BS ISO 14817-2:2015

BSI Standards Publication

Intelligent transport systems — ITS central data dictionaries

Part 2: Governance of the Central ITS Data Concept Registry

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

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Intelligent transport systems — ITS central data dictionaries —

Part 2: Governance of the Central ITS Data Concept Registry

Systèmes intelligents de transport — Dictionnaires de données centrales des ITS —

Partie 2: Gouvernance du registre central de concept des données des ITS

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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.

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

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

This first edition of ISO 14817-2, together with ISO 14817-1, cancels and replaces ISO 14817:2002, which has been technically revised.

ISO 14817 consists of the following parts, under the general title *Intelligent transport systems — ITS central data dictionaries*:

— *Part 1: Requirements for ITS data definitions*

— *Part 2: Governance of the Central ITS Data Concept Registry*

— *Part 3: Object identifier assignments for ITS data concepts*

Introduction

Background

This International Standard has been developed by ISO/TC 204, in order to provide a framework for the documentation and registration of data that passes through system interfaces within the Intelligent transport systems (ITS) domain. It is designed to maximize interoperability and facilitate information re-use across system interfaces.

Vision statement

This International Standard envisions a harmonized approach to ITS data concepts to promote maximum interoperability of data within the ITS sector by the creation and maintenance of the "Central ITS Data Concept Registry" (CIDCR), supported by interface and application specific ITS data dictionaries, created and maintained in a common and interoperable form, and to ensure the minimization of duplication by clear rules for data concept definition and data concept registry management.

Mission statement

The mission is to develop tools that will promote a holistic, integrated approach involving vehicle technology, infrastructure, and the road user to increase transport safety and efficiency. Specifically, this International Standard defines the principles and concepts; scope; field of application; rules and procedures; definition and concept of operation for the CIDCR and ITS functional data dictionaries; and makes provision for the migration of data concepts from ITS functional data dictionaries to the CIDCR so as to maximize interoperability and minimize proliferation of similar (but inconsistently defined) data concept entries.

This International Standard defines the framework, formats, and procedures used to define information and information exchanges within the ITS sector. This International Standard is designed to be used by the ITS community at large, but should be of special interest to application developers, equipment providers, and data concept registry managers.

This International Standard specifies a set of meta-attributes for ITS data concepts, as well as associated conventions and schemes that enable the description, standardization and management of all exchanged ITS data. Through consistent use of these common structures and associated conventions and schemes, interchange of data and information among the various ITS functional subsystems via their specific application systems can be maximized. This International Standard also supports re-use of data elements and other data concepts across various ITS functional subsystems and their specific application systems

The formats and processes defined within this International Standard are consistent with implementation(s) of the ISO ITS System Architecture defined in the ISO 14813 Standardization deliverables, particularly parts that discuss core TICS reference architecture and example elaboration. This does not preclude the application of data concept registries using alternative international, regional or national system architecture methodologies or techniques, indeed, common formats and processes will ease migration and interoperability between such approaches.

The ITS data concepts that populate the CIDCR or data dictionary may originate from a 'Computer-Aided Software Engineering' (CASE) tool implementation of the ISO 14813 ITS Reference Architecture, from International Standards for ITS, from National implementations for ITS, or from the submission by relevant users. Data dictionary entries are not limited to those generated by object oriented methodologies.

Overview of Central ITS Data Concept Registry

The scope of ITS applications covers numerous ISO/TC 204 functional areas as well as national and regional ITS organizations, each having an established group of stakeholders. The international integration of ITS applications is one of the major development issues, so that data defined and gathered in one of these functional areas (e.g. traffic management, traveller information) can be applied

in another. For this type of interoperability the definition of data that can persist across different functional areas must be standardized. The CIDCR meets this requirement.

The CIDCR supports the standardization and harmonization of data concepts (e.g. data elements) from different stakeholder groups. The ITS stakeholder community is large and diverse as evidenced by the number of working groups within ISO/TC 204 and the number of national or regional ITS bodies participating. The definition of key data elements will arise from numerous sources. Moreover different groups will have an interest in the definition of the same data concept, which could lead to the prospect of duplicate or similar definitions being developed. The CIDCR will assist in promoting the reuse of previously defined data and minimizing data duplication.

The complete ITS distributed system will be very large, both in geographic extent and in the number and diversity of the application areas, inevitably leading to the independent development of sub-systems. In this context, a second major purpose of the CIDCR is to document and register interface dialogues. This process provides the main foundation for interoperability, by also focusing on those data concepts which cross an interface, but which are not necessarily harmonized throughout ITS. The semantics of data concepts may be documented by recording the associations of the data models in which they participate.

The operational concept of the data concept registration is described in the following subclauses. See Annex A for specific procedural details.

Document overview

This clause provides an overview of this International Standard. Clause 1 identifies the scope of this part of ISO 14817. Clause 2 identifies requirements for conformance to this part of ISO 14817. Clause 3 identifies references required for proper implementation of this part of ISO 14817. Clause 4 defines terms used in this part of ISO 14817 and Clause 5 lists the abbreviations.

The requirements for the CIDCR begin in Clause 6 with an overview of the concept of operations. A framework describing the registration of different types of data concepts in the CIDCR and the registration status levels are presented.

Clause 7 identifies the management of the CIDCR and identifies the major actors that interface with the registry and their responsibilities. Clause 8 then identifies the administrative meta-attributes associated with each data concept.

The annexes to this part of ISO 14817 describe the specific details for implementing the requirements introduced in Clause 6 to Clause 8. Annex A details when specific meta-attributes are required for each type of data concept. Annex B defines the process used for quality control within the CIDCR, Annex C defines the registration status levels and Annex D defines the rules for version control. Finally, Annex E defines guidelines for harmonization.

The Bibliography includes a list of documents related to this part of ISO 14817.

INTERNATIONAL STANDARD **ISO 14817-2:2015(E)**

Intelligent transport systems — ITS central data dictionaries —

Part 2: Governance of the Central ITS Data Concept Registry

1 Scope

This part of ISO 14817 specifies the registration process to enter data concepts into the Central ITS Data Concept Registry (CIDCR).

The CIDCR is designed to include data concepts that conform to ISO 14817-1. These data concepts may be derived from the system architecture defined in ISO 14813, but may also support data concepts using alternative International, Regional or National System Architecture methodologies or techniques.

2 Conformance

This part of ISO 14817 prescribes a conceptual model, but not a physical implementation. Therefore, the meta model need not be physically implemented exactly as specified. However, it should be possible to map unambiguously to and from the implementation and the meta model.

A conforming implementation shall support all processes defined by this part of ISO 14817.

3 Normative references

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

ISO 14817-1, *Intelligent transport systems — ITS central data dictionaries — Part 1: Requirements for ITS data definitions*

ISO 14817-3, *Intelligent transport systems — ITS central data dictionaries — Part 3: Object identifier assignments for ITS data concepts*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14817-1, ISO 14817-3 and the following apply.

4.1
data concept registration process
process by which data is formally described and provided to an approved location in the data concept registry

Note 1 to entry: This process is effected under the control of the "ITS Registrar", in accordance with the requirements of this part of ISO 14817.

4.2
ITS registrar
organizational element or an individual appointed by ISO/TC 204 to undertake the day-to-day management of the data concept registry process

5 Symbols and abbreviated terms

ASN.1	Abstract Syntax Notation One
ANSI	American National Standards Institute
CASE	Computer-Aided Software Engineering
CCC	Change Control Committee
CIDCR	Central ITS Data Concept Registry
DCI	Data concept identifier
DD	Data Dictionary
DCR	Data Concept Registry
ExCom	Executive Committee
ID	identification
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITS	Intelligent transport system(s)
N/A	not applicable
OID	object identifier
OSI	Open System Interconnection
RA	Registration Authority
TC	Technical Committee
UML	Unified Modelling Language
URL	Uniform Resource Locator

6 Framework of Central ITS Data Concept Registry

The overall framework for the CIDCR is presented in Figure 1. It illustrates the relationships among the following:

— ITS architectures (and data models);

— ITS data dictionaries (that are intended to include all data concepts);

— CIDCR;

— ITS Applications.

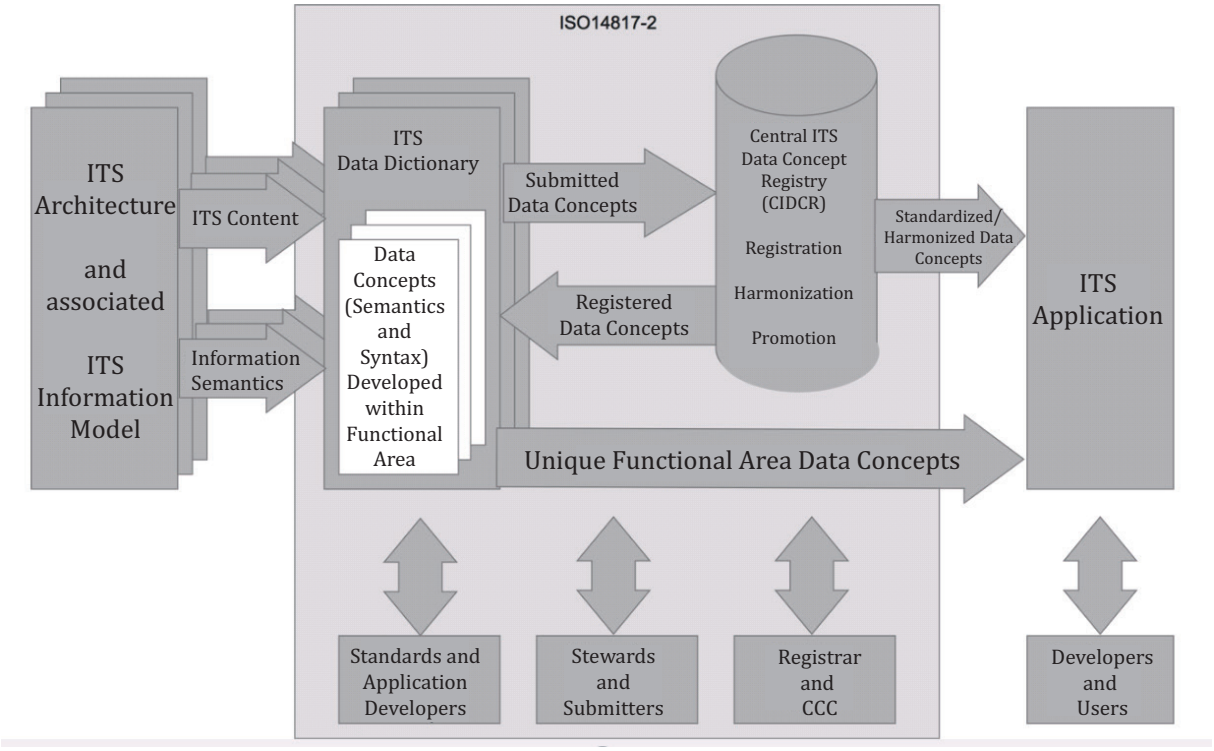


Figure 1 — CIDCR operational framework

For each of these elements, Figure 1 also lists their key functions. For data dictionaries, the CIDCR, and the applications it further identifies the key stakeholders or stakeholder groups that participate in or manage their operations. Finally, Figure 1 illustrates the information exchanged between these operational elements.

The ITS data dictionaries contain data concepts based on information flows documented in an ITS Architecture.

NOTE There may be multiple architectures, each with multiple versions that are referenced.

The data dictionaries in Figure 1 may be developed, for example, by ISO/TC 204 or regional or National "Standards Development Organizations" (SDOs), public agencies, or private companies. These data dictionaries are the responsibility of their respective SDOs, regional or National bodies. Each data dictionary shall be associated with a data steward and/or data submitter, using the process defined in this part of ISO 14817, to submit data concepts from their respective data dictionaries to the CIDCR. Furthermore, these data dictionaries should use registered data concepts from the CIDCR rather than invent new data concepts. The use of such registered data concepts will help to avoid redundancy in data concepts.

The CIDCR shall be the repository for submitted data concepts. Through the efforts of the data stewards, the registrar and the CIDCR change control committee (CCC) support identification of harmonization opportunities, recommendations for harmonization, and promotion of data concepts to higher quality levels where warranted. Finally, the CIDCR can provide data concepts to developers and other users for use in ITS applications.

Developers and other users should use data concepts from the CIDCR at the highest ("*Preferred*") quality level. The data concepts at this level are described unambiguously, harmonized across ITS sectors, and are considered representative of published data standards.

Table 1 presents a summary of the distinguishing characteristics between a data dictionary and the CIDCR.

Table 1 — Distinguishing characteristics of data dictionaries and the CIDCR

ITS Data Dictionary	CIDCR
Multiple data dictionaries	One (International) data concept registry
Covers single functional area	Covers multiple functional areas
Managed by a functional area steward	Managed by the CCC
Harmonized within the functional area	Harmonized across the ITS sector

7 Management of the Central ITS Data Concept Registry

7.1 Overview

Organizational roles associated with the ITS data concept registration process shall be established. The organizational roles for the CIDCR shall include the Executive Committee (ExCom), the Change Control Committee (CCC), the Registrar, Stewards, Submitters, and Read-only Users. A summary of each role is provided in this Clause. Clause 8 provides a description of the purpose, specific responsibilities, and membership or selection criteria for each role.

Figure 2 provides a high level view of how these organizational roles are related within the context of the CIDCR.

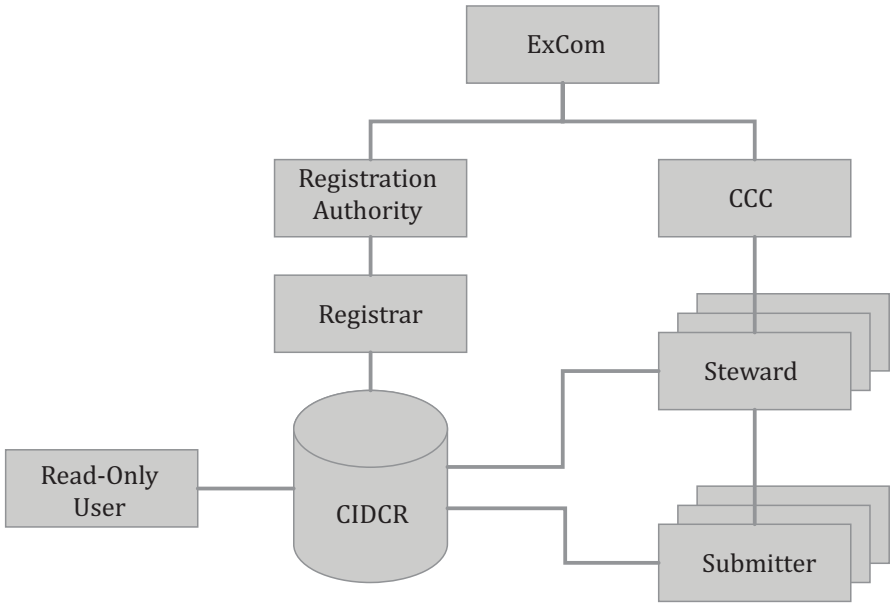


Figure 2 — Organizational chart for the CIDCR

7.2 ITS executive committee

The CIDCR Executive Committee (ExCom) shall be an organization established by ISO/TC 204. It shall be responsible for administering responsibilities and authority delegated by ISO/TC 204 in relation to the CIDCR. TC 204 shall specify precise reporting responsibilities for the ExCom. ExCom procedures and practices shall be subject to review and approval by TC 204 or its designated organizational component.

The ITS ExCom shall be responsible for overall policy and business direction for the CIDCR, to include the following.

a) Establishing overall registry policies, such as the application process for Submitters.

b) Resolution of all business management issues pertaining to the registry, including, but not limited to:

   1) addressing copyright issues;

   2) appointing representatives to the CCC;

   3) appointing stewards;

   4) selecting the registration authority;

   5) addressing funding issues;

   6) defining ExCom membership.

c) Ensuring the long-term success and performance of the registry.

d) Establishing and updating the registry charter and strategic plans.

e) Meeting at least semi-annually in face-to-face meetings, with additional meetings and/or teleconferences held as needed.

The ExCom will normally fulfil its responsibilities via consensus building. Intransigent issues may be resolved by ISO/TC 204, and whenever deemed appropriate in consultation with CEN/TC 278.

7.3 Change control committee

The CIDCR Change Control Committee (CCC) shall be the organization that is constituted to provide overall technical direction of the CIDCR and its contents, and its operation. The structure, staffing, procedures, and membership of the CCC are determined by the CIDCR ExCom. The membership of the CCC should include the Stewards.

The CCC is responsible for the following:

a) overall conduct of ITS registration operations;

b) promoting the reuse and sharing of data in the CIDCR within and across ITS functional-areas, and among external interested parties to the ITS enterprise;

c) progressing data concepts through registry registration “Qualified” and “Preferred” quality levels;

d) identifying data concepts to be registered from external data concept registries or data dictionaries;

e) resolving technical issues associated with registered data concepts, e.g. overlap, duplication, etc;

f) approving updates to data concepts previously placed in the registry in the “Qualified” or “Preferred” registration quality levels;

g) proposing registry policies to the ExCom for approval;

h) approving registry content, procedures, and formats;

i) submitting management-related recommendations and issues to the ExCom;

j) acting on directions from the ExCom;

k) meeting periodically in face-to-face meetings, with additional meetings and teleconferences held as needed.

The CCC will normally fulfil its responsibilities via consensus building in accordance with a procedure established by the ExCom. Intransigent issues may be resolved by a procedure established by the ExCom.

7.4 Registration Authority

The designated CIDCR Registration Authority (RA) shall be responsible for

a) nominating a registrar for approval by the ExCom, and

b) Hosting the CIDCR.

The CIDCR ExCom shall appoint the RA for defined durations, subject to their ability to provide an acceptable Registrar.

7.5 Registrar

The CIDCR Registrar shall be an approved representative of the RA who has expertise in data concept registration processes. The Registrar shall be responsible for facilitating the registration of ITS data concepts and making those data concepts widely accessible and available to the ITS community through the CIDCR. The RA shall appoint the Registrar with the approval of the CIDCR ExCom.

The Registrar provides a single point-of-contact responsible for managing and maintaining information about ITS data in the registry, under the authority of the RA. The Registrar is responsible for the following:

a) monitoring and managing the registry/data dictionary contents (Note: The registry is established, operated, and maintained by the RA);

b) enforcing policies, procedures, and formats for populating and using the registry;

c) proposing procedures and standard formats for the registry to the CCC for consideration;

d) recording current registration status and quality levels for data concepts in the registry;

e) ensuring access for authorized users to contents in the registry;

f) assisting in the progression of data concepts through the registration quality levels;

g) assisting in the identification and resolution of duplicate or overlapping data concepts in the registry;

h) acting on direction from the CCC;

j) maintaining the CIDCR software, within defined budgets;

k) maintaining contact information for all members of the CCC and the ExCom;

l) providing access to the CIDCR for authorized users;

m) maintaining controlled word lists of the CIDCR, such as, but not limited to

   1) status levels (as described in 8.2.7 and Annex C), and

   2) organization identifiers (as described in ISO 14817-1, B.1.5).

7.6 Steward

A CIDCR Steward shall be an ITS domain expert with current knowledge of standardization efforts in one or more sectors of the ITS domain. Stewards are responsible for the accuracy, reliability, and currency of descriptive metadata for data concepts at a registration quality level of “Qualified” or above within an assigned functional, regional or national area. Each ITS sector should be associated with at least one primary Steward, but a Steward may have responsibilities that cut across multiple ITS functions (e.g. value domains such as date, time, location, codes of the countries of the world). Stewards are appointed by the ExCom.

Stewards provide specific expert points of contact responsible for coordinating the identification, organization, and establishment of registered data for use throughout the ITS enterprise within an assigned area. Stewards are responsible for the following:

a) co-ordinating the identification and documentation of data concepts within their assigned area;

b) ensuring that appropriate data concepts in their assigned area are properly registered;

c) co-ordinating with other Stewards to attempt to prevent or resolve duplicated efforts in defining data concepts;

d) reviewing all data concepts once they are in the "Recorded" quality level to identify and attempt to resolve conflicts among data concepts with other Stewards;

e) ensuring the quality of meta-attributes for data concepts they propose for the "Qualified" registration quality level, reusing standardized data from external data concept registries where applicable;

f) proposing "Preferred" registration quality level data concepts in their assigned area;

g) ensuring that data concept registration procedures and formats are followed within their assigned functional area;

h) recommending Submitters to the RA.

7.7 Submitter

A CIDCR Submitter shall be an ITS domain expert who has developed data or represents an organization that has developed data. Submitters are approved by a process defined by the CIDCR ExCom. A Submitter is authorized to identify and submit data concepts suitable for registration. Submitters may be CIDCR Stewards or National Bodies.

Submitters should be familiar with or engaged in development and operational environments. Submitters maintain data concepts and are engaged to describe and submit new data concepts that conform to ISO 14817-1.

A Submitter is responsible for the following:

a) identifying himself to the "Registrar" in writing;

b) identifying and documenting data concepts appropriate for registration in the registry;

c) submitting data concepts to the registry;

d) ensuring the completeness of mandatory meta-attributes for ITS data concepts proposed for the "Recorded" registration quality level.

7.8 Read-only user

A CIDCR Read-only User is an individual that is approved to review the contents of the CIDCR. A Read-only User submits a request for access via the CIDCR. Access is approved by the CIDCR Registrar according to rules defined by the CIDCR CCC. A Read-only User has access to all the ITS sector contents in the registry, but is **not** permitted to submit, alter, or delete contents.

8 Administrative metadata

8.1 General

In addition to the meta-attributes defined in ISO 14817-1, the CIDCR shall support the metadata defined in this Clause according to the conformance rules defined in Annex A. 8.2 defines additional meta-attributes to be tracked for each data concept while 8.3 and 8.4 define administrative concepts

with their own set of meta-attributes. The administrative concepts store sets of administrative meta-attributes that are inter-related. An overview of this metadata are shown in Figure 3.

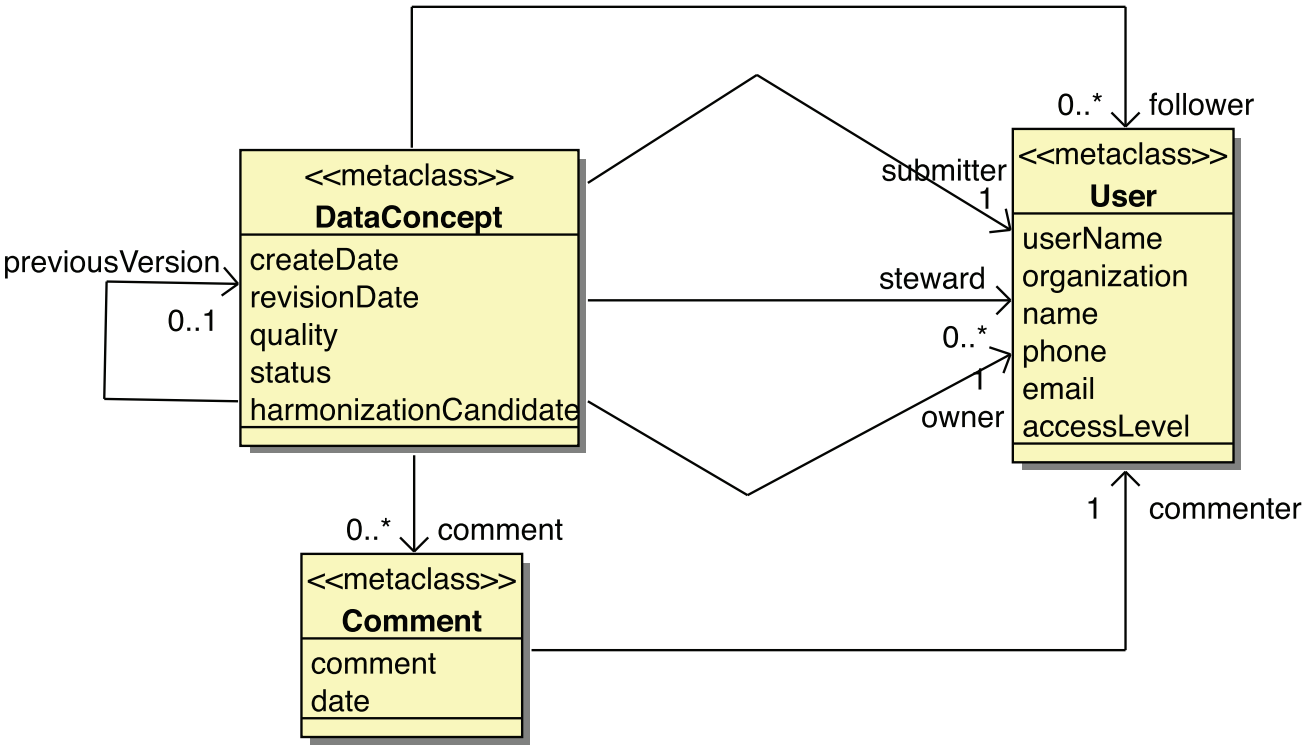


Figure 3 — Data concept overview

Each Data Concept is characterized by a Create Date, a Revision Date, a Quality, a Status, a Submitter, and an Owner. In addition, each Data Concept may have zero or more Followers, zero or more Stewards, and zero or more Comments. Each of these meta-attributes are defined in 8.2.

Any revision or new version of a data concept shall result in a new data concept record in the CIDCR and will be linked to the version that it updates. This will allow a complete historical record of the evolution of the data concept.

The Comments meta-attribute is represented by the Comment Administrative Concept, which is characterized by a Comment, a Date, and a Commenter. The details of these meta-attributes are given in 8.3.

The Submitter, Steward, Owner, Follower, and Commenter meta-attributes are represented by the User Administrative Concept, which is characterized by a User Name, an Organization, a Name, a Phone, an Email, and an Access Level. The details of these meta-attributes are given in 8.4.

8.2 Administrative meta-attributes for data concepts

8.2.1 Create date

Definition: The date on which the major version of the data concept was initially entered into the CIDCR, regardless of its status or quality at the time it was entered.

8.2.2 Revision date

Definition: The date on which the last revision was made to the data concept.

8.2.3 Submitter

Definition: A reference to the user who made the last revision to the data concept.

8.2.4 Steward

Definition: A reference to a user who has primary responsibility for harmonizing this data concept.

8.2.5 Owner

Definition: A reference to the user who is ultimately responsible for the managing the data concept.

The CIDCR may include data concepts that are adopted from foreign data dictionaries. In these cases, the source authority for the external data concept should reference the user that represents that data dictionary, otherwise this meta-attribute will reference the Steward that is associated with the data concept.

8.2.6 Quality

Definition: An indication of how well the data concept conforms to rules of ISO 14817-1, as given in Annex B.

8.2.7 Status

Definition: An administrative level assigned to a data concept according to its standardization status, as given in Annex C.

8.2.8 Follower

Definition: A reference to a user who has requested to be notified whenever this data concept (or any of its contained data concepts) changes.

NOTE A user who follows a Module will be notified anytime a data concept contained within that Module changes.

8.2.9 Comment

Definition: A reference to a comment that has been submitted by a user.

NOTE See 8.3 for details about the comment.

8.2.10 Harmonization candidate

Definition: An indication if a user believes the data concept should be harmonized.

Details about the proposed harmonization should be provided in a comment.

NOTE The harmonization process is defined in Annex E.

8.3 Comment

8.3.1 Comment

Definition: A human-readable textual description of the comment that a user wishes to submit for consideration by the Steward.

NOTE Comments are visible by all users who can view the data concept.

8.3.2 Date

Definition: The date on which the comment was submitted to the CIDCR.

8.3.3 Commenter

Definition: A reference to the user who submitted the comment.

8.4 User

8.4.1 User name

Definition: The name of the user as it appears to other users of the CIDCR.

8.4.2 Organization

Definition: The organization represented by the user when logged in with this account.

NOTE A single expert may be hired by multiple clients in order to submit data on their behalf. A user may have multiple accounts to accommodate this, each with a specific user name.

8.4.3 Name

Definition: The first and last name of the user.

8.4.4 Phone

Definition: A phone number, including country code, that can be used to contact the user.

8.4.5 E-mail

Definition: The e-mail address where the user would like to receive CIDCR-related messages.

8.4.6 Access level

Definition: The access level that has been assigned to the user.

Annex A
(normative)

Administrative meta-data requirements

A.1 Overview

This Annex presents conformance rules for including meta-attributes in the CIDCR for each data concept.

Rows denote the various meta-attributes. The first column of each row provides the name of the meta attribute. The clause number, wherein the meta attribute is defined, is given in the second column. The next 11 columns list the data concepts that may be registered in the CIDCR. The last column is for any notes pertinent to the meta-attribute and its relationship to each of the data concepts.

Each cell of the table contains a code that indicates whether the meta attribute on a particular row is mandatory, optional, indicative, automatically assigned, or not applicable for the data concept in a particular column. These codes are as follows:

— "M" = mandatory. Mandatory meta attributes are required for the referenced data concept, without exception.

— "O" = optional. Optional meta attributes may be implemented if desired by the functional-area data dictionary.

— "I" = indicative. Indicative meta attributes depend upon an "if" condition that is independent of any other meta-attribute. If the "if" condition is applicable, then the "I" coded meta-attribute is mandatory; otherwise, it is not applicable.

— "A" = Assigned. The value of this meta attribute is automatically assigned for data concepts entered into the CIDCR.

— "N/A" = not applicable.

The note column of each table explains the nature of each contingent or indicative meta attribute and provides other explanatory information.

NOTE Only single values are permitted for each meta attribute unless specifically identified as "Multiples Allowed".

A.2 Meta-attribute requirements for data concepts

Table A.1 shows the administrative meta attribute requirements for data concepts in the CIDCR.

Table A.1 — Administrative meta-attributes for data concepts

		Data concepts									
Meta-attribute	**Clause**	**Dictionary document**	**Module**	**Object class**	**Data element**	**Value domain**	**Interface dialog**	**Mes-sage**	**Data frame**	**Aggre-gate domain**	**Notes**
Create date	7.1.1	A	A	A	A	A	A	A	A	A	
Revision date	7.1.2	A	A	A	A	A	A	A	A	A	
Submitter	7.1.3	A	A	A	A	A	A	A	A	A	
Steward	7.1.4	I	I	I	I	I	I	I	I	I	Required, if data concept is at quality of "Qualified" or higher. Multiples allowed
Owner	7.1.5	M	M	M	M	M	M	M	M	M	
Quality	7.1.6	M	M	M	M	M	M	M	M	M	
Status	7.1.7	M	M	M	M	M	M	M	M	M	
Follower	7.1.8	A	A	A	A	A	A	A	A	A	Multiples allowed
Comment	7.1.9	O	O	O	O	O	O	O	O	O	Multiples allowed
Harmonization candidate	7.1.10	M	M	M	M	M	M	M	M	M	

Annex B
(normative)

Quality control

B.1 Quality levels

Quality levels are established to track the progression of a data concept in the quality review cycle as shown in the most common order of progression.

a) "**Incomplete**" – Indicates that the data concept has entries for at least the Data Concept Type, Contextual Name, and Definition meta-attributes, but does not pass all automated quality checks. An automated comment generated by the CIDCR should explain the problems identified by these automated checks.

b) "**Recorded**" – Indicates that the data concept has syntactically valid entries for all mandatory meta-attributes and passes all defined automated checks for the data concept type.

c) "**Submitted**" – Indicates that the Submitter is satisfied with the proposed values of all meta-attributes and wishes to submit it for consideration as a qualified data concept.

d) "**Provisionally Qualified**" - Indicates that a "Steward" has confirmed that all appropriate meta-attributes are complete and conform to applicable meta-attribute quality requirements for syntax and semantics.

e) "**Qualified**" – Indicates that the CCC has confirmed that all appropriate meta-attributes are complete and conform to applicable meta-attribute quality requirements for syntax and semantics.

f) "**Provisionally Preferred**" – Indicates that a Steward has proposed the data concept to become a "Preferred" data concept for general use in the ITS community; however, certification of "Preferred" status of the data concept by the CCC is not yet complete.

g) "**Preferred**" – Indicates that the CCC believes that the data concept embodies the preferred syntax and semantics to be used when discussing the concept anywhere within the ITS domain. Data concepts using alternate syntax and semantics may still be defined.

NOTE The preferred quality level is intended to guide developers of new data concepts towards a single solution when a custom design is not technically justified. It is recognized that alternate syntax and/or semantics may be required in some situations, especially to address legacy, bandwidth, or other technical issues. A Steward or the CCC may recommend the use of a preferred data concept, but the ultimate decision on whether to use a preferred data concept or an alternate representation is left to the domain experts developing the standard.

h) "**Provisionally Retired**" – Indicates that a Steward has suggested that the data concept be retired. The data concept should either include a value for the Successor meta-attribute or include a comment as to why the data concept is proposed for retirement without a successor.

i) "**Retired**" – Indicates that the CCC no longer recommends the data concept for new deployments within the ITS community but implementers should be aware that existing systems may use the data. Such data concepts are retained in the registry archival storage facility for historic reference purposes. "Retired" data concepts should either include a value for the Successor meta-attribute or a comment explaining why there is no successor.

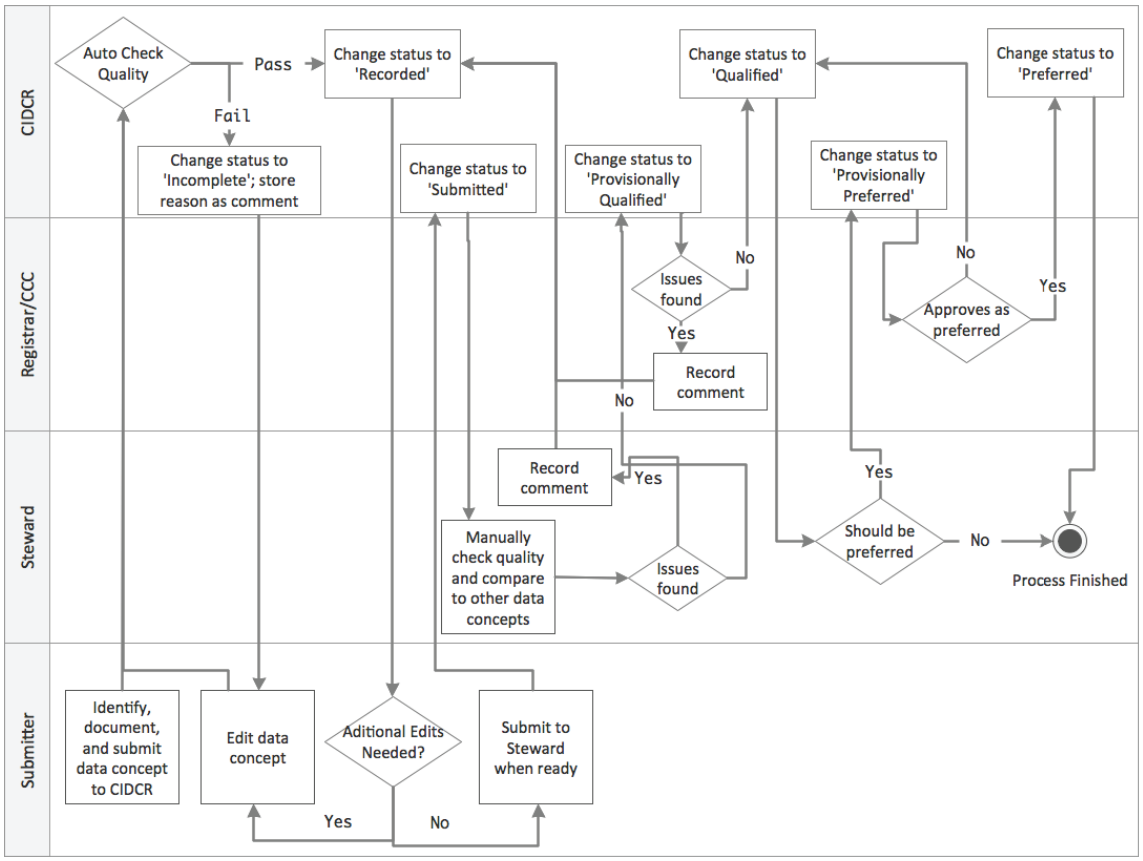
j) "**Provisionally Obsolete**" – Indicates that a Steward has suggested that the data concept be considered obsolete.

k) "**Obsolete**" – Indicates that the CCC no longer believes that the data concept is in use within the ITS community and discourages its use in new deployments. Such data concepts are retained in the registry archival storage facility for historic reference purposes.

B.2 Quality control process

B.2.1 Overview

This Clause describes registration and harmonization activities for the CIDCR. Figure B1 summarizes these activities.



NOTE 1 Figure only shows primary responsibility; comments can be submitted by anyone at any time.

NOTE 2 Intransigent issues found by the Steward, CCC, or Registrar may be resolved by the ExCom.

Figure B.1 — Registration functional activities

The RA shall establish the necessary procedures to accomplish the functional activities described in this Annex.

B.2.2 Registration initiation

The Submitter shall be responsible to propose and document data concepts for registration in the CIDCR in a manner that it qualifies for "Recorded" quality level, which indicates that the data passes all automated syntactical checks. A Submitter shall acquire an understanding of ITS data concepts, their context and sources, and their significance in the course of accomplishing normal operational, design, development, or management activities. Once submitted, the CIDCR shall perform a number of automated checks on the syntax of the required meta-attributes. If any of the checks fail, the quality level shall be "Incomplete" and the CIDCR shall indicate the problems within a comment to the data concept. If all checks pass, the quality level shall be "Recorded". Once the data concept is in the

"Recorded" quality level and the Submitter is comfortable with the values of all meta-attributes, the Submitter may submit the data concept for further review (at which point its quality level becomes "Submitted").

B.2.3 Quality review

When a data concept reaches the "Submitted" quality level, the relevant Steward will be notified by the CIDCR. The Steward shall ensure that the data concept meets all quality requirements. Whereas the CIDCR automated checks will focus on syntactical checks, the Steward will focus on semantics (e.g. is the definition and other fields clear and unambiguous) and comparing the data to other data concepts to prevent unnecessary duplication or overlaps. If the Steward finds any issues with the data concept, s/he shall record the issue(s) in a comment and change the quality level to "Recorded". Comments from the Steward should be limited to semantic clarity issues and the CIDCR will notify the Submitter any time a comment is added, deleted, or modified to the data concept.

Upon the receipt of a comment from a Steward, the Submitter should modify the data concept to address the comment. If the Submitter believes the normative information data concept is correct, the modification may be limited to the non-normative fields, such as the Remarks meta-attribute.

Once the Steward is satisfied with the quality of the data concept, s/he shall change its quality level to "Provisionally Qualified". If the Submitter and Steward are unable to resolve the issue, the issue shall be elevated to the CCC.

The CCC shall review data concepts that have been identified as "Provisionally Qualified" or for which the Submitter and Steward could not reach consensus. The CCC, which includes Stewards representing all sectors of the ITS industry, shall identify any concerns about the data concept. If any issues are found, the CCC will add a comment to the data concept and return the quality level to "Recorded". The Submitter should make changes and resubmit the data concept.

Once the CCC is satisfied with the quality of the data concept, the Registrar shall change its quality level to "Qualified". If the Submitter and the CCC are unable to resolve the issue, the issue shall be elevated to the ExCom.

Conflicts between the Submitter and Steward(s) should be exceedingly rare as long as each understands their intended role. Stewards should realize that Submitters are the domain experts who understand the needs of their standards. Submitters should realize that Stewards are the experts on how to document data and what data already exists within the CIDCR. Stewards should suggest the reuse of existing data concepts, when they exist, so that we minimize redundancy and meaningless variations within the CIDCR; but they should readily accept a Submitter's assertion that their request for a new data concept is valid, if they continue to believe this after being notified of what existing data concepts might exist.

B.2.4 Preferred Review

Any Steward, perhaps based on the request from a Submitter, may elevate any data concept to the "Provisionally Preferred" quality level.

The CCC shall review data concepts that have been identified as "Provisionally Preferred". The CCC shall determine whether the data concept embodies the preferred syntax and semantics that should be used throughout all sectors of ITS when discussing the data concept. If the CCC agrees, the quality level shall be elevated to "Preferred", otherwise, the quality level shall be returned to the "Qualified" state.

B.2.5 Retirement

NOTE This process is not shown in Figure B1.

A Steward may recommend that a data concept be retired for a various reasons, which includes the following:

a) new version of the data concept has reached the same quality level or higher;

b) data concept has been merged with another data concept or diverged into multiple data concepts;

c) ITS community no longer needs the data concept.

Once recommended, the quality level shall be changed to “Provisionally Retired”. The CCC shall review data concepts that have been identified as “Provisionally Retired” and determine whether to retire the data concept. If the CCC agrees, the quality level shall be updated to “Retired”, otherwise, the quality level shall be returned to the level it had prior to the recommendation to retire.

Annex C
(normative)

Status levels

C.1 Status levels

Status levels are established so that users of the CIDCR may understand the relative stability of data concepts. The status levels are defined below in order from lowest level to highest level.

a) "Rescinded" – Indicates that none of the other status levels apply and that the data concept is no longer in use and no longer in any current standard.

b) "Regional Draft" – Indicates that the data concept is currently being developed in a regional standard or other document and has not been used.

c) "Regional Use" – Indicates that the data concept is currently in use, but it is not contained in any current formal standard.

d) "Regional Tentative" – Indicates that the data concept is in the latter stages of being formalized within a regional standard irrespective of its use. For example, the normal user comment periods have been completed, but the document is either under ballot or under final editing and the data concept is not yet considered standardized.

e) "Regional Standard" – Indicates that the data concept is part of an approved regional standard.

f) "WG Draft" – Indicates that the data concept is contained in an international working group draft standard. (i.e. Preparatory or Committee Stage)

g) "DIS" – Indicates that the data concept is contained in an international draft International Standard (i.e. Enquiry Stage)

h) "FDIS" – Indicates that the data concept is contained in a final draft International Standard (i.e. Approval Stage)

i) "Standard" – Indicates that the data concept is contained in a published International Standard.

Data concepts that appear in more than one document shall be assigned the status that reflects its highest level of registration among all documents contained in the CIDCR.

Annex D
(normative)

Version control

D.1 General

Every instance of a data concept in the CIDCR is associated with a version (i.e. major version number) and a revision (i.e. minor version number). Both of these values are automatically managed by the CIDCR, while the Registrar has the ability to override the revisions of the CIDCR.

The CIDCR shall maintain copies of all revisions of all versions of every data concept. Any edit to a data concept will generally create a new revision or version of the data concept with (nearly) identical information, except for the edited meta-attributes.

The values of the version and revision meta-attributes shall be conformant to the rules defined in ISO 14817-1. Precise procedures for managing the values of these meta-attributes are provided in the following clauses.

D.2 Version changes

The version number shall only change upon the first normative change to a data concept that is at the Status level of “Standard” or “Regional Standard”. The CIDCR shall consider a change to any of the following meta-attributes to be a normative change:

a) definition;

b) dialogue order rules;

c) abstract;

d) data type;

e) format;

f) unit of measure;

g) valid value rule;

h) constraint.

The CIDCR shall allow the Registrar to override the version update, and instead implement a revision update, if it is only caused by a change in the Definition meta-attribute. The Registrar shall only take this action if directed to do so by the CCC.

The override by the Registrar should only be directed when the edit to the above meta-attributes are strictly editorial in nature.

An update in the Version meta-attribute shall clear the Object Identifier meta-attribute.

NOTE This will generally change the quality of the data concept to “Draft”.

D.3 Revision changes

Any change to a data concept shall result in a new duplicated record in the database, with the caveats as shown below:

a) The following changes shall not result in a duplicated record:

   1) The addition, deletion, or amendment of a Comment;

   2) The addition, deletion, or amendment of a Follower;

   3) The addition, deletion, or amendment of a Steward.

b) The following meta-attributes shall be updated as appropriate, not simply copied from the previous record:

   1) version;

   2) revision;

   3) revision date.

c) The CIDCR implementation may create abstractions of the data concept to share certain meta-attributes among multiple revisions. For example, the Data Type meta-attribute may not change among different revisions of the same version of a data concept. The CIDCR may choose to implement the design in such a way to take advantage of this shared data.

Annex E
(normative)

Harmonization and resolution

NOTE Harmonization of data does not necessarily result in a single definition of every data concept; it merely suggests that every alternative data concept exists for a reason and acts in harmony with other data concepts. This is conceptually similar to the world of music, where a harmonized part is different than the melody. It is similar to the melody (e.g. same key, same tempo, and generally the same or similar rhythm) but is different for a reason (i.e. to enhance the overall musical experience).

E.1 ITS data harmonization and reuse procedures

E.1.1 Overview

These procedures detail how the CCC and the Stewards execute their responsibilities regarding identification, reconciliation, and documentation of data concept overlaps and duplications across all sectors of ITS.

E.1.2 Identification and resolution of ITS data aresues

Identification of potential data concept issues may be accomplished by Stewards or the Registrar as follows:

Step 1: Stewards may review the CIDCR contents to identify potential data concept harmonization issues. The Stewards shall flag all data concepts identified with the Harmonization Candidate flag and shall explain the issue in a comment.

Step 2: The Registrar may independently identify harmonization issues using the capabilities of the CIDCR and may focus on particular areas based on direction received from the CCC (e.g. location reference or incident management) or data concept type (e.g. value domains). Identification of potential data concept issues will result from analysis by the Registrar of data element names, definitions, common property/object/representation terms, and common or similar value domains.

Step 3: The Registrar will prepare a summary listing of potential data concept issues together with all documenting meta-attributes for each data concept on the summary listing. The listing will contain any new potential data element issues identified since the last check point as well as any open data element issues from past listings; it will also indicate the harmonization status for recently resolved issues. This summary listing will include the following meta attributes: Data Concept Identifier, Descriptive Name, Definition, Remarks, Comments, and Steward.

Step 4: The Registrar shall distribute the listing to the CCC.

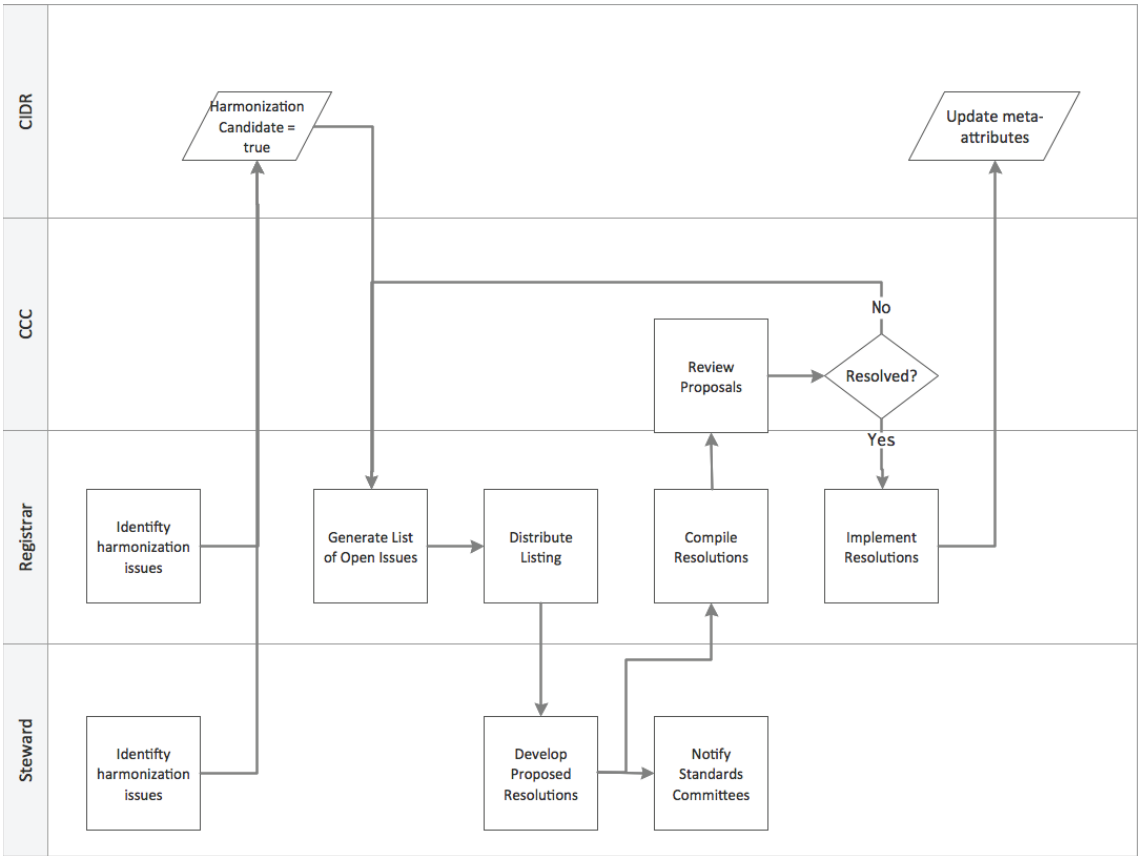


Figure E.1 — Harmonization procedure flow

Step 5: Upon receipt of this periodic listing, each Steward shall analyse the potential issues for which they are a Steward, consulting with any other Stewards as appropriate, and determine an appropriate resolution. The first step in this process is for each of the Stewards involved to understand the semantics of the data concepts at issue. If the semantics are not equivalent then the data concepts should remain separate. If they are equivalent or significantly equivalent, then the Stewards should agree to use one of them, modify one of them for joint use, or mutually agree to a new data concept to supersede those data concepts at issue. After achieving semantic resolutions, the Stewards then should address the syntactical issues (i.e. representational form) of the data concepts at issue. The intent of this examination is to agree on a mutual solution to these dimensions of the data concepts at issue.

A UML Class diagram should be prepared as a first step to understanding the semantic issues involved.

The resolution may be any of the following:

a) one data concept is selected (possibly modified) as the Preferred and other data concepts reference the selected data concept as their Successor;

b) new data concept is created to represent the Preferred concept and the other data concepts reference the new data concept as their Successor;

c) each of the data concepts at issue are kept separate and independent.

Step 6: Each Steward associated with the data concept shall notify their standards committee(s) and Submitter of the resolution for their consideration. The standards committees will need to weigh the benefits of migrating to the resolved definition versus the benefits of continuing to use their existing definition.

NOTE A harmonized data concept has been assigned a Successor does not mean that the status or quality of the harmonized data concept changes. The data concept can still be kept at the “Qualified” quality level and “Standard” status level for as long as the standardization committee believes it is appropriate.

Step 7: The Stewards shall report the results of the resolution to the Registrar as soon as that resolution is determined.

Step 8: The CCC will review the harmonization results and issue directions to the Registrar. For those data concepts at issue for which harmonization has been achieved between the relevant Stewards, the CCC will review and approve the Stewards' harmonization status, or require such additional harmonization actions as may be appropriate. The CCC will review those data concepts at issue that the relevant Stewards have not been able to resolve and propose resolutions, if possible. The Registrar should retain each data concept at issue, together with its current harmonization status, on the harmonization listing until the CCC has approved the final harmonization status. These data concepts will be included in the next listing of harmonization issued at Step 2.

Step 9: Once final harmonization is achieved, the Registrar shall ensure that the results of the resolutions are implemented within the CIDCR by

a) ensuring the preferred data concept is elevated to the "Preferred" quality level,

b) ensuring that each non-preferred associated data concept is updated to list the preferred data concept as its Successor,

c) clearing the harmonization candidate flag from each associated data concept, and

d) adding a remark to each associated data concept to explain the resolution.

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