Digital archives for the Grand Secretariat Archives	Archives	Politics/History	Archives	EAD
Digital Archives of Chinese Archaeological Data	Artifacts	Archaeology	Museum	CDWA, MIDAS
Digital Archive for Rare Books of Fu Ssu-Nien Library	Rare Books	History	Archives	TEI
Digital Library Project for Official Economic Archives and Diplomatic Archives	Archives	Diplomacy	Archives	EAD
Zoological Research of Taiwan: Fish and Mollusks	Specimen	Herbarium	Herbarium	SPECIES 2000 Standard Data
Digital Library of Taiwan Herbarium	Specimen	Herbarium	Herbarium	HISPID
Linguistics Anchoring and Language Archive of Digital Archives	Corpus	Language	N/A	OLAC
GIS Archive for Modern Chinese Historic Atlas and Aerial Photos	Map, Photography	GIS	N/A	FGDC
Taiwan Aborigine: Ping-pu	Video, Costume	Race/Aborigine	Museum	DC
Digital Archives for Ethnological Specimen, Photo and Archives	Report	Race/Aborigine	Museum	CDWA



Digital Archives for Ethnological Specimen, Photo and Archives	Report	Race/Aborigine	Museum	CDWA
Knowledge Base of Taiwan's Earthquake	Report, Photo	Earthquake	N/A	DC
Digital Archives Project of the Office of Governor-General in Taiwan	Archives	Politics/History	Archives	EAD
Digital Archives Project of Chinese Antiquities at the National Palace Museum	Artifacts	Arts	Museum	CDWA
Digital Archives Project of Chinese Painting and Calligraphy at the National Palace Museum	Painting and Calligraphy	Arts	Museum	CDWA
Digital Library Project of National Museum of History	Artifacts/Painting	Arts	Museum	CDWA
Digital Video Library Project	Video Tape	Multimedia	Museum	IFLA FRBR /ECHO
Taiwan Momery: Digital Photo Museum	Photography	Multimedia	Museum	DC/CDWA
National Digital Archives Program (2002-2006): Academia Historica (Taiwan, ROC)	Archives/Photo	Politics/History	Archives	EAD

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