INTERNATIONAL STANDARD

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Geographic information — Procedures for item registration

Information géographique — Procédures pour l'enregistrement d'éléments

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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 19135 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

Introduction

This International Standard specifies procedures for the registration of items of geographic information. ISO/IEC JTC 1 defines registration as the assignment of an unambiguous name to an object in a way that makes the assignment available to interested parties. Items of geographic information that may be registered are members of object classes specified in technical standards such as those developed by ISO/TC 211.

NOTE In this International Standard, the definition of registration has been changed so that registration is the assignment of linguistically independent identifiers, rather than names, to items of geographic information.

Registration of items of geographic information offers several benefits to the geographic information community. Registration:

a) supports wider use of registered items both by providing international recognition to the fact that such items conform to an ISO International Standard and by making them publicly available to potential users;

b) provides both immediate recognition to extensions of an International Standard and a source for updates to that International Standard during the regular maintenance cycle;

c) may provide a single mechanism to access information concerning items that are specified in different standards;

d) provides a mechanism for managing temporal change;

NOTE Items specified in a standard or in a register may change over time either due to changes in technology or for other reasons. Published standards do not clearly document what changes may have occurred, and do not include information about earlier versions of specified items. Such information can be maintained in a register

e) may be used to make sets of standardized tags available for encoding of registered items in data sets; and

f) supports cultural and linguistic adaptability by providing both a means for recording equivalent names of items used in different languages, cultures, application areas and professions, and a means for making those equivalent names publicly available.

This International Standard specifies procedures to be followed in preparing and maintaining registers of items of geographic information. Although any organization may choose to establish registers of items of geographic information that conform to this International Standard, this International Standard is intended particularly to apply to registers established under the auspices of ISO/TC 211.

A registration authority is an organization authorized by ISO to maintain a register. ISO discourages the proliferation of registers, but the maintenance of a single large register places a heavy burden on the registration authority. A goal of this International Standard is to achieve a balance between minimizing the number of registers for items of geographic information and minimizing the burden on the registration authorities.

Geographic information — Procedures for item registration

1 Scope

This International Standard specifies procedures to be followed in establishing, maintaining and publishing registers of unique, unambiguous and permanent identifiers and meanings that are assigned to items of geographic information. In order to accomplish this purpose, this International Standard specifies elements of information that are necessary to provide identification and meaning to the registered items and to manage the registration of these items.

2 Conformance

2.1 Introduction

To conform to this International Standard, a register of items of geographic information shall satisfy all of the conditions specified for one of the conformance classes described below.

2.2 General conformance

Any register that claims conformance to this International Standard shall satisfy all of the conditions specified in the abstract test suite for general conformance (Annex A.1).

2.3 Hierarchical registers

Any hierarchical register that claims conformance to this International Standard shall satisfy all of the conditions specified in the abstract test suite for general conformance (A.1) and shall, in addition, satisfy the conditions specified in the abstract test suite for hierarchical registers (A.2).

2.4 Registers established by ISO/TC 211

Any register established by ISO/TC 211 shall satisfy all of the conditions specified in the Abstract Test Suite for general conformance (A.1), and shall in addition satisfy all of the conditions specified in the abstract test suite for registers established by ISO/TC 211 (A.3).

3 Normative references

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

ISO 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/TS 19103:2005, *Geographic information — Conceptual schema language*

ISO 19115:2003, *Geographic information — Metadata*

4 Terms, definitions and abbreviations

4.1 Terms and definitions

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

4.1.1
clarification
non-substantive change to a **register** item

NOTE A non-substantive change does not change the semantics or technical meaning of the item. Clarification does not result in a change to the registration status of the register item.

4.1.2
control body
group of technical experts that makes decisions regarding the content of a **register**

4.1.3
geographic information
information concerning phenomena implicitly or explicitly associated with a location relative to the Earth

[ISO 19101:2002]

4.1.4
hierarchical register
structured set of **registers** for a domain of register items, composed of a **principal register** and a set of **subregisters**

EXAMPLE ISO 6523 is associated with a hierarchical register. The principal register contains organization identifier schemes and each subregister contains a set of organization identifiers that comply with a single organization identifier scheme.

4.1.5
identifier
linguistically independent sequence of characters capable of uniquely and permanently identifying that with which it is associated

[adapted from ISO/IEC 11179-3:2003]

4.1.6
item class
set of items with common properties

NOTE Class is used in this context to refer to a set of instances, not the concept abstracted from that set of instances.

4.1.7
locale
cultural and linguistic setting applicable to the interpretation of a character string

4.1.8
principal register
register that contains a description of each of the **subregisters** in a **hierarchical register**

4.1.9
register
set of files containing **identifiers** assigned to items with descriptions of the associated items

NOTE Adapted from Annex E of the ISO/IEC JTC 1, *Procedures*.

4.1.10
register manager
organization to which management of a **register** has been delegated by the **register owner**

NOTE In the case of an ISO register, the register manager performs the functions of the registration authority specified in the ISO/IEC Directives.

4.1.11
register owner
organization that establishes a **register**

4.1.12
registration
assignment of a permanent, unique and unambiguous **identifier** to an item

NOTE Adapted from Annex E of the ISO/IEC JTC 1, *Procedures*.

4.1.13
registry
information system on which a **register** is maintained

[adapted from ISO/IEC 11179-3:2003]

4.1.14
retirement
declaration that a **register** item is no longer suitable for use in the production of new data

NOTE The status of the retired item changes from “valid” to “retired”. A retired item is kept in the register to support the interpretation of data produced before its retirement.

4.1.15
source reference
reference to the source of an item that has been adopted from a source external to the **register**

4.1.16
submitting organization
organization authorized by a **register owner** to propose changes to the content of a **register**

4.1.17
subregister
part of a **hierarchical register** that contains items from a partition of a domain of information

4.1.18
supersession
replacement of a **register** item by one or more new items

NOTE The status of the replaced item changes from “valid” to “superseded”.

4.1.19
technical standard
standard containing the definitions of **item classes** requiring **registration**

NOTE Adapted from Annex E of the ISO/IEC JTC 1, *Procedures*.

4.2 Abbreviations

IEC International Electrotechnical Commission

JTC 1 Joint Technical Committee 1

NWIP New Work Item Proposal

TC Technical Committee

TMB Technical Management Board

UML Unified Modeling Language

4.3 Notation

The conceptual schema specified in this International Standard is described using the Unified Modeling Language (UML) (ISO/IEC 19501), following the guidance of ISO/TS 19103:2005. UML notation is described in Annex B.

By convention within ISO/TC 211, names of UML classes, with the exception of basic data type classes, include a two-letter prefix that identifies the standard and the UML package in which the class is specified. UML classes specified in this International Standard have the two letter prefix of “RE”. Several model elements used in this schema are specified in packages specified in ISO 19115:2003, as shown in Table 1.

Table 1 — UML packages from ISO 19115:2003

Prefix	Package
CI	Citation
EX	Extent
MD	Metadata

5 Roles and responsibilities in the management of registers

5.1 Introduction

Several organizations play a role in the management of a register (Figure 1). The roles and their relationships are illustrated as a conceptual model using UML notation. This model is not intended to be implemented in software and data, but as a set of organizations and the interactions between them.

NOTE Although they are not organizations, register and registry are included in Figure 1 because they are the basis of the roles played by the organizations included.

5.2 Register owner

A register owner is an organization that:

a) has established one or more registers; and

b) has primary responsibility for the management, dissemination and intellectual content of those registers.

A register owner may serve as the register manager for any register that it has established, or it may appoint another organization to serve as the register manager (5.3). A register owner shall specify the criteria that determine which organizations may act as submitting organizations (5.4) to propose changes to the content of

the register. A register owner may serve as the control body (5.5) for any register that it has established, or it may delegate that role to a subgroup within the organization or to the register manager that it has appointed to manage that register. The register owner shall establish a procedure to process appeals by submitting organizations of decisions made by the control body of a register. The specification of this procedure shall include appropriate time limits for completion of the process.

The register owner shall specify the time interval for reports from the register manager that describe the proposals received and the decisions taken since the last report. The register owner shall set terms and conditions for making the contents of the register available to the public.

In the case of a hierarchical register (7.1.4), the register owner shall coordinate the establishment of subregisters by other organizations.

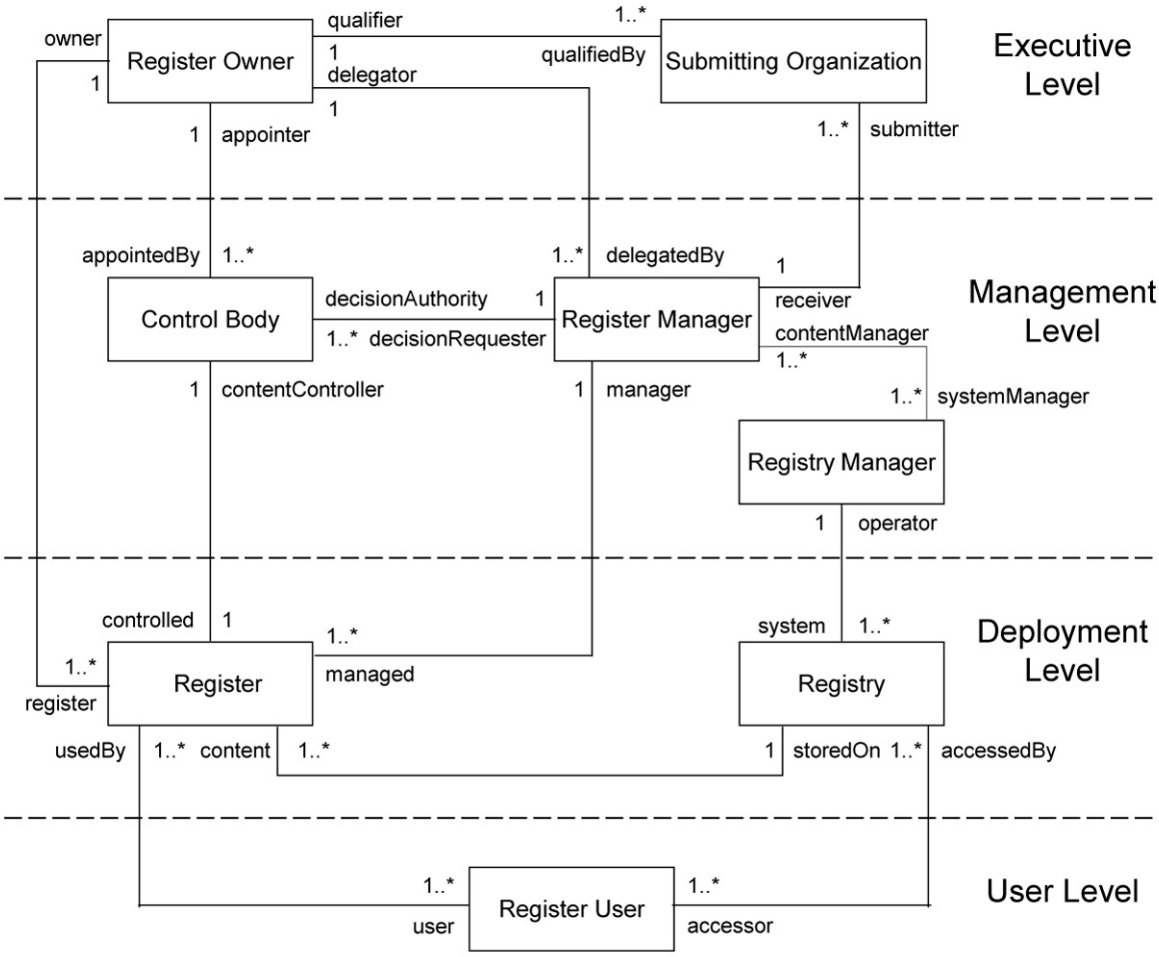

Figure 1 — Organizational relationships

5.3 Register manager

5.3.1 Appointment of a register manager

A register owner may delegate the role of register manager to another organization. This is the usual case for registers established by ISO or IEC Technical Committees.

5.3.2 Responsibilities of a register manager

A register manager shall manage a register of items within the item classes for which it is responsible in conformance with Clause 6. A register manager may manage multiple registers. A register manager may own and operate the registry that holds a register that it manages, or it may delegate operation of the registry to a registry manager (5.6). Upon request, the register manager shall distribute an information package containing a description of the register and how to submit proposals for changes to the content of the register. The register manager shall accept proposals from submitting organizations and manage the proposals as specified in 6.2. The register manager shall pass proposals to the control body (5.5) for decisions as to acceptability, and shall serve as the point of contact between the control body and the submitting organization for negotiations regarding changes to the proposal. The register manager shall provide reports to the register owner at intervals specified by the register owner. Each report shall describe the proposals received and the decisions taken since the last report. The contents of the register shall be available to the public under the terms and conditions set by the register owner.

5.4 Submitting organizations

5.4.1 Eligible submitting organizations

A submitting organization is an organization that is qualified under criteria determined by the register owner to propose changes to the content of a register. The register manager shall determine whether a submitting organization is qualified in accordance with the criteria established by the register owner. A potential submitting organization may appeal the determination to the register owner.

5.4.2 Responsibilities of submitting organizations

Submitting organizations shall manage the submission of proposals to the register manager or appeals to the register owner that are initiated from within their respective countries or organizations as specified in 6.2.

5.5 Control body

A control body is a group of technical experts appointed by a register owner to decide on the acceptability of proposals for changes to the content of a register (6.2.7). The control body shall accept proposals from the register manager and render a decision regarding each proposal within the time limits specified by the register owner.

5.6 Registry manager

A registry manager is a person or an organization responsible for the day-to-day management of a registry. A registry manager may engage a third-party service provider to perform this service. A registry manager shall ensure the integrity of any register held in the registry (6.5), and shall provide means for electronic access to the registry (6.4) for register managers, control bodies and register users.

5.7 Register user

Register users access a registry in order to use one or more of the registers held in that register. Register users include any person or organization interested in accessing or influencing the content of a register. Users have a variety of registration requirements:

— Developers of standards and specifications want to re-use items specified in a register;

— Data producers want to use in their products items specified in a register;

— Data users want to understand the meaning of register items used by a data producer; and

— System developers want to provide a capability to use register items in data production, interchange or consumption.

A register owner may set terms and conditions for different levels of access to the register to satisfy the requirements of different categories of users.

Register users vary in the frequency of access they need, from the occasional data user who may need to determine the meaning of a register item on a very infrequent basis, to the data producer who may need to use values from a register many times a day. Register managers shall consider the requirements of different categories of users in selecting methods for publishing the content of a register (6.4).

6 Management of registers

6.1 Establishment of registers

Any organization may establish a register. A register established by an ISO Technical Committee (TC) or Subcommittee is an ISO register. Although this International Standard is intended primarily for registers established by ISO/TC 211, other ISO or IEC Technical Committees may choose to establish registers that conform to this International Standard. Organizations other than ISO or IEC Technical Committees or Subcommittees may also choose to establish registers that conform to this International Standard. In establishing registers, ISO Technical Committees are required to follow the general rules specified in the ISO/IEC Directives, but may develop detailed rules and procedures to satisfy their own requirements.

The ISO/IEC Directives require a TC, when it is developing an International Standard that may require registration, to inform the Chief Executive Officer at an early stage in order to permit any necessary negotiations and allow the ISO/TMB or IEC Council Board to take a decision in advance of the publication of the International Standard. The ISO/IEC JTC 1 Procedures specify the rules for the establishment of JTC 1 registers. Annex C of this International Standard specifies the rules and procedures for the establishment and management of registers by ISO/TC 211. Other organizations may specify their own rules and procedures for establishing registers.

Every register requires a technical standard that specifies the classes of items to be registered. To establish a register that conforms to this International Standard, an organization shall:

a) be the organization that produced the technical standard that specifies the item classes to be held in the register; or

b) have the approval of that organization.

6.2 Processing of proposals

6.2.1 Introduction

Submitting organizations may submit requests to add items to a register, to modify items in a register, or to retire items in a register. Modifications are of two kinds: simple clarifications that cause no substantive change to an item (6.2.3), and substantive changes that are handled through a supersession process (6.2.4). The control body shall determine whether a proposed modification is to be handled as a clarification or supersession.

6.2.2 Addition

Addition is the insertion into a register of an item that describes a concept not described by an item already in the register.

6.2.3 Clarification

Clarifications correct errors in spelling, punctuation or grammar. A clarification shall not cause any substantive semantic or technical change to a registered item.

6.2.4 Supersession

Modification of a registered item that results in substantive semantic or technical change shall be accomplished by including a new item in the register with a new identifier and the date on which it superseded the original item (8.9.6). The original item shall remain in the register but shall include the date at which it was superseded, and a reference to the item that superseded it.

6.2.5 Retirement

Submitting organizations may submit requests for retirement of registered items that are no longer useful for producing data. Retirement shall be accomplished by leaving the item in the register, marking it retired, and including the date on which it was retired (8.9.6).

6.2.6 Submission of proposals

6.2.6.1 The process for submitting proposals for registration of items of geographic information is illustrated in Figure 2.

6.2.6.2 Submitting organizations shall:

a) receive proposals for the registration of items that are initiated from within their respective countries or organizations;

b) ensure that all proposals are complete (6.6);

c) coordinate proposals with other submitting organizations, if desired;

d) forward to the appropriate register manager those proposals that have the support of the submitting organization; and

e) explain proposals to the register manager or register owner, if necessary.

6.2.6.3 The register manager shall:

a) receive proposals from qualified submitting organizations;

b) review proposals for completeness, and return proposals to the submitting organization if the proposal is incomplete or if the submitting organization is not qualified;

c) generate a proposal management record (8.9), with the *status* (8.9.4) set to “pending”; and

d) initiate the approval process (6.2.7).

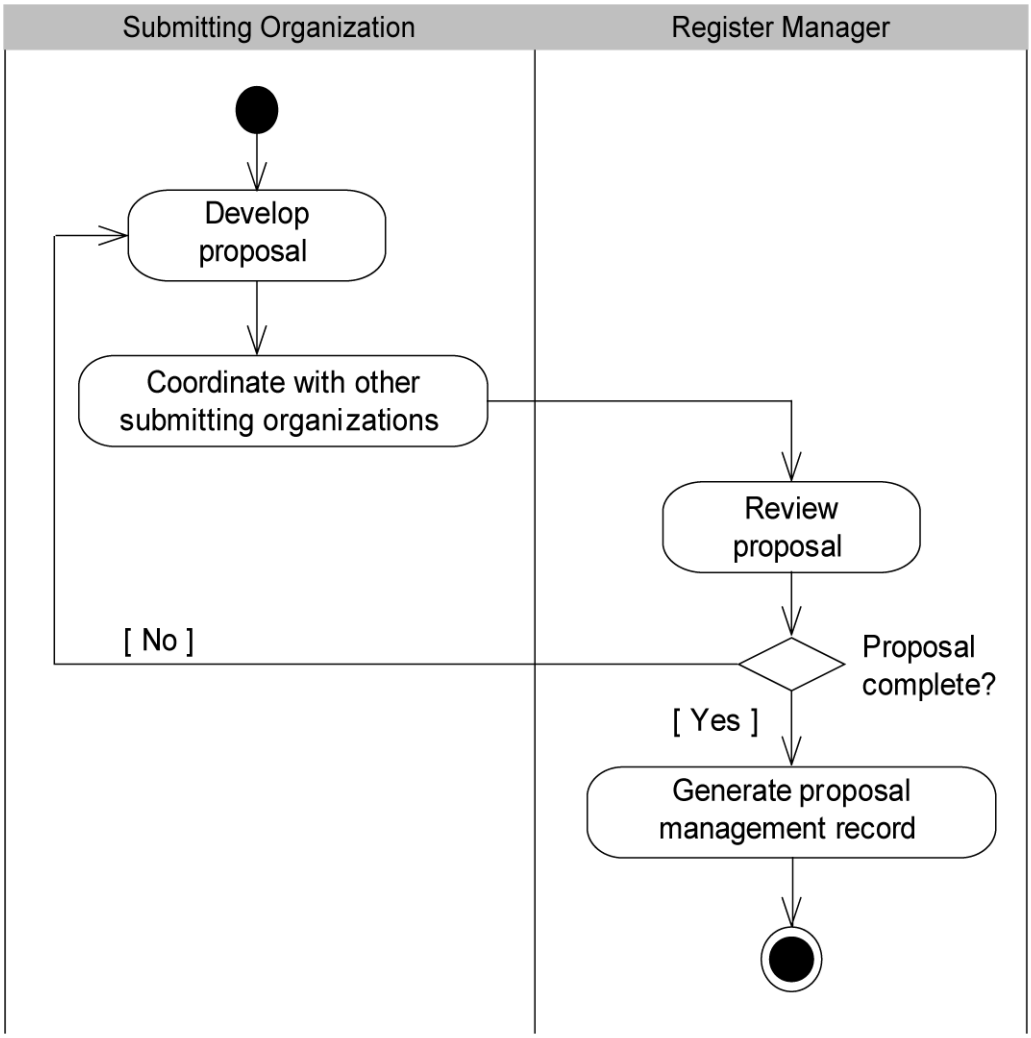

Figure 2 — Submission of proposals for registration

6.2.7 Approval process

6.2.7.1 The process for determining the acceptability of proposals is illustrated in Figure 3. It shall be completed within a time period specified by the register owner.

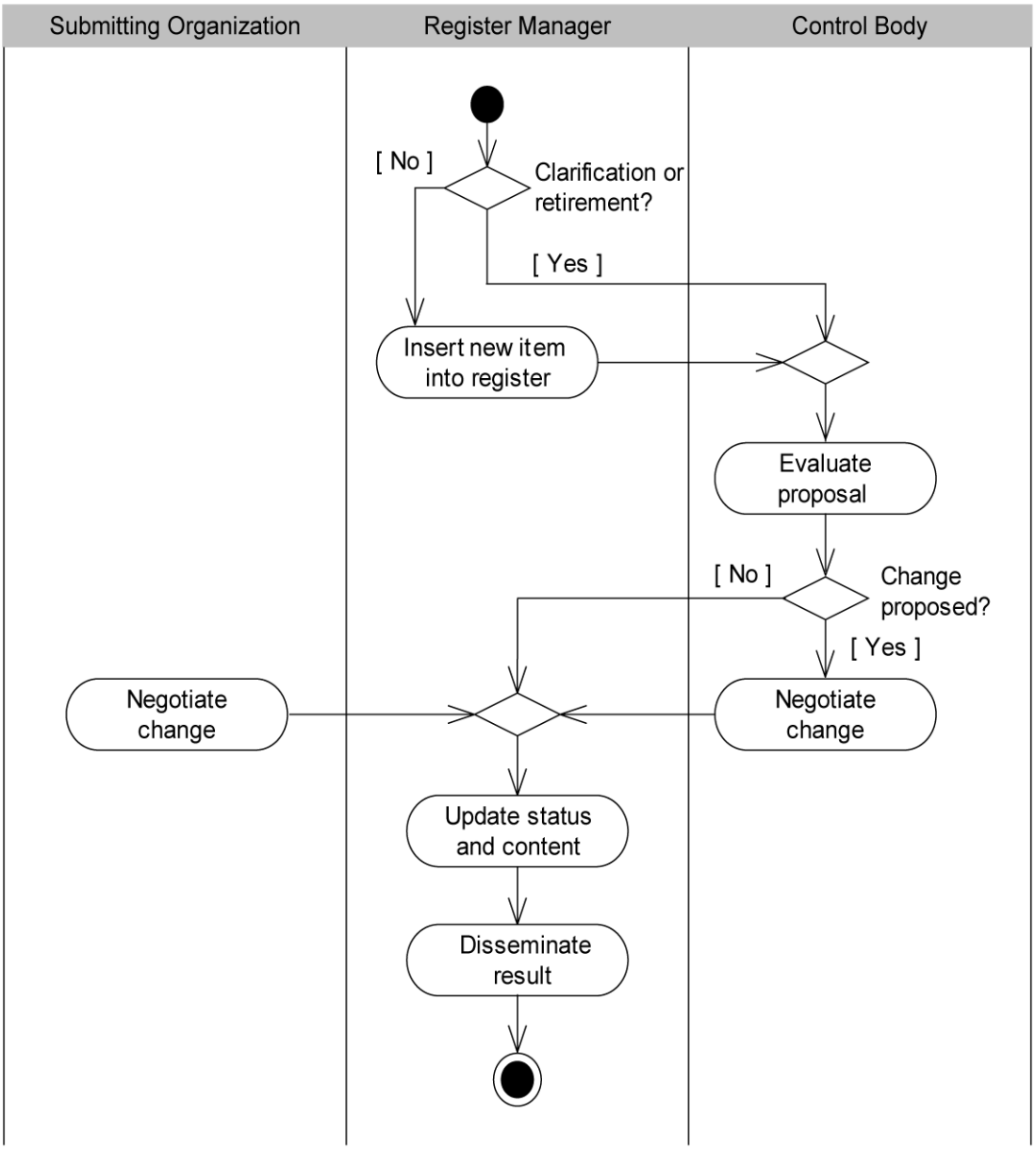

Figure 3 — Approval process

6.2.7.2 The register manager shall:

a) if the proposal is for clarification or retirement of a register item, forward the proposal to the control body;

b) if the proposal is for registration of a new item or modification of an existing register item:

   1) insert the new or superseding item into the register;

   2) assign an *itemIdentifier* (8.8.2) to the new or superseding item, as specified in 7.2;

3) set the *status* (8.8.4) to “notValid”; and

4) forward the proposal to the control body.

6.2.7.3 The control body shall:

a) decide to accept the proposal without change, to accept the proposal subject to changes negotiated with the submitting organization, or not to accept the proposal. Criteria for not accepting a proposal include:

1) the specification of the item is incomplete or incomprehensible;

2) an identical item already exists in the register;

NOTE In the case of a hierarchical register, an identical item may exist in more than one subregister.

3) the proposed item does not belong to an item class included in this register; or

4) the justification for the proposal is inadequate;

b) inform the register manager of the decision, and the rationale for the decision, within a time limit specified by the register owner.

6.2.7.4 The register manager shall:

a) serve as point of contact if there is a need for negotiations between the submitting organization and the control body regarding changes to the proposal that are specified by the control body as a condition of acceptance; and

b) inform the submitting organization of the results of processing a proposal.

If the decision of the control body is positive, the register manager shall:

a) complete the proposal management record with *status* (8.9.4) set to “final”, *disposition* (8.9.5) set to “accepted”, and *dateDisposed* (8.9.6) set to the current date;

b) make approved changes to the content of the register item; and

c) set the status (8.8,4) of the register item to “valid”, “superseded” or “retired”, as appropriate.

If the decision of the control body is negative, the register manager shall:

a) update the proposal management record by setting status (8.9.4) to “tentative”, *disposition* (8.9.5) to “notAccepted”, and *dateDisposed* (8.9.6) to the current date;

b) inform the submitting organization of the deadline for appealing the decision of the control body.

The register manager shall disseminate the results of the approval process.

6.2.7.5 Submitting organizations shall:

a) negotiate with the control body with regard to changes to their proposal that are specified by the control body as a condition of acceptance; and

b) make known within their respective countries or organizations the decisions taken on proposals by the control body as transmitted to them by the register manager.

6.2.8 Withdrawal

Submitting organizations may decide to withdraw a proposal at any time during the approval process.

The register manager shall:

a) change the *status* (8.9.4) of the proposal management record from “pending” to “final”; and

b) change the value for *disposition* (8.9.5) to ”withdrawn” and the value for *dateDisposed* (8.9.6) to the current date.

6.2.9 Appeal

6.2.9.1 A submitting organization may appeal to the register owner if it disagrees with the decision of a control body to reject a proposal. An appeal shall contain at a minimum a description of the situation, a justification for the appeal, and a statement of the impact if the appeal is not successful. The appeal process is illustrated in Figure 4.

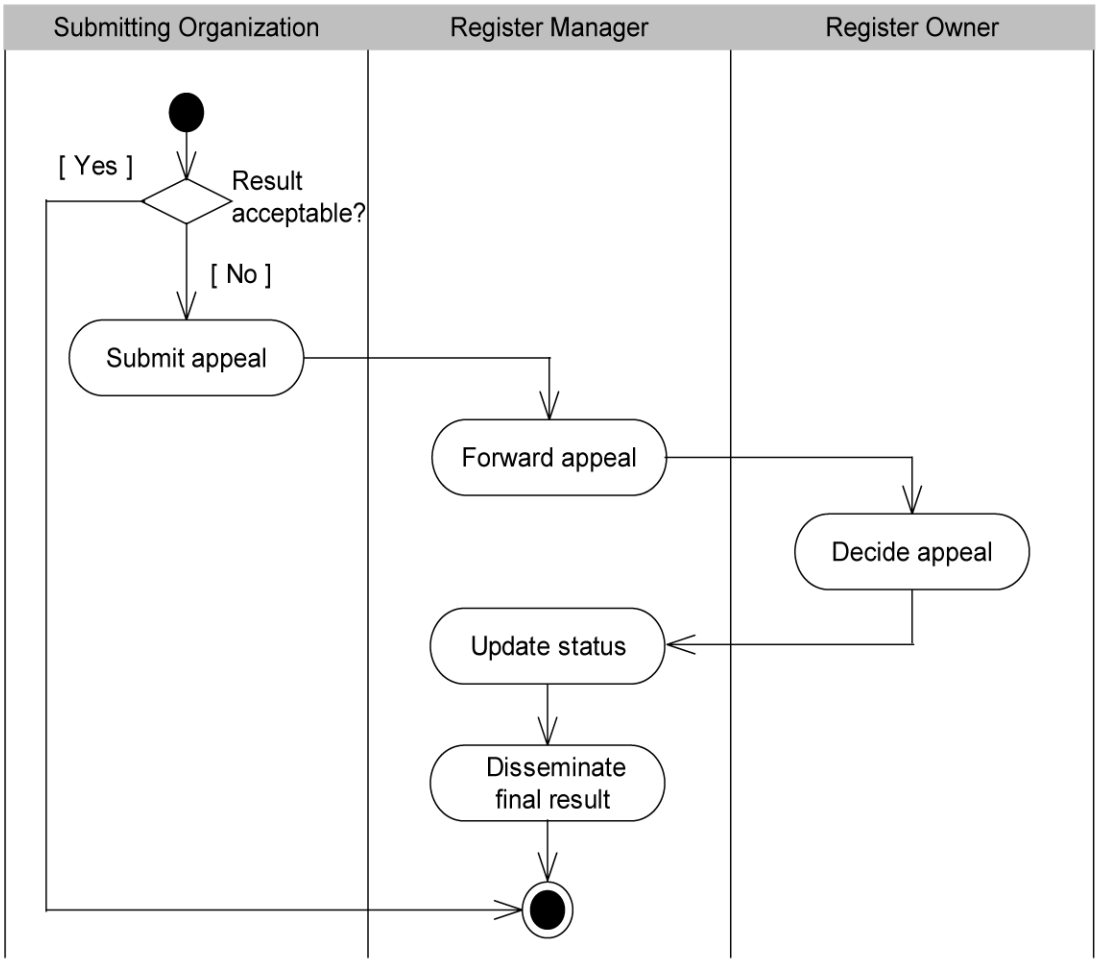

Figure 4 — Appeal process

6.2.9.2 The submitting organization shall:

a) determine if the decision regarding a proposal for registration is acceptable; and

b) if not, submit an appeal to the register manager.

If there is no appeal by the deadline for submitting an appeal, the register manager shall change the *status* (8.9.4) of the proposal management record to “final” and change the *dateDisposed* (8.9.6) to the current date.

6.2.9.3 The register manager shall forward the appeal to the register owner.

6.2.9.4 The register owner shall:

a) process the appeal in conformance with its established procedures (5.2);

b) decide whether to accept or reject the appeal; and

c) return the result to the register manager.

6.2.9.5 The register manager shall:

a) update the *disposition* (8.9.5) and *dateDisposed* (8.9.6) of the proposal management record;

b) update the *status* (8.8.4) of the register item; and

c) provide the results of the decision to the control body and to the submitting organization.

6.2.9.6 The submitting organization shall:

a) make the results of the appeal known within their country or organization.

6.3 List of submitting organizations

A register manager shall maintain and publish a register-specific list of all qualified submitting organizations (5.4.1) that have submitted proposals for changes to the content of each register that it manages. Each list shall include the name and the contact information (8.5.3) for each submitting organization.

6.4 Publication

A registry manager shall ensure that information about valid, superseded or retired items in the register is readily available to users. The method for providing this information may depend upon the requirements of the members of the user community (5.7).

A transactional approach is recommended to support users with occasional requirements for information about specific register items. The register should be accessible to users through an internet web site or other electronically processable form, within appropriate access constraints. Register services should support queries based on item names or searches based on keywords occurring in definitions or other elements of information about the register item.

A transfer approach is recommended to support users with requirements for frequent access to many of the items in a register. The register manager should be prepared to provide copies of the set of valid items contained in the register as digital data on a physical distribution medium, or on paper. The register manager should also support a means for updating distributed copies. The register manager may charge for the cost of reproduction and distribution of such copies.

6.5 Integrity

A register manager shall ensure, for each register that it manages, that:

a) all aspects of the registration process are handled in accordance with good business practice;

b) the content of the register is accurate;

c) only authorized persons can make changes to the register;

d) the register is secured against loss caused by damage to the system on which that register is maintained;

e) a softcopy of the register is sent to the register owner at least once a year; and

f) confidential information is safeguarded.

6.6 Registration proposals

Annex D specifies the minimum information necessary to submit a proposal to a register manager. Additional information requirements may be specified for an item class by the technical standard that specifies that item class. Details may be obtained from the relevant register manager.

7 Some principles of registration

7.1 Alternative register structures

7.1.1 Overview

There are several alternatives for structuring registers:

— a simple register that contains items of a single item class (7.1.2);

— a multi-part register in which different parts contain items from different item classes (7.1.3); or

— a hierarchical register, the upper level of which contains a list of lower level registers (7.1.4).

7.1.2 Simple register

A simple register contains items of a single item class. This is the simplest structure to manage, since the same elements of information are recorded for all items in the register, and it imposes a smaller cost burden on any one register manager. A disadvantage, for any organization that wishes to establish registers for multiple item classes, is that it may scatter such registers across several register managers.

EXAMPLE An ISO/TC 211 terminology register would contain only items of an item class specified in ISO 19104.

7.1.3 Multi-part register

A multi-part register contains items from different item classes. It is organized into sections based on the different elements of information recorded for each class.

EXAMPLE A feature catalogue that conforms to ISO 19110 may be instantiated as a multi-part register. Such a register would include distinct item classes for feature types, for feature attributes, for feature associations, and for feature operations.

7.1.4 Hierarchical register

A hierarchical register is a structured set of registers composed of a principal register and one or more subregisters. A hierarchical register is associated with a partitioned domain of geographic information (Figure 5). Depending upon the criteria used to partition a domain, the subdivisions may, but need not be, mutually exclusive. Identical items may occur in more than one partition, although most items in each should be unique.

The principal register may be a multi-part register, or it may be one part of a multi-part register. The principal register contains a set of items that describe the subregisters. Each of the subregisters contains a set of register items from a partition of the information domain.

A principal register may be an ISO register. However, its subregisters are usually established and maintained by organizations other than ISO or IEC Technical Committees.

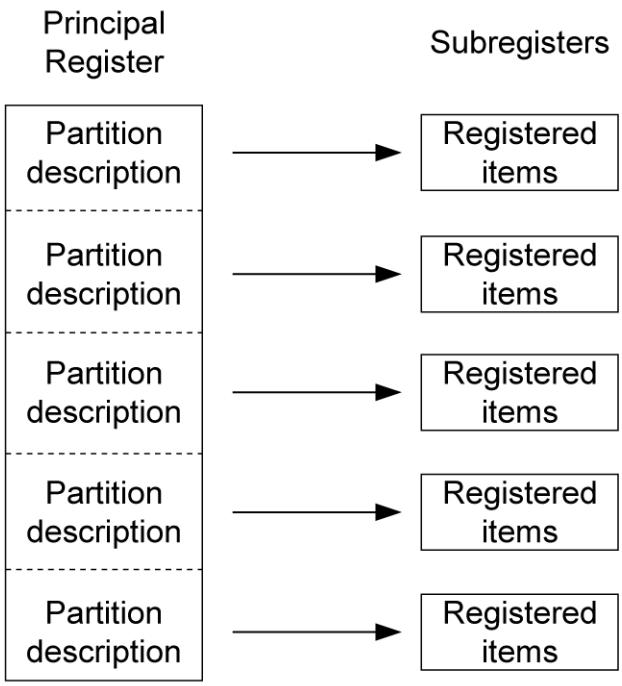

Figure 5 — A hierarchical register

EXAMPLE The ISO/IEC JTC 1, *Procedures* cite the register for ISO 6523 as an example of a hierarchical register. This hierarchical register consists of a principal register of organization identifier schemes, with a subregister for each scheme that contains organization identifiers that comply with that scheme. The registers for the individual organization identifier schemes are managed by “issuing organizations” that need not be ISO designated registration authorities. An ISO/TC 211 register of feature catalogues would be established as a hierarchical register in which each feature catalogue is established as a subregister owned by the organization that produces that catalogue.

7.2 Identification of register items

7.2.1 Introduction

All items shall include both an identifier that supports the requirement for an information process efficient denotation and a name that supports the requirement for a human-accessible denotation (Figure 6).

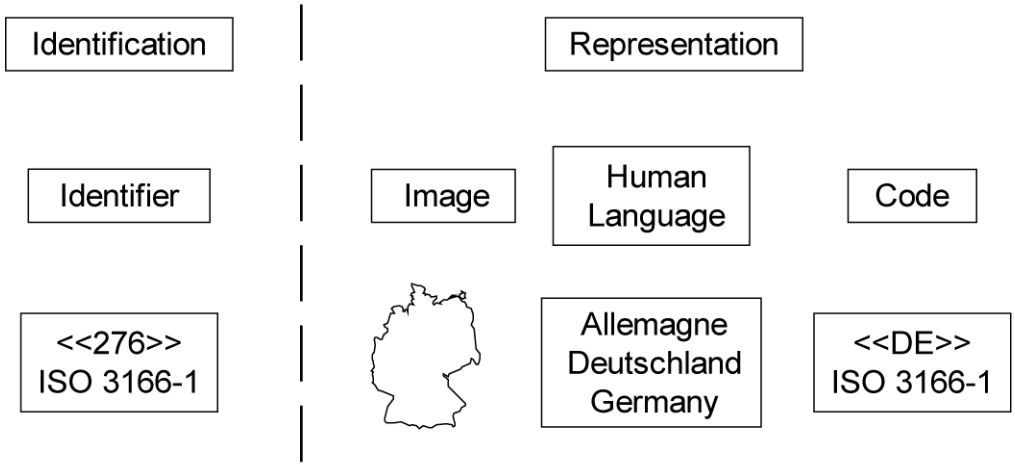

Figure 6 — Example of the distinction between identifiers used in an information technology interface and representations used in a user interface

7.2.2 Item identifiers

Item identifiers shall serve as the method for uniquely identifying an item within a register.

7.2.3 Item names

Item names are needed to support searches for items of interest to a human user of the register. A register item shall be assigned a name in the operating language of the register in which it appears. The syntax of the naming domain shall be specified in the technical standard that specifies the item class. Names are not required to be unique and therefore may only be used as secondary identifiers of items within a register.

7.3 Definition of register items

7.3.1 Characteristics of a definition

ISO 704 provides guidelines for defining terms; some of those guidelines are useful for defining items of other kinds.

A definition shall:

a) be a precise statement of the nature of the concept embodied by an item;

b) identify the essential characteristics of an item that differentiate it from other items;

c) describe what an item is, not what it is not;

d) describe an item, not the words that make up a designation; and

e) be as brief as possible and as complex as necessary. Complex definitions can contain several dependent clauses, but carefully written definitions contain only that information which makes the item unique.

7.3.2 References to external sources

7.3.2.1 Use of externally specified items

Different registers may be used to support different application areas, but such application areas may need to share information. One organization may formally recognize another as the appropriate source for specifications of items of a particular type. A register owner may choose to adopt items from other organizations that have specified them in documents or in registers. When this is done, the adopting register shall provide a reference (8.13) to the source of the adopted item. Specifications adopted from standards are a special case (7.3.2.2).

EXAMPLE If a standards body recognizes the IHO S-57 object (feature) catalogue as the authoritative source for hydrographic information, then the hydrographic feature types specified in the IHO S-57 object catalogue may be individually referenced (e.g., name and definition) in a separate register maintained by the adopting standards body.

An adopted definition shall not be changed except to accommodate differences in style between the source and the using register, or to add context information that is implicit at the source (8.24).

NOTE Before a term and definition are re-used from a source that is not the original source, they should be checked against the original source, since repeated restyling may inadvertently change the meaning.

Organizations may agree to a common process for maintaining shared specifications. Such bilateral cooperative agreements should contain provisions to inform the other organization if the source standard or register for the shared items is modified.

References may also be used to provide lineage information describing the historical development of a specification. In this case, there may be more than one reference, and the changes relative to the referenced definitions may be more significant.

7.3.2.2 Items specified in standards

Registration provides identification for an item but is not a standardization procedure. Items contained in a register may be specified in an international, national, or other standard before or after registration. In these cases, the register shall reference the applicable standard. When such a standard is prepared subsequent to registration of an item, the item identifier of the item shall be indicated in the standard.

NOTE The reference here is not to the technical standard in which an item class is specified, but to the standard in which the individual item is specified.

EXAMPLE ISO/TC 211 may establish a register of metadata elements. The item class “metadata element” is specified in ISO 19115:2003. The register of metadata elements could contain the service metadata elements specified in ISO 19119 as registered items. Information about each of these registered items would include a reference to ISO 19119 as the standard in which the individual item is specified as well as an exact identification of the referenced item.

7.4 Cultural and linguistic adaptability

A register shall be managed in a manner that supports cultural and linguistic requirements (ISO/IEC TR 19764). Data elements describing a register or its contents shall;

a) use identifiers rather than names or abbreviations;

b) use a code list instead of free text where a list of permissible values is proposed; and

c) structure free text data elements in a manner that supports multiple languages.

Names and specifications of items in a register may have meaning only in the context of particular languages or cultures (locales). In order to determine an unambiguous cultural and linguistic context for a register, it is necessary to specify the language, country and encoding of characters and character strings in that register.

In order to support cultural and linguistic adaptability, individual items in a register may additionally specify alternative names and definitions. These may be specified in alternative languages and cultures that differ from that of the register. Submitting organizations are encouraged to propose alternative item specifications in languages other than the operating language of the register.

Register owners may also choose to manage cultural and linguistic issues through the use of multiple registers, where the items in one register that is homogenous with respect to a locale reference items in another register based on a different locale.

7.5 Status of register items

The content of a register is potentially dynamic. New items will be proposed and accepted or not accepted. Once accepted, items may be subsequently clarified, superseded or retired. Information elements are required in order to support the management of items throughout their life, including their sponsoring organization, status, dates of assumption of particular states, and possible supersession by other items in the register.

Individual items shall be individually managed, moving through a set of well-defined states. Information about the temporal history of each item shall be maintained.

Normally only the valid, superseded and retired items are exposed when the contents of a register are made available to the public. Proposed and unaccepted items are part of the approval mechanism and are only required for management of the register. Submitting organizations shall have access to both proposed and unaccepted items because information about them may be useful for the development of new proposals.

An item in a register has a period of validity that begins on the date on which the proposal to register the item was accepted, and ends on the date on which a decision to supersede or retire the item has been made. Although retired and superseded items are no longer valid for use in the production of new data, they are kept in the register to support the interpretation of data produced before their retirement or supersession.

NOTE This does not imply that use of an unregistered item specified in a standard is somehow “invalid” until the item is registered. However, a reference using an item identifier can apply only to the specification of a register item.

Geographic information concepts represented in a register may change over time due to changes in requirements or technology, or for other reasons. By defining a series of items of the same item class, each with associated dates of validity, a register can identify how a particular concept has changed over a period of time. If an item is superseded by another item, the date the succession occurred shall be captured, along with references to and from the item that superseded it. At any given time, only one item in the series shall be “valid” (8.8.4).

7.6 State of a register

It is necessary to be able to specify a unique state in the evolution of the contents of a register since those contents will evolve over time. This International Standard specifies two alternative mechanisms, distinguished by the rate of change of the contents of a register, for specifying such a unique state.

a) For slowly changing registers, e.g. those disseminated as published hard copy documents, a version may be specified.

b) For rapidly changing registers, e.g. those made available as online interactive databases, a date of latest change may be specified.

8 Register schema

8.1 Introduction

The schema specified in this clause describes the structure of a register. The schema consists of a single package (Figure 7) comprised of 13 classes that represent information held in the register, and nine data types used by attributes of these classes, each documented in a subclause below.

Information about the register and items in the register shall be:

a) accessible through any on-line interface to the register (6.4);

b) included in any copy of the register (6.4); and

c) included in any information package about the register (5.3.2).

The principal register of a hierarchical register shall hold that information for each of its subregisters.

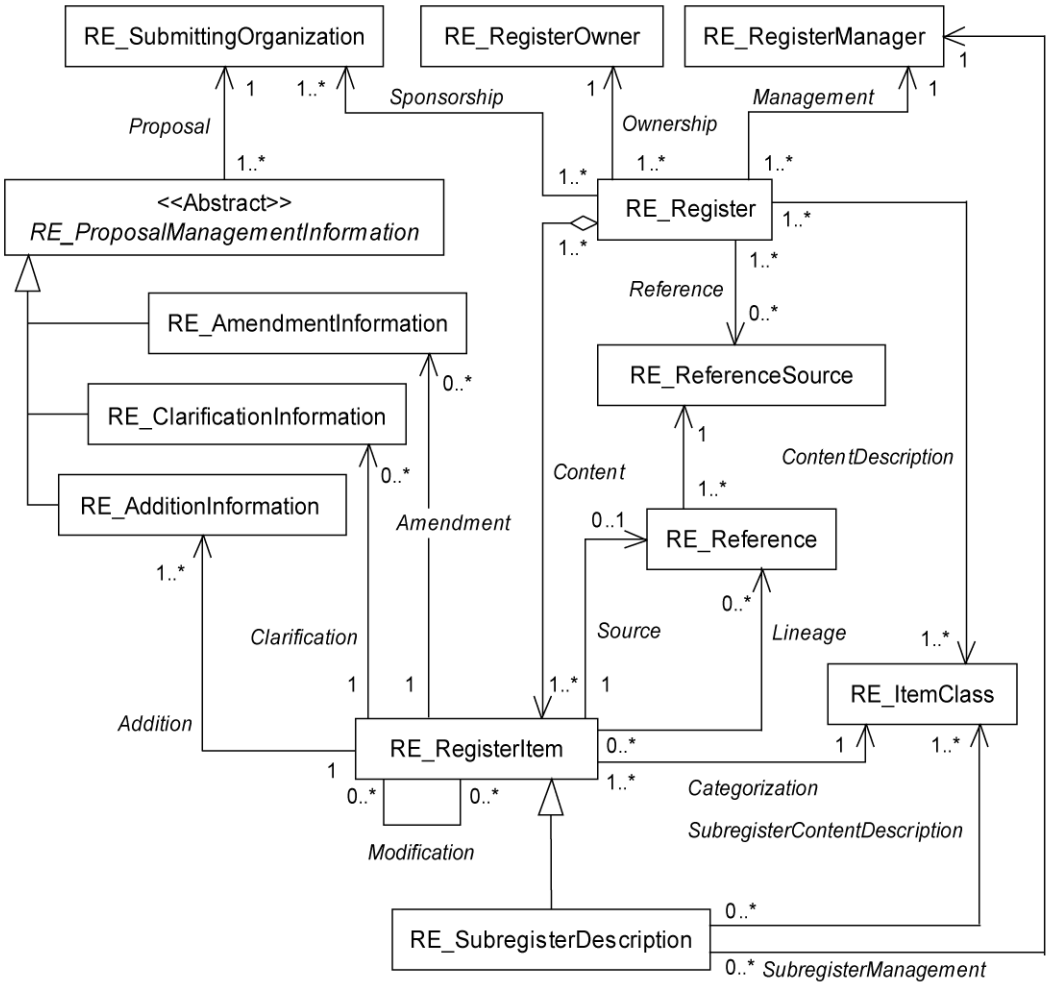

Figure 7 — The register schema

8.2 RE_Register

8.2.1 Introduction

The class RE_Register (Figure 8) specifies information about the register itself. It has six attributes and six associations.

8.2.2 name

The attribute *name* shall be represented as a CharacterString containing a compact and human-readable designator that is used to uniquely denote that register within the set of registers maintained by the register owner. In the case of a hierarchical register, the *name* of a subregister shall uniquely identify that subregister within the scope of all registers established by the owner of the principal register.

EXAMPLE "ISO/TC 211 Register of Feature Data Dictionaries and Feature Catalogues" might be the name of the principal register of a hierarchical register. "DGIWG FACC Data Dictionary" and "IHO S-57 Object Dictionary" might be the names of subregisters within the hierarchy.

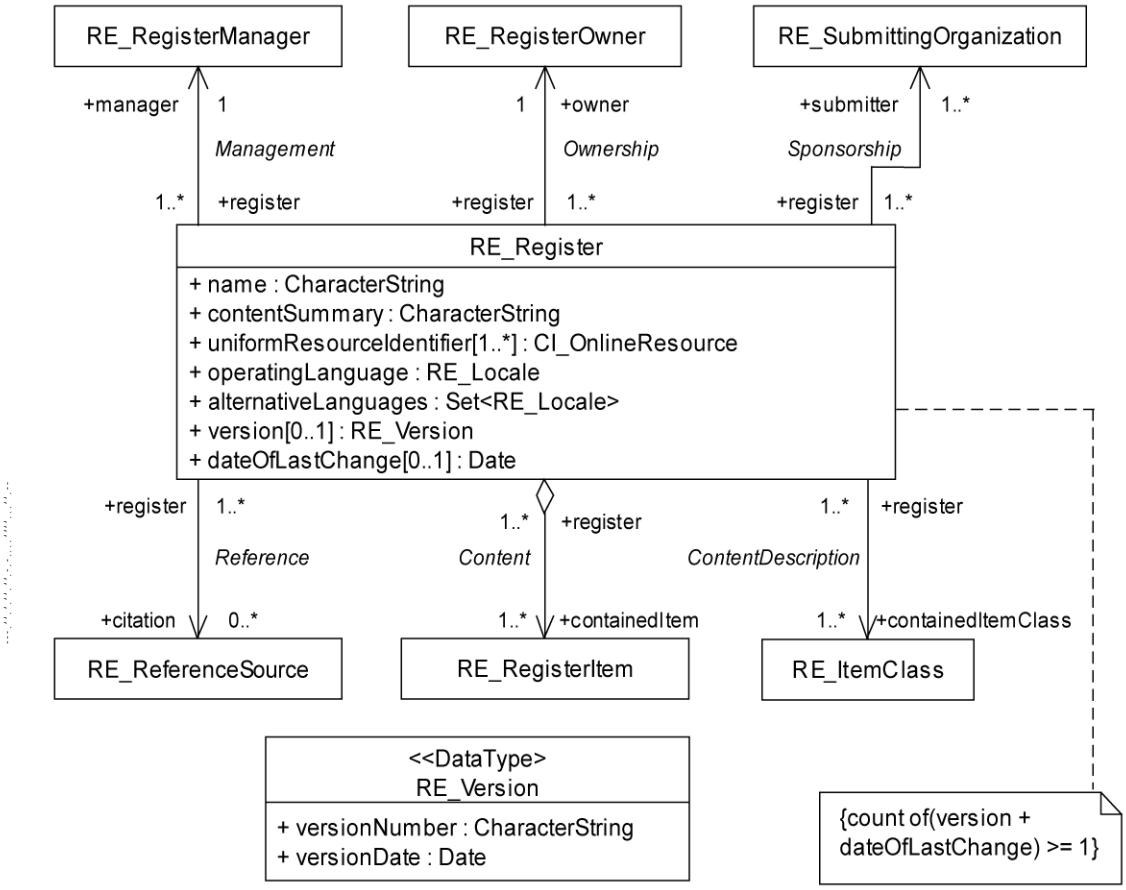

Figure 8 — RE_Register

8.2.3 contentSummary

The attribute *contentSummary* shall be represented as a CharacterString containing a general statement of the purpose for which items in the register are made available to potential users. It should also specify any limits to the scope of the register and identify the types of applications for which the items are intended.

NOTE The scope of a register could be limited by theme, by region, by language or other criteria.

EXAMPLE The scope of a terminology register could be limited to Spanish terms used to describe landforms in Latin America.

8.2.4 uniformResourceIdentifier

The attribute *uniformResourceIdentifier* shall take as its value a set of instances of CI_OnLineResource [ISO 19115:2003, B.3.2.5, row 396], each containing information about online resources associated with the register.

The set shall contain at least one instance of CI_OnLineResource for which the attribute *OnLineResource.function* has the value “information” (002) [ISO 19115:2003, B.5.3, row 3] and the corresponding value of the attribute *OnLineResource.linkage* specifies a resource providing access to the complete content of the register.

EXAMPLE “http://www.digest.org/Navigate2.htm” and “http://www.epa.gov/opppmsd1/PPISdata/index.html” are sample values of *OnLineResource.linkage*.

8.2.5 operatingLanguage

The attribute *operatingLanguage* shall be represented as an instance of class RE_Locale (8.17) that is used to specify language, country information and character encoding for the proper interpretation of the content of character strings in the register.

The values of all character strings in the register shall be in accordance with the value of *operatingLanguage*, unless otherwise stated.

8.2.6 alternativeLanguages

In order to support cultural and linguistic adaptability, individual items in a register may provide elements of information in additional languages other than the operating language of the register.

The attribute *alternativeLanguages* shall be represented as a set of instances of RE_Locale (8.17), each specifying an additional unique locale used by items in the register. Every member of the set shall be used by at least one item in the register. The *locale* of every *alternativeExpression* (8.8.10) used by any item in the register shall be included in this set of RE_Locales.

This attribute provides a summary of alternative locales used by items in a register. Register owners shall specify and publish their policy as to whether all or only some of the items in a register shall have alternative expressions (8.15).

8.2.7 version

The conditional attribute *version* shall be represented as an instance of class RE_Version (8.18) that specifies a unique state in the life of the register. A value shall be provided for this attribute if a value of *dateOfLastChange* (8.2.8) is not supplied.

8.2.8 dateOfLastChange

The conditional attribute *dateOfLastChange* shall be represented as an instance of the class <<Date>> [ISO/TS 19103:2005, 6.5.2.7] and specify the (full precision) date of the most recent change to the status (8.8.4) of an item in the register was made. A value shall be provided for this attribute if a value of *version* (8.2.7) is not supplied.

8.2.9 Ownership

The association *Ownership* connects the RE_Register to the instance of RE_RegisterOwner (8.3) that provides information about the register owner that owns the register. The association shall be navigable from *register* to *owner*, but need not be navigable in the reverse direction.

8.2.10 Management

The association *Management* connects the RE_Register to the instance of RE_RegisterManager (8.4) that provides information about the register manager that manages the register. The association shall be navigable from *register* to *manager*, but need not be navigable in the reverse direction.

8.2.11 ContentDescription

The association *ContentDescription* connects the RE_Register to one or more instances of RE_ItemClass (8.6), each of which describes the characteristics of a class of items held in the register. The association shall be navigable from *register* to *containedItemClass*, but need not be navigable in the reverse direction.

8.2.12 Content

The aggregation association *Content* connects the RE_Register to the set of RE_RegisterItem (8.8) held in the register. The association shall be navigable from *register* to *containedItem*, but need not be navigable in the reverse direction.

8.2.13 Sponsorship

The association *Sponsorship* connects the RE_Register to the instances of RE_SubmittingOrganization (8.5) that have submitted proposals for changes to the content of the register. The association shall be navigable from *register* to *submitter*, but need not be navigable in the reverse direction.

8.2.14 Reference

The conditional association *Reference* connects the RE_Register to a set of RE_ReferenceSource (8.7) that describe the sources (documents or registers) from which items in the RE_Register have been taken. This association is mandatory for any register that includes references to external sources for item specifications included in the register. All references for every item in the register shall be listed in the set of associated RE_ReferenceSource. Every member of that set shall be referenced by at least one item in the register. The association shall be navigable from *register* to *citation*, but need not be navigable in the opposite direction.

8.3 RE_RegisterOwner

8.3.1 Introduction

The class RE_RegisterOwner (Figure 9) specifies information about the register owner. It has two attributes and one association.

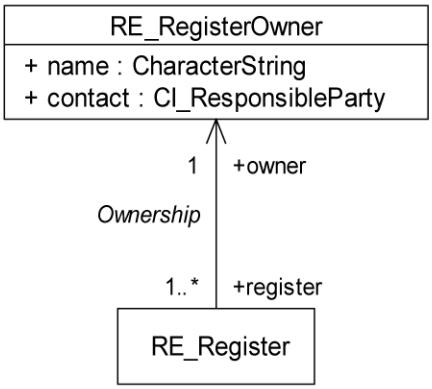

Figure 9 — RE_RegisterOwner

8.3.2 name

The attribute *name* shall be represented as a CharacterString containing a compact and human-readable designator that is used to denote the owner of that register.

EXAMPLE "ISO/TC 211," "Digital Geographic Information Working Group," and "International Hydrographic Bureau".

NOTE This International Standard does not require that an owner name be unique, since an organization will, in general, have had a name before undertaking the establishment of a register.

8.3.3 contact

The attribute *contact* shall be represented as an instance of CI_ResponsibleParty (ISO 19115:2003, B.3.2.1, row 374). Either the attribute *CI_ResponsibleParty.individualName* or the attribute *CI_ResponsibleParty.positionName* shall identify, by name or by position, respectively, a person who serves as a point of contact for information about the register owner and the register. The attribute *CI_ResponsibleParty.contactInfo* shall use an instance of CI_Contact [ISO 19115:2003, B.3.2.3, row 387] to provide information about the means of communication with that person.

8.3.4 Ownership

The association *Ownership* connects the RE_RegisterOwner to an instance of RE_Register (8.2) that it owns. The association shall be navigable from *register* to *owner*, but need not be navigable in the reverse direction.

8.4 RE_RegisterManager

8.4.1 Introduction

The class RE_RegisterManager (Figure 10) specifies information about the register manager appointed by a register owner to manage a register. It has two attributes and two associations.

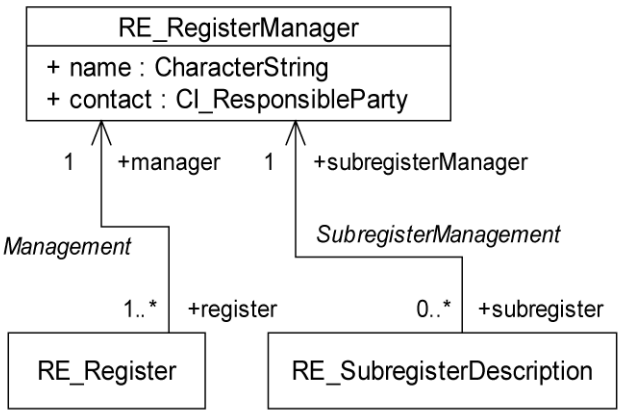

Figure 10 — RE_RegisterManager

8.4.2 name

The attribute *name* shall be represented as a CharacterString containing a compact and human-readable designator that is used to denote the manager of the register.

EXAMPLE "Digital Geographic Information Working Group," and "International Hydrographic Bureau".

NOTE This International Standard does not require that a register manager name be unique, since an organization will, in general, have had a name before undertaking the management of a register.

8.4.3 contact

The attribute *contact* shall be represented as an instance of CI_ResponsibleParty [ISO 19115:2003, B.3.2.1, row 374]. Either the attribute *CI_ResponsibleParty.individualName* or the attribute *CI_ResponsibleParty.positionName* shall identify, by name or by position, respectively, a person who serves as a point of contact for information about the register manager and the register. The attribute *CI_ResponsibleParty.contactInfo* shall use an instance of CI_Contact [ISO 19115:2003, B.3.2.3, row 387] to provide information about the means of communication with that person.

8.4.4 Management

The association *Management* connects the RE_RegisterManager to an instance of RE_Register (8.2) managed by the register manager. The association shall be navigable from *register* to *manager*, but need not be navigable in the reverse direction.

8.4.5 SubregisterManagement

In the case of a hierarchical register, the conditional association *SubregisterManagement* connects the RE_RegisterManager to an instance of RE_SubregisterDescription (8.14) that describes a subregister managed by the register manager. The association shall be navigable from *register* to *subregisterManager*, but need not be navigable in the reverse direction.

8.5 RE_SubmittingOrganization

8.5.1 Introduction

The class RE_SubmittingOrganization (Figure 11) specifies information about a submitting organization. It has two attributes and two associations.

8.5.2 name

The attribute *name* shall be represented as a CharacterString containing a compact and human-readable designator that is used to denote the submitting organization.

EXAMPLE "ISO TC 211", "ISO/IEC SC 24", and "ICAO".

NOTE This International Standard does not require that a register manager name be unique, since an organization will, in general, have had a name before undertaking the management of a register.

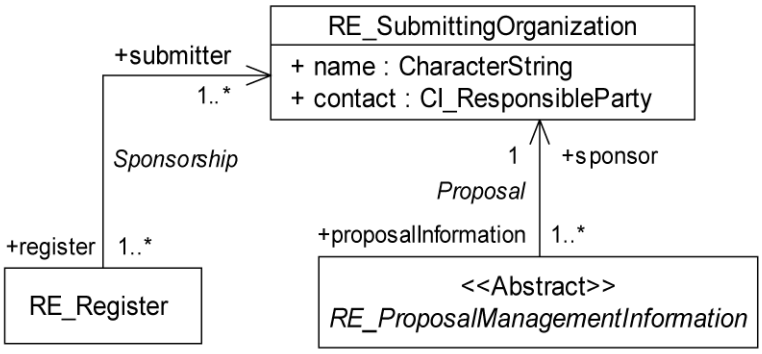

Figure 11 — RE_SubmittingOrganization

8.5.3 contact

The attribute *contact* shall be represented as an instance of CI_ResponsibleParty [ISO 19115:2003, B.3.2.1, row 374]. Either the attribute *CI_ResponsibleParty.individualName* or the attribute *CI_ResponsibleParty.positionName* shall identify, by name or by position, respectively, a person who serves as a point of contact for information about the sponsoring organization and the proposals that it has submitted. The attribute *CI_ResponsibleParty.contactInfo* shall use an instance of CI_Contact [ISO 19115:2003, B.3.2.3, row 387] to provide information about the means of communication with that person.

8.5.4 Sponsorship

The association *Sponsorship* connects an RE_SubmittingOrganization to an RE_Register (8.2) for which it has proposed changes. This association shall be navigable from *register* to *submitter*, but need not be navigable in the opposite direction.

8.5.5 Proposal

The association *Proposal* connects an RE_SubmittingOrganization to the instances of RE_ProposalManagementInformation (8.9) associated with the proposals that it has submitted. The association shall be navigable from *proposalInformation* to sponsor, but need not be navigable in the opposite direction.

8.6 RE_ItemClass

8.6.1 Introduction

RE_ItemClass (Figure 12) is a description of a class of geographic information items specified in a technical standard. RE_ItemClass has three attributes and three associations.

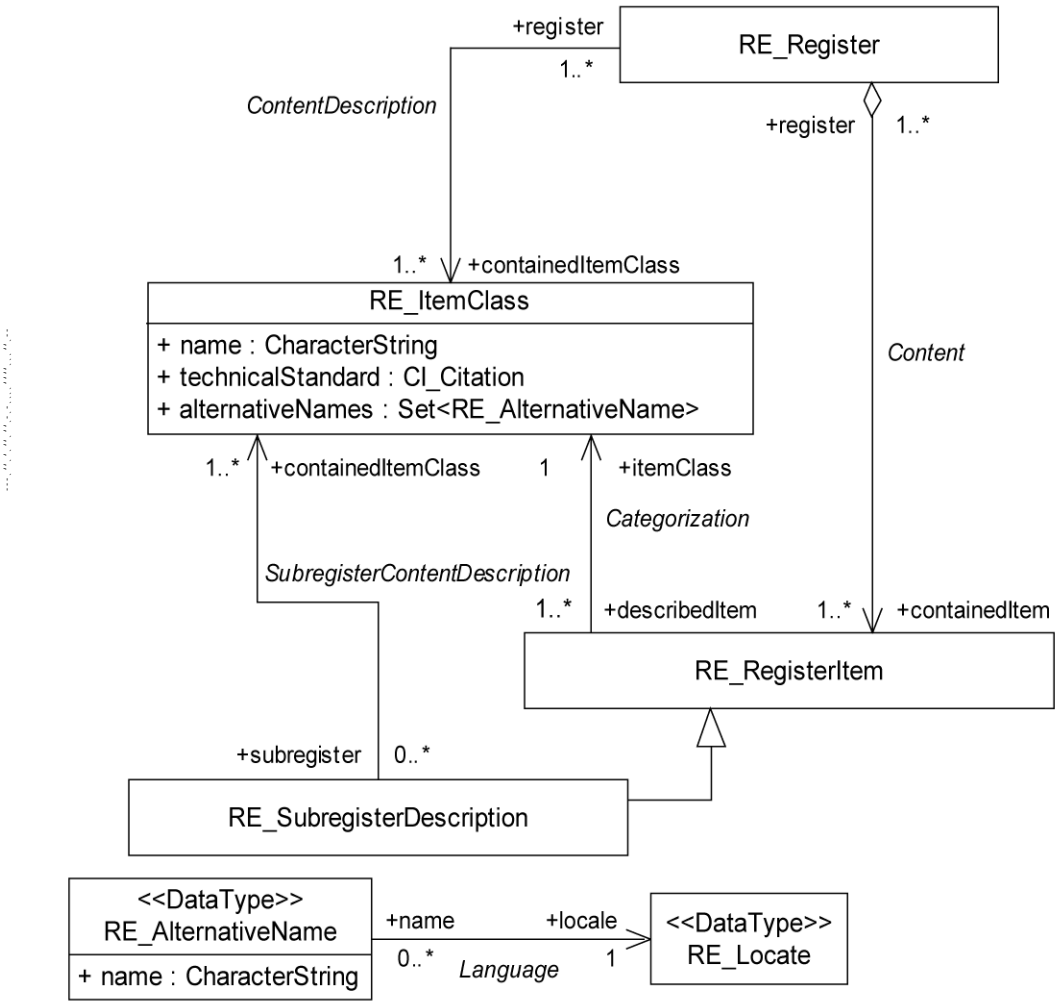

Figure 12 — RE_ItemClass

8.6.2 name

The attribute *name* shall be represented as a CharacterString containing a compact and human-readable designator that is used to denote a class of item.

The *name* that designates an item class held in a register that conforms to this International Standard shall:

a) uniquely denote the item class within the context of the register; and

b) be based on the item class designation used in the applicable technical standard (8.6.3).

8.6.3 technicalStandard

The attribute *technicalStandard* shall be represented as an instance of CI_Citation [ISO 19115:2003, B.3.2.1, row 359] that shall specify the technical standard (and the specific portion thereof) to which items in the item class shall conform.

8.6.4 alternativeNames

The attribute *alternativeNames* shall contain a set of instances of RE_AlternativeName, each of which is a translation of the *name* of the RE_ItemClass into a language other than the *operatingLanguage* of the RE_Register.

8.6.5 ContentDescription

The association *ContentDescription* shall connect the RE_ItemClass to the an instance of RE_Register (8.2) in which the items of that item class are contained. This association shall be navigable from *register* to *containedItemClass*, but need not be navigable in the opposite direction.

8.6.6 Categorization

The association *Categorization* shall connect each RE_RegisterItem (8.8) to the instance of RE_ItemClass of which it is a member. This association shall be navigable from *describedItem* to *itemClass*, but need not be navigable in the opposite direction.

8.6.7 SubregisterContentDescription

In the case of a hierarchical register, the conditional association *SubregisterContentDescription* shall connect the RE_ItemClass to the instance of RE_SubregisterDescription (8.14) that describes a subregister in which items of that item class are contained. This association shall be navigable from *subregister* to *containedItemClass*, but need not be navigable in the opposite direction.

8.7 RE_ReferenceSource

8.7.1 Introduction

The class RE_ReferenceSource (Figure 13) specifies information about the source of RE_RegisterItem specifications taken from an external document or register. It has one attribute and two associations.

8.7.2 citation

The attribute *citation* shall use an instance of CI_Citation [ISO 19115:2003, B.3.2.1, row 359] to describe a document or register used as an external source of items.

8.7.3 Reference

The association *Reference* shall connect the RE_ReferenceSource to an RE_Register (8.2) that uses item specifications from the source described by that RE_ReferenceSource. This association shall be navigable from *register* to *citation*, but need not be navigable in the opposite direction.

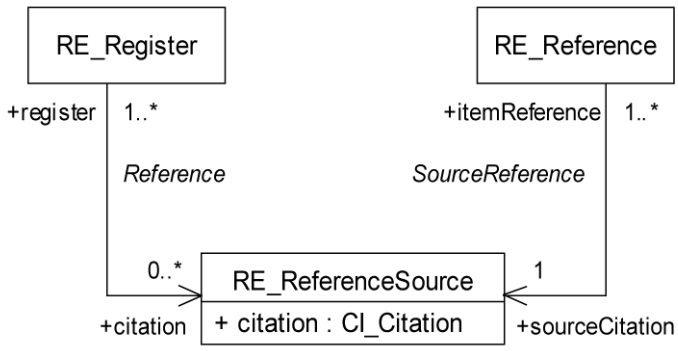

Figure 13 — RE_ReferenceSource

8.7.4 SourceReference

The association *SourceReference* shall connect to an RE_ReferenceSource from the instances of RE_Reference (8.13) that are associated with the specific items derived from items in the document or register described by this RE_ReferenceSource. This association shall be navigable from *itemReference* to *sourceCitation*, but need not be navigable in the opposite direction.

8.8 RE_RegisterItem

8.8.1 Introduction

The class RE_RegisterItem (Figure 14) specifies elements of information to be recorded for each item held in a register. It has nine attributes and eight associations. The technical standard that specified an item class may specify additional elements to be recorded.

8.8.2 itemIdentifier

The attribute *itemIdentifier* shall be represented as a positive integer (i.e. greater than zero) that is used to uniquely denote that item within the register and is intended for information processing. Values shall be assigned sequentially in the order in which items are proposed for entry into the register. Once a value has been assigned, it shall not be reused.

NOTE When a register contains items from different item classes, each item will be uniquely identifiable by the item identifier alone.

8.8.3 name

The attribute *name* shall be represented as a CharacterString containing a compact and human-readable designator that is used to denote a register concept. Each *name* shall:

— denote an item concept in the scope of an item class; and

— be a succinct expression of the item concept it denotes.

EXAMPLE “Lift” and “buoy shape”.

The *name* shall be unique within a register according to the following rules:

— Multiple items of the same item class may use the same value for *name* but only one such item may have a status of “valid”.

— Items in different item classes may use the same value for name.

The *name* may be used to support searches for items of interest to a human user of the register.

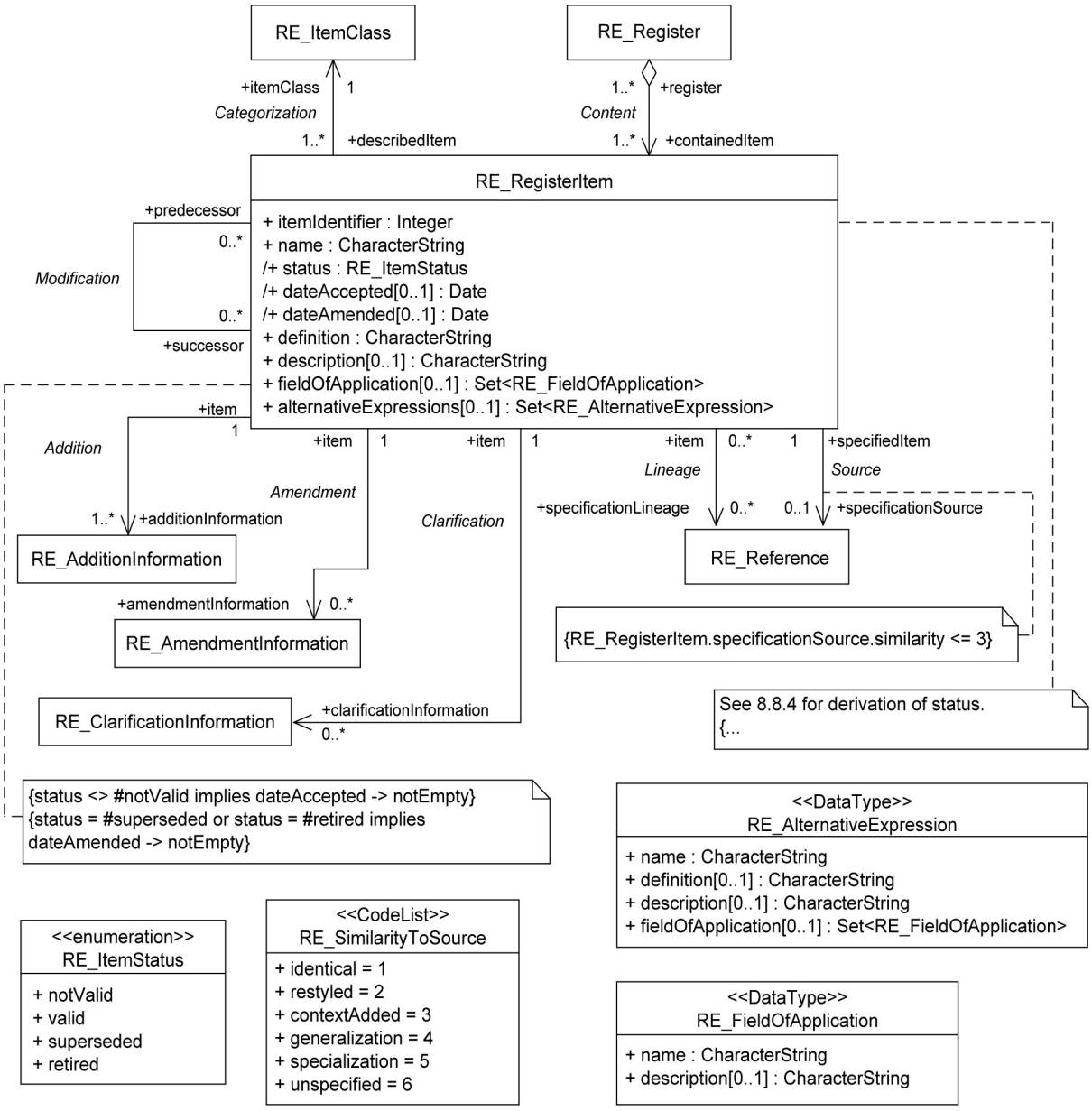

Figure 14 — RE_RegisterItem

8.8.4 status

The derived attribute *status* shall be represented as an instance of RE_ItemStatus (8.20) that identifies the registration status of the RE_RegisterItem. The value is derived through the *Addition* and *Amendment* associations as specified by the constraint:

{if

exists -> (self.amendmentInformation.amendmentType = #retirement

and self.amendmentInformation.disposition = #accepted

and self.amendmentInformation.status = #final)

then self.status = #retired

else if

exists -> (self.amendmentInformation.amendmentType = #supersession

and self.amendmentInformation.disposition = #accepted

and self.amendmentInformation.status = #final)

then self.status = #superseded

else if

exists -> (self.additionInformation.disposition = #accepted

and self.additionInformation.status = #final)

then self.status = #valid

else self.status = #notValid

endif}

8.8.5 dateAccepted

The conditional attribute *dateAccepted* shall specify the date on which a proposal to add the item to the register was accepted. The condition is identified by the constraint:

{status <> #notValid implies dateAccepted -> notEmpty}

The value is derived from information in RE_AdditionInformation:

DateAccepted = self.additionInformation.dateDisposed

8.8.6 dateAmended

The conditional attribute *dateAmended* shall specify the date on which a proposal to supersede or retire the item was accepted. The condition is identified by the constraint:

{status = #superseded or status = #retired implies dateAmended -> notEmpty}

The value is derived from information in RE_AmendmentInformation:

DataAmended = self.amendmentInformation.dateDisposed

8.8.7 definition

The attribute *definition* shall be represented as a CharacterString containing the definition of the concept embodied by that item and expressed in the operating language of the register. The *definition* shall be a precise statement of the nature, properties, scope or essential qualities of the concept as realized by the item 7.3.1.

EXAMPLE "Equipment consisting of a platform, which is often enclosed, that is raised and lowered in a vertical shaft to transport humans, equipment or materials; a lift or (U.S.) elevator". and "The shape of a buoy".

If a definition is taken from an external source, RE_Reference (8.13) shall be used to provide information about that source together with the unique identifier of the item in the external source where available.

8.8.8 description

The optional attribute *description* shall be represented as a CharacterString containing a description of the concept embodied by that item and expressed in the operating language of the register. The *description* shall be a statement of the nature, properties, scope, or non-essential qualities of the concept that are realized by the item but are not specified by the *definition* element.

EXAMPLE 1 "A lift may be moved through a system of overhead cables, lateral traction or under-floor hydraulics."

EXAMPLE 2 "Buoy shape is generally based on the portion visible above the water line."

8.8.9 fieldOfApplication

The optional attribute *fieldOfApplication* shall be represented as a set of instances of RE_FieldOfApplication, each of which shall describe a kind of use of the item. The *fieldOfApplication* may be used as the basis for creating metadata for submission to search engines.

EXAMPLES "Agricultural Production" and "Marine Navigation".

8.8.10 alternativeExpressions

The optional attribute *alternativeExpressions* shall be represented as a set of instances of RE_AlternativeExpression (8.15), each specifying an alternative name and optionally additional information in a locale different from that of the register. No two instances of RE_AlternativeExpression within the set shall have the same value for *locale*.

8.8.11 Content

The aggregation association *Content* shall connect the RE_RegisterItem to the RE_Register (8.2) in which it is contained. This association shall be navigable from *register* to *containedItem*, but need not be navigable in the opposite direction.

8.8.12 Categorization

The association *Categorization* shall connect the RE_RegisterItem to the instance of RE_ItemClass (8.6) that describes the item class of which it is a member. This association shall be navigable from *describedItem* to *itemClass*, but need not be navigable in the opposite direction.

8.8.13 Source

The conditional association *Source* shall connect the RE_RegisterItem to an instance of RE_Reference (8.13) that identifies the source of the register item. This association shall be present if the item has been taken from an external source. The association shall be navigable from *specifiedItem* to *specificationSource*, but need not be navigable in the opposite direction. The constraint {RE_RegisterItem.itemSource.similarity<=3} limits the changes to an item specification derived from a *specificationSource* to changes in style or addition of context (7.3.2.1).

8.8.14 Lineage

The optional association *Lineage* shall connect the RE_RegisterItem to a set of zero or more instances of RE_Reference (8.13) that provide information about the development of the item specification. The association shall be navigable from *item* to *specificationLineage*, but need not be navigable in the opposite direction.

8.8.15 Modification

The conditional association *Modification* shall connect the RE_RegisterItem to one or more other instances of RE_RegisterItem that preceded or superseded it. The existence of more than one successor for a registered item implies a subdivision of the concept represented by that registered item. Any *successor* shall represent the same concept as its *predecessor* or a sub-concept of that concept.

EXAMPLE The feature type “buoy” held in one feature catalogue register might be replaced by several feature types representing subtypes of “buoy” in another register. Conversely, several types of “road” in one register might be replaced by a single supertype “transportation route” in another feature register.

8.8.16 Addition

The association *Addition* shall connect an instance of RE_RegisterItem to one or more instances of RE_AdditionInformation (8.10) that contain information about the process of adding this RE_RegisterItem to the register. The association shall be navigable from *item* to *additionInformation*, but need not be navigable in the opposite direction.

8.8.17 Clarification

The conditional association *Clarification* shall connect an instance of RE_RegisterItem to zero or more instances of RE_ClarificationInformation (8.11) that contain information about the process of clarifying this RE_RegisterItem. This association shall be present if there have been any proposals to clarify the item. The association shall be navigable from *item* to *clarificationInformation*, but need not be navigable in the opposite direction.

8.8.18 Amendment

The conditional association *Amendment* shall connect the RE_RegisterItem to zero or more instances of RE_AmendmentInformation (8.12) that contain information about the process of amending this RE_RegisterItem. This association shall be present if there have been any proposals to amend the item. The association shall be navigable from *item* to *amendmentInformation*, but need not be navigable in the opposite direction.

8.9 RE_ProposalManagementInformation

8.9.1 Introduction

The class RE_ProposalManagementInformation (Figure 15) specifies elements of management information to be recorded for each proposal to add or modify a register item. It has eight attributes and one association. It has three subclasses that hold information about specific types of proposals.

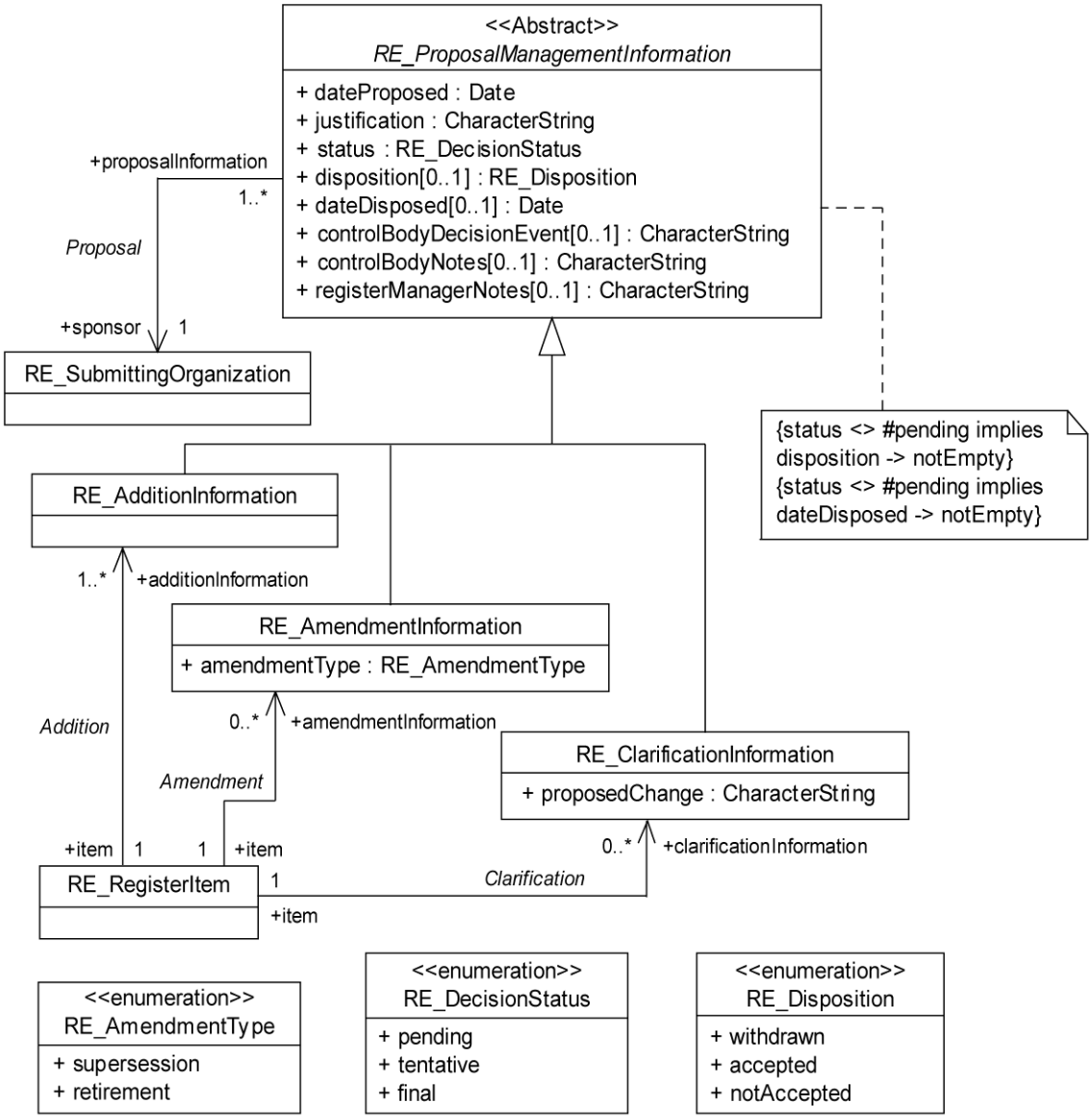

Figure 15 — RE_ProposalManagementInformation

8.9.2 dateProposed

The attribute *dateProposed* shall be represented as an instance of the class <<Date>> [ISO/TS 19103:2005, 6.5.2.7] and specify the (full precision) date on which the item was entered into the register.

EXAMPLE 2002-11-27.

8.9.3 justification

The attribute *justification* shall be represented as a CharacterString that explains why the proposed change should be implemented.

8.9.4 status

The attribute *status* shall be represented as an instance of RE_DecisionStatus that identifies the standing of the proposed change within the approval process.

8.9.5 disposition

The conditional attribute *disposition* shall be represented as an instance of RE_Disposition that identifies the disposition of the proposal. The condition is specified by the constraint {status <> #pending implies disposition -> notEmpty}, which means that a value shall be provided if the value of *status* is “tentative” or “final”.

8.9.6 dateDisposed

The conditional attribute *dateDisposed* shall be represented as an instance of the class <<Date>> [ISO/TS 19103:2005, 6.5.2.7] and specify the (full precision) date on which the disposition of the proposal was determined. The condition is specified by the constraint {status <> #pending implies dateDisposed -> notEmpty}, which means that a date shall be provided if the value of *status* is “tentative” or “final”. The date shall be revised when the value of *status* is changed from “tentative” to “final”.

8.9.7 controlBodyDecisionEvent

The optional attribute *controlBodyDecisionEvent* shall be represented as a CharacterString that identifies a meeting or other event associated with the control body’s decision concerning the proposed change.

8.9.8 controlBodyNotes

The optional attribute *controlBodyNotes* shall be represented as a CharacterString containing notes relevant to the control body’s decision concerning the proposal. Individual entries within the notes should be dated.

8.9.9 registerManagerNotes

The optional attribute *registerManagerNotes* shall be represented as a CharacterString containing notes relevant to the register manager’s handling of the proposal. Individual entries within the notes should be dated.

8.9.10 Proposal

The association *Proposal* shall connect an instance of RE_ProposalManagementInformation to the RE_SubmittingOrganization (8.5) that proposed that the associated *item* be added or modified. This association shall be navigable from *proposalInformation* to *sponsor*, but need not be navigable in the opposite direction.

8.10 RE_AdditionInformation

8.10.1 Introduction

The subclass RE_AdditionInformation contains management information about a proposal to add an item to a register. It has one association in addition to the attributes and association inherited from RE_ProposalManagementInformation.

8.10.2 Addition

The association *Addition* shall connect an instance of RE_AdditionInformation to the instance of RE_RegisterItem that was proposed to be added. The association shall be navigable from *item* to *additionInformation*, but need not be navigable in the opposite direction. A multiplicity of *additionInformation* greater than 1 implies that one or more proposals to add the item to the register have been either withdrawn or not accepted.

8.11 RE_ClarificationInformation

8.11.1 Introduction

The subclass RE_ClarificationInformation contains management information about a proposal to clarify an item in a register. It has one attribute and one association in addition to the attributes and association inherited from RE_ManagementInformation.

8.11.2 proposedChange

The attribute *proposedChange* shall be represented as a CharacterString containing a description of the clarification that shall identify the elements of the register item that are changed and the prior and subsequent values of each.

EXAMPLE The definition of this item was changed to correct a typographical error. The misspelled word "phenomnon" was changed to "phenomenon".

8.11.3 Clarification

The association *Clarification* shall connect an instance of RE_ClarificationInformation to the instance of RE_RegisterItem whose clarification it describes. The association shall be navigable from *item* to *clarificationInformation*, but need not be navigable in the opposite direction.

8.12 RE_AmendmentInformation

8.12.1 Introduction

The subclass RE_AmendmentInformation contains management information about a proposal to amend an item in a register. It has one attribute and one association in addition to the attributes and association inherited from RE_ProposalManagementInformation.

8.12.2 amendmentType

The attribute *amendmentType* shall be represented as an instance of RE_AmendmentType that identifies the type of amendment proposed.

8.12.3 Amendment

The association *Amendment* shall connect an instance of RE_AmendmentInformation to the instance of RE_RegisterItem for which an amendment was proposed. The association shall be navigable from *item* to *amendmentInformation*, but need not be navigable in the opposite direction. A multiplicity of *amendmentInformation* greater than 1 implies that one or more proposals to supersede or retire the item have been withdrawn or not accepted.

8.13 RE_Reference

8.13.1 Introduction

The class RE_Reference (Figure 16) specifies information about the source and/or lineage of a specific RE_RegisterItem (8.8) derived from an external document or register. It has four attributes and three associations.

8.13.2 itemIdentifierAtSource

The attribute *itemIdentifierAtSource* shall be represented as a CharacterString that provides the value of the item identifier in the source document or register from which the specification of the RE_RegisterItem (8.8) is derived.

8.13.3 similarity

The attribute *similarity* shall use a value from the <<CodeList>> RE_SimilarityToSource (8.24) that specifies the type of change that has been made to the item specification relative to the item specification in the external source.

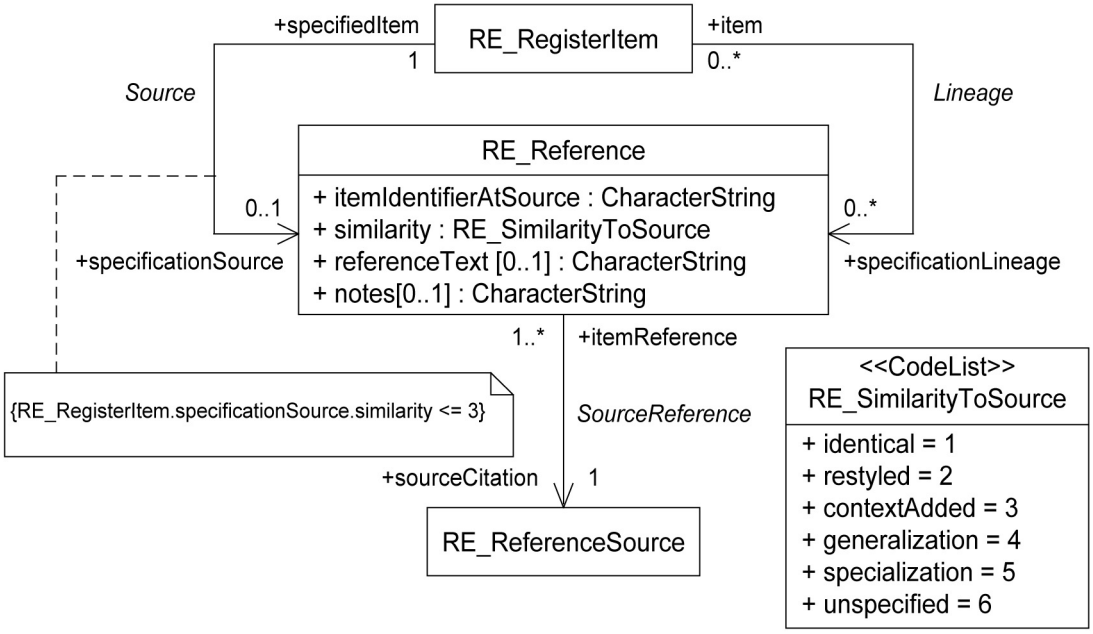

Figure 16 — RE_Reference

8.13.4 referenceText

The optional attribute *referenceText* shall be represented as a CharacterString that may be used to provide a copy of documentation about the item from the RE_ReferenceSource.

NOTE This attribute is intended for use in cases where the RE_ReferenceSource may not be readily accessible to users of the register.

8.13.5 notes

The optional attribute *notes* shall be represented as a CharacterString that may be used to provide additional information about the derivation of the specification of a register item from an external source.

8.13.6 Source

The association *Source* shall connect an RE_Reference to the RE_RegisterItem (8.8) for which it provides source information. This association shall be navigable from *specifiedItem* to *specificationSource*, but need not be navigable in the opposite direction. The changes to an item specification derived from a *specificationSource* are limited as specified in 8.8.13.

8.13.7 Lineage

The optional association *Lineage* shall connect a set of zero or more RE_Reference to the RE_RegisterItem (8.8) for which it provides information about the derivation of the item specification. This association shall be navigable from *item* to *specificationLineage*, but need not be navigable in the opposite direction.

8.13.8 SourceReference

The association *SourceReference* shall connect an RE_Reference to the RE_ReferenceSource (8.7) that specifies the external source from which the item specification was taken. This association shall be navigable from *itemReference* to *sourceCitation*, but need not be navigable in the opposite direction.

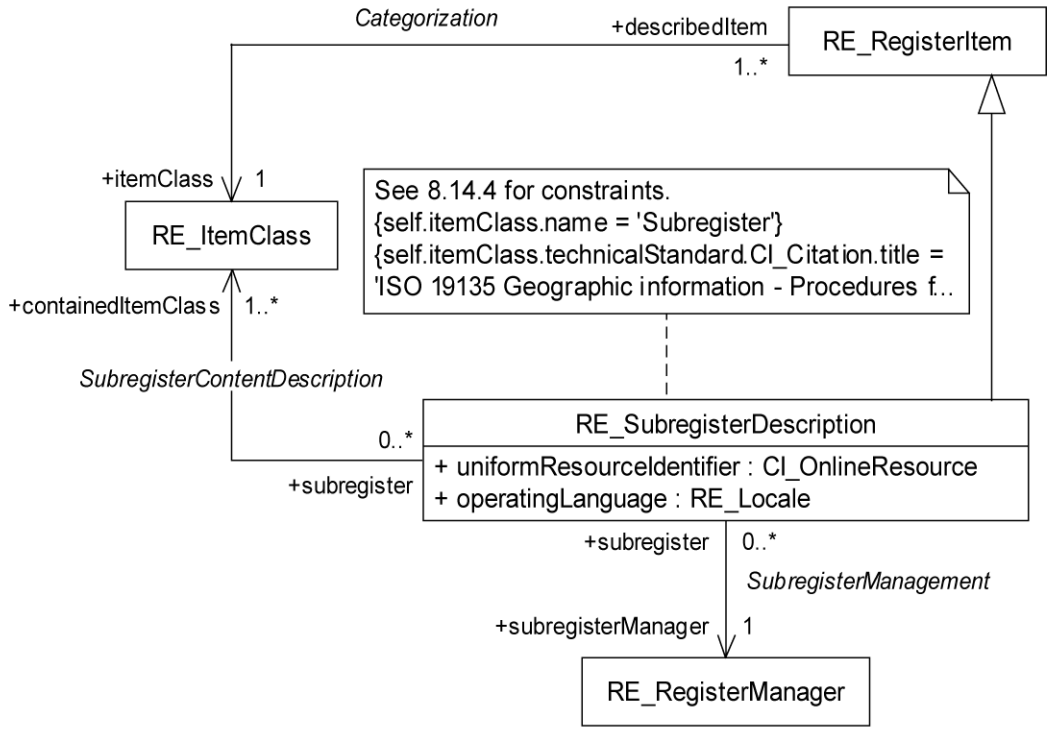

Figure 17 — RE_SubregisterDescription

8.14 RE_SubregisterDescription

8.14.1 Introduction

RE_SubregisterDescription (Figure 17) is a subclass of RE_RegisterItem that shall be used in the principal register of a hierarchical register to describe each of the affiliated subregisters. It inherits nine attributes and eight associations from RE_RegisterItem. Their semantics are unchanged, but a few are subject to additional constraints or conditions specified in this subclause. In addition, RE_SubregisterDescription has two attributes and two associations that are specific to the class.

NOTE Because a subregister is a type of register, it contains an instance of RE_Register that describes itself (8.2.1). RE_SubregisterDescription carries similar information about the subregister, but it is contained within the principal register.

8.14.2 name

RE_SubregisterDescription inherits the attribute *name* from RE_RegisterItem. The value of *name* shall be identical to the value of *RE_Register.name* as specified in the subregister.

8.14.3 description

The inherited optional attribute *description* may be used to provide the information specified by *RE_Register.contentSummary* in the subregister.

8.14.4 Categorization

The association Categorization is inherited from RE_RegisterItem. It shall connect an instance of RE_SubregisterDescription to the *itemClass* that identifies this International Standard as the source of the specification of the class RE_SubregisterDescription. The values of the attributes of the object identified by *itemClass* are, therefore, subject to the constraints:

{self.itemClass.name = 'Subregister'}

{self.itemClass.technicalStandard.CI_Citation.title = 'ISO 19135 Geographic information - Procedures for registration of items of geographic information'}

{self.itemClass.technicalStandard.CI_Citation.alternateTitle = ISO 19135:2004'}

{self.itemClass.technicalStandard.CI_Citation.date.CI_Date.date = '2004'}

{self.itemClass.technicalStandard.CI_Citation.otherCitationDetails = 'Clause 8.14'}

8.14.5 uniformResourceIdentifier

The attribute *uniformResourceIdentifier* shall be represented as an instance of CI_OnLineResource [ISO 19115:2003, B.3.2.5, row 396] for which the attribute *OnLineResource.function* has the value “information” (002) [ISO 19115:2003, B.5.3, row 3] and the corresponding value of the attribute *OnLineResource.linkage* specifies a resource providing access to the complete content of the subregister.

8.14.6 operatingLanguage

The attribute *operatingLanguage* shall be represented as an instance of class RE_Locale (8.17) that is used to specify language, country information and character encoding for the proper interpretation of the content of character strings in the subregister.

8.14.7 SubregisterManagement

The association *SubregisterManagement* shall connect an RE_SubregisterDescription to an instance of RE_RegisterManager (8.4) that provides information about the register manager that manages the subregister. The association shall be navigable from *subregister* to *subregisterManager*, but need not be navigable in the reverse direction.

8.14.8 SubregisterContentDescription

The association *SubregisterContentDescription* connects an RE_SubegisterDescription to one or more instances of RE_ItemClass (8.6), each of which describes the characteristics of a class of items held in the subregister. The association shall be navigable from *subregister* to *containedItemClass*, but need not be navigable in the reverse direction.

8.15 RE_AlternativeExpression

8.15.1 Introduction

The class RE_AlternativeExpression (Figure 18) is a data type used to provide information about a register item in an alternative language. It has four attributes and one association. Subclasses of RE_AlternativeExpression may be specified in order to add additional attributes appropriate for particular item classes.

EXAMPLE A specification for a metadata element register could identify a subclass of RE_AlternativeExpression that would include the data dictionary fields specified in ISO 19115:2003 (obligation/condition, data type, and domain) as additional attributes.

8.15.2 name

The attribute *name* shall be represented as a CharacterString whose content meets the requirements of *RE_RegisterItem.name* except that the applicable locale shall be that specified in *RE_AlternativeExpression.locale*.

8.15.3 definition

The optional attribute *definition* shall be represented as a CharacterString whose content meets the requirements of *RE_RegisterItem.definition* except that the applicable locale shall be that specified in *RE_AlternativeExpression.locale*.

8.15.4 description

The optional attribute *description* shall be represented as a CharacterString whose content meets the requirements of *RE_RegisterItem.description* except that the applicable locale shall be that specified in *RE_AlternativeExpression.locale*.

8.15.5 fieldOfApplication

The optional attribute *fieldOfApplication* shall be represented as a set of instances of RE_FieldOfApplication whose content meets the requirements of *RE_RegisterItem.fieldOfApplication* except that the applicable locale shall be that specified in *RE_AlternativeExpression.locale*.

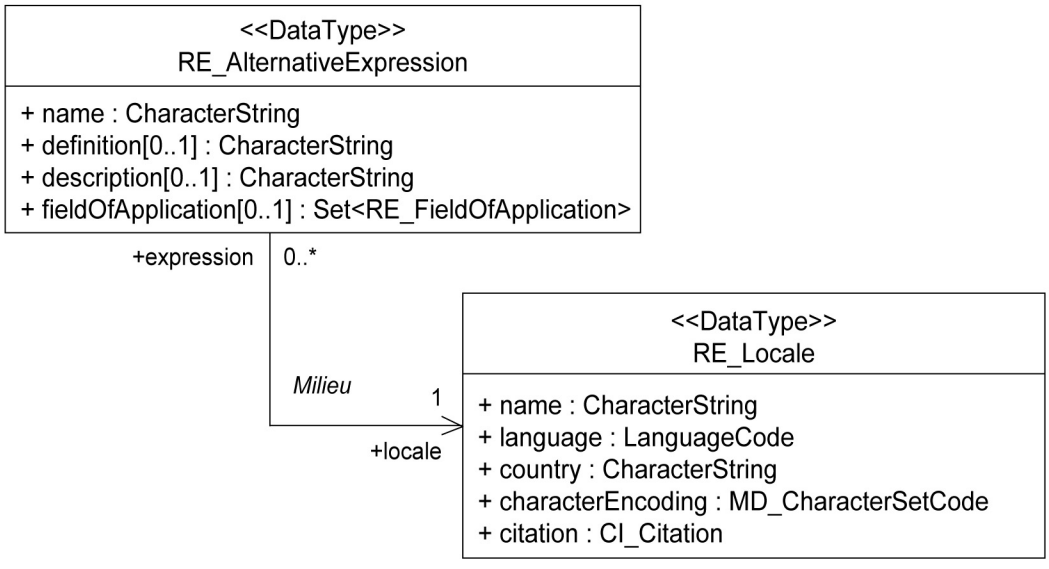

Figure 18 — RE_AlternativeExpression and RE_Locale

8.15.6 Milieu

The association *Milieu* connects an instance of RE_AlternativeExpression to the instance of RE_Locale (8.17) that applies to the values of the attributes of this instance of RE_AlternativeExpression. That instance of RE_Locale shall be one of those included in the instance of *RE_ItemClass.alternativeLanguages* (8.6.4) that is associated with a register item. The association shall be navigable from *expression* to *locale*, but need not be navigable in the opposite direction.

8.16 RE_AlternativeName

8.16.1 Introduction

The class RE_AlternativeName (Figure 12) is a data type used to provide the name of an item class in an alternative language. It has one attribute and one association.

8.16.2 name

The attribute *name* shall be represented as a CharacterString.

8.16.3 language

The association *language* connects an instance of RE_AlternativeName to the instance of RE_Locale (8.17) that identifies the language used for this alternative name.

8.17 RE_Locale

8.17.1 Introduction

The class RE_Locale (Figure 18) has five attributes and one association. It provides information about languages used in a register.

8.17.2 name

The attribute *name* shall be represented as a CharacterString that describes the locale.

EXAMPLE “Welsh”

8.17.3 language

The attribute *language* shall take as its value a 3-character language code as specified in ISO 639-2.

NOTE The list of codes maintained by the ISO 639-2 Registration Authority is available at the URL http://www.loc.gov/standards/iso639-2/langcodes.html.

8.17.4 country

The attribute *country* shall be represented as a CharacterString that holds a 3-character numerical country code as specified in ISO 3166-1.

NOTE The list of codes is available from the URL ftp.ics.uci.edu/pub/ietf/http/related/iso3166.txt or the ISO 3166 Maintenance Agency at URL http://www.iso.ch/iso/en/prods-services/iso3166ma/index.html.

8.17.5 characterEncoding

The attribute *characterEncoding* shall be represented as an instance of MD_CharacterSetCode [ISO 19115:2003, B.5.10] that specifies the name of the character coding standard used.

8.17.6 citation

The optional attribute *citation* shall be represented as an instance of CI_Citation [ISO 19115:2003, B.3.2.1, row 359] that identifies a resource that provides more information about the locale.

EXAMPLE An instance of CI_Citation could provide information about a specific dialect of the language identified for the locale, or about some other culturally significant aspect of information presentation, such as a specific method of formatting numbers.

8.17.7 Milieu

The conditional association Milieu shall connect an instance of RE_Locale to the instances of RE_AlternativeExpression that use that locale. The association shall be navigable from *expression* to *locale*, but need not be navigable in the opposite direction. The association is conditional because RE_Locale is also used to identify the *operatingLanguage* of a register (8.2.5).

EXAMPLE An instance of RE_Locale that identifies English as used in the United States would have the following attribute values:

name: “US English”
language: eng
country: 840
characterEncoding: 009
citation: (not used)

8.18 RE_Version

8.18.1 Introduction

The data type class RE_Version (Figure 8) has two attributes.

8.18.2 number

The attribute *number* shall be represented as a constrained CharacterString that denotes the version. The CharacterString shall be of the form <first positive integer> <dot> <second positive integer> <letter characters> (“#.#a”), where:

a) <first positive integer> (one or more digits) shall specify the major version designation;

b) <dot> (“.”) shall delimit the <first positive integer> from the <second positive integer> when there is a <second positive integer>;

c) <second positive integer> (one or more digits) shall optionally specify the minor version designation; and

d) <letters> (one or more characters) shall optionally specify the minor subversion designation.

EXAMPLE “2.1a”.

8.18.3 date

The attribute *date* shall be represented as an instance of the class <<Date>> [ISO/TS 19103:2005, 6.5.2.7] that specifies the date (which may be of reduced precision) of the version.

EXAMPLE 2002-10-21.

8.19 RE_FieldOfApplication

8.19.1 Introduction

RE_FieldOfApplication (Figure 14) is a data type used to provide information about a use for a register item. It has two attributes, *name* and *description*.

8.19.2 name

The attribute *name* shall be represented as a CharacterString used to identify the field of application.

EXAMPLE "Agricultural Production", "Marine Navigation".

8.19.3 description

The optional attribute *description* shall be represented as a CharacterString that provides a description of the field of application.

EXAMPLE "Pertaining to the science, art, and business of cultivating soil, producing crops, and raising livestock.", "Pertaining to the science or art of conducting ships or vessels from one place to another at sea."

8.20 RE_ItemStatus

RE_ItemStatus (Figure 14) is an <<Enumeration>> that specifies the status of a register item (8.8.4). The domain of RE_ItemStatus is specified in Table 2.

Table 2 — Values of RE_ItemStatus

Value	Meaning
notValid	The item has been entered into the register, but the control body has not accepted the proposal to add it.
valid	The item has been accepted, is recommended for use, and has not been superseded or retired.
superseded	The item has been superseded by another item and is no longer recommended for use.
retired	A decision has been made that the item is no longer recommended for use. It has not been superseded by another item.

8.21 RE_DecisionStatus

RE_DecisionStatus (Figure 15) is an <<Enumeration>> that specifies the status of a decision regarding a proposal to add or modify a register item (8.9.4). The domain of RE_DecisionStatus is specified in Table 3.

Table 3 — Values of RE_DecisionStatus

Value	Meaning
pending	No decision has been made.
tentative	A decision has been made, but it is still subject to appeal.
final	A decision has been made and the time limit for appeal has run out or an appeal has been resolved.

8.22 RE_Disposition

RE_Disposition (Figure 15) is an <<Enumeration>> that provides values for describing the disposition of a proposal to add or modify a register item (8.9.5). The domain of RE_Disposition is specified in Table 4.

Table 4 — Values of RE_Disposition

Value	Meaning
withdrawn	The submitting organization has withdrawn the proposal.
accepted	The control body decided to accept the proposal.
notAccepted	The control body decided not to accept the proposal.

8.23 RE_AmendmentType

RE_AmendmentType (Figure 15) is an <<Enumeration>> that provides values for describing the kind of change requested by a proposal to amend a register item (8.12.2). The domain of RE_AmendmentType is specified in Table 5.

Table 5 — Values of RE_AmendmentType

Value	Meaning
supersession	The proposal requests that an item be superseded.
retirement	The proposal requests that an item be retired.

8.24 RE_SimilarityToSource

RE_SimilarityToSource (Figure 16) is a <<CodeList>> that identifies the type of change that has been made to an item specification relative to an item specification in an external source (8.13.3). The domain of RE_SimilarityToSource is specified in Table 6.

Table 6 — Values of RE_SimilarityToSource

Code	Value	Meaning
1	identical	No change has been made to the specification.
2	restyled	The style of the specification has been changed to match the style and structure of other specifications in the register that has imported the specification.
3	contextAdded	The specification includes information about its context that is not explicit in the specification in the external source.
4	generalization	The specification of the register item has been generalized to have a broader meaning than the item specified in the external source.
5	specialization	The specification of the register item has been specialized to have a narrower meaning than the item specified in the external source.
6	unspecified	The nature of the differences between the register item and the similar item in the external source is unspecified.

Annex A
(normative)

Abstract test suite

A.1 General conformance

A.1.1 Register owner responsibilities

a) Test Purpose: Verify that the register owner has identified a register manager and a control body for the register, specified criteria that determine which organizations may act as submitting organizations, and established a procedure to process appeals of decisions made by the control body.

b) Test Method: Request information about the register from the register owner and/or register manager. Verify that required information is included.

c) Reference: 5.2.

d) Test Type: Basic.

A.1.2 Register manager responsibilities

a) Test Purpose: Verify that the register manager distributes an information package containing a description of the register and how to submit proposals and that the register manager provides reports to the register owner at intervals specified by the register owner.

b) Test Method: Request a copy of the information package and review for completeness. Request copies of register manager reports from the register owner.

c) Reference: 5.3.

d) Test Type: Basic.

A.1.3 Submission by approved submitting organizations

a) Test Purpose: Verify that all submitting organizations satisfy the criteria established by the register owner, and that register items have been submitted by approved submitting organizations.

b) Test Method: Obtain a copy of the criteria for submitting organizations determined by the register owner and inspect the list of submitting organizations to verify that all satisfy these criteria. Check the submitting organization associated with each of a sample of register items to verify that each is listed as a submitting organization.

c) Reference: 5.4.1, 8.9.10.

d) Test Type: Basic.

A.1.4 Management procedures

a) Test Purpose: Verify that the register is managed according to the rules specified in this International Standard.

b) Test Method: Check the procedures described in the information package distributed by the register manager.

c) Reference: Clause 6.

d) Test Type: Capability.

A.1.5 Register content

a) Test Purpose: Verify that the items in the register contain the minimum specified content.

b) Test Method: Inspect each of a sample of entries in the register to ensure that they include all elements of information required by this International Standard and the technical standard that specifies the corresponding item class.

c) Reference: Clause 8.

d) Test Type: Capability.

A.1.6 Publication of register contents

a) Test Purpose: Verify that the contents of the register are publicly available.

b) Test Method: Check the information packet distributed by the register manager. Visit the web site or electronically processable form and inspect the information made available.

c) Reference: 6.4.

d) Test Type: Capability.

A.2 Hierarchical registers

A.2.1 Principal register

a) Test Purpose: Verify that the principal register provides required information about subregisters.

b) Test Method: Access the principal register and request information about one or more subregisters. Inspect the result to verify that all required elements are present.

c) Reference: 2.3.

d) Test Type: Basic.

A.2.2 Subregister

a) Test Purpose: Verify that the subregister conforms to the description provided by the principal register.

b) Test Method: Access the instance of RE_Register that describes the register itself and compare the information it holds to that held by the instance of RE_SubregisterDescription that describes this subregister in the principal register.

c) Reference: 2.3.

d) Test Type: Basic.

A.3 Registers established by ISO/TC 211

A.3.1 Maintenance by an authorised register manager

a) Test Purpose: Verify that the register is maintained by an authorized register manager.

b) Test Method: Check the list of registration authorities maintained on the ISO web site to ensure that the organization has been authorized by the ISO TMB to act as a register manager for the technical standard that specifies the relevant item class.

c) Reference: C.2.

d) Test Type: Basic.

A.3.2 Submission by approved submitting organizations

a) Test Purpose: Verify that all submitting organizations satisfy the criteria established by ISO/TC 211, and that register items have been submitted by approved submitting organizations.

b) Test Method: Inspect the list of submitting organizations to verify that all satisfy the criteria specified in this International Standard. Check the submitting organization associated with each of a sample of register items to verify that each is listed as a submitting organization.

c) Reference: C.6.

d) Test Type: Basic.

Annex B
(informative)

UML Notation

B.1 Introduction

This annex provides a brief description of UML notation as specified in ISO/IEC 19501-1 and ISO/TS 19103:2005, and as used in the UML diagrams in this International Standard.

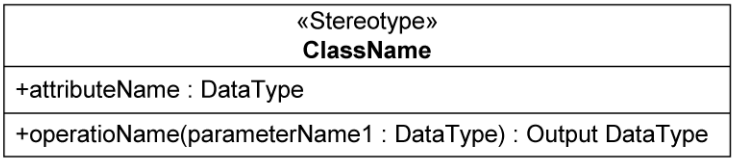

Figure B.1 — UML Class

B.2 Class

A UML class (Figure B.1) represents a concept within the system being modelled. It is a description of a set of objects that share the same attributes, operations, methods, relationships and semantics. A class is drawn as a solid-outline rectangle with three compartments separated by horizontal lines. The top name compartment holds the class name and other general properties of the class (including stereotype); the middle list compartment holds a list of attributes; the bottom list compartment holds a list of operations. The attribute and operation compartments may be suppressed to simplify a diagram. Suppression does not indicate that there are no attributes or operations.

NOTE This International Standard does not specify any operations or methods.

ISO/TS 19103:2005 specifies that a class name shall include no blank spaces and that individual words in the name shall begin with capital letters.

B.3 Stereotype

Stereotypes extend the semantics, but not the structure of pre-existing types and classes. A stereotype is used to classify (or mark) other UML elements so that they behave as if they were instances of new “virtual” metamodel classes whose form is based on existing “base” classes. A stereotype may introduce additional values and additional constraints. All model elements that are classified by a particular stereotype receive these values and constraints.

Class level stereotypes used in this International Standard include:

a) <<DataType>> specified in ISO/IEC 19501, is a descriptor of a set of values that lack identity (independent existence and the possibility of side effects). Data types include primitive predefined types and user-definable types. A DataType is thus a class with few or no operations whose primary purpose is to hold the abstract state of another class for transmittal, storage, encoding or persistent storage.

b) <<Enumeration>> specified in ISO/IEC 19501, is a data type whose instances form a list of named literal values. Both the enumeration name and its literal values are declared. Enumeration means a short list of well-understood potential values within a class. Classic examples are Boolean that has only two (or three) potential values TRUE, FALSE (and NULL). Most enumerations will be encoded as a sequential set of Integers, unless specified otherwise. The actual encoding is normally only of use to programming language compilers.

c) <<CodeList>>, specified in ISO/TS 19103:2005, is a flexible enumeration that uses string values through a binding of the Dictionary type key and returns values as string types, e.g. Dictionary (String, String). A CodeList is useful for expressing a long list of potential values. If the elements of the list are completely known, an Enumeration shall be used; if only the likely values of the elements are known, a codeList shall be used. Enumerated code lists may be encoded according to a standard, such as ISO 3166-1. CodeLists are more likely to have their values exposed to the user, and are therefore often mnemonic. Different implementations are likely to use different encoding schemes (with translation tables to other encoding schemes available).

B.4 Attribute

An attribute represents a characteristic common to the objects of a class. An attribute is specified by a text string that can be parsed into elements that describe the properties of the attribute:

visibility name [multiplicity]: type-expression = initial-value

where:

visibility may be public (indicated by "+") or private (indicated by "–").

name is a character string. ISO/TS 19103:2005 specifies that an attribute name shall include no blank spaces, that it shall begin with a lower case letter, and that individual words in the name, following the first word, shall begin with upper case letters.

multiplicity specifies the number of values that an instance of a class may have for a given attribute. The notation is explained in B.10. When multiplicity of an attribute is not shown in a diagram, it has the default value of 1.

type-expression identifies the data type of the attribute.

initial value, if present, specifies a default value for the attribute.

B.5 Association

An association (Figure B.2) is a semantic relationship between classes that specifies connections between their instances. An association is drawn as a solid line connecting two class rectangles. An association may have a name, represented as a character string placed near the line, but not close to either end. ISO/TS 19103:2005 specifies that an association name shall include no blank spaces and that individual words in the name shall begin with upper case letters. The association ends are adorned with information pertinent to the class at that end of the association, including multiplicity and role name.

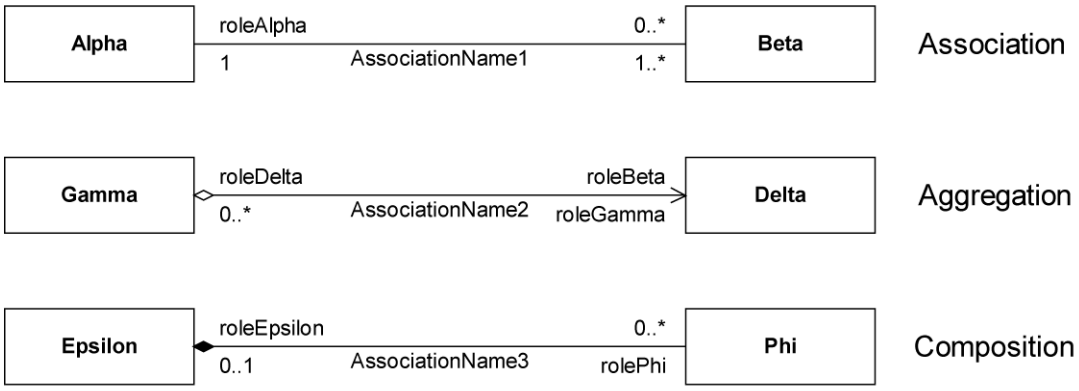

Figure B.2 — UML Associations

B.6 Role name

A role name adorning an association end specifies behaviour of the class at that end with respect to the class at the other end of the association. In Figure B.2, roleAlpha describes the role that the class named Alpha has with respect to the class named Beta. A role name is represented as a character string. ISO/TS 19103:2005 specifies that a role name shall include no blank spaces, that it shall begin with a lower case letter, and that individual words in the name, following the first word, shall begin with upper case letters.

B.7 Navigability

An arrow attached to the end of an association path indicates that navigation is supported toward the class attached to the arrow. In other words, information held in that class is accessible from the class at the other end of the association. Arrows may be attached to zero, one, or two ends of the path. This International Standard follows the practice of showing arrows only in the case of association paths that are navigable in only one direction. All other associations are assumed to be navigable in both directions. In Figure B.2, AssociationName2 is navigable from Gamma to Delta, but not in the opposite direction.

B.8 Aggregation

Associations may be used to show aggregation or composition relationships between classes. An open diamond on an association end indicates that the class at that end of the association is an aggregate of instances of the class at the other end of the association. For example, the class named Gamma, in Figure B.2, is an aggregate of zero or more instances of the class named Delta. Aggregation is considered a weak form of composition. The members of an aggregation can exist independently of the aggregation, and can be members of more than one aggregation.

B.9 Composition

A closed diamond on an association end indicates that the class at that end of the association is composed of instances of the class at the other end of the association. For example, the class named Epsilon in Figure B.2 is composed of zero or more instances of the class named Phi. Members of a composite cannot exit independently of the composite class, nor can they be members of more than one composite class.

B.10 Multiplicity

Multiplicity specifies the number of instances of a class that may be associated with a class at the other end of the association.

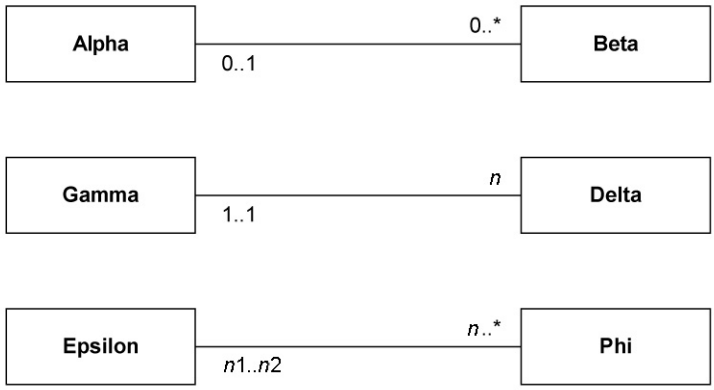

Figure B.3 — UML Multiplicity

The values shown in B.3 are all valid. They have the following meanings:

- zero or one instance of Alpha may be associated with one instance of Beta;
- zero or more instances of Beta may be associated with one instance of Alpha;
- one and only one instance of Gamma may be associated with one instance of Delta;
- n being an integer number, n and only n instances of Delta may be associated with one instance of Gamma;
- $n1$ and $n2$ being integer numbers, with $n2 > n1$, the number of instances of Epsilon that may be associated with an instance of Phi may be within the range $n1$ to $n2$;
- n being an integer number, n or more instances of Phi may be associated with one instance of Epsilon.

B.11 Generalization

ISO/IEC 19501 defines generalization (Figure B.4) as a taxonomic relationship between a more general element and a more specific element. The more specific element is fully consistent with the more general element and contains additional information. An instance of the more specific element may be used where the more general element is allowed. Generalization is shown as a solid-line path from the child (the more specific element, such as a subclass) to the parent (the more general element, such as a superclass), with a large hollow triangle at the end of the path where it meets the more general element. Figure B.4 shows two generalization relationships.

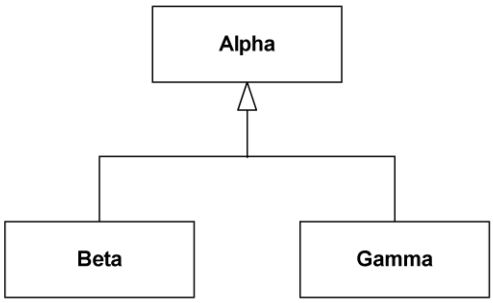

Figure B.4 — UML Generalization

B.12 Derived elements

A derived element, such as an attribute or a rolename, is one whose value can be computed from another element, but is shown for clarity even though it adds no semantic information. A derived element is indicated by a slash ("/") in front of its name.

B.13 Note

A note (Figure B.5) contains textual information. It is shown as a rectangle with a “bent corner” in the upper right corner, attached to zero or more model elements by a dashed line. Notes may be used to contain comments or constraints.

B.14 Constraint

A constraint specifies a semantic condition or restriction. Although ISO/IEC 19501 specifies an Object Constraint Language for writing constraints, a constraint may be written using any formal notation, or a natural language. A constraint is shown as a text string in braces ("{ }"). It is placed near the element to which it applies. If the notation for an element is a text string (such as an attribute), the constraint string may follow the element text string in braces. A constraint included as an element in a list applies to all subsequent elements in the list, down to the next constraint element or the end of the list.

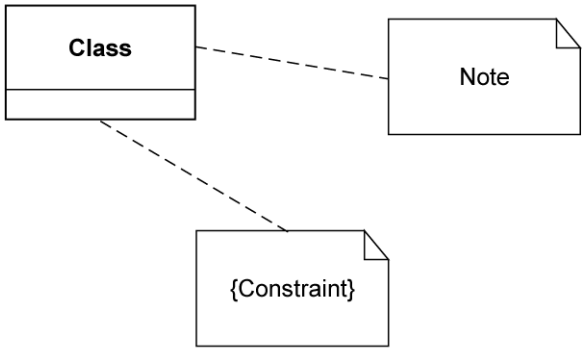

Figure B.5 — Note and constraint

Annex C
(normative)

Establishment of registers by ISO/TC 211

C.1 Introduction

ISO/TC 211 has developed several technical standards that specify geographic information item classes and may develop more in the future. The TC may choose to establish registers for some of these classes. A proposal to establish a register should be included in the New Work Item Proposal (NWIP) to develop a technical standard that will specify an item class to be registered. ISO/TC 211 may also resolve to establish a register in connection with a standard that is already in development. In all such cases, ISO/TC 211 shall be the register owner.

C.2 Appointment of an ISO/TC 211 register manager

When ISO/TC 211 resolves to establish a register, the TC Secretariat shall solicit nominations of qualified organizations (C.3) to serve as the register manager. In order to reduce the proliferation of registration authorities, ISO/TC 211 shall first seek candidates among the registration authorities it has already approved. If no existing ISO/TC 211 register manager is able to serve, the ISO/TC 211 Secretariat shall solicit nominations. Only ISO/TC 211 member National Bodies, and organizations in liaison with ISO/TC 211 may nominate organizations to be ISO/TC 211 registration authorities. ISO/TC 211 shall endorse the nomination by letter ballot or by plenary resolution. If more than one candidate is nominated, ISO/TC 211 shall choose between them by letter ballot. Once a candidate has been selected, the ISO/TC 211 Secretariat shall request the approval of the ISO/TMB.

C.3 Qualifications of an ISO/TC 211 register manager

To qualify for designation as an ISO/TC 211 register manager an organization shall demonstrate that:

a) it is a legal entity;

b) it has been in existence for no less than five years;

c) it enjoys a sound financial structure;

d) it has available personnel who are technically competent in the relevant subjects of the technical standards upon which item classes in the register are based;

e) it agrees to function in its capacity as a register manager for a minimum of five years;

f) it has sufficient equipment resources (e.g. hardware, software) and communication facilities (e.g. postal address, telephone, facsimile, e-mail address, web site);

g) if it operates with a fee structure, this structure shall be only for the purpose of cost recovery, agreed by ISO/TC 211 and approved by ISO Council; and

h) it shall require no financial contribution from ISO Central Secretariat or ISO members.

C.4 Responsibilities of an ISO/TC 211 register manager

The register manager shall provide a report on its activities to each plenary meeting of ISO/TC 211. It shall indicate (e.g. on its web page) that it has been designated an ISO/TC 211 register manager by ISO. In order to promote the standardization of registered items, the register manager shall provide copies of portions of the registers maintained by the register manager to standards developers at no charge under the terms and conditions set by the register manager. The register manager shall complete processing of submitted proposals in no longer than 120 days.

C.5 Contract

If appointed, an ISO/TC 211 register manager shall operate under a contract with ISO. Upon 12 months notice, either the ISO/TC 211 register manager or the ISO may terminate the contract.

The contract document shall:

a) identify the principal parties, which are:

   1) the International Organization for Standardization (ISO) through ISO/TC 211; and

   2) the ISO/TC 211 register manager (the register manager).

b) identify all organizations engaged by the register manager to establish and/or operate and/or maintain the registry on its behalf (the Third-Party Service Providers).

c) specify the administrative provisions, including:

   1) the legal jurisdiction in which the contract is enforceable;

   2) the term of the contract;

   3) the provisions for monitoring and reporting, including reports to plenary meetings of ISO/TC 211;

   4) the schedule for contract reviews;

   5) the provisions for contract renewal;

   6) the provisions for contract variation and change management;

   7) the provisions for dispute resolution;

   8) the provisions for early termination of the contract, either through unexpected forced withdrawal, or through the withdrawal of either principal party following 12 months notice; and

   9) the arrangements for the transfer of the register to ISO/TC 211 following the expiry or termination of the contract.

d) identify the requirements of the contract and the responsibilities of the parties, including:

   1) the requirements for the management of the register (reflecting the provisions of Clause 6 of this International Standard);

   2) the responsibilities of the register manager (reflecting the provisions of 5.3.2 of this International Standard); and

   3) the responsibilities of ISO/TC 211.

e) prescribe the terms and conditions for supplying information to the public, including:

   1) the methods of supply;

   2) the procedures for calculating and revising fees (if fees are to be charged); and

   3) the recognition of intellectual property.

The service provision contracts between the register manager and Third-Party Service Providers shall be subject to endorsement by ISO/TC 211 and shall be attached to the contract between ISO/TC 211 and the register manager.

An attachment to the contract shall nominate the representatives of ISO/TC 211 and the register manager, who are delegated with the responsibility for the day-to-day management and administration of the contract.

C.6 Submitting organizations

In the case of registers established by ISO/TC 211, proposals for adding, clarifying, superseding or retiring register items may be made by the following submitting organizations:

a) any P member or O member of ISO/TC 211; or

b) any organization having liaison status with ISO/TC 211.

C.7 Control bodies

C.7.1 Appointment of control bodies by ISO/TC 211

ISO/TC 211 shall, in consultation with member bodies and liaison organizations, appoint a control body composed of people having appropriate technical expertise.

C.7.2 Responsibilities of control bodies

A control body shall review proposals for action on registration of individual items or sets of items and inform the register manager of its decision within 90 days of receiving the proposal from the register manager.

C.8 Appeals

A submitting organization may appeal to ISO/TC 211 if it disagrees with the decision of a control body to reject a registration proposal. An appeal shall contain at a minimum a description of the situation, a justification for the appeal, and a statement of the impact if the appeal is not successful. In the event of an appeal, the ISO/TC 211 Secretariat shall issue a letter ballot for the TC to vote to accept or reject the appeal. For such a ballot, both votes to sustain and votes to overturn the decision of the control body shall require a statement of the rationale for the vote. The decision of the TC shall be published within 150 days of the date of the appeal.

Annex D
(normative)

Information to be included in proposals for item registration

D.1 Elements of information required for all proposals

The following information shall be included in any proposal for registration of an item of geographic information:

a) name of submitting organization (8.5.2);

b) contact information for the submitting organization (8.5.3);

c) date proposal was submitted;

d) statement as to whether the proposal is for addition, clarification, supersession or retirement of an item; and

e) justification for accepting the proposal (8.9.3).

D.2 Additional elements of information for proposals to add new items to a register

D.2.1 Mandatory elements of information

The following information shall be included in any proposal to add an item to a register:

a) name of the item class to which the item belongs (8.6.2);

b) name of the item (8.8.3); and

c) definition of the item (8.8.7).

D.2.2 Conditional elements of information

The following conditional elements of information shall be included as needed:

a) citation information that describes the source from which an externally referenced item was obtained (8.7.2);

b) identifier assigned to the item at its source (8.13.2);

c) type of changes made to the item specification as compared to that at its source (8.13.3); and

d) additional information, as required by the technical standard that specifies the item class.

D.2.3 Optional elements of information

Optional elements of information include:

a) a description of the item (8.8.8);

b) field(s) of application for which the item may be used (8.8.9);

c) names and definitions and optional elements of the item specification in alternative languages (8.8.10);

d) citation information that describes the lineage of the item (8.8.14); and

e) additional comments.

D.2.4 Additional elements of information required for proposals to clarify a registered item

Additional elements of information include:

a) item identifier (8.8.2);

b) name of the item (8.8.3); and

c) proposed change to the item (8.11.2).

D.3 Elements of information required for proposals to supersede a registered item

For the registered item to be superseded:

a) item identifier (8.8.2); and

b) name of the item (8.8.3).

For the new item to supersede a registered item, all elements specified for proposals to add new items to a register (D.2) are included.

D.4 Additional elements of information for proposals to retire a registered item

Additional elements of information include:

a) item identifier (8.8.2); and

b) name of the item (8.8.3).

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