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Building construction — Organization of information about construction works —

Part 3: Framework for object-oriented information

Construction immobilière — Organisation de l'information des travaux de construction —

Partie 3: Schéma pour l'information basée sur l'objet

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

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 13, *Organization of information about construction works,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 442, *Building Information Modelling (BIM),* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 12006:2007), which has been technically revised.

The main changes are as follows:

— model has been changed and adapted for multiple implementations of dictionaries;

— UML and XML have been introduced in informative annexes;

— API specification has been included;

— relationships among concepts have been made mandatory and concepts have been made more rigid, specific and object-oriented.

A list of all parts in the ISO 12006 series can be found on the ISO website.

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

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Introduction

This document defines a specification for an extensible taxonomy model, which provides the ability to add concepts like subjects and properties, describe subject by means of properties, and to define relationships between concepts. The set of properties associated with a subject provide the formal definition of the subject as well as its typical behaviour. Properties can have predefined values; and they can be associated with units.

The model makes it possible to describe multiple dictionaries based on the same model. Each concept belongs to one data dictionary. The concepts in one data dictionary can be related to concepts in another data dictionary.

Every entity in the model has a universal unique identifier. The model allows users to describe the development and maintenance of a data dictionary by providing change requests; and it also allows describing the experts reviewing change requests. The model described in this document is proposed as a bridge between classification systems as described in ISO 12006-2 and product modelling as described in ISO 10303-41, ISO 10303-221, ISO 15926-2 and ISO 16739-1.

This document supports the requirements for implementing the concepts described in ISO 23386 and ISO 23387. Not all the concepts from ISO 23386 are provided by the model described in this document.

To simplify and support implementation of dictionaries based on this framework, This document includes UML model[10] and XML schema[11] as Annexes C and D respectively. An API specification is added as Annex B to standardize and define the minimum functionality to extract and exchange data between dictionaries based on this document.

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Building construction — Organization of information about construction works —

Part 3: Framework for object-oriented information

1 Scope

This document specifies a language-independent information model which can be used for the development of dictionaries used to store or provide information about construction works. The model is extended by instantiating content, such as further objects and their relationships, allowing the content to serve as an ontology, taxonomy, meronomy, lexicon and thesaurus.

NOTE 1 Lexicons are resources for comprising lexical entries for a given language

NOTE 2 Meronomies are type of hierarchies which deals with part-whole relationships

NOTE 3 Ontologies are formal, explicit specification of a shared conceptualizationIt enables classification systems, information models, object models, data templates and process models to be cross-referenced from within a common framework.

This document provides the description of an API allowing the interconnection of data dictionaries as described in ISO 23386.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 80000 (all parts), *Quantities and units*

ISO 639 (all parts), *Codes for the representation of names of languages*

ISO/IEC 10646, *Information technology — Universal coded character set (UCS)*

ISO/IEC 9834-8,2014, *Information technology — Procedures for the operation of object identifier registration authorities — Part 8: Generation of universally unique identifiers (UUIDs) and their use in object identifiers*

ISO/IEC 20802-1, *Information technology — Open data protocol (OData) v4.0 — Part 1: Core*

ISO/IEC 20802-2, *Information technology — Open data protocol (OData) v4.0 — Part 2: OData JSON Format*

3 Terms and definitions

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

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

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

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

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3.1
data dictionary
database that contains metadata

[SOURCE: ISO 2382, 2121501, modified — The admitted term "information resource dictionary" has been removed. The Notes to entry have been removed.]

3.2
classification
process of assigning *objects* (3.4) to classes according to criteria

[SOURCE: ISO 22274:2013, 3.5]

3.3
data template
data structure used to describe the characteristics of construction *objects* (3.4)

[SOURCE: ISO 23387:2020, 3.3, modified — Exampless and Notes to entry have been removed.]

3.4
object
any part of the perceivable or conceivable world

Note 1 to entry: An object is something abstract or physical toward which thought, feeling, or action is directed.

[SOURCE: ISO 12006-2:2015, 3.1.1]

3.5
property
defined characteristic suitable for the description and differentiation of the *objects* (3.4) in a class

[SOURCE: ISO 22274:2013, 3.25, modified - Example removed.]

3.6
attribute
data element for the computer-sensible description of a *property* (3.5), a relation or a class

EXAMPLE Creation date of a class object in a computer system.

[SOURCE: ISO ISO 22274:2013, 3.2]

4 Language encoding

All information that is specified as type “String”, or that resolves to type “String”, shall be able to be expressed using the UNICODE character set (see ISO 23386) as set out in ISO/IEC 10646, preferably using the UTF-8 encoding form, the UTF-8 encoding scheme and the “UCS Transformation Format 8”.

5 Specification

5.1 General

The model in this document is specified using the EXPRESS data definition language according to ISO 10303-11.

The model is described informally in 5.2, conforming to the EXPRESS-G notation.

The model is described formally in the EXPRESS language specification presented in 5.3 and as an EXPRESS long form specification in Annex A.

NOTE ISO 10303-28, ISO/TS 10303-25 and ISO 10303-22 specify mappings to XML and XMI representations and an API respectively.

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