INTERNATIONAL STANDARD

ISO
16354

Guidelines for knowledge libraries and object libraries

Lignes directrices pour les bibliothèques de connaissance et les bibliothèques d'objets

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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 electro technical 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 16354 was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 13, *Organization of information about construction works*.

Introduction

Knowledge libraries are databases that contain modelled knowledge about kinds of things.

Knowledge libraries are intended to support business processes concerning any kind of products during their lifetime, for example to support their design, procurement, construction, operation or maintenance. There is an increasing awareness of the high potential value of knowledge libraries and of the drawbacks of the inconsistencies and lack of interoperability between different knowledge libraries.

This standard is based on Netherlands Technical Agreement NTA 8611:2008 (en), *Guidelines for Knowledge Libraries and Object Libraries, Version 3.0*.

On both a national and international level knowledge libraries exist or are being developed, such as the Gellish English Dictionary-Taxonomy (previously called STEPlib), UNETO-VNI ETIM system, LexiCon and the GWW Objectenbibliotheek [Civil Object Library] and International Framework for Dictionaries (IFD) developed by the Building Smart consortium. International efforts include IEC 61360, ISO 13584, ISO/TS 15926-4, and ISO 12006-3.

Historically, most libraries have had their own unique structure and methodology for defining their objects and they use their own naming conventions. For instance, the structure of the article classes laid down in ISO 13584-42 notably differs from that of the UNETO-VNI component classes (publication 8) or LexiCon, based on ISO 12006-3. In most cases the intrinsic definition of objects will also be different.

The major ICT developments with regard to the Internet and XML technology have increased the possibility for uniformity. From a technical point of view, it has become much easier to exchange data, which increases the need and support for this within the industry. Organizations launching new initiatives for the creation of knowledge libraries may also greatly benefit from enhanced uniformity. They may come up with questions such as: "Which existing libraries should be used?", "Will these libraries receive sufficient support?", "Do they fulfil my information needs?" and "Is there international support for such libraries?"

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Guidelines for knowledge libraries and object libraries

1   Scope

The aim of this standard is to distinguish categories of knowledge libraries and to lay the foundation for uniform structures and content of such knowledge libraries and for commonality in their usage. By drawing up a number of guidelines, a guiding principle is provided for new libraries as well as for upgrading existing libraries. Without these guidelines there is an undesirable amount of freedom, so that the various libraries may become too heterogeneous. This would render the comparison, linking and integrated usage of these libraries very complex, if not impossible.

— The objective of the standard is to categorize knowledge libraries and object libraries and to provide recommendations for the creation of such libraries. Libraries that are compliant with the guidelines of this standard may be more easily linked to, or integrated with other libraries.

— The target audience of the standard consists of developers of knowledge libraries, builders of translation software or interfaces between knowledge libraries, certifying bodies and builders of applications who must base their work on the knowledge libraries laid down.

NOTE 1   Knowledge libraries are databases or files that contain modelled knowledge about kinds of things. They are intended to support business processes concerning any kind of products during their lifetime, for example to support their design, procurement, construction, operation or maintenance. There is an increasing awareness of the high potential value of knowledge libraries and of the drawbacks of the inconsistencies and lack of interoperability between different knowledge libraries.

NOTE 2   This standard does not aim to standardize terminology, but to harmonize and standardize concepts. Thus the use of synonyms and synonymous phrases and one-to-one translations are allowed or even recommended, provided that alternative terms denote the same concepts and reference is made to the corresponding synonymous terms in this standard.

2   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.

None.

3   Terms and definitions

3.1   Terms and definitions for concepts

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

NOTE   The guidelines in this standard are expressed by using two kinds of building blocks: concepts and relation types (which are a special kind of concepts). In this clause, the definitions of those building blocks are provided. The overall description method of the building blocks bears great resemblance to the description method used in several other ISO standards, e.g. the ISO 10303 series.

For each concept a number, a term (which may be a multi-word term or phrase) and a definition is given, usually followed by an explanation in a Note and one or more examples. Each term denotes a concept in English in the context (language community) of this standard.

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3.1.1
knowledge library
collection of information models that express knowledge (which may include also definition models and requirements models) about kinds of things (concepts) and that are stored and retrieved as electronic information

Note 1 to entry: A knowledge library may contain knowledge about physical objects as well as about non-physical objects, such as occurrences, activities, processes and events, or about properties, relationships, scales (units of measure), mathematical objects, etc. Each information model in a knowledge library should be retrievable as a separate model, although the content of the various models may overlap. It is not required that every information model has a separate unique identifier as a model may also be retrieved on the basis of a query.

An *object library* (in the context of this standard) is a special kind of knowledge library as it is a collection of knowledge models (possibly also including definitions and requirements) about kinds of physical objects.

3.1.2
knowledge model
information model that expresses knowledge in a computer interpretable structure

Note 1 to entry: A knowledge model consists of a number of expressions of facts about a concept, each of which expressions expresses something that can be the case. Those expressions should comply with the guidelines in this standard. A requirements model is a subtype of a knowledge model. It expresses what shall be the case in a particular context.

Note 2 to entry: Knowledge models typically define further subtypes of the concepts that are defined in this standard.

Information models are expressions of meaning in a formal language that is computer interpretable.

3.1.3
fact
state of being the case

Note 1 to entry: A fact can be represented by a fact identifier (see the concept 'unique identifier'). Something that is the case may be expressed by an expression. Such an expression may consist of a relation between representatives of related things, whereas typically that relation is classified by a kind of relation. A fact may be stated, denied or questioned or confirmed in the expression.

3.1.4
definition
representation of a concept by a descriptive statement which serves to differentiate it from related concepts

[ISO 1087-1:2000]

Note 1 to entry: A definition may be expressed as natural language text (a textual definition) or as a definition model. A textual definition should comply with the applicable guideline(s) in this standard. A definition expresses what is by definition the case for all things of the defined kind and if such an expressed constraint is not the case for a thing, then that thing is not a thing of the defined kind.

A *definition model* is a subtype of a knowledge model and consists of a number of expressions of facts about the defined concept. Those expressions should comply with the guidelines in this standard.

3.1.5
concept
(1)unit of knowledge created by a unique combination of aspects and/or components

[adapted from ISO 1087-1:2000]

(2)commonality between individual things that is defined by one or more constraints that describe the limits for the inclusion of individual things to conform to the concept

Note 1 to entry: A concept is a human idea used to categorize phenomena and to allocate knowledge that is common about those phenomena. All concepts in a knowledge library are specializations (subtypes) of concept.