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Information and documentation — Metadata for managing records —

Part 2: Conceptual and implementation issues

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 23081-2:2009), of which it constitutes a minor revision.

The changes compared to the previous edition are as follows:

— the second element of the title has been changed from "Managing metadata for records" to "Metadata for managing records";

— in Clause 2, ISO 30300 has been added as a normative reference;

— in Clause 3, a reference to ISO 30300 has been added and the terminological entries have been deleted;

— dated references have been updated;

— minor editorial changes have been applied for clarification.

A list of all parts in the ISO 23081 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The ISO 23081 series describes metadata for records. This document 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 document 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 document are primarily focused on the "records" entity. However, they are also relevant to the other entities.

This document 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 can 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 can 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 document 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 document 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 — Metadata for managing records —

Part 2: Conceptual and implementation issues

1 Scope

This document 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 15489-1:2016, *Information and documentation — Records management — Part 1: Concepts and principles*

ISO 23081-1:2017, *Information and documentation — Records management processes — Metadata for records — Part 1: Principles*

ISO 30300, *Information and documentation — Records management — Core concepts and vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23081-1, ISO/IEC 11179-1 and ISO 30300 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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, useability 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 a 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 useability 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 operate 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 specify elements that shall be present for records to be reliable, authentic and to have integrity. Other elements are 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 authoritative records (see ISO 15489-1:2016, 5.2.2) 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 23081-1:2017, 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 should also 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 15489-1:2016, 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, useability 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.

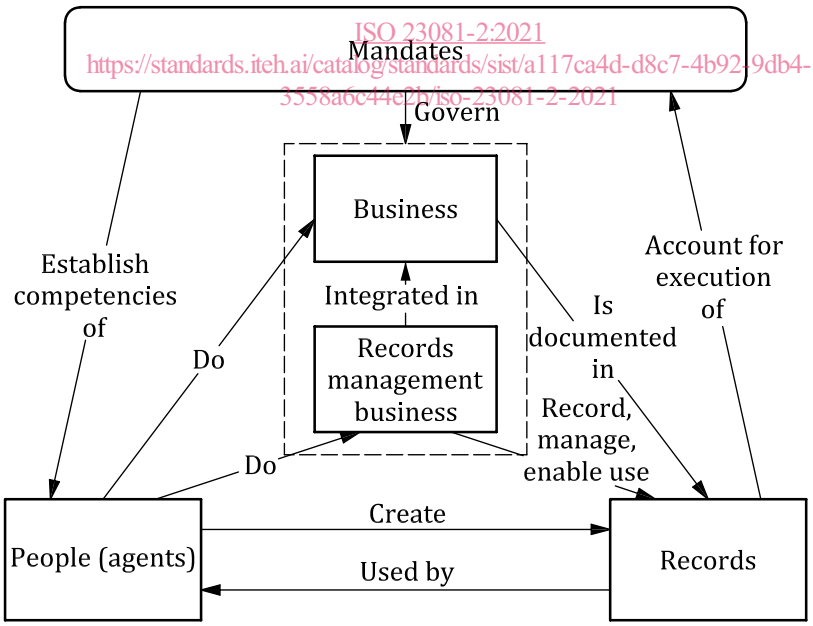
Figure 1 specifies the conceptual entity model and supports any number of entities, but of particular importance are the following:

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 23081-1:2017, 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 serve 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 (see Figure 2) due to their importance from a records perspective.

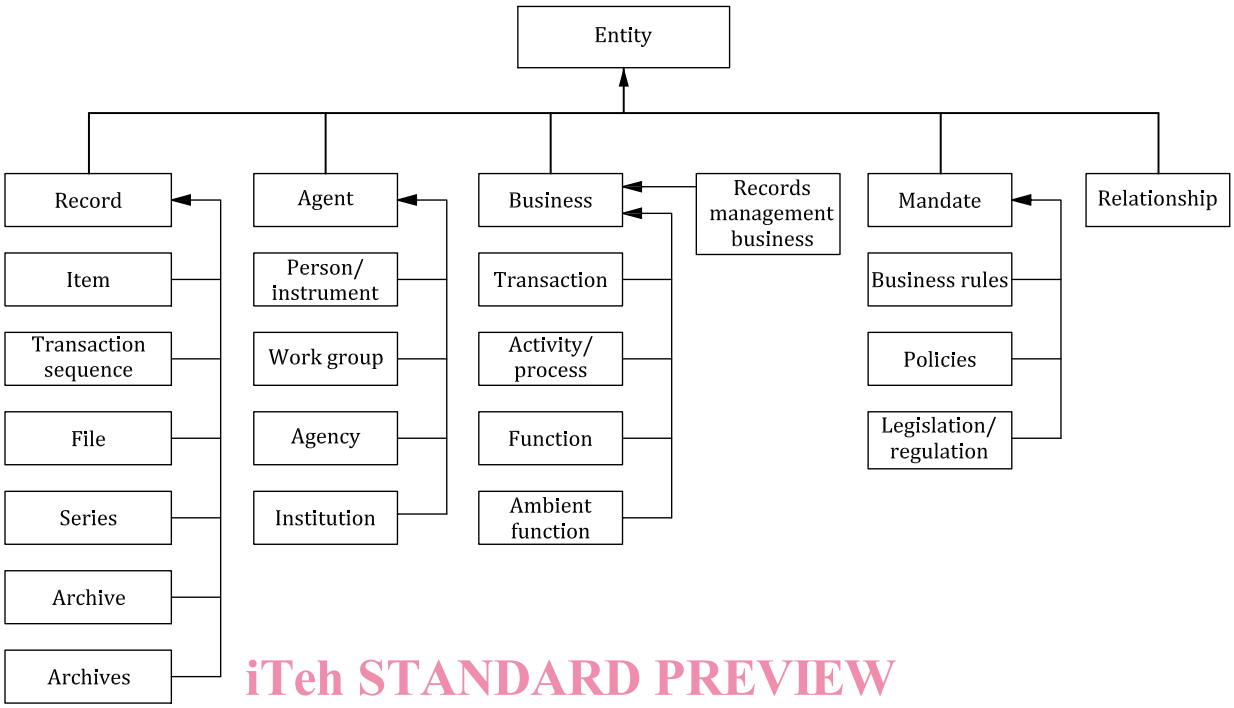


Figure 2 — Entity model as unified modeling language (UML)[6] class diagram showing generalization/specialization relationships between entities

The diagram in Figure 2 represents the generalization/specialization associations between classes of entities associated with managing records and their subclasses. For example, this diagram shows Series as a type of Record entity, Business rules as a type of Mandate entity and Records management business as a type of Business entity. The generalization/specialization associations allow for common structure and behaviour of classes to be identified.

The subclasses include layers of aggregation for entities associated with managing records. The diagram does not illustrate the aggregation relationships between the subclasses (these are detailed in Clause 7) nor relationships between the general classes (as illustrated in Figure 1). By default, generalization/specialization sets are considered to be incomplete, so the diagram in Figure 2 implies that the sets of subclasses are extensible.

Including relationship as a separate class of entity allows for greater flexibility in the implementation of this document. Metadata schemas derived from this framework can choose to implement relationships as:

a) a separate class;

b) a relation attribute of record, agent, business, and mandate classes; or

c) other attributes of record, agent, business, and mandate classes.

Where relationship is defined as a separate class of entity, each of the entities participating in the relationship will contain a relation element which points to a relationship entity. This relationship entity describes the relationship type and the members of the relationship. It also contains any contextual information about the relationship, for example the history of the relationship. In the description of the relationship entity, the identity and nature of the relationship needs to be captured, along with the roles that each entity making up the relationship plays. Event metadata relating to the relationship capture the dates of these associations.