INTERNATIONAL STANDARD

ISO 2146

Third edition
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Information and documentation — Registry services for libraries and related organizations

Information et documentation — Services de registre pour les bibliothèques et les organismes associés

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 2146 was prepared by Technical Committee ISO/TC 46, *Information and documentation*, Subcommittee SC 4, *Technical interoperability*.

This third edition constitutes a revision of the second edition (ISO 2146:1988), which was withdrawn in 1999. The entire text of the second edition has been reorganized and rewritten for this third edition.

Introduction

ISO 2146 was first published in 1972 under the title *Directories of libraries, information and documentation centres*. Its purpose was to assist in compiling and publishing international directories, national registries published in bi- or multilingual countries and national and regional directories intended for international use. When the second edition came up for its ten year review in 1988, the world had changed. Agencies were finding new ways of collecting and publishing directory information on the Internet and of deploying it in machine-readable form to aid discovery and delivery.

The need was identified to repurpose this International Standard as a data element directory and to take into account new usage scenarios. Development of the revision began in 2001 with support for interlibrary lending scenarios as an initial driver. The primary purpose of ISO 2146 in its new form is to offer a conceptual basis for the development of the full range of registry services needed to support digital library usage scenarios. As such, it is designed to be explanatory and extensible rather than restrictive and prescriptive. The term "registry" has been adopted in the title and the data element directory to indicate that this International Standard supports the process of collecting the required information from stakeholders as well as making it available for use.

The data element directory has been formulated as an object-oriented model that can be converted to machine readable formats such as XML. Some concepts are less developed than others but this version of this International Standard is nevertheless complete. It allows for the addition of new elements through a typing approach and provides free text elements for capturing information not explicitly modelled. It also allows any data element to be encoded using an extension schema. As a framework standard, it does not prescribe how data are recorded or what ontologies or controlled vocabularies are used. To do so would limit the applicability of this International Standard to specific usage scenarios. However, a range of examples and starter lists is provided, and implementers are encouraged to use (or to collaborate in the development of) appropriate standards for any given service, usage, or subject field.

It is anticipated that different registry applications will be based on profiles of this International Standard. The profiles will specify the objects in the information model and the data elements essential to that registry type, and define and maintain the enumerated lists appropriate to the application. The profile will also specify the bindings and protocols to be used for exchange purposes. This will enable parties in the same sector and in parallel sectors to collaborate in the development and delivery of services and content.

Other standards exist to facilitate the exchange of registry objects between systems. This International Standard is not intended to replace these standards although an XML schema version of the data element directory can be used for this purpose. Similarly, other standards exist or are under development to enable the persistent identification of registry objects. This International Standard provides data elements for the recording and management of such identifiers but does not prescribe their use.

Information and documentation — Registry services for libraries and related organizations

1 Scope

This International Standard establishes the rules for registries operating in a network environment to provide the information about collections, parties, activities and services needed by libraries and related organizations to manage their collections and deliver information and documentation services across a range of applications and domains.

This International Standard presents a data element directory that can be used as a framework for collecting the appropriate data and sharing it with other registry services, providing access to registry data through standard protocols whenever it is needed as part of an automated business workflow, publishing registries in electronic or print form, and archiving registry data when the data exist only in electronic form.

This International Standard is applicable to national registries published in bi- or multilingual countries and national and regional registries intended for international use.

The field of application includes but is not limited to

— collection management systems and digital repositories,

— discovery services, including catalogues and indexes, federated metadata repositories and metasearch portals,

— delivery services, including persistent identifier management and resolution, access management and interlending services,

— reference services including reference management systems and virtual reference services, and

— the registry services themselves, of all types, needed to support the above applications.

2 Normative references

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

ISO 639-2, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 3166-2, *Codes for the representation of names of countries and their subdivisions — Part 2: Country subdivision code*

ISO 4217, *Codes for the representation of currencies and funds*

ISO 8601:2004, *Data elements and interchange formats — Information interchange — Representation of dates and times*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1
attribute
data element that is a property or characteristic of a class

3.2
character
printable symbol having phonetic or pictographic meaning and usually forming part of a word of text, depicting a numeral, or expressing grammatical punctuation

3.3
code
representation of a piece of information such as a letter, word or phrase in another form, usually briefer

3.4
data element
element
basic unit of identifiable and definable data

3.5
data type
term used to qualify both the content and the structure of an element

3.6
entity
record in a database or registry consisting of one or more elements that has a discrete existence

3.7
ILL
inter library loan
lending or copying transaction between two libraries on behalf of an end user

3.8
registry
collection of registry objects compiled to support the business of a given community

3.9
role
function played by an entity such as a party or address, often specific to a transaction

3.10
transaction
creation or modification of a message required to support the searching and maintenance of a registry record or record element

3.11
word
unit of language consisting of one or more characters that carries meaning

4 Presentation

4.1 Information model hierarchy

In this International Standard a registry is defined as a collection of registry objects that has been compiled to support the business of a given community. The data element directory which makes up the body of this International Standard is based on an object-oriented data model which has a registry object as its primary object class. A registry object may be a collection, party, activity or service. A collection is an aggregation of physical or digital objects. A party is a person or group. An activity is something occurring over time that generates one or more outputs. A service is a system (analogue or digital) that provides one or more functions of value to an end user.

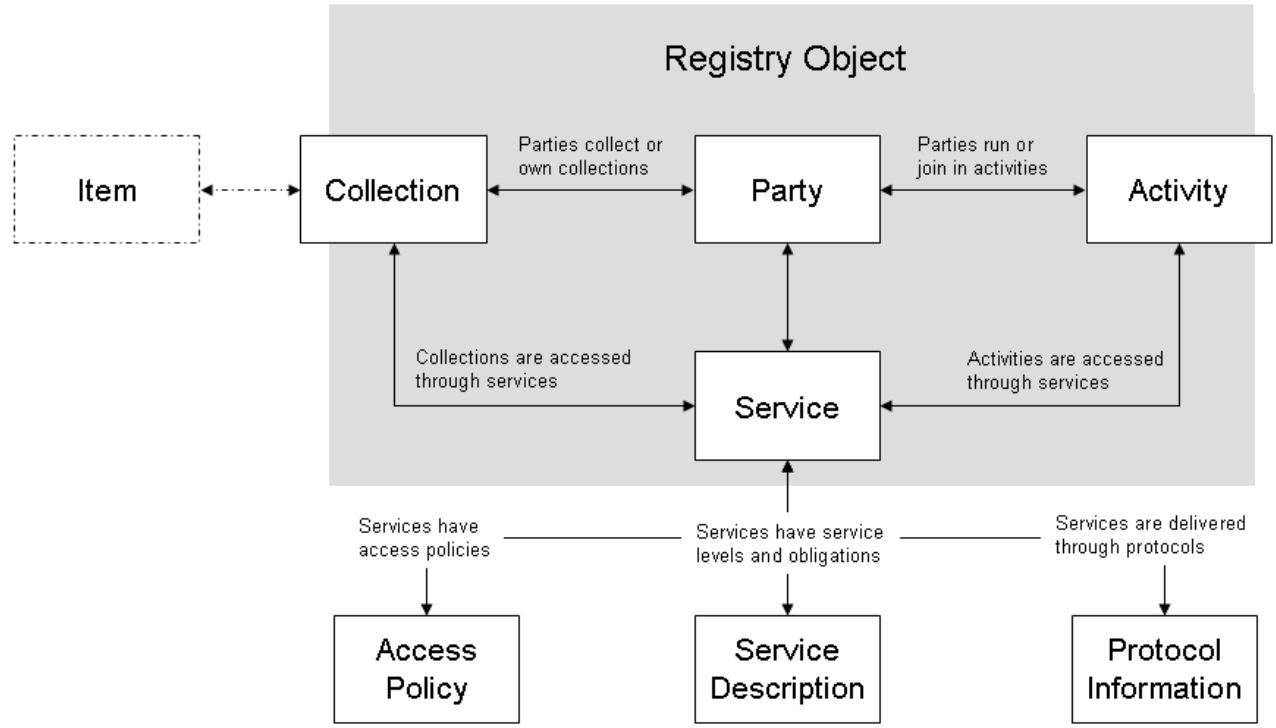

Figure 1 — Registry object and its sub-classes

Figure 1 shows the relationships between these sub-classes. Amongst other roles, parties collect or own collections and run or join in activities. Parties also manage and use services through which collections and activities are accessed.

Figure 1 also shows that services may have policies that permit or deny access to users under certain conditions, that they have service levels and obligations that need to be described and that they may be delivered through protocols in a network environment. The data elements needed to describe access policies, service descriptions and protocol information are the key to building interoperable services and also to developing service-oriented applications. When bound into appropriate schemas they become interface objects that can be exchanged as messages whenever this information is needed to perform a function. In this context, a registry is itself a collection that can be accessed through a service using standard protocols.

While the scope of this International Standard is limited to the four sub-classes of registry object shown in Figure 1, an item object has been included in the diagram to show the continuum between item and collection. Items and collections are both resources and can be described using the bibliographic entities defined in the IFLA *Functional requirements for bibliographic records* (FRBR) model. Resource description standards such as the *DCMI Metadata terms* enable the description of both collections and items and their discovery using

common access points. These map readily to data elements defined in this International Standard when collections need to be treated as registry objects (see Note). Collections become registry objects when further properties and relations need to be described to support their management and use than is needed for resource discovery. Implementers may, however, elect to extend the number of sub-classes to support the description of items or of any other business object genre that might need to be treated as a registry object to support the business of a community.

NOTE See for example, the DCMI Collections Application Profile mappings in Annex E.

4.2 Structure

The data element directory reflects the information model hierarchy through the following structure.

— Clause 5 describes data elements applicable to all registry objects.

— Clauses 6 to 8 describe data elements applicable to parties, collections and activities.

— Clause 9 describes data elements applicable to services.

— Clause 10 describes data elements specific to access policies.

— Clause 11 describes data elements specific to service descriptions.

— Clause 12 describes data elements specific to service protocols.

— Clause 13 describes common data elements that are referenced in more than one clause.

Annex A contains an alphabetical list of data elements cross-referenced to the appropriate numbered entry.

Annexes B to F are informative annexes which discuss how this International Standard might be applied to address the needs of libraries and related organizations for registry services.

4.3 Arrangement

Each element in the data element directory has its own numbered clause with the name of the data element as the heading, a description defining its purpose and its data type. An element may also have guidelines as to how it should be used and examples drawn from existing applications. Data elements of type class also have a list of their attributes (data elements that are properties or characteristics of the class), with information about whether or not they are mandatory (obligation) within the parent class and how often they can occur (occurrence).

Annex A also includes the description and lists the classes in which the data element is used.

NOTE Examples of controlled vocabularies are for guidance only and will need to be formalized in profiles.

4.4 Obligation

Obligation can have the following values.

4.4.1
M
mandatory
information indicating that a data element shall be present within a specific record

4.4.2
O
optional
information indicating that a data element may be present within a specific record

4.4.3
CM
conditional mandatory
information indicating that one of two or more data elements shall be present within a record

4.4.4
CO
conditional optional
information indicating that a data element is optional but when it is used one of two or more data elements shall be present within a record

NOTE In this International Standard, an attribute is only designated as mandatory if it is needed to uniquely identify multiple instances of a class. It will be up to profiles to specify what other elements need to be mandatory to support specific usage scenarios.

4.5 Occurrence

4.5.1
1
one and only one instance of the element shall occur in an instance of the class

4.5.2
0-1
the element is optional but if it occurs there shall be one and only one instance

4.5.3
0-N
the element is optional but may occur any number of times

4.5.4
1-N
the element is mandatory but may occur any number of times

4.6 Data types

For the purposes of this International Standard the following data types are defined.

4.6.1
boolean
data type having two values: one and zero [which are equivalent to true and false]

4.6.2
class
set of data elements describing the abstract characteristics of an object

4.6.3
date time
string formed according to the rules specified for Date and Time in ISO 8601:2004

4.6.4
decimal
data type consisting of numbers expressed in the base ten numeral system

4.6.5
label, class
complex data type used when values may need to be associated with an authority

Ref.	Attribute	Obl.	Occ.	Data type
4.6.5.1	value	M	1	string
4.6.5.2	authority	O	0-1	string
4.6.5.3	other value	O	0-1	string

The authority may be a registration agency, a controlled vocabulary or a set of rules governing the form of the value. The authority data element is optional for two reasons: the authority may be derivable from the value without needing to specify it explicitly; or a decision has been made not to associate the value with an authority in a given context.

In cases where a string is associated with a controlled vocabulary, there may be a requirement to record values not included in the core list. In this case, set the value to other and record the string in other value.

In XML schema bindings data elements of class label may be denormalized to elements of type string with the authority encoded as an XML attribute.

NOTE The label class in this International Standard is not equivalent to the enumeration data type in XML. Although some data elements of this class may have values drawn from a simple controlled list that can be enumerated in an XML schema binding, others will have values generated independently by a registration authority, or draw their values from collections of terms that are separately maintained.

In an XML schema that binds a data element of class label to a data element of type enumeration, use XML case conventions unless the terms are not easily converted from one case to another for rendering in displays.

4.6.5.1
value, string
string or code that may need to be associated with an authority to control its form or content or to make it unique in a given context

4.6.5.2
authority, string
agency that controls the form or content of a value or its uniqueness in a given context

4.6.5.3
other value, string
string that represents the other value when ‘other’ is recorded as the value

4.6.6
metadata, class
complex data type enabling the embedding of data formatted in a designated extension schema

Ref.	Attribute	Obl.	Occ.	Data type
4.6.6.1	metadata format	M	1	label
4.6.6.2	bindata	CM	1	string
4.6.6.3	xmldata			

The data type of any element in the data element directory may be replaced by the metadata data type if there is a requirement to extend the information to be collected, stored and exchanged to meet the specific needs of a designated community.

4.6.6.1
metadata format, label
string or code specifying the metadata format

EXAMPLES

1) CERIF (Common European research information format)
2) DCMI (Dublin Core Metadata Initiative metadata terms)
3) EAC (Encoded archival context)
4) EAD (Encoded archival description)
5) ebXML (OASIS/ebXML registry services specification)
6) IESR (IESR [Information Environment Service Registry] application profile)
7) LOM (Learning object metadata)
8) MADS (Metadata authority description schema)
9) MARC (Machine-readable cataloging)
10) MODS (Metadata object description schema)
11) RSLP (Research Support Libraries Programme collection description)
12) UDDI (Universal description, discovery and integration)
13) WSDL (Web service definition language)
14) X.500
15) XACML (eXtensible Access Control Markup Language)
16) Z39.91-200x (NISO Z39.92-200x, Collection description specification)
17) Z39.92-200x (NISO Z39.92-200x, Information retrieval service description specification)
18) ZeeRex

4.6.6.2
bindata, string
element containing Base64 encoded metadata

4.6.6.3
xmldata, string
element containing XML encoded metadata

4.6.7
positive integer
data type consisting of all the whole numbers with values greater than zero

4.6.8
seq lang string, class
complex data type enabling the recording of one or more language strings expressing the same concept in different languages or language systems

Ref.	Attribute	Obl.	Occ.	Data type
4.6.8.1	language string	M	1-N	string

National registries published in bi- or multilingual countries and national and regional registries intended for international use shall use seq lang string to record the language of a string, any transformations it has undergone from the original language and the system used to create these transformations. In implementations seq lang string may be denormalized to string where there is no requirement to publish a registry in more than one language or language string type and no transformations have been performed.

EXAMPLES

1) A Canadian registry published in both French and English

2) A New Zealand registry published in both Maori and English

3) A Chinese registry published in Chinese and transliterated using the Pin Yin transliteration system

4.6.8.1
language string, class
value of an element expressed in a specified language and language string type

Ref.	Attribute	Obl.	Occ.	Data type
4.6.8.1.1	language string value	M	1	string
13.9	language	O	0-1	label
4.6.8.1.2	language string type	O	0-1	label
4.6.8.1.3	language string type system	O	0-1	label
13.7	is default	O	0-1	Boolean

Create one language string for each language and language string type. Use default to indicate that a string is to be used as the default when no specific language or language string type or language string type system is requested.

4.6.8.1.1
language string value, string
text value of a language string

4.6.8.1.2
language string type, label
code or string delineating the nature of the language string when it has undergone a transformation from its original form

EXAMPLE Equivalent, Translated, Transliterated, Transcribed

4.6.8.1.3
language string type system, label
standard or system followed for transliteration or transcription

EXAMPLE ISO 9, ISO 259, ISO 843

4.6.9
string
data type consisting of a sequence of one or more characters

4.6.10
time
string formed according to the rules specified for time in ISO 8601:2004

Data elements of type date time and time may be stored in a form that represents local time as long as it can be converted on export to coordinated universal time (UTC) or local time with offset to UTC.

4.7 Attributes

Attributes are presented in table form with the following information.

4.7.1
ref.
reference
clause number of the referenced element

4.7.2
attribute
name of the referenced element

4.7.3
obl.
obligation
information about whether or not a data element is mandatory within a specific record

4.7.4
occ.
occurrence
information about whether or not a data element may be repeated within a specific record

4.7.5
data type
data type of the referenced element

NOTE Lists of attributes are not separately captioned and numbered because they can be uniquely referenced within the standard by the clause number and heading. They form an integral part of the entry and help to quantify properties of a data element in an easy-to-read form.

5 Registry object

Data type: class

entity playing a role in the conduct of business in a specific community or domain

Ref.	Attribute	Obl.	Occ.	Data type
5.1	registry object key	M	1	label
6	party	CM	1	sub-class
7	collection			
8	activity			
9	service			
5.2	identifier	O	0-N	class
5.3	name	O	0-N	class
5.4	relation	O	0-N	class
13.10	location	O	0-N	class
5.5	subject	O	0-N	label
13.4	description	O	0-N	class
13.5	info pointer	O	0-N	class
5.6	event	O	0-N	class
13.3	date range	O	0-1	class
13.6	is active	O	0-1	boolean
13.9	language	O	0-N	label
13.12	notes	O	0-1	class
5.7	date record created	M	1	date time
5.8	date record last modified	M	1	date time
14	record details	O	0-1	class

A registry object shall represent a party, collection, activity or service. The only mandatory elements are registry object key, date record created and date record last modified. Other elements may be specified as mandatory in profiles conforming to this International Standard.

Depending on the business context, a party, collection, activity or service may be the primary registry object described in a display or import or export package with secondary registry objects referenced through the relation element.

A registry object may stand alone for contribution or harvesting purposes or form part of a registry developed and maintained by a specific enterprise, community or domain and made accessible and shareable through an agreed set of protocols.

Use date range to determine the active status of a registry object OR set the active status flag in the absence of a start or end date when active status needs to be recorded.

In order to group and filter aggregated registry objects in an international registry by country, record at least one instance of location with a physical address/address part of type “country”. Similarly, in a registry object intended for international use, record at least one instance of language that is a declaration of the main language of the registry object. If language equivalence is required, declare each language.

EXAMPLES

1) Party
   i) Creator or rights holder
   ii) Collection owner or manager
   iii) Activity owner or manager
   iv) Service owner or manager
   v) Customer, participant or user
2) Collection
   i) Collective work (e.g. dataset, personal archive)
   ii) Repository (e.g. data center, documentation center, institutional repository, library collection, gallery collection, museum collection)
   iii) Catalogue or index (local, consortial, national or international index or database)
   iv) Registry as a collection in its own right
3) Activity
   i) Course (e.g. colloquium, laboratory, physical activity)
   ii) Event (e.g. conference, Meeting, Performance, Workshop)
   iii) Project (e.g. digitization project, research project)
4) Service
   i) Collection management service
   ii) Content submission and dissemination service (e.g. METS gateway)
   iii) Metadata harvesting service (e.g. OAI gateway)
   iv) Discovery service (catalogue or index, metasearch portal or search target)
   v) Resolver service (e.g. OpenURL resolver)
   vi) Interlending service (e.g. consortial borrowing, interlibrary loan, exhibition)
   vii) Reference service
   viii) Registry as a service in its own right

5.1
registry object key, label
string used for matching and linking purposes that distinguishes one registry object from another within a given business context or that is globally unique

In any implementation an element or combination of elements will need to be selected as a key for matching purposes or a key provided. The key may be a default identifier value or, in order to support a registry based on the X.500 or LDAP data model, the official name of the registry object as it would be constructed from a hierarchical organization of entries.

In this International Standard registry object key is defined explicitly as an element to reduce the payload in having to parse identifier or name instances to extract a single unique string.

Because of the importance of the key in identifying and linking to related registry objects outside the context of a single registry service it shall be expressed either as a URI or as a label with a mandatory authority identifying the authority within which the string value is unique.

If an identifier is used for the registry object key choose one that can operate as a globally unique identifier for all entries in the registry, including child objects. If the official name is used, make sure that name changes are managed by recording the old name as a former name with an appropriate date range.

5.2
identifier, class
globally unique means of distinguishing one registry object from another

Ref.	Attribute	Obl.	Occ.	Data type
5.2.1	identifier value	M	1	label
5.2.2	identifier role	O	0-N	label
13.7	is default	O	0-1	Boolean
13.3	date range	O	0-1	class
13.6	is active	O	0-1	Boolean
13.12	notes	O	0-1	class

The identifier element has a full set of optional attributes enabling the history of an identifier to be maintained by an assigning authority. However, it may be denormalized to an element of data type label if there is no requirement to maintain a history of the identifier.

Use date range to determine the active status of an identifier OR set the active status flag in the absence of a start or end date.

The same identifier may identify more than one registry object over a period of time but it shall only have an active status in one identity instance.

The same identifier may play more than one identifier role but only one identifier shall be the default identifier.

NOTE A number of International Standards exist or are under development to enable the persistent identification of registry objects. These include

— ISO 15511, for the identifier for libraries and related organizations (ISIL),

— ISO 26324, for the identifier for digital object identifier (DOI) system,

— ISO 27729,for the identifier for international standard name identifier (ISNI),

— ISO 27730, for the identifier for international standard collection identifier (ISCI).

The identifier class in this International Standard provides data elements for the recording and management of such identifiers but does not prescribe their use. However, where a registry object has had an International Standard identifier assigned to it, this shall be included as an identifier instance.

5.2.1
identifier value, label
sequence of characters or words that uniquely identifies a registry object within the domain of a specified authority or that is globally unique

EXAMPLES

1) Biblioteca nazionale centrale – Roma
(authority: ISIL + Value: IT-RM0267)

2) Landmap Shuttle Radar Topography Mission
(authority: URI + value: http://purl.org/poi/iesr.ac.uk/1152526728-8555)

3) A.C.T. Drug Indicators Project, 1987-1989
(authority: ASSDA + value: au.edu.anu.assda.ddi.00935)

4) Sheet Music Consortium
(authority: URI + value: http://digital.library.ucla.edu/sheetmusic/)

5.2.2
identifier role, label
word or phrase indicating the function or purpose of an identifier in a transaction of business within a specific community

EXAMPLE ILL Protocol Symbol, ILL Symbol, Local Record Number, Standard Business Number, Union Catalogue Symbol, Password

5.3
name, class
word or phrase or initialism used to refer to a registry object

Ref.	Attribute	Obl.	Occ.	Data type
5.3.1	name role	M	1	label
5.3.2	unstructured name	CM	1	seq lang string
5.3.3	name part		1-N	class
13.3	date range	O	0-1	class
13.6	is active	O	0-1	boolean
13.12	notes	O	0-1	class

Use name to store the official name of a registry object and any alternative names by which it is, or has been known. The official name may also be used as the registry object key.

Use date range to determine the active status of a name OR set the active status flag in the absence of a start or end date. Note that a name of name role “former name” should not have an open-ended date range or an active flag set to true.

5.3.1
name role, label
code or string identifying the function or purpose of a name

EXAMPLE Official Name, Alternative Name, Abbreviation, Acronym, Former Name

5.3.2
name part, class
one element of a structured name, or the full name if it is unstructured

Ref.	Attribute	Obl.	Occ.	Data type
5.3.2.1	name part value	M	1	seq lang string
5.3.2.2	name part type	O	0-1	label

Use a single instance of name part for an unstructured name or multiple instances, together with name part type, when there is a need for a structured name, for instance, when there is a requirement for sorting, formatting or searching on parts of a name.

Treat name parts in different languages or language systems not as separate instances of name part but as a sequence of multi-language strings. Multi-language strings should be included for the name of the registry object in its official language(s) as well as its translation into the registry language(s) and, for non-Latin characters, a transliterated or transcribed form if the data supports this. However, translation or transliteration may be the only form able to be given in some contexts.

In implementations, name part(s) may be defined as specific attributes of name rather than using a separate object class.

5.3.2.1
name part value, seq lang string
text value of a name part

5.3.2.2
name part type, label
code or string identifying the nature of a name part

EXAMPLES

1) MARC21 100 (Forename, Surname, Family Name, Numeration, Titles)

2) MARC21 110 (Corporate/Jurisdiction Name, Subordinate Unit)

5.4
relation, class
indication that a registry object is associated with another registry object

Ref.	Attribute	Obl.	Occ.	Data type
5.4.1	relation type	M	1	label
5.4.2	related registry object key	M	1	label
5.4.3	Relation qualifier	O	0-N	label
13.3	date range	O	0-1	class
13.6	is active	O	0-1	boolean
13.12	Notes	O	0-1	class

Create a relation instance for all relations needing to be described in either one or both directions. Use date range to determine the active status of a relation OR set the active status flag in the absence of a start or end date.

5.4.1
relation type, label
code or string identifying the specific nature of a relation between one registry object and another

EXAMPLES

1) person-person (Has parent; Is parent of; Has spouse/Is spouse of; Is partner of/Has partner; Is role for/Has role)

2) group-person (Has member/Is member of, Has position, Is position in. has contact, is contact for)

3) group-group (Has part/is part of; Absorbs/Is absorbed by; Has jurisdiction for/is jurisdiction of; Amalgamates, Is amalgamated with; Has reciprocal relationship with)

4) party-collection (Owns/Is owned by; Collects/Is collected by, Is location for/Is located at, Holds rights in/Has rights holder, Is rights holder contact for/Has rights holder contact)

5) party-activity (Owns/Is owned by; Runs/Is run by)

6) collection-collection (Has part/Is part of; Describes/Is described by, Describes items in/Has items described by; Is location for/Is located at; Contains; Has association with)

7) activity-activity (Has part/Is part of)

8) party-service (Is user of/Has user; Is customer of/Has customer; Owns/Is owned by; Manages/Is managed by)

9) collection-service (Is available via/Makes available)

10) activity-service (Is available via/Makes available)

11) service-service (Has part/Is part of)

5.4.2
related registry object key, label
string uniquely identifying a related registry object

5.4.3
relation qualifier, label
information that qualifies the nature of the relation

EXAMPLE A dataset with an RSS feed that is delivered by a service of the repository in which the dataset is held. In this case the repository service may be recorded as a related registry object and a relation qualifier used to record the URI for the feed or arguments needing to be added to the service key to uniquely identify the feed.

5.5
subject, label
word or phrase indicating a topic associated with a registry object

Typically, subject will be expressed as keywords, key phrases or classification codes from a controlled vocabulary or formal classification scheme.

EXAMPLES

1) Party (Field of Activity)
2) Person (Occupation)
3) Collection, Activity (Topic)

5.6
event, class
happening occurring at a particular point in time or location that may be associated with a registry object

Ref.	Attribute	Obl.	Occ.	Data type
5.7.1	event type	M	0-1	label
13.3	date range	O	0-1	class
13.4	description	O	0-N	class
13.10	location	O	0-1	class
13.12	notes	O	0-1	notes

Use event to structure key events in the biography or history of a registry object.

5.6.1
event type, label
code or string identifying the nature of an event

Use event type to distinguish one event type from another and to group events of the same type.

Ontologies for event type will depend on the sub-class and type of the registry object.

EXAMPLES

1) Person (Birth, Death, Marriage, Active, Exhibition, Qualification, Award)
2) Group (Establishment, Incorporation, Dissolution)

5.7
date record created, date time
date and time the registry object record was created

Use date record created to allow for easy identification of new registry objects even if a full set of record details are also encoded.

The date recorded shall be the date the registry object was created, not the date the record was ingested into a registry.

5.8
date record last modified, date time
date and time the registry object record or any of its data elements were last modified

Use date record last modified to allow for easy identification of updated registry objects even if a full set of record details are also encoded.

The date recorded shall be the date the registry object was updated through the addition of new content, not the date the record was ingested into a registry or moved to a new registry platform.

6 Party

Data type: sub-class

person or group performing a role in relation to the business of a specific community or domain

Ref.	Attribute	Obl.	Occ.	Data type
6.1	party type	O	0-N	label

This International Standard identifies two broad types of party:

— **person**
human being or identity assumed by one or more human beings

— **group**
one or more persons acting as a family, group, association, partnership or corporation.

EXAMPLES

1) Creators and rights holders
2) Collection owners and managers
3) Activity owners and managers
4) Service owners and managers
5) Customers, participants and users

6.1
party type, label
code or string classifying a party

Use party type to distinguish between persons and groups as defined above. Use additional instances of party type for sub-types or alternatively handle these through a hierarchy of sub-classes or a hierarchical scheme.

EXAMPLES

1) Group (Family, Organization)
2) Family (Clan, Dynasty, Family unit, Matriarchy, Patriarchy)
3) Organization (Corporate, Education, Government [Local, National, State], Private)
4) Libraries and related Organizations (Archive, Book Store, College, Documentation Center, Document Supplier, Gallery, Graduate School, Information Broker, Institute of Technology, Library, Library School, Library Supplier, Museum, Primary School, Publisher, Secondary School, University)
5) Libraries (Academic Library, Art Library, Branch Library, Central Resource Library, College Library, Corporate Library, Correctional Facility Library, Dental Library, Government Library, Historical Library, Hospital Library, Institute of Technology Library, Law Library, Library Consortium, Medical Library, Music Library, National Library, Nursing Library, Parliamentary Library, Private Library, Public Library, Regional Library, School Library, Special Collections Library, State Library, Institute of Technology Library, University Library, Veterinary Library).

Also use party type for any aspects of a party such as sex, occupation, field of activity, heritage, industry type or jurisdiction that can be quantified through a value/authority pair that are not already supported by registry object.

In implementations, different party type value/authority combinations may be treated as specific attributes by flattening the hierarchy.

Use event for attributes that need to be associated with a date range or location, for example, honors.

7 Collection

Data type: sub-class

aggregation of physical or digital objects treated as a unit for business purposes

Ref.	Attribute	Obl.	Occ.	Data type
7.1	collection type	O	0-N	label
7.2	collection profile	O	0-N	class
7.3	rights	O	0-1	seq lang string

This International Standard defines four broad types of collections:

— **collective work**
compiled content created as separate and independent works and assembled into a collective whole for distribution and use

— **repository**
collection of physical or digital objects compiled for information and documentation purposes and/or for storage and safekeeping

— **catalogue or index**
collection of resource descriptions describing the content of one or more repositories or collective works

— **registry**
collection of registry objects compiled to support the business of a given community

Figure 2 illustrates the relationship between the four collection types. Items and collective works such as datasets are located in repositories. Catalogues or indexes describe the content of collective works and repositories. Registries describe collective works, repositories, catalogues or indexes and other registries. In all cases, super-collections and sub-collections shall be described using a “Has part/Is part of” relation.

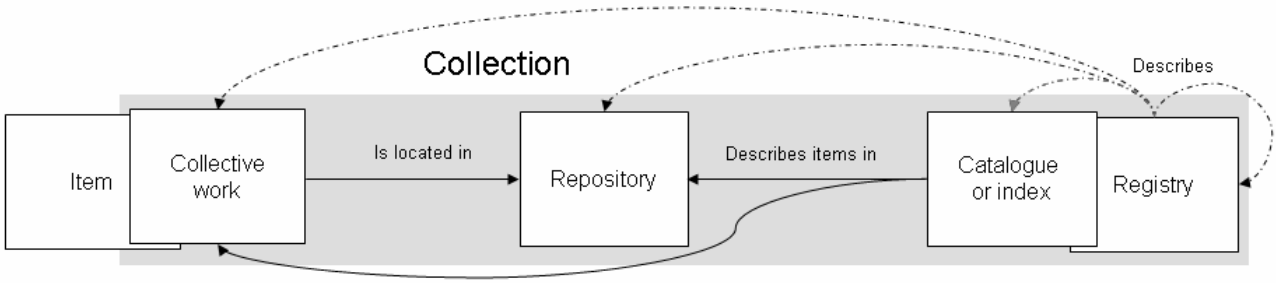

Figure 2 — Collection types

EXAMPLES

1) Australia's River Basins 1997 (collective work)

2) Geoscience Australia (repository)

3) Geoscience Australia Product Catalogue (catalogue or index)

4) Australian Spatial Data Directory (registry)

7.1
collection type, label
code or string identifying the nature or classifying a collection

Use collection type to distinguish between collective work, repository, catalogue or index and registry as defined above. Use additional instances of collection type for sub-types or alternatively handle these through a hierarchy of sub-classes or a hierarchical scheme.

EXAMPLE The *DCMI Collections Description Type Vocabulary,* which defines three sub-types of catalogue or index:

— analytic finding aid;

— hierarchic finding aid;

— indexing finding aid.

Also use collection type for other aspects of a collection such as audience that can be quantified through a value/authority pair and that are not already supported by registry object or collection profile.

In implementations, different collection type value/authority combinations may be implemented as specific attributes by flattening the hierarchy.

7.2
collection profile, class
means of quantifying the size and growth rate of a collection

Ref.	Attribute	Obl.	Occ.	Data type
7.2.1	collection profile key	M	1	string
13.11	measurement type	O	0-1	label
13.13	resource type	O	0-1	label
7.2.2	number of units	O	0-1	positive integer
7.2.3	average annual increase	O	0-1	positive integer
7.2.4	average annual decrease	O	0-1	positive integer
7.2.5	accrual policy	O	0-1	label
7.2.6	accrual periodicity	O	0-1	label
7.2.7	accrual method	O	0-1	label
7.2.8	disposal policy	O	0-1	label
7.2.9	coverage	O	0-N	class
13.3	date range	O	0-N	class
13.12	notes	O	0-1	class

Set a collection profile for the whole collection by leaving resource type empty.

Leave attributes such as accrual method empty in collection profiles for specific resource type(s) if they are inherited from the profile for the whole collection.

Use date range to record a range of dates over which resources in the collection (if resource type is left blank) or of the specified resource type were created.

7.2.1
collection profile key, string
string uniquely identifying a collection profile

7.2.2
number of units, positive integer
indication of the size of a collection, based on a specified measurement such as objects (books or photographic records) or bibliographic (metadata) items

7.2.3
average annual increase, positive integer
number of units by which a collection increases per year, based on a specified measurement type and accrual policy

7.2.4
average annual decrease, positive integer
number of units by which a collection decreases per year, based on a specified measurement type and disposal policy

7.2.5
accrual policy, label
conditions and selection criteria governing the addition of items to a collection

EXAMPLE Closed, Passive, Active, Partial

7.2.6
accrual periodicity, label
frequency with which items are added to a collection

EXAMPLE Annual, Bimonthly, Semiweekly, Daily, Biweekly, Semiannual, Biennial, Triennial, Three Times a Week, Three Times a Month, Continuously Updated, Monthly, Quarterly, Semimonthly, Three Times a Year, Weekly, Completely Irregular

7.2.7
accrual method, label
type of acquisition employed to add items to a collection

EXAMPLE Deposit, Donation, Purchase, Loan, License, Item Creation

7.2.8
disposal policy, label
conditions and selection criteria governing the removal or archiving of items from a collection

EXAMPLE Age, Amount of Use, Uniqueness

7.2.9
coverage, class
means of quantifying the scope of a collection

Ref.	Attribute	Obl.	Occ.	Data type
7.2.9.1	coverage type	M	1	label
7.2.9.2	coverage area	M	1	label
13.4	description	O	0-N	class
7.2.9.3	current strength	O	0-1	label
7.2.9.4	current strength notes	O	0-1	seq lang string
7.2.9.5	planned strength	O	0-1	label
7.2.9.6	planned strength notes	O	0-1	seq lang string

Use coverage without specifying resource type in collection profile to describe the coverage of the whole collection; or include resource type to document coverage for specific resource types.

7.2.9.1
coverage type, label
type of coverage being described

EXAMPLE Geographical (Within Which), Geographical (About Which), Chronological; Language, Subject

7.2.9.2
coverage area, label
code or string identifying a specific area within the specified coverage type that is in scope for the collection

Use authorities for each coverage type that are of relevance to the business domain.

EXAMPLES

1) Temporal
2) Geographical (within which) (ISO 3166-1 Country; ISO 3166-2 Region)
3) Geographical (about which) (ISO 3166-1 Country; ISO 3166-2 Region)
4) Language (ISO 639-2)
5) Subject (Dewy Decimal Classification Scheme, Library of Congress Classification Scheme)

7.2.9.3
current strength, label
code or string rating the current coverage in a specified area

EXAMPLE Numeric code (0-5)

7.2.9.4
current strength notes, seq lang string
explanatory text about a current strength rating

7.2.9.5
planned strength, label
code or string rating the planned coverage in a specified area

EXAMPLE 0-5 (Out of scope, Minimal, Basic, Study, Research, Comprehensive)

7.2.9.6
planned strength notes, seq lang string
explanatory text about a planned strength rating

7.3
rights, seq lang string
information about rights held in and over a collection

Use info pointer to point to a resource containing more detailed information about rights.

Use collection-party relations to record rights holders.

Use a collection-service relation to record access policies.

8 Activity

Data type: sub-class

something occurring over time that generates one or more outputs

Ref.	Attribute	Obl.	Occ.	Data type
8.1	activity type	O	0-N	label

This International Standard defines five types of activity:

— **award**
something given to a party or activity or service or resource to recognize excellence in a certain field

— **course**
education imparted in a series of lessons or meetings

— **event**
something that happens at a particular place or time as an organized activity with participants or an audience

— **program**
system of activities intended to meet a public need

— **project**
piece of work that is undertaken or attempted, with a start and end date and defined objectives

EXAMPLES

1) Physics with Medical Technology (course)
2) International Workshop on Spoken Language Translation (event)
3) Climate Change Science Program (program)
4) Australian Hepatitis C (HCV) Research Register Project No: 27: Routine epidemiological Surveillance for HCV (project)

8.1
activity type, label
code or string identifying the nature of an activity

Use activity type to distinguish between courses, events, programs and projects as defined above. Use additional instances of activity type for sub-types or alternatively handle these through a hierarchy of sub-classes or a hierarchical scheme.

EXAMPLES

1) Activity: Course, Event, Project
2) Award: Certificate, Grant, Medal, Prize
3) Course: Clinical, Colloquium, Discussion Group, Dissertation, Laboratory, Physical activity
4) Event: Conference, Display, Concert, Dance, Exhibition, Festival, Film, Lecture, Meeting, Performance, Seminar, Sport, Talk, Theatre, Tour, Training, Tutorial, Visit, Workshop
5) Program: Non-award, Certificate, Diploma, Degree, Masters, Doctorate
6) Project: Audit, Creation, Construction, Implementation, Procurement, Reengineering, Research

Also use activity type for other aspects of an activity such as audience that can be quantified through a value/authority pair and that are not already supported by registry object. In implementations, different activity type value/authority combinations may be implemented as specific attributes by flattening the hierarchy.

9 Service

Data type: sub-class

system that provides one or more functions of value to the end user

Ref.	Attribute	Obl.	Occ.	Data type
9.1	service type	O	0-N	label
9.2	function	O	0-N	label
9.3	product	O	0-N	class
9.4	service times	O	0-N	class
9.5	policy combining algorithm	O	0-1	label
10	access policy	O	0-N	class
11	service description	O	0-N	class
12	protocol information	O	0-N	class

In a service-oriented architecture services are interfaces between a requester and a responder that enable a given action to be performed. Using standard protocols and schemas for the exchange of messages and data ensures interoperability between applications. In this International Standard the term service is defined in a much broader sense as a system that provides one or more functions of value to the end user.

One example of a service is a catalogue that provides access to a collection of metadata describing the holdings of a library. In fact, most libraries will have at least two such services – one a web-based online public access catalogue, the other a target service that enables access to the same catalogue or index through one or more standard search and retrieval protocols. Most libraries also offer interlending services that may depend on messaging systems to support resource delivery workflows. The service data element enables each of these services to be described in terms of access policies, service levels and obligations and protocol support.

EXAMPLES

1) Národní knihovna Ceské republiky (web interface to the catalogue)
2) San Francisco State University (Z39.50 interface to the catalogue)
3) British Library Document Supply Service
4) African Higher Education Research Online (OAI-PMH Harvesting Service)
5) Virtual Reference Canada

9.1
service type, label
code or string identifying the nature of a Service

Use service type to categorize the service based on its primary purpose in business terms.

Different communities will categorize their services in different ways and at different levels of granularity, depending on the need for interoperability and the kinds of protocols used for performing particular functions or actions.

In a given service registry, service type may be the same for all registry objects, for example, all services in an interlending policy directory may be given the Service Type Interlending Service. Alternatively a registry of libraries and related organizations may describe a full range of services.

Also use service type for other aspects of a Service that can be quantified through a value/authority pair and that are not already supported by Registry Object or other Service attributes.

In implementations, different service type value/authority combinations may be implemented as specific attributes by flattening the hierarchy. Dependencies may be handled through a hierarchy of sub-classes or a hierarchical scheme.

EXAMPLES Deposit, Discovery, General, Interlending, Publishing, Reference

9.2
function, label
code or string identifying a business process supported by a service that needs to be distinguished for access control, interoperability or reporting purposes

Use function in service to define the range of functions supported by the service. Use function in access policy to define the range of functions to which the access policy applies. Use function in obligation to record any charges associated with use of the function. Use function in product to identify the function needing to be deployed to deliver the product.

Controlled vocabularies for the function data element will depend on agreed service frameworks that define the service interfaces needed to facilitate technical interoperability across the range of business processes needing to be supported.

EXAMPLES

1) Digital Library Federation. ILS Discovery Interfaces.
2) e-Framework for Education and Research. Service Genre Registry.
3) National Library of Australia. Service Framework.

9.3
product, class
output of a service that needs to be distinguished for access control, interoperability or reporting purposes

Ref	Attribute	Obl.	Occ.	Data type
9.3.1	product key	M	1	string
9.3.2	product type	O	0-1	label
9.2	function	O	0-1	label
13.4	description	O	0-1	class
9.3.3	input description	O	0-N	label
9.3.4	output description	O	0-N	label
13.12	notes	O	0-1	notes

9.3.1
product key, string
string uniquely identifying a particular product within a service

Use product key in product to identify product instances and in obligation to record any charges associated with delivery of the product.

9.3.2
product type, label
code or string identifying the nature of a product

EXAMPLES

1) Copy product type (Index, Microfilm, Microfiche, Photocopy, Photograph, Sound Recording, Transcript)
2) Metadata product type (Brief, Brief with Holdings, Full, Full with Holdings)
3) Reference product type (Answer, Bibliography)

9.3.3
input description, label
attribute of material from which a product is to be created

EXAMPLE Archival Material, Map, Monograph-bound, Picture, Patent, Technical report

9.3.4
output description, label
attribute of a product that is to be created from another

EXAMPLES

1) Quality (Acid-free, High resolution)
2) Size (A1, A2, A3, A4, Legal, letter)
3) Format (Paper, JPEG, PDF, TIFF)
4) Carrier (Cassette, CD-R, DVD)

9.4
service times, class
set of date and time ranges associated with the availability and delivery of a service

Ref.	Attribute	Obl.	Occ.	Data type
9.4.1	service times key	M	1	string
13.4	description	O	0-N	class
9.4.2	service hours	O	0-N	class
13.3	date range	O	0-1	class
9.4.3	suspension	O	0-N	class

Use description to describe service times in an unstructured form. Use service hours if there is a requirement for service times to be parsable. Use date range if the effect of access policies using this set of service times is to make the service only available for a specified period of time.

9.4.1
service times key, string
string uniquely identifying a particular Service Times instance within a service

9.4.2
service hours, class
service times expressed in the form of structured text

Ref.	Attribute	Obl.	Occ.	Data type
9.4.2.1	day of week	M	1	positive integer
9.4.2.2	time valid from	0	1	time
9.4.2.3	time valid to	0	1	time

9.4.2.1
day of week, positive integer
code designating a specific day within a week to which service hours apply

Use a whole number between 1 and 7 as specified in ISO 8601:2004, 4.1.4.

9.4.2.2
time valid from, time
time of day a service becomes available on a given day of the week

9.4.2.3
time valid to, time
time of day a services ceases to be available on a given day of the week

9.4.3
suspension, class
means of recording when a service is temporarily unavailable and the reason why

Ref.	Attribute	Obl.	Occ.	Data type
13.3	date range	M	1	class
13.12	notes	O	0-1	class

9.5
policy combining algorithm, label
in a registry of services, a way of interpreting the results of a request for an access policy decision when more than one access policy applies

A policy combining algorithm can be recorded as an attribute of a registry, where it will apply by default to all of the access policies defined in the registry, or as an attribute of a specific service, where it will only apply to the access policies defined for that service.

EXAMPLE XACML Combining Algorithms (Deny-overrides, Ordered-deny-overrides, Permit-overrides, Ordered-permit-overrides, First-applicable, Only-one-applicable)

10 Access policy

Data type: class

means of defining who may access a service, what functions and resources they can access and what conditions and obligations apply

Ref.	Attribute	Obl.	Occ.	Data type
9.2	function	O	0-N	label
10.1	user category	O	0-N	label
13.10	location	O	0-N	class
10.2	target party	O	0-N	label
10.3	target collection	O	0-N	label
10.4	target activity	O	0-N	label
13.5.2	target resource	O	0-N	label
13.13	resource type	O	0-N	label
10.5	effect	M	1	label
10.6	condition	O	0-1	string
9.4.1	service times key	O	0-1	string
11.1	service description key	O	0-N	string

The target of the access policy is a combination of function, user category, location, affiliation, target collection, target activity, target resource and/or resource type. If an element is not used the effect applies to any value. If the effect is permit, the defined service times, service level and service policies become obligations of both the requester and service provider. (This model assumes that an access policy is always associated with a service.)

10.1
user category, label
code or string identifying the nature of a user for access control purposes

EXAMPLES

1) ILL (Library, Non-library)

2) University (Student, Staff, Other)

3) Agreed non-specific (A, B, C)

10.2
target party, label
string uniquely identifying a referenced party

10.3
target collection, label
string uniquely identifying a referenced collection

10.4
target activity, label
string uniquely identifying a referenced activity

10.5
effect, label
code in an access policy indicating whether the specified requester(s) can access the specified action(s) and wanted item(s) at the specified service level(s)

EXAMPLE XACML Effect Scheme (Permit, Deny)

10.6
condition, string
set of prerequisites needing to be met for an access policy to apply

EXAMPLES

1) The resource was published more than 3 years ago

2) It is more than 70 years after the death of the creator

11 Service description

Data type: class

set of policies that might be associated with the delivery of a service, for reference by one or more access policies

Ref.	Attribute	Obl.	Occ.	Data type
11.1	service description key	M	1	string
11.2	service level	O	0-1	label
11.3	obligation	O	0-N	class
13.12	notes	O	0-1	class

Use service description to define obligations associated with different service levels at as high a level of granularity as required for the business context.

11.1
service description key, string
string uniquely identifying a particular service description within a service

11.2
service level, label
code or string identifying the service response associated with a specific service description

EXAMPLE Normal, Priority, Rush, Express, When Convenient

11.3
obligation, class
information about restrictions and conditions associated with use of a service

Ref.	Attribute	Obl.	Occ.	Data type
11.3.1	charge type	M	1	label
9.2	function	O	0-1	label
11.3.2	request method			class
11.3.3	delivery method	CO	0-1	class
11.3.4	billing method			class
11.3.5	payment method			class
9.4.1	product key	O	0-1	string
13.8	is supported	O	0-1	boolean
13.4	description	O	0-N	class
11.3.6	obligation attribute	O	0-N	label
11.3.7	charge	O	0-1	class

Use obligation to record any charges associated with a service and any service policies, measures and constraints. Use description type to set up multiple policy statements and text instructions; for example, a general policy statement for the lend function and specific statements for return instructions, renew policy, overdue policy and replacement policy.

11.3.1
charge type, label
code or string identifying the nature of an obligation for which a charge may apply

Use charge type to categorize obligations, whether or not a charge applies.

Use the following charge type values by default:

— Service Charge

— Service Level Charge

— Function Charge

— Method Charge

— Product Charge

EXAMPLES Damage Charge, Loss Charge, Overdue Charge, Renewal Charge

To record obligations related to a specific function, include a value in function when charge type is Function Charge. In the absence of a function value, the obligation will apply to all functions.

To record obligations related to a specific method, include a value in either request method, delivery method, billing method or payment method when charge type is Method Charge. In the absence of a method value, the obligation will apply to all methods.

To record obligations related to a specific product, include a value in product key when charge type is Product Charge. In the absence of a product key value, the obligation will apply to all products.

11.3.1.1 Charging algorithm
To determine the total charge for a given service request use the following charging algorithm:

— Charge Type (Service Charge) +

— Charge Type (Service Level Charge) +

— Charge Type (Function Charge) +

— Charge Type (Method Charge, Request Method) +

— Charge Type (Method Charge, Delivery Method) +

— Charge Type (Method Charge, Billing Method) +

— Charge Type (Method Charge, Payment Method) +

— Charge Type (Product Method, Product Key).

11.3.2
request method, class
facility or facilities used to request or order a service

Ref.	Attribute	Obl.	Occ.	Data type
11.3.2.1	request method type	M	1	label
11.3.2.2	utility	O	0-1	label

11.3.2.1
request method type, label
code or string defining the nature of a request method

EXAMPLE Email, Fax, Web form, Mail, Phone, Telex, Ariel - Email, Ariel - FTP, ILL System

11.3.2.2
utility, label
name of a system or service used as a method

EXAMPLES

1) ILL request method (Docline, ISO ILL, KDD, OCLC-WCRS)
2) ILL billing method (BL Interlending Reimbursement; CONARLS IRUC; KDD Payments Service; NN/LMEFTS; OCLC IFM; RLG Shares; Scotland SILLR Scheme)

11.3.3
delivery method, class
facility or facilities used to provide a service

Ref.	Attribute	Obl.	Occ.	Data type
11.3.3.1	delivery method type	M	1	label
11.3.2.2	utility	O	0-1	label

11.3.3.1
delivery method type, label
code or string defining the nature of a delivery method

EXAMPLES

1) Postal delivery (Air Mail, Air Package, Express Mail, Express Package, Mail, Package)
2) Courier delivery (Normal, Priority, Express)
3) Electronic delivery (Ariel – Email, Ariel – FTP, Email, Fax, Fax-Local, Hosted ILL System, ILLiad-Odyssey, Post on Web Server, Post on FTP Server, Prospero, Secure Copy, Secure Copy-SCP)
4) Direct delivery (Client Pickup, Internal Transport, Mutual Arrangement, Requester Pickup)

11.3.4
billing method, class
facility or facilities used to charge or invoice for a service

Ref.	Attribute	Obl.	Occ.	Data type
11.3.4.1	billing method type	M	1	label
11.3.2.2	utility	O	0-1	label

11.3.4.1
billing method type, label
code or string defining the nature of a billing method

EXAMPLE Bills not Issued, Invoice, Invoice to Follow, Invoice with Item, Periodic payment, Utility Billing System

11.3.5
payment method, class
facility or facilities used to pay for a service

Ref.	Attribute	Obl.	Occ.	Data type
11.3.5.1	payment method type	M	1	label
11.3.2.2	utility	O	0-1	label

11.3.5.1
payment method type, label
code or string defining the nature of a payment method

EXAMPLE Bank Electronic Payment, Cash, Cheque, Deposit Account, Gratis Scheme, Prepaid, Reciprocal Agreement

11.3.6
obligation attribute, label
any other aspect of an obligation that needs to be expressed in a parsable form

EXAMPLES

1) General (Service Priority. Maximum Processing Time, Maximum Response Time, Maximum Submissions, Will Broker, Will Refer)
2) Loan function (Loan Period, Renew Period, Maximum Renewals, Maximum Outstanding, Item Use Restriction, Will Respond to Subject Requests)
3) Copy function (Rights Type, Copyright Compliance Indication, Minimum Pages, Maximum Pages, Will Respond to Subject Requests)
4) Locate function (Search Range, Maximum Locations Returned, Returns Library Unit Symbol, Returns Name, Returns Address, Returns Call No, Returns Full Bib Citation, Respond with Other Locations Services)
5) Estimate function (Total Provided, Breakdown Provided, Estimate Valid Period)

11.3.7
charge, class
cost associated with the use of a service

Ref.	Attribute	Obl.	Occ.	Data type
13.2	currency	M	1	label
11.3.7.1	charge amount	M	1	decimal
11.3.7.2	tax included	O	0-1	Boolean
11.3.7.3	tax	O	0-1	decimal
11.3.8	increment	O	0-1	class
13.12	notes	O	0-1	class

11.3.7.1
charge amount, decimal
decimal value for a monetary amount in a specified currency

11.3.7.2
tax included, boolean
flag indicating whether or not an applicable goods and services or value added tax is included in the charge

11.3.7.3
tax, decimal
decimal value for the tax in a specified currency if it is not included in the charge amount

11.3.8
increment, class
charge added to the base cost of a service parameter for a specific increment

Ref.	Attribute	Obl.	Occ.	Data type
13.11	measurement type	M	1	label
11.3.8.1	increment quantity	M	1	decimal
11.3.8.2	minimum quantity	O	0-1	decimal
11.3.8.3	maximum quantity	O	0-1	decimal
13.2	currency	O	0-1	label
11.3.7.1	charge amount	O	0-1	decimal
11.3.7.3	tax	O	0-1	decimal
11.3.8.4	replace previous level	O	0-1	Boolean

Use increment to set charges that vary based on the quantity or quality of a service parameter. The base charge can be set as a service fee that applies to a default quantity or quality; or it can be set to zero and the charges recorded solely using instances of increment.

It is assumed that currency and tax Included set for the base charge also apply to the increment.

EXAMPLES

1) A charge of $2.00 per page is charged for color copies.
2) A levy of $40 is charged for a service level with a 2 hour turn around time.
3) A charge of $3.50 per 10 pages is charged for the first 30 pages and additional copies are made at $2.50 per 10 pages.

11.3.8.1
increment quantity, decimal
number of units to which an increment applies

EXAMPLES

1) If the charge is per 15 pages then the increment quantity is 15.
2) If the charge is per week then the increment quantity is 1.

11.3.8.2
minimum quantity, decimal
least number or measure that will be delivered at the rate specified for this increment

In the example below, the base charge is set to zero. The first increment has Increment Type set to Page, Increment Quantity set to 10 and Maximum Quantity set to 30. The next increment has Increment Type set to Page, Increment Quantity set to 10 and Minimum Quantity set to 31.

EXAMPLE A charge of $3.50 per 10 pages is the charge for the first 30 pages and additional copies are made at $2.50 per 10 pages.

11.3.8.3
maximum quantity, decimal
greatest number or measure that will be delivered at the rate specified for this increment

In the example below, the base charge is set to zero. The first increment has Increment Type set to Page, Increment Quantity set to 10 and Maximum Quantity set to 30. The next increment has Increment Type set to Page, Increment Quantity set to 10 and Minimum Quantity set to 31.

EXAMPLE A charge of $3.50 per 10 pages is the charge for the first 30 pages and additional copies are made at $2.50 per 10 pages.

11.3.8.4
replace previous level, boolean
flag indicating whether the increment should be added to or replace the previous level

12 Protocol information

Data type: class

indicates a protocol supported by the service and the level of conformance

Ref.	Attribute	Obl.	Occ.	Data type
12.1	protocol	M	1	label
12.2	version number	0	0-N	string
12.3	software	O	0-1	class
12.4	supported profile	O	0-N	label
12.5	supported feature	O	0-N	class
12.6	supported character set	O	0-N	class

A protocol is a set of rules for exchanging data and messages between a service requester and a service provider. Protocols will vary depending on the nature of the service being delivered and the data and messages needing to be exchanged. For technical interoperability, the service requester and service supplier need to have a common understanding of the protocol supported and the version that has been implemented.

A protocol may describe a wider range of behaviours than is needed to support the business of a given community. Communities may therefore develop profiles that bind a protocol to particular data representations, controlled vocabularies and business rules, or that extend it to support needs specific to the community. Even then, a community profile may not describe all the features supported by a given implementation.

Use protocol information to record a protocol supported by the service, relevant supported profiles and any additional information about supported features that is needed to describe the service as fully as is needed for the level of interoperability required.

Use a single instance of protocol information for all supported versions of a protocol unless the level of support is different across versions.

12.1
protocol, label
code or string identifying a protocol

EXAMPLES

1) Atom publishing protocol
2) OAI-PMH (Open Archives Initiative protocol for metadata harvesting)
3) Open URL (ANSI/NISO Z39.88 - The OpenURL Framework for Context-Sensitive Services)
4) SRU (Search/Retrieval via URL)

For a more comprehensive list, see Appendix F.

12.2
version number, string
number or string designating a particular edition of a protocol or software or profile

12.3
software, class
set of programs used to support a protocol

Ref.	Attribute	Obl.	Occ.	Data type
12.3.1	software name	M	1	string
12.2	version number	O	0-1	string

Record version number in a separate data element if it is known.

12.3.1
software name, string
word or phrase by which a software is known

12.4
supported profile, class
indication that a system or service adheres to a document comprising agreed protocol options that ensure interoperability among systems and services

Ref.	Attribute	Obl.	Occ.	Data type
12.4.1	profile	M	1	string
12.2	version number	O	0-1	string

Record version number in a separate data element if it is known or if more than one version of a profile is supported.

EXAMPLE Bath Profile (International Z39.50 specification for library applications and resource discovery)

12.4.1
profile, string
word or phrase by which a profile is known

12.5
supported feature, class
detailed information about adherence to a specific element of a protocol

Ref.	Attribute	Obl.	Occ.	Data type
12.5.1	feature type	M	1	label
12.5.2	feature key	M	1	label
12.5.3	feature name	O	0-1	seq lang string
12.5.4	functional level	O	0-N	string
13.8	is supported	O	0-1	boolean
13.7	is default	O	0-1	boolean
12.5.5	default setting	O	0-1	string
12.5.6	mapping	O	0-N	label
12.5.7	feature-specific attribute	O	0-N	label

12.5.1
feature type, label
code or string identifying the nature of a supported protocol optional or mandatory element

EXAMPLE Z39.50 (Index, Record info)

12.5.2
feature key, label
code or string uniquely identifying a supported protocol optional or mandatory element

EXAMPLES

1) Index (Z39.50 attribute set)

2) Record info (Z39.50 record syntax object identifiers)

12.5.3
feature name, seq lang string
word or phrase by which a protocol element is known

12.5.4
functional level, string
number, word or phrase identifying the extent to which a protocol feature is supported

12.5.5
default setting, string
value applied by a protocol server if not specified in a request or other transaction

12.5.6
mapping, label
indication that an element has an equivalent in a different, specified set

EXAMPLE Internal, [Authority], URI

12.5.7
feature-specific attribute, label
code or string identifying or quantifying specific aspects of an element in parsable form

EXAMPLE Sort keyword

12.6
supported character set, class
encoding scheme for the abstract representation of characters in a computer system

Ref.	Attribute	Obl.	Occ.	Data type
12.6.1	character set	M	1	label
12.6.1	character encoding	0	0-N	label

12.6.1 character set, label
well-defined group of symbols used for the support of one or more languages

EXAMPLE ISO 646, ISO 10646 (Unicode), ISO 8859-1, ISO 5426

12.6.2
character encoding, label
mapping from an abstract character set description to actual code units used to represent a character, including octet serialization

EXAMPLE UTF-8, UTF16

13 Global elements

13.1
address, class
physical or electronic location

Ref.	Attribute	Obl.	Occ.	Data type
13.1.1	physical address	CM	1	sub-class
13.1.2	electronic address			
13.1.3	address part	M	1-N	class
13.1.4	text encoding	O	0-1	label

Record each instance of a physical or electronic address separately. Render the full address for a given location and location type by combining address instances using physical address type and electronic address type to distinguish each instance, for example, postal address, street address, email, fax.

Use date range to determine the active status of an address OR set the active status flag in the absence of a start or end date.

13.1.1
physical address, sub-class
code or phrase that indicates a physical location

Ref.	Attribute	Obl.	Occ.	Data type
13.1.1.1	physical address type	O	0-N	label

13.1.1.1
physical address type, label
code or string identifying the nature of a physical address

Use physical address type to distinguish between postal address or street address. If the postal address and street address are the same, include both as physical address type instances.

13.1.2
electronic address, sub-class
code or phrase that indicates an electronic location

Ref.	Attribute	Obl.	Occ.	Data type
13.1.2.1	electronic address type	O	0-N	Label

13.1.2.1
electronic address type, label
code or string identifying the nature of an electronic address

Use electronic address type to distinguish between different kinds of electronic addresses. If the electronic address is the same for one or more types (e.g. Voice and Fax) include each as electronic address type instances.

Use a related nominal person with relation type 'Is contact for' to record an electronic address that is used as a point of contact for a particular business activity, e.g. billing or delivery.

EXAMPLES

1) Email, Fax, Pager, Telex, Voice, Voice Toll Free, Voice Mobile
2) Ariel-Email; Ariel-FTP; Direct Connect; EPICWIN; Prospero; Hosted ILL System; ILLiad-Odyssey; IPIG-Email; IPIG-TCP-Duplex; IPIG-TCP-Simplex
3) WWW, Z39.50, SRW, SRU, OAI, RSS

13.1.3
address part, class
one element of a structured address, or the full address if it is unstructured

Ref.	Attribute	Obl.	Occ.	Data type
13.1.3.1	address part type	O	0-1	label
13.1.3.2	address part value	M	1	label

Use a single instance of address part for an unstructured address or multiple instances, together with address part type, when there is a need for a structured address, for instance, when there is a requirement for sorting or formatting parts of an address.

In implementations, address part(s) may be defined as specific attributes of address rather than using a separate object class.

13.1.3.1
address part type, label
code or string identifying the nature of an address part

EXAMPLES

1) Physical Address 1 (Care of; Location within Building; House Name; Street; Post Office Box; District; City; Region; Country, Postal Code)
2) Physical Address 2 (Address Line 1; Address Line 2; Locality; Region; Country, Postal Code)
3) Electronic Address (International Access Code; Area Code; Local Number)
4) System Address (Host Name, Port, System Name)

13.1.3.2
address part value, label
text value of an address part and the authority, if applicable, from which the value is derived

For country, use the valid 2-character country code values specified in ISO 3166-1 and their expansions for display. Use the numeric values from ISO 3166-1 when representation in Non-Roman scripts is required.

For region, use the valid regional codes as specified in ISO 3166-2, including country codes.

13.1.4
text encoding, label
code or string describing the way in which a data element with data type of string has been formatted

Use when the data element contains text marked up in some way for formatting purposes.

EXAMPLE Carriage-Return, Newline Delimited Text, HTML, XML

13.2
currency, label
unit of exchange in which a specific amount or tax is reported

Use ISO 4217 as the authority for Currency values unless there is a need to develop additional authorities for "pseudo" currencies such as IFLA vouchers.

EXAMPLE USD United States Dollar, GBP United Kingdom Pound, CAD Canadian Dollar, AUD Australian Dollar

13.3
date range, class
indication of the time span applying to what is being described and/or whether it is current

Ref.	Attribute	Obl.	Occ.	Data type
13.3.1	start date	O	0-1	date time
13.3.2	end date	O	0-1	date time

At least one element shall be included.

ISO 8601, on which the date time data type is based, does not support a way of representing open dates in a single data element. However, implementations may treat date range as a single data element of class label by using an agreed encoding syntax such as the one adopted by the *Dublin Core Collection Profile*.

If end date is not present this indicates that the time period is open-ended. If start date is not present this indicates that the time period has ended but any date before this is valid in searching or reporting for the class to which the date range applies.

13.3.1
start date, date time
start date and time of a time period

13.3.2
end date, date time
end date and time of a time period

13.4
description, class
information about a registry object in text form

Ref.	Attribute	Obl.	Occ.	Data type
13.4.1	description value	M	1	seq lang string
13.4.2	description role	O	0-1	label

13.4.1
description value, seq lang string
text value comprising information about a registry object

13.4.2
description role, label
indication of the possible utility of a description

EXAMPLE Brief, Full, Column Heading

13.5
info pointer, class
means of associating a registry object or information in a note element with a resource such as a document or image that provides complementary additional information

Ref.	Attribute	Obl.	Occ.	Data type
13.5.1	info pointer type	O	1	label
13.5.2	target resource	M	1	label

Use info pointer in registry object for information about the registry object that is not included in the record, for example, publications about the registry object, an icon or logo associated with the registry object, charters or other documents that act as a source of authority, written policy statements, staff directories, etc.

Use info pointer in a note for sources used to derive the information in the note.

Generally, do not use info pointer for links to related services when describing a collection or activity. Either use relation to support these links or denormalise the relation through an “is available via” attribute as a direct child of registry object.

13.5.1
info pointer type, label
code or string identifying the nature of an Info Pointer

EXAMPLES

1) Assets (Equipment, Facility)
2) Documents (Charter, Policy, Staff Directory)
3) Images (Icon, Logo, Official Seal)
4) Inputs (Program, Call for papers, Registration, Attendees)
5) Outputs (Minutes, Publication, Patent, Proceeding, Product)

13.5.2
target resource, label
string uniquely identifying a referenced resource

The Target Resource may be a bibliographic citation in text form or an identifier

13.6
is active, boolean
flag indicating whether or not what is being described is current

13.7
is default, boolean
flag indicating whether or not a stored value is to be treated as a replacement value in case no value is present

13.8
is supported, boolean
flag indicating whether or not a function, method or product is supported

13.9
language, label
any valid three-character language code as specified in ISO 639-2

EXAMPLE eng English, fin Finnish, fre French

13.10
location, class
place where an object can be found

Ref.	Attribute	Obl.	Occ.	Data type
13.10.1	location type	O	0-1	label
13.10.2	spatial location	O	0-N	label
13.1	address	O	0-N	class
13.3	date range	O	0-1	class
13.6	is active	O	0-1	Boolean
13.12	notes	O	0-1	notes

13.10.1
location type, label
code, word or phrase that defines the nature of a particular location where there are multiple locations associated with an object

EXAMPLES

1) Person: Home location, Term location, Business location

2) Group: Delivery location, Invoice location, Notification location

When a contact needs to be associated with a location that is used for a particular business activity, e.g. billing or delivery or help desk, use a related nominal party with relation type “Is contact for” and record the location for that location type as a property of the nominal party.

13.10.2
spatial location, label
position on the surface of the earth expressed in terms of a spatial referencing system

Use appropriate OpenGIS and ISO 19100 schemes for spatial location.

Include country and region codes as address parts in physical address.

13.11
measurement type, label
code or string delineating what is being measured by a specified quantity

EXAMPLES

1) Collection size (Titles, items, shelf meters, shelf feet)

2) Length (Feet, Inches, Meters)

3) Part (Exposure, Frame, Image, Kilobyte, Page, Sheet)

4) Time period (Year, Month, Week, Day, Hour, Minute)

5) Weight (kilogram, Ounce, Pound)

6) Miscellaneous (Varies by Publisher, Varies – Replacement Cost, Varies by Title)

13.12
notes, class
place for recording additional information about a Registry Object or Element

Ref.	Attribute	Obl.	Occ.	Data type
13.12.1	note	M	1	seq lang string
13.5	info pointer	O	0-N	class

13.12.1
note, seq lang string
phrase relating to a registry object or element, carrying additional information

13.13
resource type, label
code or string defining the nature of a resource

Use a controlled vocabulary for resource type that is sufficiently granular to support the required access policies and collection profiling process.

EXAMPLE Electronic resources, Manuscripts, Maps, Microforms, Monographs, Multimedia, Newspapers, Pictures, Rare material, Reference material, Serials (bound), Serials (unbound), Sound Recordings

14 Record details

Data type: class

administrative metadata about a registry object record

Ref.	Attribute	Obl.	Occ.	Data type
14.1	update event	M	1-N	class
14.2	status	O	0-N	class
13.12	notes	O	0-1	seq lang string

Use record details if there is a requirement to manage the creation, publication and updating of registry objects as part of a registry service. Use the registry object data elements date record created and date record last modified to allow easy identification of new and updated registry objects in a network environment.

14.1
update event, class
change that introduces or removes a record from a given business context or modifies the information that it contains

Ref.	Attribute	Obl.	Occ.	Data type
14.1.1	update event type	M	1	label
13.3	date range	M	1	date time
14.1.2	record updater	M	1	label
14.1.3	record source	O	0-1	label
13.12	notes	0	0-1	class

14.1.1
update event type, label
code or string identifying the nature of an update event

EXAMPLE Add, Modify, Delete

14.1.2
record updater, label
unique identifier for the party responsible for an update event

The record updater value may be a party key.

14.1.3
record source, label
code or string identifying a record used as input to an offline update event

14.2
status, class
relative position or standing of a record

Ref.	Attribute	Obl.	Occ.	Data type
14.2.1	status type	M	1	label
1.4.2.2	status value	M	1	label
14.2.3	date status assigned	O	0-1	date time
13.12	notes	O	0-1	class

14.2.1
status type, label
code or string indicating the type of status being recorded

EXAMPLE Record Status, Review Status

14.2.2
status value, label
code or string indicating the assigned position or standing

EXAMPLES

1) Record Status (New, Updated, Flagged for Deletion, Deleted)

2) Review Status (Submitted, Pending, Rejected, Approved)

14.2.3
date status assigned, date time
date and time a status was assigned

Annex A
(normative)

Alphabetic sequence of data elements

The table below lists all of the data elements in the data element directory in an alphabetic sequence. Included with each data element is its clause number, description and data type and a list of the data elements in which it is used.

Element	Ref.	Description	Data type	Used by
access policy	10	means of defining who may access a service, what functions and resources they can access and what conditions and obligations apply	class	service
accrual method	7.2.7	type of acquisition employed to add items to a collection	label	collection profile
accrual periodicity	7.2.6	frequency with which items are added to a collection	label	collection profile
accrual policy	7.2.5	conditions and selection criteria governing the addition of items to a collection	label	collection profile
activity	8	something occurring over time that generates one or more outputs	sub-class	registry object
activity type	8.1	code or string identifying the nature of an activity	label	activity
address	13.1	physical or electronic location	class	location
address part	13.1.3	one element of a structured address, or the full address if it is unstructured	class	address
address part type	13.1.3.1	code or string identifying the nature of an address part	label	address part
address part value	13.1.3.2	text value of an address part and the authority, if applicable, from which the value is derived	label	address part
authority	4.6.5.2	agency that controls the form or content of a value or its uniqueness in a given context	string	label
average annual decrease	7.2.4	number of units by which a collection decreases per year, based on a specified measurement type and disposal policy	positive integer	collection profile
average annual increase	7.2.3	number of units by which a collection increases per year, based on a specified measurement type and accrual policy	positive integer	collection profile
billing method	11.3.4	facility or facilities used to charge or invoice for a service	class	obligation
billing method type	11.3.4.1	code or string defining the nature of a billing method	label	billing method
bindata	4.6.6.2	element containing Base64 encoded metadata	string	metadata
character encoding	12.6.2	mapping from an abstract character set description to actual code units used to represent a character, including octet serialization	label	supported character set
character set	12.6.1	well-defined group of symbols used for the support of one or more languages	label	supported character set
charge	11.3.7	cost associated with the use of a service	class	obligation

Element	Ref.	Description	Data type	Used by
charge amount	11.3.7.1	decimal value for a monetary amount in a specified currency	decimal	charge, increment
charge type	11.3.1	code or string identifying the nature of an obligation for which a charge may apply	label	obligation
collection	7	aggregation of physical or digital objects treated as a unit for business purposes	sub-class	registry object
collection profile	7.2	means of quantifying the size and growth rate of a collection	class	collection
collection profile key	7.2.1	string uniquely identifying a collection profile	string	collection profile
collection type	7.1	code or string identifying the nature or classifying a collection	label	collection
condition	10.6	set of prerequisites needing to be met for an access policy to apply	string	access policy
coverage	7.2.9	means of quantifying the scope of a collection	class	collection profile
coverage area	7.2.9.2	code or string identifying a specific area within the specified coverage type that is in scope for the collection	label	coverage
coverage type	7.2.9.1	type of coverage being described	label	coverage
currency	13.2	unit of exchange in which a specific amount or tax is reported	label	charge, increment, statistics
current strength	7.2.9.3	code or string rating the current coverage in a specified area	label	coverage
current strength notes	7.2.9.4	explanatory text about a current strength rating	seq lang string	coverage
date range	13.3	indication of the time span applying to what is being described and/or whether it is current	class	collection profile, event, identifier, location, name, record details, registry object, relation, service times, suspension, update event
date record created	5.8	date time the registry object record was created	date time	registry object
date record last modified	5.9	date time the registry object record or any of its data elements were last modified	date time	registry object
date status assigned	14.2.3	date and time a status was assigned	date time	status
start date	13.3.1	start date and time of a time period	date time	date range
end date	13.3.2	end date and time of a time period	date time	date range
day of week	9.4.2.1	code designating a specific day within a week to which service hours apply	positive integer	service hours
default setting	12.5.5	value applied by a protocol server if not specified in a request or other transaction	string	supported feature
delivery method	11.3.3	facility or facilities used to provide a service	class	obligation
delivery method type	11.3.3.1	code or string defining the nature of a delivery method	label	delivery method

Element	Ref.	Description	Data type	Used by
description	13.4	information about a registry object in text form	class	coverage, event, obligation, product, registry object, service times
description role	13.4.2	indication of the possible utility of a description	label	description
description value	13.4.1	text value comprising information about a registry object	seq lang string	description
disposal policy	7.2.8	conditions and selection criteria governing the removal or archiving of items from a collection	label	collection profile
effect	10.5	code in an access policy indicating whether the specified requester(s) can access the specified action(s) and wanted item(s) at the specified service level(s)	label	access policy
electronic address	13.1.2	code or phrase that indicates an electronic location	sub-class	address
electronic address type	13.1.2.1	code or string identifying the nature of an electronic address	label	electronic address
event	5.6	something that happens at a given place and time	class	registry object
event type	5.7.1	code or string identifying the nature of an event	label	event
feature key	12.5.2	code or string uniquely identifying a supported protocol optional or mandatory element	label	supported feature
feature name	12.5.3	word or phrase by which a protocol element is known	seq lang string	supported feature
feature type	12.5.1	code or string identifying the nature of a supported protocol optional or mandatory element	label	supported feature
feature-specific attribute	12.5.7	code or string identifying or quantifying specific aspects of an element in parsable form	label	supported feature
function	9.2	code or string identifying a business process supported by a service that needs to be distinguished for access control, interoperability or reporting purposes	label	access policy, obligation, product, service
functional level	12.5.4	number, word or phrase identifying the extent to which a protocol feature is supported	string	supported feature
identifier	5.2	globally unique means of distinguishing one registry object from another	class	registry object
identifier role	5.2.2	word or phrase indicating the function or purpose of an identifier in a transaction of business within a specific community	label	identifier
identifier value	5.2.1	sequence of characters or words that uniquely identifies a registry object within the domain of a specified authority or that is globally unique	label	identifier
increment	11.3.8	charge added to the base cost of a service parameter for a specific increment	class	charge
increment quantity	11.3.8.1	number of units to which an increment applies	decimal	increment
indicator	6.2.2.2	code or string identifying the thing being measured	label	statistics
indicator type	6.2.2.1	code or string identifying the type of thing being measured	label	statistics

Element	Ref.	Description	Data type	Used by
info pointer	13.5	means of associating a registry object or information in a note element with a resource such as a document or image that provides complementary additional information	class	record details, registry object, update event
info pointer type	13.5.1	code or string identifying the nature of an info pointer	label	info pointer
input description	9.3.3	attribute of material from which a product is to be created	label	product
is active	13.6	flag indicating whether or not what is being described is current	boolean	event, identifier, location, name, record details, registry object, relation, service times, suspension, update event
is default	13.7	flag indicating whether or not a stored value is to be treated as a replacement value in case no value is present	boolean	identifier, language string, supported feature
is supported	13.8	flag indicating whether or not a function, method or product is supported	boolean	obligation, supported feature
label	4.6.5	complex data type used when values may need to be associated with a specified authority	class	all elements of data type label
language	13.9	any valid three-character language code as specified in ISO 639-2	label	language string, registry object
language string	4.6.8.1	value of an element expressed in a specified language and language string type	class	seq lang string
language string type	4.6.8.1.2	code or string delineating the nature of the language string when it has undergone a transformation from its original form	label	language string
language string type system	4.6.8.1.3	standard or system followed for transliteration or transcription	label	language string
language string value	4.6.8.1.1	text value of a language string	string	language string
location	13.10	place where an object can be found	label	access policy, event, registry object
location type	13.10.1	Code, word or phrase that defines the nature of a particular location where there are multiple locations associated with an object	label	location
mapping	12.5.6	indication that an element has an equivalent in a different, specified set	label	supported feature
maximum quantity	11.3.8.3	greatest number or measure that will be delivered at the rate specified for this increment	decimal	increment
measurement type	13.11	code or string delineating what is being measured by a specified quantity	label	collection profile, increment
metadata	4.6.6	complex data type enabling the embedding of data formatted in a designated extension schema	class	alternative data type for any element
metadata format	4.6.6.1	code or string specifying the metadata format	label	metadata
minimum quantity	11.3.8.2	least number or measure that will be delivered at the rate specified for this increment	decimal	increment

Element	Ref.	Description	Data type	Used by
name	5.3	word or phrase or initialism used to refer to a registry object	class	registry object
name part	5.3.2	one element of a structured name, or the full name if it is unstructured	class	name
name part type	5.3.2.2	code or string identifying the nature of a name part	label	name part
name part value	5.3.2.1	text value of a name part	seq lang string	name part
name role	5.3.1	code or string identifying the function or purpose of a name	label	name
note	13.12.1	phrase relating to a registry object or element, carrying additional information	seq lang string	notes
notes	13.12	place for recording additional information about a registry object or element	class	charge, collection profile, event, feature name, identifier, name, product, registry object, relation, service description, suspension
number of units	7.2.2	indication of the size of a collection, based on a specified measurement such as objects (books or photographic records) or bibliographic (metadata) items	positive integer	collection profile
obligation	11.3	information about restrictions and conditions associated with use of a service	class	service description
obligation attribute	11.3.6	any other aspect of an obligation that needs to be expressed in a parsable form	label	obligation
other value	4.6.5.3	string that represents the other value when ‘other’ is recorded as the value	string	label
output description	9.3.4	attribute of a product that is to be created from another	label	product
party	6	person or group performing a role in relation to the business of a specific community or domain	sub-class	registry object
party type	6.1	code or string classifying a party	label	party
payment method	11.3.5	facility or facilities used to pay for a service	class	obligation
payment method type	11.3.5.1	code or string defining the nature of a payment method	label	payment method
physical address	13.1.1	code or phrase that indicates a physical location	sub-class	address
physical address type	13.1.1.1	code or string identifying the nature of a physical address	label	physical address
planned strength	7.2.9.5	code or string rating the planned coverage in a specified area	label	coverage
planned strength notes	7.2.9.6	explanatory text about a planned strength rating	seq lang string	coverage
policy combining algorithm	9.5	in a registry of services, a way of interpreting the results of a request for an access policy decision when more than one access policy applies	label	service
product	9.3	output of a service that needs to be distinguished for access control, interoperability or reporting purposes	class	service

Element	Ref.	Description	Data type	Used by
product key	9.3.1	string uniquely identifying a particular product within a service	string	obligation, product
product type	9.3.2	code or string identifying the nature of a product	label	product
profile	12.4.1	word or phrase by which a profile is known	string	supported profile
protocol	12.1	code or string identifying a protocol	label	protocol information
protocol information	12	indicates a protocol supported by the service and the level of conformance	class	service
record details	14	administrative metadata about a registry object record	class	registry object
record source	14.1.3	code or string identifying a record used as input to an offline update event	label	record details, update event
record updater	14.1.2	unique identifier for the party responsible for an update event	label	record details, update event
registry object	5	entity playing a role in the conduct of business in a specific community or domain	class	registry
registry object key	5.1	string used for matching and linking purposes that distinguishes one registry object from another within a given business context or that is globally unique	label	registry object
related registry object key	5.4.2	string uniquely identifying a related registry object	label	relation
relation	5.4	indication that a registry object is associated with another registry object	class	registry object
relation qualifier	5.4.3	information that qualifies the nature of the relation	Label	relation
relation type	5.4.1	code or string identifying the specific nature of a relation between one registry object and another	label	relation
replace previous level	11.3.8.4	flag indicating whether the increment should be added to or replace the previous level	boolean	increment
request method	11.3.2	facility or facilities used to request or order a service	class	obligation
request method type	11.3.2.1	code or string defining the nature of a request method	label	request method
resource type	13.13	code or string defining the nature of a resource	label	access policy, collection profile
rights	7.3	information about rights held in and over a collection	seq lang string	collection
seq lang string	4.6.8	sequence of one or more language strings expressing the same concept in different languages	class	current strength notes, description value, name part value, notes, planned strength notes
service	9	system that provides one or more functions of value to the end user	sub-class	registry object
service description	11	set of policies that might be associated with the delivery of a service, for reference by one or more access policies	class	service
service description key	11.1	string uniquely identifying a particular service description within a service	string	access policy, service description
service hours	9.4.2	service times expressed in the form of structured text	class	service times

Element	Ref.	Description	Data type	Used by
service level	11.2	code or string identifying the service response associated with a specific service description	label	service description
service times	9.4	set of date and time ranges associated with the availability and delivery of a service	class	service
service times key	9.4.1	string uniquely identifying a particular service times instance within a service	string	access policy, service times
service type	9.1	code or string identifying the nature of a service	label	service
software	12.3	set of programs used to support a protocol	class	protocol information
software name	12.3.1	word or phrase by which a software is known	string	software
spatial location	13.10.2	position on the earth's surface expressed in terms of a spatial referencing system	label	location
statistic	6.2.2.3	measurement enabling the size and growth of something to be monitored	decimal	statistics
statistics	6.2.2	means of quantifying the size and growth rate of an organization	class	group
status	14.2	assigned position or standing of a record	class	record details
status type	14.2.1	code or string indicating the type of status being recorded	label	status
status value	14.2.2	code or string indicating the assigned position or standing	label	status
subject	5.5	word or phrase indicating a topic associated with a registry object	label	registry object
supported character set	12.6	encoding scheme for the abstract representation of characters in a computer system	class	protocol information
supported feature	12.5	detailed information about adherence to a specific element of a protocol	class	protocol information
supported profile	12.4	indication that a system or service adheres to a document comprising agreed protocol options that ensure interoperability among systems and services	class	protocol information
suspension	9.4.3	means of recording when a service is temporarily unavailable and the reason why	class	service times
target activity	10.4	string uniquely identifying a referenced activity	label	access policy
target collection	10.3	string uniquely identifying a referenced collection	label	access policy
target party	10.2	string uniquely identifying a referenced group	label	access policy
target resource	13.5.2	string uniquely identifying a referenced resource	label	info pointer
tax	11.3.7.3	decimal value for the tax in a specified currency if it is not included in the charge amount	decimal	charge, increment
tax included	11.3.7.2	flag indicating whether or not an applicable goods and services or value added tax is included in the charge	boolean	charge
text encoding	13.1.4	code or string describing the way in which a data element with data type of string has been formatted	label	address
time valid from	9.4.2.2	time of day a service becomes available on a given day of the week	time	service hours
time valid to	9.4.2.3	time of day a services ceases to be available on a given day of the week	time	service hours

Element	Ref.	Description	Data type	Used by
update event	14.1	change that introduces or removes a record from a given business context or modifies the information that it contains	class	record details
update event type	14.1.1	code or string identifying the nature of an update event	label	record details, update event
user category	10.1	code or string identifying the nature of a user for access control purposes	label	access policy
utility	11.3.2.2	name of a system or service used as a method	label	billing method, delivery method, payment method, request method
value	4.6.5.1	string or code that may need to be associated with an authority to control its form or content or to make it unique in a given context	string	label
version number	12.2	number or string designating a particular edition of a protocol or software or profile	string	protocol information, software, supported profile
xmldata	4.6.6.3	element containing XML encoded metadata	string	metadata

Annex B
(informative)

General guidelines for building registry services

B.1 Introduction

This International Standard provides an information model for building registry services for libraries and related organizations. What these registry services are and how the data is used will depend on a range of factors not excluding the effort required to collect and maintain quality machine-parsable data and the cost-benefit of so doing. This annex discusses how this International Standard might be applied to address the needs of libraries and related organizations for registry services and the relationship of this International Standard to related standards for the description of parties, collections, services and activities.

As a general principle, data is best created and maintained by the individuals or institutions who have a primary need for it to support internal business processes and workflows. When building registry services, specifying explicit use cases and scenarios will help to identify what data needs to be collected and the interfaces required to enable data to be shared and re-used.

Ideally, registry services should be designed to support the sharing, disambiguation and re-use of data not only within an enterprise or sector, but also at a national level and across national boundaries.

B.2 Service framework

The trend towards open software solutions and collaborative development is now driving an interest in service-oriented architectures and the use of standard interfaces to perform business functions. This has led to an increasing recognition of the need for registry services to enable these functions to be fully-automated. It has also exposed the need for service frameworks that enable communities to identify common functions and work towards interoperable solutions.

Figure B.1 represents an emerging vocabulary being developed by the National Library of Australia for describing the services and functions that may need to be supported by libraries and related organizations in the delivery of digital library services. Many of these functions have an exact correspondence with the service genres being developed for the *E-framework for education and research.* This international initiative aims to provide a metamodel for service frameworks in the education and research sectors and already has a well-developed technical model and an evolving service genre registry. Such a metamodel will be an important means of exploring commonalities between service frameworks and identifying opportunities for collaboration.

Figure B.1 also shows diagrammatically how registry services act as the glue that enables each of these functions to be processed and also the relationship between registry objects and other data needed to deliver digital library services. This International Standard deals with the data needed to deliver registry services. Other framework standards such as the IFLA *Functional Requirements for Bibliographic Records* (FRBR) and ISO 8459 deal with metadata (resources and topics), and business data (users and transactions). However, there are crossovers between this data when it comes to the description of collective works as resources and of parties as creators, contributors and subjects of resources.

Common services	Business services	Creation services	Annotation services	Collection services	Repository services	Registry services
Authenticate	Consign	Create	Tag	Add	Select	Register
Authorise	Confirm	Update	Annotate	Read	Acquire	Match
Personalise	Schedule	Publish	Classify	Replace	Deposit	Merge
Recommend	Track	Assemble	Associate	Remove	Accession	Change
Log	Acquit	Generate	Rate	Search	Describe	Scan
Audit	Abort	Pack	Value	Manage	Control	Lookup
Alert	Pay	Sequence		Provision	Archive	Locate
Report		Transform		Harvest	Preserve	Bookmark
Contact		Translate		Syndicate	Obtain	Request
					Supply	Resolve
Archives & Mss | Audio | Books | Maps | Datasets | Film & Video | Journals | Learning Objects Newspapers | Objects & Artefacts | Pictures | Scores | Theses | Web Archives						
Party	Collection	Service	Activity	Resource	Topic	User	Transaction

Figure B.1 — Draft digital Library Service Framework

B.3 Controlled vocabularies

A large number of data elements in this International Standard are defined as labels that may need to have their values determined by controlled vocabularies in implementations in order to ensure interoperability. While examples are included that could be used as starter lists, community groups will need to identify and/or develop controlled vocabularies in profiles. Some vocabularies may already be in use in related standards and profiles over these standards. Others may still be under development or may need to be developed as registry services are implemented to meet specific needs.

In this International Standard only four controlled vocabularies for coding are prescribed:

a) currency (ISO 4227)

b) language (ISO 639-2)

c) country (ISO 3166-1)

d) region (ISO 3166-2)

The following controlled vocabularies are prescribed as defaults but may be extended to cover requirements:

— activity type (Course, Event, Program, Project)

— charge type (Service Charge, Service Level Charge, Function Charge, Method Charge, Product Charge)

— collection type (Collective work, Repository, Catalogue or index , Registry)

— party type (Person, Group)

— physical address type (Postal address, Street address)

— status value [(Record status (New, Updated, Flagged for Deletion, Deleted), Review status (Submitted, Pending, Rejected, Approved)]

B.4 Relations

B.4.1 Building relation ontologies

Identifying the relations needing to be recorded and maintained will be one of the most important activities of a community building registry services to support their activities. The examples in 5.4.1 can be used as a starter list but are not comprehensive. Relation type ontologies may need to be hierarchical to support the level of granularity required as well as allowing relations belonging to the same category to be grouped together for grouping or filtering purposes. The registry object type in the related registry object may also be used as a further way of grouping and filtering related registry objects.

B.4.2 Whole/part relations

Use “Has part/Is part of” relations to record super-registry object/sub-registry object relations. Recording this relation at the child level may be sufficient if a globally unique persistent identifier is used as the registry object key for the parent. Alternatively, relations may need to be encoded in both directions to ensure that a registry object is completely self-describing.

Allow location, contacts and info pointers recorded for a registry object to be inherited by child objects unless a different set of values has been recorded.

B.4.3 Functional roles

For people who play functional roles in relation to a registry object, set up a nominal party for the role and link this through a relation to the person playing the role as illustrated in Figure B.2. Use the nominal party instance to store properties of the role and the actual party instance to store properties that are intrinsic to the person or group regardless of the roles that they play.

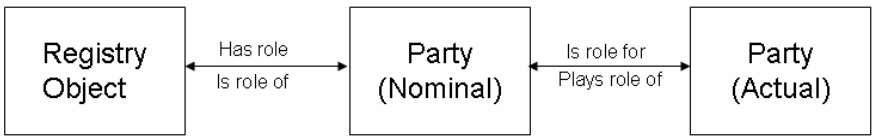

Figure B.2 — registry objects and nominal roles

Use appropriate generic relation types to characterize the role (e.g. Has contact/Is contact for, Has position, Is position in, etc). Use party name for role titles (e.g. After hours contact, Chief investigator). Use party type. to impose a controlled vocabulary on roles, or to characterize roles further, e.g. by organizational level.

When building registries of research programs and projects, treat programs and projects as activities as illustrated in Figure B.3 and use the nominal party model for people playing functional roles in the organization delivering the program, the program itself or the projects it manages.

Take care to distinguish between the project itself and project outputs (items and collective works) when registering project information.

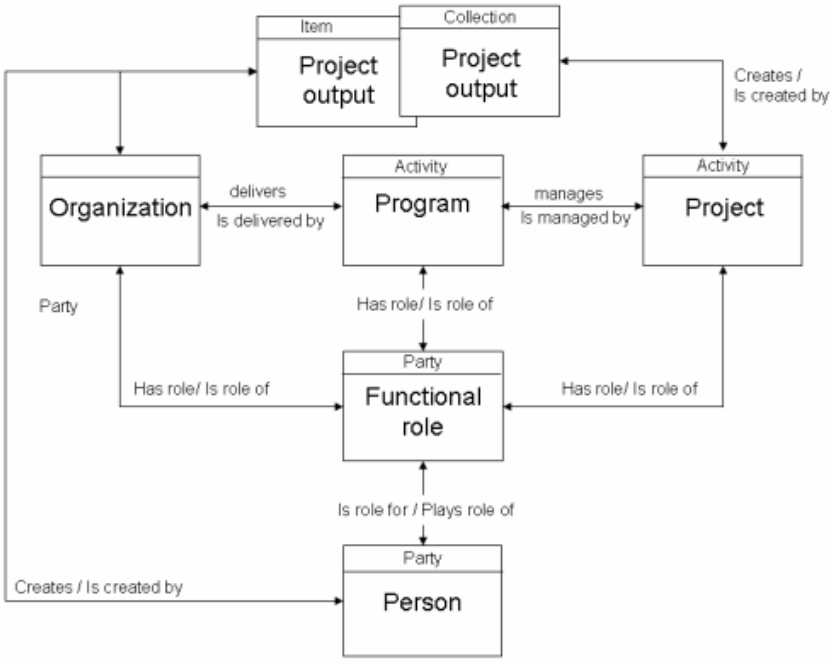

Figure B.3 — Programs and projects

B.5 Users and business transactions

User is a particular functional role that may be undertaken by a party. When using the nominal party model for users, use the userid as the registry object key. Passwords may be stored as instances of identifier with appropriate encryption. User category may be stored as an instance of party type.

Profiles that record user preferences will be application-specific and this International Standard does not prescribe any data elements for recording preferences. These will need to be defined through application-specific extensions.

B.6 Statistics

This International Standard includes an element class to profile collections in 7.2. Collection profile enables policies for building a collection to be recorded, together with information about coverage and current and planned strengths and statistics about the size of the collection and its growth rate. The data elements defined have been tested in a range of implementations, including the registry services of metasearch portals and regional and national conspectus compilations.

A similar element class has not been defined in this revision of the International Standard for other registry object sub-classes as it is less clear exactly what information might need to be collected and shared by a designated community. The OCLC WorldCat Registry XML Schema includes data elements for collecting budgetary and service statistics. These cross registry object boundaries, some having to do with the size and structure of the organization, others with service usage.

Standards for reporting statistics of this kind for libraries and related organizations include:

— ISO 2789 on international library statistics;

— ISO 11620 on library performance indicators;

— NISO Standardized Usage Statistics Harvesting Initiative (SUSHI).

The SUSHI standard was designed as a protocol to collect usage of online content but can be used to collect any report formatted in XML. This International Standard assumes that use of a protocol for harvesting reports in agreed formats would provide a best practice approach to meeting the requirement within a designated community to collect and share statistics. In conjunction with this, it is recommended that organizations register support for such a protocol as a service protocol information instance.

B.7 Bindings and protocols

For exchange and transmission purposes, a registry object may consist of:

— a primary registry object with a number of fully embedded secondary registry objects in a hierarchical arrangement

— a primary registry object that references external related registry objects through a registry object key

— a number of loosely grouped registry objects that are related in some way and reference each other through their registry object keys

The content model defined in this International Standard is likely to be implemented through designated community-specific schemas based on one or more combinations of these models. A range of different metadata formats and protocols may be needed to support the required usage scenarios and registry services. A list of these is given in 4.6.6. XML schemas are also being developed based directly on the data element directory described in this International Standard and these may become adopted as standards over time.

This International Standard assumes that a hierarchical arrangement is not scalable and that registry object keys will generally be used to link related registry objects. Because of the complexity of relations between collections, parties, activities and services and the number of places in a federated environment where data might be created and maintained, it will be important for communities of implementers to ensure that such keys are persistent and globally unique.

A packaging approach can be used to bundle loosely grouped registry objects, following the example given by the description sets defined in the *DCMI Abstract Model* for resources and agents or the *PREMIS (PREservation Metadata: Implementation Strategies)* container with its associated XML schemas for objects, events, agents and rights. It may be necessary to create separate schemas for different sub-types of registry object in order to detail the required ontologies and behaviours in a form that can be self-validating. In addition, separate schemas could be created for service descriptions, protocol information and access policy, with their own bindings.

B.8 Profiles

Profiles of this International Standard will play an important role in ensuring interoperability of systems and services. When describing registry services in a collection service registry, supported profiles should be recorded using the protocol information data element. Ideally each profile should be assigned a globally unique identifier (URI) that resolves to a service description for the profile in machine-readable form. (The schema for such a profile could in fact be a binding of this International Standard).

Annex C
(informative)

Case study 1: Registries of libraries and related organizations

C.1 Overview

Registries of libraries and related organizations are built around a primary registry object that describes the party, as illustrated in Figure C.1. The party instance supports the recording of information about names, identifiers, categorizations, location and hierarchical and administrative arrangements. By taking a framework approach this information can be shared by a range of registry services serving specific purposes rather than having to be recreated for each new business need.

Instances of collection can be used to support the profiling of collections and their strengths. Instances of activity can be used to support the sharing of information about activities such as digitization projects or public events in which a community of organizations is involved. Instances of service can be used to support the recording of information about opening hours, discovery services, interlending services, resolver services, etc.

Figure C.1 shows how, when using party as the primary registry object, the relationship between collection and service may be inferred unless more than one collection is involved.

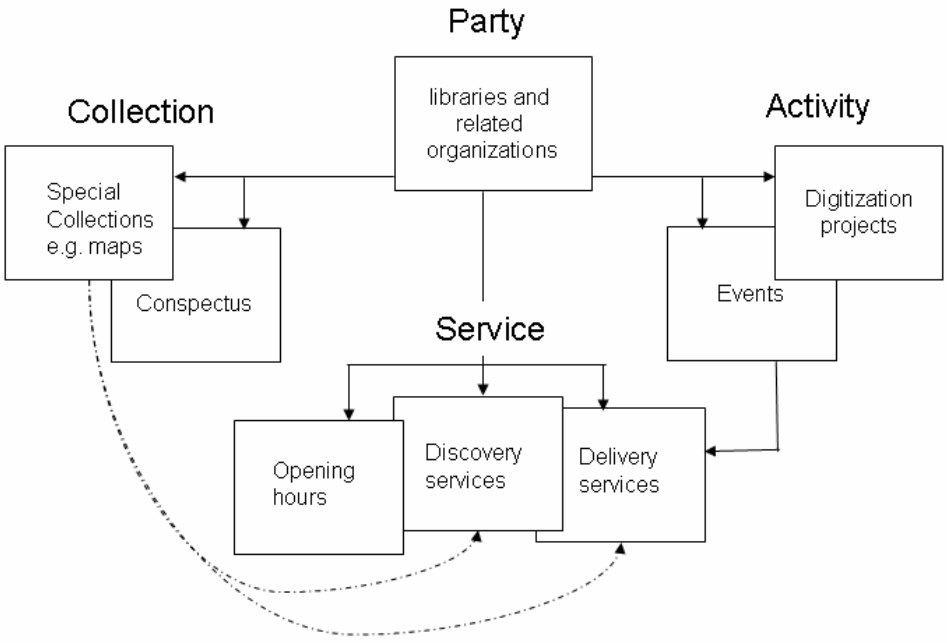

Figure C.1 — Registries of libraries and related organizations

C.2 Primary registry object

To set up the primary registry object, create instances of party for each organization, establishing a hierarchy of subordinate units and setting up administrative relationships through the relation element. As a general rule create subordinate units for branches or other administrative divisions of an organization that have a separate

identity that needs to be recorded. Do not create subordinate units for areas within an organization responsible for delivering a service such as interlibrary loan unless the registry is intended to be a functional directory for the organization. Instead record details for the service in a secondary registry object of sub-class service as described in B.2.3 and link this through a 'Manages/is managed by' relation directly to the organization.

Record at least one instance of organization type in group type using a schema like the one given as an example in 6.1 d). If the organization type is library record the library type in a second instance of group type using a schema like the one given as an example in 6.1 e).

Note that ISIL cannot be used as a registry object key as it is generally assigned at the organization level. However, subclause 5.2 specifies that the ISIL be encoded as an identifier instance for a library or related organization where one has been assigned. (Assume that subordinate units inherit the ISIL of their parent organization unless they have been assigned their own value.)

Encode names of parties that are subordinate units in one of three ways:

a) as a single unstructured name part value using the full name in a form that is unique within the registry context, e.g. *Ministry of Foreign Affairs – Library*,

b) as multiple instances of name part with each separately encoded by type, e.g. MARC21/Corporate name with name part value *Ministry of Financial Affairs* and MARC21/Subordinate unit with name part value *Library*, and

c) as a single unstructured name part value for the subordinate unit, e.g. *Library*.

Use method a) or b) if the name is unambiguous in a given business context and the library is the main object of interest (i.e. there is no separate entry for *Ministry of Foreign Affairs*). Use method c) when the parent party and the subordinate unit are part of a hierarchical organization of entries.

C.3 Secondary registry objects

Set up one or more of the following relation instances, depending on the information needing to be recorded:

— Record general contact information for the organization in party relation instances using nominal party instances.

— Record collection details in a collection relation instances with relation type set to "Owns" and collection type of the related collection set to "Repository".

— Record digitization project details in activity relation instances with relation type set to "Administers" and activity type of the related activity set to "Project".

— Record event details in activity relation instances with relation type set to "Administers" and activity type of the related activity set to "Event".

— Record discovery service details in related instances of service with relation type set to "Delivers" and service type of the related service set to "Discovery".

— Record delivery service details in related instances of service with relation type set to "Delivers" and service type of the related service set to "Delivery".

Allow location, contacts and info pointers recorded for an organization to be inherited by subordinate units and related collections, services and activities unless a different set of values has been recorded.

C.4 Change scenarios

In a registry of libraries and related organizations, names, identifiers and relations may change in response to a number of scenarios, including change of corporate governance, merging of institutions, splitting of an institution into several different organizations, an autonomous organization being subsumed into a child role within its own or another organization. Likely change scenarios and recommended behaviours are summarised in Table 1. The recommended behaviours represent best practice if a full change history is required. Note that, to maintain a change history for secondary objects when ownership is transferred to a new organisation it will be necessary to record inverse relations in the secondary object.

Table C.1 — Change scenarios

Scenario	Recommended behaviour
1) A new organization or subordinate unit is created	Create a new registry object for the organization or subordinate unit
2) An organization changes its location	Update location and contact details
3) An organization changes its name	Create new instance of name and change name role, date range and active status of former name
4) One organization is subsumed by another.	Change the active status of the first organization, its names, locations, contacts and identifiers to Inactive with appropriate end date dates. Create a relation to the second organization with relation type “Is absorbed by” or equivalent. Transfer extant secondary registry objects to the new organization, maintaining a history of ownership through an inverse relation element if required. Make defunct secondary registry objects inactive.
5) Two organizations merge to become a new organization	Create a new registry object for the new organization and subsume them both into the new organization. Transfer extant secondary registry objects to the new organization, maintaining a history of ownership through an inverse relation element if required. Re-use existing identifiers of one of the organizations if required. Make defunct secondary registry objects inactive.
6) One organization splits to become two organizations	Create a new registry object for each of the two new organizations. Transfer extant secondary registry objects to one or the other maintaining a history of ownership through an inverse relation element if required. Re-use existing identifiers in one of the new organizations if required. Make defunct secondary registry objects inactive.
7) Two organizations sponsor a new organization	Create a new registry object for the new organization and set up relations to the two existing organizations with relation type “Is jurisdiction of”
8) Subordinate unit of one organization becomes a subordinate unit of another	Set up a new relation for the parent unit. If there is a requirement to maintain a history set the relation to the old parent to inactive with appropriate end date dates
9) An organization ceases to exist and its collections are dispersed	Change the active status of the organization, its names, locations, contacts, identifiers and secondary registry objects inactive with appropriate end date dates. NOTE Some implementations delete inactive secondary registry objects and just keep an organization stub to maintain a history of identifiers.

C.5 Usage scenarios, bindings and protocols

Information stored in registries of libraries and related organizations is starting to play an increasingly important role in machine-machine interactions that use requests and responses specifically designed to support a given workflow. For example, as part of responding to a search request, a resource discovery service might query a registry of libraries and related organizations to

a) limit result sets to items held by organizations

   1) of a given type,

   2) in a given country or region,

   3) that will supply to the user,

   4) that have an available copy,

   5) that charge less than a specified amount for delivery,

   6) that support a given delivery method;

b) limit the display of holdings in search results to organizations meeting these criteria;

c) get the full name of the collecting agency for display in brief and full record displays;

d) support links to contact details for the library or related organization;

e) support deep linking to a local catalogue or index;

f) support access to a subscribed item through an organization's resolver service;

g) enable mediated and unmediated requesting of copies and loans from selected resource providers;

h) support the management of an interlending transaction through all required states.

The WorldCat registry has developed an XML schema for transmitting and exchanging information on libraries and related organizations that contribute holdings to WorldCat. This schema enables the collection of data to address scenarios c) to f) above and goes some of the way to supporting scenarios a), b), g) and h). Detailed information about interlending policies and level of ILL protocol support encoded in machine-readable form is still needed to provide full support for these scenarios.

In 2002 the ILL Protocol Implementers' Group (IPIG) developed an information model for an ILL Policy Directory. This model formed the basis of early drafts of the ISO 2146 revision and informs many of the controlled vocabulary examples in this version. The IPIG also experimented with the expression of the model in the form of an X.500 schema. This demonstrated that X.500 can be used as a binding and protocol for information about libraries and related organizations when there is a requirement to integrate registry entries with enterprise registries. However, it is a cumbersome binding for a service registry object.

The ILL Protocol (ISO 10160 and ISO 10161) is likely to be replaced over time by a series of service-oriented standards that address the data needing to be exchanged to support a given workflow. The need for registry services to support these workflows is still compelling and can be based on the modelling work already done and encapsulated in this International Standard. For example:

— the *OpenURL Request Transfer Message (RTM)* will be used to direct requests for loan, copy, access to lookup or digitization of an item; it is intended to be used for directing requests to Resource Delivery Systems and / or Electronic Resolver Systems;

— ISO 20775 about a schema for holdings information will be used to provide information about holdings and availability of wanted resources either in response to a direct request through a protocol such as SRU/SRW for holdings information or as part of the Request Transfer Message.

Information about requesters, providers and their requesting and delivery methods; about wanted resources, their availability and conditions of use; and about the level of support of requesting and delivery systems for the required protocols and schemas will need to be derived from appropriate service registry objects.

Annex D
(informative)

Case study 2: Collection service registries

D.1 Overview

Information stored in collection service registries is already playing an important role in the discovery and use of collections and a number of standards have been developed for this purpose. IESR (Information Environment Service Registry) uses a metadata schema for collections, services and agents based on the RSLP (Research Support Libraries Program) *Collection Description schema*, which is itself based on Michael Heaney's *An Analytical Model of Collections and their Catalogues* published in 2002. This model and the RSLP work was also influential in the development of the *DCMI Collection Application Profile* and the *DCMI Collection Description Type Vocabulary* which both form the basis of the NISO Z39.91-200x *Collection Description Specification*.

The Heaney model and models based on it define two categories of collection – collections that are aggregations of physical and/or digital resources and catalogues or indexes to these collections. They also define a location entity – "a place where collections are held" – with sub-types for physical and digital locations.

In this International Standard, a distinction is made between collections that are collective works held in a repository and repositories themselves. This distinction is needed in the management of federated repository environments. The stakeholders building repositories are different from those creating collective works and the registry services needed to support their activities are different as well. Registry is also identified as an additional collection type.

This International Standard does not make a distinction between a collection and its location because location is a property applicable to all registry objects. A collection of type "repository" (whether physical or digital) may have a spatial location and both physical and electronic addresses. A collection of type "collective work" (like an item) will generally inherit the location details of the repository in which it is held. This will be specified through a relation instance of type "Is located in/Has location".

D.2 Collection service framework

D.2.1 General

The difference between collective works, repositories, catalogues or indexes and registries as defined in this International Standard and the relationships between them are illustrated in Clause 7, Figure 2. Items and collective works (published or unpublished, physical or digital) are located in repositories owned and managed by collecting agencies (libraries, museums, archives, learning and research institutions and data and documentation centres). The contents of repositories and collective works within them are described by catalogues or indexes. Collective works, repositories and catalogues or indexes are themselves described by registries. A registry is itself a collection and may be described in a super-registry.

Figure D.1 uses the service framework diagram in B.2 to show how the functions and protocols needing to be described in collection service registries will depend on the collection type as follows.

— Creators employ content services to create, submit, publish, and annotate content, and to create new content using a variety of techniques.

— Managers of repositories employ collection services in combination with services specific to repositories to select, acquire, obtain through harvest or deposit, ingest, control and preserve content. They also

supply content to authorized users on request. This may involve having to reproduce or lend items not yet available online or to put an item on hold for a user if it is not immediately available.

— Managers of catalogues or indexes and of registries employ collection services in combination with services specific to registries to register or harvest metadata that supports the discovery of and access to items in repositories or other registry objects.

Common services and business services may apply to all usage scenarios.

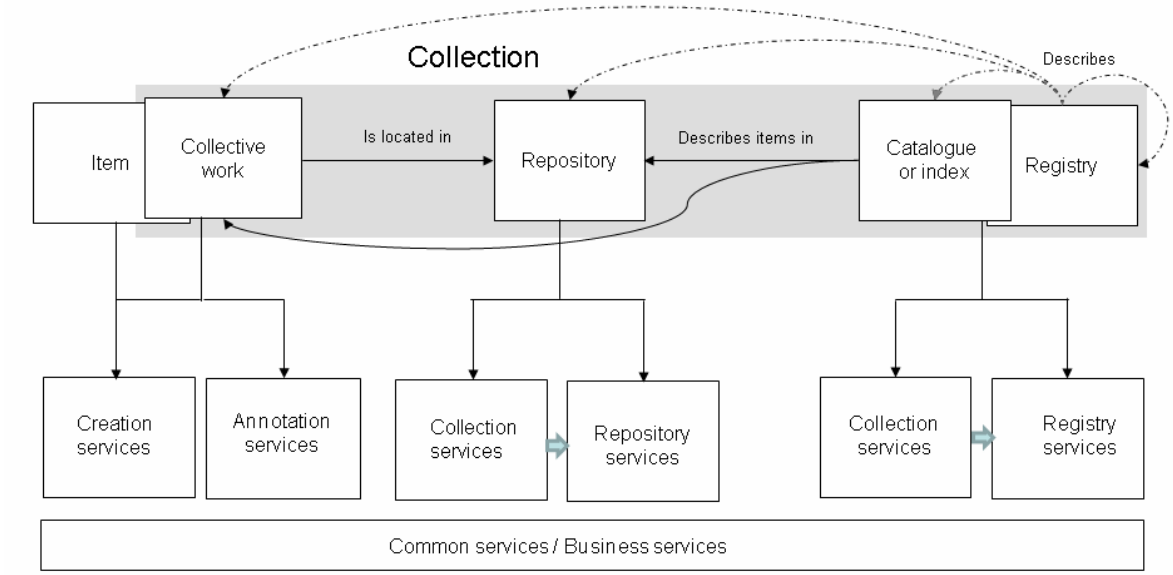

Figure D.1 — Collection service registries

In practice libraries and related organizations may need to set up a number of different collection service registries based on the type of collection, the contributing community, the services needing to be described and how these services will be discovered and used.

D.2.2 Collective works

Collective work is used in this International Standard to refer to compiled content created as separate and independent works and assembled into a collective whole for distribution and use. Examples include journals and newspapers, personal archives and datasets. Some collective works may be sufficiently well-described using existing resource description standards and may not also need to be treated as a registry object.

Figure D.1 shows that the boundaries between collection service registries and catalogues or indexes are not clear-cut. A resource located in a repository or described in a catalogue or index may be a collection or an item. Bibliographic standards treat a journal, newspaper or edited monograph as an item although they are also collective works. In a way it is a false distinction to treat collections separately from resources. Certainly, a user with an interest in a particular subject would want to be able to discover collective works on that subject as well as items. At the other extreme, some collective works are themselves repositories. For example, a data center may host the output of just one compilation project.

As a general rule, descriptions for a collective work are created by authors or publishers as a by-product of submitting the work to a repository or by repository managers as part of the process of bringing the work into the collection. As part of the workflow, there may be a requirement to record information about services, access policies and protocols enabling the collective work to be accessed, used and updated that is not supported by existing resource description standards.

Note that the workflow for describing a collective work needs to be aligned with the submission process and may be a byproduct of some other workflow that advances the author's content creation and publication activities. The collection description may need to go into the catalogue or index for the repository as well as being registered as a related registry object in a collection service registry.

For this reason, it may be best to assign registry object keys to collective works using the same infrastructure, standards and guidelines as for assigning persistent identifiers to items.

In guidelines for registering collective works, take care to distinguish between the need to record information about a project with a collective work as an output and the collective work itself (Figure B.3, B.4.3).

D.2.3 Repositories

Repository is used in this International Standard to refer to a collection of physical or digital objects compiled for information and documentation purposes and/or for storage and safekeeping. In resource descriptions, the repository in which an item or collective work is located is recorded through a location statement using an identifier such as a URI (for a digital location) or a union catalogue symbol (for a physical location). Union catalogue symbols are often seen as identifiers for organizations but in practice they are identifiers for repositories and may also double as identifiers for interlending services.

The same issue arises with using a union catalogue symbol as a registry object key for a repository as with using ISIL as a registry object key for organization (C.3). Union catalogue symbols are generally assigned at the repository level. Sub-collections inherit the symbol unless they have a separate service identity. ISO 27730 *Information and documentation – International standard collection identifier (ISCI)* will provide a system for ensuring that each registered repository can have a standard registry object key.

Repositories may be registered by repository managers or by metadata aggregators or metasearch portal managers as a by-product of registering a catalogue or index for harvesting or discovery purposes.

D.2.4 Catalogues or indexes

The term catalogue or index is used in this International Standard to refer to collections of metadata describing the content of one or more repositories or collective works. In scope a catalogue or index may be local, regional, national or international. It may consist solely of resource descriptions or it may also contain full-text indexes to the digital content that it describes.

A clear separation exists between a catalogue or index and the services providing access to it, which need to be recorded as separate service relation instances.

A less clear distinction exists between repository or collective work and catalogue or index when the repository or collective work is digital. This relation may be inferred until there is a requirement to make the distinction in registry products. For example, a community may wish to build a registry of submission services to assist in submission workflows and also to maintain a registry of search services to enable broadcast searching.

Catalogues or indexes of repositories may be registered by repository managers, catalogue or index managers or managers of metasearch portals.

Catalogues or indexes of collective works may be registered by creators of the work or by collectors who have compiled the catalogue or index as part of describing and/or digitizing the work.

D.2.5 Collection sets and sub-repositories

A repository may contain content that is promoted for discovery or harvesting in the form of collection sets based on item type or other criteria (for example, pictures, maps). A repository may also store and manage content in a number of different sub-repositories that do not necessarily correspond to the logical views of the collection provided by collection sets.

Figure D.2 shows one way of setting up the relationship between a repository, its catalogue or index, collection sets and sub-repositories. A repository contains resources of various types that may be promoted as collection sets. The collection sets are sub-collections of type “catalogue or index”. The repository may also have a number of different sub-repositories or locations. The sub-repositories are sub-collections of type “repository”.

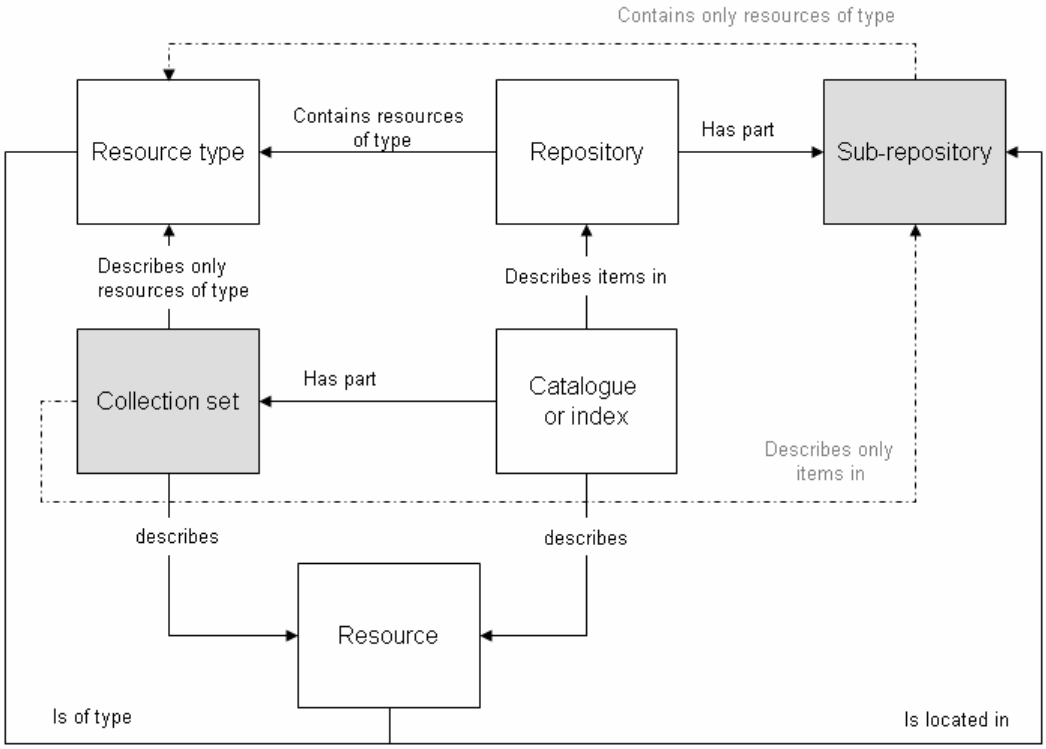

Figure D.2 — Collection sets and sub-repositories

While a collection set might only describe resources in a sub-repository, and a sub-repository might contain only resources of a given type, this is not necessarily the norm. In either case, the location of resources described in a collection set is recorded as a relation instance of type “Is located in”.

D.2.6 Registries

Registry is used in this International Standard to refer to collections of registry objects. Registries are most likely to be registered by registry managers.

D.3 Change scenarios

The change scenarios in C.4 may be adapted to apply to collections. Organizational changes often result in the splitting or amalgamation of repositories and the catalogues or indexes that describe their contents.

D.4 Usage scenarios, bindings and protocols

Information stored in collection service registries is already playing an important role in the delivery of metadata and discovery services and will play an increasingly important role in content, collection and delivery services. Usage scenarios include

a) use of the discovery services of a collection service registry to

   1) discover collections meeting specified criteria

   2) get the service location, access policy and protocol information needed to search catalogues or indexes to these collections, to obtain more detailed holdings and availability information, and to resolve to an appropriate copy of a wanted resource or to an appropriate requesting service if it is not directly available online

   3) get the service location, access policy and protocol information needed to submit content to a repository

   4) periodically audit service locations and availability.

b) use of the metadata services of a collection service registry to

   1) contribute collection and service descriptions to a collection service registry

   2) aggregate collection and service descriptions for a specific use, e.g. to mirror a federated registry locally, or to build a registry service for a particular region, discipline or specialization.

Users may be people accessing a web interface to the service or an application using standard protocols such as SRW/SRU, SRW/SRU Update or OAI-PMH.

Registries may be local, regional, national or international in scope.

Note that the discovery and metadata services needed to support collection service registries overlap significantly with those needed to support registries of libraries and related organizations. This International Standard supports the collection of information about parties, collections, services and activities as part of a coherent framework that will support the delivery of a range of registry services and products.

A number of different but related bindings are currently in use for collection descriptions by libraries and related organizations. These include the RSLP Collection Description Schema, the IESR Metadata scheme, the Dublin Core Collections Application Profile and the NISO Z39.920200x *Collection Description Specification*. ZeeRex is the binding used for services in all four of these communities. Mappings to UDDI are also under consideration.

The ORCA (Online Research Collections Australia) Registry has developed a schema based on this International Standard using the packaging approach suggested in B.5. as a way of supporting a full range of usage scenarios for an Australian Data Commons.

Annex E
(informative)

Dublin Core Collections Application Profile

E.1 Overview

The Dublin Core Collections Application Profile can be used as a binding for this International Standard for simple collection description. Note when reviewing the mappings below that his International Standard is a fully normalised model that is capable of supporting a range of additional collection description requirements through the collection profile data element. Elements that the collection sub-class inherit from the registry object class support the maintenance of identifier and name histories that may not be a requirement for simple collection description.

The information model of this International Standard also supports the description of related parties and of services providing access to collections as separate registry object instances. In the Dublin Core Collections Application Profile these related registry objects can be referenced through persistent identifiers but one or more separate sets of bindings is needed for their description.

E.2 Mapping between this International Standard and the Dublin Core CAP

Dublin Core CAP	This International Standard
Collection	Registry object (5): sub-class collection (7)
Type [dc:type]	collection type (7.1) with DCMIType as the authority
CollectionIdentifier [dc:identifier]	identifier (5.2) with URI as the authority (5.2.1)
Title [dc:title]	name (5.3) with name role (5.3.1) set to Official name and values in Unstructured name (5.3.2) or Name part (5.3.3) depending on requirement. Map multi-language strings to language string instances (4.6.8).
Alternative Title [dcterms:alternative]	As above with name role set to Alternative name.
Description [dcterms:abstract]	description (13.4)
Size [dcterms:extent]	collection profile (7.2): number of units (7.2.2)
Language [dc:language]	language (13.9)
Item Type [cld:itemType]	collection profile (7.2): resource type (13.3) with DCMIType as the authority
Item Format [cld:itemFormat]	collection profile (7.2): resource type (13.3) with URI or designated authority
Rights [dc:rights]	rights (7.3) for a value string or info pointer (13.5) with info pointer type (13.5.1) set to Rights for a value URI
Access Rights [dcterms:accessRights]	collection-service relation (5.4) with relation type (5.4.1) set to “Is accessible via“, and with access policy (10) recorded in a separate service (9) object
Accrual Method [dcterms:accrualMethod]	collection profile (7.2): accrual method (7.2.7) with cld:AccrualMethod as authority
Accrual Periodicity [dcterms:accrualPeriodicity]	collection profile (7.2): accrual periodicity (7.2.6)
Accrual Policy [dcterms:accrualPolicy]	collection profile (7.2): accrual policy (7.2.5)

Dublin Core CAP	This International Standard
Custodial History [dcterms:provenance]	Event (5.6)
Audience [dcterms:audience]	collection type (7.1) extended to an audience sub-type
Subject [dc:subject]	subject (5.5)
Spatial Coverage [dcterms:spatial]	collection profile (7.2): coverage (7.2.9) with coverage type (7.2.9.1) set to „geographical within which“
Temporal Coverage [dcterms:temporal]	collection profile (7.2): coverage (7.2.9) with coverage type (7.2.9.1) set to „temporal within which“
Date Collection Accumulated [dcterms:created]	date range (13.3)
Date Items Created [cld:dateItemsCreated]	collection profile (7.2): date range (13.3)
Collector [dc:creator]	collection-party relation (5.4) of relation type (5.4.1) „is collected by“ with separate party (6) instance for collector.
Owner [marcrel:OWN]	collection-party relation (5.4) of relation type (5.4.1) „is owned by“ with separate party (6) instance for collector.
Is Located At [cld:isLocatedAt]	collection-party relation (5.4) of relation type (5.4.1) „is located at“ with separate party (6) instance for location.
Is Accessed Via [cld:isAccessedVia]	collection-service relation (5.4) with relation type (5.4.1) set to “Is accessible via”, and with separate service (9) instance (this will be the same service instance where access policy is recorded)
Sub-Collection [dcterms:hasPart]	collection-collection relation (5.4) of relation type (5.4.1) Has part
Super-Collection [dcterms:isPartOf]	collection-collection relation (5.4) of relation type (5.4.1) Is part of
Catalogue or index [cld:catalogueOrIndex]	collection-collection relation (5.4) of relation type (5.4.1) Is described by
Associated Collection [cld:associatedCollection]	collection-collection relation (5.4) of relation type (5.4.1) is associated with
Associated Publication [dcterms:isReferencedBy]	info pointer (13.5)

Annex F
(informative)

Related standards

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