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Information and documentation — Managing metadata for records —

Part 2: Conceptual and implementation issues

Information et documentation — Gestion des métadonnées pour l'information et les documents —

Partie 2: Concepts et mise en oeuvre

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Contents

Page

Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 23081-2 was prepared by Technical Committee ISO/TC 46, *Information and documentation*, Subcommittee SC 11, *Archives/records management*.

This first edition cancels and replaces ISO/TS 23081-2:2007, which has been technically revised.

ISO 23081 consists of the following parts, under the general title *Information and documentation — Managing metadata for records*:

— *Part 1: Principles*

— *Part 2: Conceptual and implementation issues*

Introduction

The ISO 23081 series describes metadata for records. This part of ISO 23081 focuses on the framework for defining metadata elements for managing records and provides a generic statement of metadata elements, whether these are physical, analogue or digital, consistent with the principles of ISO 23081-1.

It provides an extended rationale for metadata for managing records in organizations, conceptual models for metadata and a high-level element set of generic metadata types suitable for any records environment encompassing, for example, current document or records management implementations or archival implementations. It defines the generic metadata types both for records entities as well as other entities that need to be managed in order to document and understand the context of records. This part of ISO 23081 also identifies, for key entities, a minimum number of fixed aggregation layers that are required for interoperability purposes. The models and generic metadata types outlined in this part of ISO 23081 are primarily focused on the "records" entity. However, they are also relevant to the other entities.

This part of ISO 23081 does not prescribe a specific set of metadata elements. Rather, it identifies generic types of metadata that are required to fulfil the requirements for managing records. This approach provides organizations with the flexibility to select specific metadata to meet their business requirements for managing their records for as long as they are required. It provides diagrams for determining the metadata elements that may be defined in a particular implementation and the metadata that could apply to each aggregation of the entities defined. It acknowledges that these entities can exist at different layers of aggregation. It defines generic metadata types that are expected to apply at all layers of aggregation, while alerting implementers to specific metadata elements that may only apply at particular layers of aggregation.

Implementing metadata for managing records in organizational and system settings involves a number of choices, which are determined by the circumstances of the organization, the systems in place and the requirements for managing records.

Building upon the principles of ISO 23081-1, this part of ISO 23081 provides further explanation on the underlying concepts of metadata schemas for managing records, offers practical guidance for developing and constructing those schemas from an organizational point of view and finally goes into issues relating to the implementation and management of metadata over time.

This part of ISO 23081 is intended for

— records professionals (or persons assigned within an organization for managing records in any environment) responsible for defining metadata for managing records at any layer of aggregation in either a business system or dedicated records application software,

— systems/business analysts responsible for identifying metadata to manage records in business systems,

— records professionals or systems analysts addressing system interoperability requirements involving records, and

— vendors, as suppliers of software applications that support and enable the creation, capture and management of metadata over time.

Information and documentation — Managing metadata for records —

Part 2: Conceptual and implementation issues

1 Scope

This part of ISO 23081 establishes a framework for defining metadata elements consistent with the principles and implementation considerations outlined in ISO 23081-1. The purpose of this framework is to

a) enable standardized description of records and critical contextual entities for records,

b) provide common understanding of fixed points of aggregation to enable interoperability of records and information relevant to records between organizational systems, and

c) enable reuse and standardization of metadata for managing records over time, space and across applications.

It further identifies some of the critical decision points that need to be addressed and documented to enable implementation of metadata for managing records. It aims to

— identify the issues that need to be addressed in implementing metadata for managing records,

— identify and explain the various options for addressing the issues, and

— identify various paths for making decisions and choosing options in implementing metadata for managing records.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 11179-1, *Information technology — Metadata registries (MDR) — Part 1: Framework*

ISO 15489-1:2001, *Information and documentation — Records management — Part 1: General*

ISO 23081-1:2006, *Information and documentation — Records management processes — Metadata for records — Part 1: Principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15489-1, ISO 23081-1, ISO/IEC 11179-1 and the following apply.

3.1
archival system
organized collection of hardware, software, policies, procedures and people, which maintains, stores, manages and makes available records over time

3.2
attribute
characteristic of an object or entity

[ISO 11179-1:2004, definition 3.1.1]

3.3
business system
organized collection of hardware, software, supplies, policies, procedures and people, which stores, processes and provides access to an organization's business information

3.4
class
description of a set of objects that share the same attributes, operations, methods, relationships, and semantics

[ISO/IEC 19501:2005, Glossary]

3.5
conceptual data model
data model that represents an abstract view of the real world

NOTE A conceptual model represents the human understanding of a system.

[ISO 11179-1:2004, definition 3.2.5]

3.6
entity
any concrete or abstract thing that exists, did exist, or may exist, including associations among these things

EXAMPLE A person, object, event, idea or process.

NOTE An entity exists whether data about it are available or not.

[ISO 11179-1:2004, definition 3.2.10; ISO/IEC 2382-17:1999, definition 17.02.05].

3.7
metadata for managing records
structured or semi-structured information, which enables the creation, management, and use of records through time and within and across domains

NOTE See ISO 23081-1:2006, Clause 4.

3.8
records application software
specific application used to maintain, manage and provide access to an organization's record resources

4 Purpose and benefits of metadata

4.1 Purposes of metadata for managing records

4.1.1 General

Organizations need information systems that capture and manage appropriate contextual information to aid the use, understanding, management of, and access to, records over time. This information is critical for asserting authenticity, reliability, integrity, usability and evidential qualities of records. Collectively, this information is known as metadata for managing records.

Metadata for managing records can be used for a variety of purposes within an organization to support, identify, authenticate, describe, locate and manage their resources in a systematic and consistent way to meet business, accountability and societal requirements of organizations.

Records application software and business systems with records functionality manage records by capturing and managing metadata about those records and the context of their creation and use.

Records, particularly in the form of electronic transactions, can exist outside of formal records application software, often being created in business systems serving specific purposes (for example, licensing systems). Records are used and understood by people who possess, or have access to, sufficient knowledge about the processes being undertaken, the people involved in the transaction, the records generated and their immediate context. Such records are not always robust, for reasons including the following.

a) Contextual linkages can be unwritten and dependent upon individual and group memory. Such reliance on unwritten contextual understanding is not dependable: some people have access to more knowledge than others, over time the usability of records will be compromised by staff movement and diminishing corporate memory.

b) The records often lack explicit information needed to identify the components of a transaction outside the specific business context and are therefore difficult to exchange with other related business systems for interoperability purposes.

c) The management processes necessary to assure the sustainability of the records for as long as they are required are not usually a feature of such systems.

4.1.2 Amount of metadata

There are practical limits to the amount of contextual information that can be made explicit and captured into a given system in the form of metadata. Context is infinite, while a single information system has finite boundaries. Further contextual information will always exist outside the boundaries of any one system. A single records application software system only needs to capture as much metadata as is considered useful for that system and its users to interpret and manage the records for as long as they are required within the system and to enable migration of those records required outside the system. Good metadata regimes are dynamic and can add additional metadata for managing records as and when necessary over time.

Much metadata for managing records can be obtained from other information systems. For them to be useful in a system for managing records they need to be structured and organized in a standardized way. Standardized metadata are an essential prerequisite for information system interoperability within and between organizations.

4.2 Business benefits for metadata for managing records

4.2.1 General

Metadata for managing records not only describe the attributes of records in a way that enables their management and use/reuse, they also document the relationships between records and the agents that make and use them and the events or circumstances in which the records are made and used. Metadata support the searching of information assets and the maintenance of their authenticity.

4.2.2 Capturing and managing records in business systems

Organizations need to create records of their transactions and maintain those records for as long as they are needed. This can be done only if organizations' business systems capture records metadata in accordance with organizational requirements for managing records. How well a system manages records is largely dependent on the metadata functionality of the system. The relationships between business systems and specific records application software systems are subject to implementation decisions, as outlined in Clause 11.

4.2.3 Interoperability

Interoperability refers to the ability of two or more automated systems to exchange information and to recognize, process and use that information successfully. Interoperable systems need to be able to function simultaneously at technical, semantic and syntactical levels. Standardized metadata are an essential prerequisite for information system interoperability.

Standardized metadata for managing records assist in enabling interoperability as follows:

a) between business systems within an organization (for example, between systems that support one business process and those that support other business processes across the organization);

b) between business systems that create records, and records application software that manage them as records;

c) between business systems during system migration;

d) between multiple organizations involved in the conduct of business processes (for example, chain management or electronic commerce transactions);

e) between organizations for a variety of other business purposes (for example in undertaking shared transactions or transfer of records to a third party);

f) across time between business systems that create records and archival systems that preserve them.

In supporting interoperability, metadata for managing records enable resource discovery of records in business systems as well as in records application software.

4.2.4 Risk management

Metadata schemas can be tailored to suit organizational requirements for risk aversion. Organizations will specify elements that shall be present for records to be reliable, authentic and to have integrity. Other elements will be optional, for inclusion at the discretion of sub-units of organizations or for particular business systems within organizations.

When considering metadata implementation strategies, organizations should identify the risks that exist, consider the degree of risk entailed, and ensure that the implementation strategy

a) provides access to critical business systems over time,

b) satisfies legal requirements for authenticity and reliability, and

c) is sustainable from a resource perspective over time.

4.2.5 Metadata for records as an organizational information asset

Structured metadata for managing records, in combination with good system search functionality, support access and retrieval of records across organizations. This maximizes the ability of people to find relevant records quickly and easily when they need to. In addition, structured records metadata enable information in

records to be retrieved within their business context, thus enhancing understanding and trust in the reliability of information retrieved for reuse. A relatively small initial investment in good metadata can enhance quality and reduce costs for retrieval of information to the organization.

4.2.6 Preventing unauthorized access to records

Metadata for managing records can be used to reduce the risk of unauthorized use of records. Metadata are needed to specify if access to records is restricted. Only those with appropriate clearance should have access to records. Any instances of access should be documented as metadata. Access control metadata are vital to secure legal and business interests of the organization. They ensure the appropriate management of confidentiality, and privacy of personal information, and other use and security restrictions identified in an organization's records.

4.2.7 Sustainability of business systems through administrative change

With the change of an organization's structure, function or work process, a shift in the responsibilities for business activities takes place. Implementation of standardized and structured records metadata assists in identifying appropriate records to be moved across systems and organizational boundaries. Such standardized metadata also assist in extracting records from one system and importing them into other systems, by preserving contextual linkage independently of any particular business system.

4.2.8 Long-term retention of digital records

Digital records depend upon metadata for their existence, management and future use. The characteristics of records (ISO 15489-1:2001, 7.2) in all formats are defined in records metadata. Ensuring the preservation of the records, including their metadata, in electronic form requires conformance to stable, structured and well defined metadata standards to ensure their sustainability across software upgrades or changes. Preservation of digital records as long as they are needed can involve a number of strategies (see Clause 11), but all strategies are dependent upon the existence of standardized metadata for managing records.

4.2.9 Incorporation of metadata into archival systems

Much of the information that is needed to document and describe records and their context in archival systems can be sourced from the metadata in records application software. This interconnection should be as seamless as possible. Capturing metadata for managing records according to a standardized schema makes this process easier to implement.

5 Policy and responsibilities

5.1 Policy decisions

As indicated in ISO 23081-1:2006, Clause 6, metadata strategies should be treated as an integral part of, or explicitly related to, an organization's broader records and information management strategy. In this respect, clear metadata-related policy should be created, either as a separate stand-alone policy area linked to the existing records policy framework or as an integral yet distinct part of the existing organizational records policies. In either case, organizations should:

a) identify and assign roles and responsibilities, including responsibilities for quality assurance of metadata;

b) identify requirements for metadata reliability, accessibility, retrieval, maintenance, and security;

c) select applicable metadata standards or schema;

d) identify and establish rules for applying metadata encoding schemes (controlled vocabularies, syntax schemes);

e) determine technical standards to be used in implementation;

f) identify how the metadata policy for managing records relates to other metadata policies or schemas that are in use in the organization;

g) identify evaluation criteria and methodology for determining compliance with, and effectiveness of, the policy;

h) develop monitoring and evaluation strategies to accompany the policy;

i) determine how the policy will be kept up-to-date in line with business activities.

Any policy should allow for different levels of implementation. It should identify the level to be achieved and how it is to be achieved.

A policy also should identify those areas that are most critical and require special attention with respect to metadata deployment strategies, such as sustainability, accessibility, vital records identification, preservation and risk analysis.

5.2 Responsibilities for implementing metadata for managing records

In line with the established framework of roles and responsibilities for records (see ISO 15489-1:2001, 6.3), responsibility for developing, implementing and maintaining metadata frameworks for managing records should be clearly assigned to records professionals in association with other organizational staff such as information technology or legal professionals, as appropriate.

This responsibility includes:

a) analysing the needs of the organization for metadata for managing records based upon business requirements;

b) monitoring and analysing developments within the organization relating to metadata, particularly requirements for managing records;

c) ensuring that metadata schemas for managing records are developed in accordance with best practice and applicable industry standards;

d) developing the metadata framework for managing records, including the metadata schema, and related organizational standards and the rules for using them;

e) identifying or developing appropriate metadata encoding schemes, element refinements and qualifiers, for example classification schemes;

f) keeping the metadata schema up-to-date and in line with business needs;

g) managing the metadata schema as a record in its own right;

h) maintaining the overall quality of both machine-generated and human-generated metadata, most particularly its accuracy, integrity, authenticity, usability and reliability;

i) co-ordinating implementation issues between records and information technology staff;

j) co-ordinating with business system owners to ensure integration of metadata for managing records into business systems as appropriate;

k) co-ordinating with archival authorities/processes to ensure interoperability between records application software and archival environments for those records that have archival value;

l) setting up a training programme and subsequent training of agents on the use and application of the metadata schema;

m) communicating about the metadata schema within the organization.

6 Metadata conceptual model

6.1 Entities

Systems designed to manage records require metadata to support processes for managing records or archives. One of the main uses of metadata is to represent entities from the business environment in the business system. Entities support the records perspective for understanding the business environment but they are not in themselves always tangible objects.

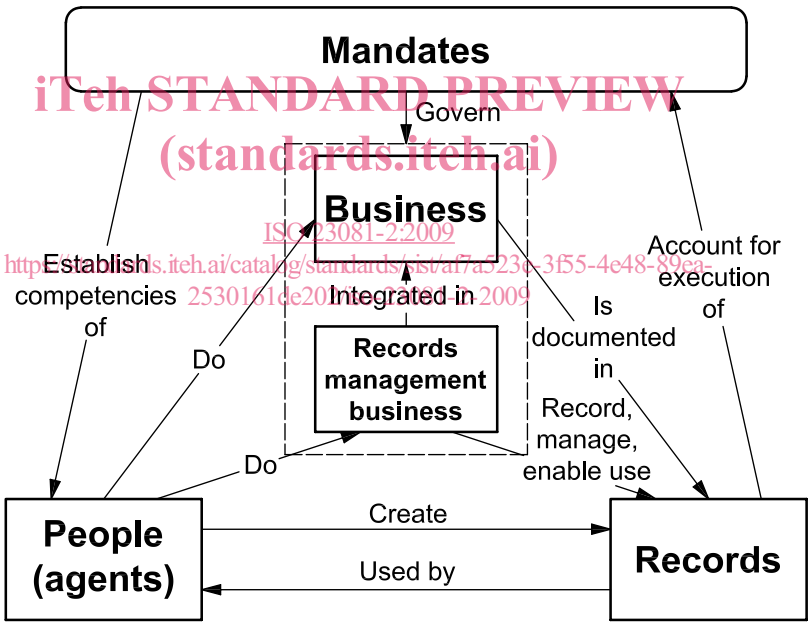
Figure 1 specifies the conceptual entity model and supports any number of entities, but of particular importance are the following:

a) the records themselves, whether an individual document or aggregations of records (known as record entities);

b) the people or organizing structures in the business environment (known as agent entities);

c) the business transacted (known as business entities);

d) the rules governing the transaction and documentation of business (known as mandate entities).



NOTE See ISO 23081-1:2006, 9.1.

Figure 1 — Conceptual entity model: Main entities and their relationships

6.2 Relationships between entities

A key requirement of metadata for managing records is to capture evidence of relationships between entities and persistently link it to record objects so that the resultant records can function as evidence of the business and social activities in which they are created and used. Metadata for managing records shall also be capable of capturing layers of aggregation in entities and the relationships among those layers. Relationships are treated as a class of entity in the following entity framework model (Figure 2) due to their importance from a records perspective.