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Foreword

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In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national 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 and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 13250 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 34, *Document description and processing languages*.

This second edition cancels and replaces the first edition (ISO/IEC 13250:2000), which has been technically revised.

Introduction

This International Standard provides a standardized notation for interchangeably representing information about the structure of information resources used to define topics, and the relationships between topics. A set of one or more interrelated documents that employs the notation defined by this International Standard is called a *topic map*. In general, the structural information conveyed by topic maps includes:

— groupings of addressable information objects around topics ("occurrences"), and

— relationships between topics ("associations").

A topic map defines a multidimensional topic space — a space in which the locations are topics, and in which the distances between topics are measurable in terms of the number of intervening topics which must be visited in order to get from one topic to another, and the kinds of relationships that define the path from one topic to another, if any, through the intervening topics, if any.

NOTE 1   Two topics may be connected through an association, and they can also be connected by virtue of sharing an occurrence.

In addition, information objects can have properties, as well as values for those properties, assigned to them externally. These properties are called *facet types*.

NOTE 2   The word *facet* can mean one side of a many-sided, polished object, or one segment of a compound eye (e.g. an insect's). Its metaphorical use here captures the idea that a facet is a property of a set of information objects that can be used to create a view of them.

Several topic maps can provide topical structure information about the same information resources. The topic maps architecture is designed to facilitate merging topic maps without requiring the merged topic maps to be copied or modified. Because of their extrinsic character, topic maps can be thought of as *overlays* on, or extensions to, sets of information objects.

The base notation of topic maps is SGML; an interchangeable topic map always consists of at least one SGML document, and it may include and/or refer to other kinds information resources. A set of information resources that comprise a complete interchangeable topic map can be specified using the "bounded object set (BOS)" facility defined by the HyTime architecture in ISO/IEC 10744:1997.

As the Extensible Markup Language (XML), a World Wide Web Consortium recommendation, is a subset of SGML, as explained in Annex K of SGML (1997), also known as WebSGML, XML can be also used as a base notation for Topic Maps.

The topic map notation is defined as an *SGML Architecture*, and this International Standard takes the form of an *architecture definition document* expressed in conformance with Normative Annex A.3 of ISO/IEC 10744:1997, the *SGML Architectural Form Definition Requirements* (AFDR). The formal definition of the topic map notation is expressed as a meta-DTD.

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Information technology — SGML applications — Topic maps

1 Scope

NOTE 1   This clause defines the scope of this International Standard. It should not be confused with the concept of "scope" defined in 3.16, which only applies in the context of topic maps.

Topic maps enable multiple, concurrent views of sets of information objects. The structural nature of these views is unconstrained; they may reflect an object oriented approach, or they may be relational, hierarchical, ordered, unordered, or any combination of the foregoing. Moreover, an unlimited number of topic maps may be overlaid on a given set of information resources.

Topic maps can be used:

— to qualify the content and/or data contained in information objects as topics to enable navigational tools such as indexes, cross-references, citation systems, or glossaries;

— to link topics together in such a way as to enable navigation between them. This capability can be used for virtual document assembly, and for creating thesaurus-like interfaces to corpora, knowledge bases, etc.;

— to filter an information set to create views adapted to specific users or purposes. For example, such filtering can aid in the management of multilingual documents, management of access modes depending on security criteria, delivery of partial views depending on user profiles and/or knowledge domains, etc.;

— to structure unstructured information objects, or to facilitate the creation of topic-oriented user interfaces that provide the effect of merging unstructured information bases with structured ones. The overlay mechanism of topic maps can be considered as a kind of *external markup mechanism*, in the sense that an arbitrary structure is imposed on the information without altering its original form.

This International Standard does not require or disallow the use of any scheme for addressing information objects. Except for the requirement that topic map documents themselves be expressed using SGML (or WebSGML) and HyTime, using the syntax described herein, neither does it require or disallow the use of any notation used to express information.

2 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 8879:1986, *Information processing — Text and office systems — Standard Generalized Markup Language (SGML)*

ISO/IEC 10744:1997, *Information technology — Hypermedia/Time-based Structuring Language (HyTime)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8879:1986, ISO/IEC 10744:1997 and the following apply.

3.1
added themes
topics added to the sets of themes comprising the scopes within which topics have their topic characteristics; added themes can be specified in two ways:

a) within the topic map document whose scopes are affected, by means of the **added themes** (*addthems*) attribute of the document element. The specified themes are added to the scopes of all of the topic characteristics which are assigned to topics via the topic links and association links contained in the document;

b) inside or outside the topic map document whose scopes are affected, by means of elements conforming to the **themes to be added** (*addthms*) architectural form. The specified themes are added to the topic characteristics assigned to topics via:

— entire topic map documents (specified via the *tmdocs* attribute),

— topic links (that is, the name characteristics and occurrence characteristics assigned to topics via topic links) (specified via the *cassign* attribute),

— association links (that is, the roles played in associations by topics, as assigned to topics via association links) (specified via the *cassign* attribute), or

— any combination of the foregoing

3.2
association

SEE **topic association** (3.22)

3.3
association link
hyperlink element conforming to the association link architectural form defined by this International Standard

NOTE   See 5.4.

3.4
association role
one of the roles that topics play in a given topic association

3.5
association type
subject which is a class of topic associations

one of the classes of topic associations of which a particular association link is an instance; the association types of which a given association link is an instance can be specified by its optional *types* attribute

3.6
base name
subelement (*basename*) of a *topname* subelement of a topic link

name characteristic of a topic that is specified in the content of a *basename* element

3.7
bounded object set
BOS
set of one or more documents and other information objects, all of which are known to the processing application and which are processed collectively, see ISO/IEC 10744:1997 for details; see also the definition of "hub document"

3.8
display name
subelement (*dispname*) of a *topname* subelement of a topic link, containing the identifying information intended to be displayed by the application to represent the subject of the topic link

name characteristic of a topic that is specified in the content of a *dispname* element

3.9
facet

subset of information objects that share an externally-applied property

values given to a particular property externally applied to a set of information objects

3.10
facet link

hyperlink that applies values for a given property (as well as the property itself) to one or more information objects

3.11
facet type

property applied by one or more facet links to one or more objects

3.12
facet value

member of the set of all values of a particular facet type

3.13
hub document

HyTime document used to define the set of information resources (the *bounded object set (BOS)*) that comprise a HyTime hyperdocument; applications may regard the HyTime document used as the entry point for a browsing session within a hyperdocument as the hub document; see ISO/IEC 10744:1997 for details; by definition, a topic map is a HyTime hyperdocument, and any topic map document can be regarded as a hub document

3.14
occurrence role

sense in which some set of occurrences is relevant to a topic; in the topic maps architecture, occurrence roles are specified as anchor roles (as defined in the HyTime architecture) of topic links

3.15
public subject descriptor

subject descriptor (see the definition of "subject descriptor") which is used (or, especially, which is designed to be used) as a common referent of the *identity* attributes of many topic links in many topic maps; the subject described by the subject descriptor is thus easily recognized as the common binding point of all the topic links that reference it, so that they will be merged

3.16
scope

extent of the validity of a topic characteristic assignment (see the definition of "topic characteristic assignment"): the context in which a name or an occurrence is assigned to a given topic, and the context in which topics are related through associations; this International Standard does not require that scopes be specified explicitly; if the scope of a topic characteristic assignment is not explicitly specified via one or more *scope* attributes, the scope within which the topic characteristic applies to the topic includes all the topics in the entire topic map; this special scope is called "the unconstrained scope"; if a scope is specified, the specification consists of a set of topics, which, in the context of their role as members of such a set, are called "themes"; each theme contributes to the extent of the scope that the themes collectively define; a given scope is the union of the subjects of the set of themes used to specify that scope

NOTE 1   The definition of scope provided here should not be confused with 1, entitled "Scope", which defines the Scope of this International Standard.

NOTE 2   If it is desired to specify a scope which is the intersection (rather than the union) of two topics, this can be accomplished by creating a topic whose subject is that intersection, and then by using that topic as a theme.

3.17

sort name

subelement (*sortname*) of a *topname* subelement of a topic link, containing a string that is an alternative representation of a topic name that is intended to be used for alphabetic or other ordering

name characteristic of a topic that is specified in the content of a *sortname* element

3.18

subject

in the most generic sense, a "subject" is any thing whatsoever, regardless of whether it exists or has any other specific characteristics, about which anything whatsoever may be asserted by any means whatsoever

NOTE   The invisible heart of every topic link is the subject that its author had in mind when it was created. In some sense, a topic link reifies a subject. The *identity* attribute of a topic link is provided to allow the author of the topic link to indicate, as unambiguously as possible, the subject he had in mind as the organizing principle of the topic. See the definition of "subject descriptor".

3.19

subject descriptor

information which is intended to provide a positive, unambiguous indication of the identity of a subject, and which is the referent of an *identity* attribute of a topic link. (See also the definition of "public subject descriptor".)

NOTE 1   There is no requirement that a subject descriptor be text, although it can be the text of a definition of the subject. It can also, for example, be a listing in a catalog of subjects, such as an acquisition number of an asset in a museum collection, a catalog number in a sales catalog, or a subject heading in a catalog of library subject headings. The distinction between a subject descriptor that happens to be a definition and an ordinary occurrence of a definition is that, in the case of the subject descriptor, the topic link's author has indicated (by referring to it by means of the value of the *identity* attribute) that it is to be regarded as the authoritative definition of the organizing principle of the topic link. In the other case, by characterizing a definition as a definitional occurrence, the author is merely acknowledging the existence of the definition and its possible relevance to the subject of the topic link.

NOTE 2   Subject descriptors may be offline resources.

3.20

theme

member of the set of topics comprising a scope within which a topic characteristic assignment is valid. See also the definitions of "scope" and "topic"

3.21

topic

aggregate of topic characteristics, including zero or more names, occurrences, and roles played in associations with other topics, whose organizing principle is a single subject

topic link element

NOTE   See 5.3.

3.22

topic association

specific relationship among specific topics that is asserted by an association link element

association link element

NOTE   See 5.4.

3.23

topic characteristic

any defining characteristic of a topic; there are three kinds of topic characteristics:

a) names,

b) occurrences, and

c) roles played in relationships ("associations") with other topics

EXAMPLE   A name of a topic is a "name characteristic" of that topic.

3.24
topic characteristic assignment
mechanism whereby a topic characteristic becomes a characteristic of a topic

EXAMPLE   *Topname* subelements of topic link elements are used to assign names to topics as topic characteristics, so, in topic map documents, they perform the function of assigning topic name characteristics.

fact that a particular topic characteristic is a characteristic of a particular topic

3.25
topic link
hyperlink element conforming to the topic link architectural form defined in 5.3 by this International Standard

NOTE 1   In this International Standard, the foregoing definition is invoked by the phrase "topic link", or, since the default SGML name of the topic link architectural form is "topic", by the special typography used to distinguish SGML names (i.e. *topic*).

NOTE 2   See also the definition of "topic".

3.26
topic map
set of information resources regarded by a topic map application as a bounded object set whose hub document is a topic map document conforming to the SGML architecture defined by this International Standard

topic map document conforming to the SGML architecture defined by this International Standard, or the document element (*topicmap*) of such a document

document element type (*topicmap*) of the topic map document architecture

3.27
topic name
string of characters specified as a name of a topic; a name characteristic of a topic

topic name (*topname*) element, as defined by this International Standard

either a base name (*basename*), display name (*dispname*) or name to be used as sort key (*sortname*) element, as defined by this International Standard, and/or the information that such an element contains

combination of the foregoing definitions

3.28
topic occurrence
information that is specified as relevant to a given subject

NOTE   Topic occurrences may be offline resources.

3.29
topic type
subject which is a class of topics

one of the classes of topics of which a particular topic link is an instance; the topic types of which a given topic link is an instance can be specified via its optional *types* attribute

3.30

unconstrained scope

the scope comprised of all of the topics in a topic map; when no applicable *scope* attributes are explicitly specified as governing a topic characteristic assignment, the scope within which the topic characteristic assignment is made is the unconstrained scope

NOTE   In other words, the unconstrained scope is the default scope. Thus, for example, in a given topic map, if no *scope* attributes are explicitly specified for the name characteristics of any topics, any two topic links that have any of the same names will be merged, due to the effect of the topic naming constraint.

4   Notation

4.1   General

Topic Maps is an enabling document architecture whose definition (this International Standard) conforms to the Architectural Form Definition Requirements in Normative Annex A.3 of ISO/IEC 10744:1997, the *SGML Architectural Form Definition Requirements* (AFDR). The formal definition of the topic map notation is expressed as a meta-DTD. The specification of the topic maps architecture is accomplished by a combination of narrative text and formal definitions.

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 The formal definitions are expressed in SGML.

The formal SGML definitions are part of the text of this International Standard and are protected by copyright. In order to facilitate conformance to the topic maps architecture, the formal SGML definitions may be copied as specified in the following copyright notice: *Copyright (C) 2000 International Organization for Standardization. Permission to copy in any form is granted for use with conforming Topic Maps systems and applications as defined in ISO/IEC 13250:2003, provided this notice is included in all copies.* The permission to copy does not apply to any other material in this International Standard.

NOTE 1   This document uses editorial conventions mandated by the ISO with which the reader should be familiar in order to understand the implications of certain words.

The text describing each construct emphasizes semantics, while the formal SGML definition provides the rigorous syntactic definitions underlying the text descriptions.

NOTE 2   For this reason, it is recommended that the reader refer to the SGML definitions while reading the textual descriptions. Although the SGML definition always follows the related text, the user may find it helpful to read the SGML first in some cases. The meta-DTD is found in "Annex A (normative) Topic maps meta-DTD".

When a construct is first introduced, it is described in the text. If the construct occurs in the formal SGML specification, both the formal SGML name and a full name in English are presented, as follows:

— The element form **full construct name** (*SGMLname*) ...

— The attribute **full construct name** (*SGMLname*) ...

The declarations include comments, called "conventional comments", that follow conventions established in the HyTime standard to specify syntactic and semantic constraints and other information that is known to an architecture engine such as a topic maps engine. The conventional comments do not extend SGML in any way. They are used in the architecture definitions only, as a notation for the documentation of the architecture. They need not be included in application DTDs and, if they are included, the SGML parser will treat them as it would any other comment.

4.2 RCS name, full name, description, and clause

Every form name is followed by comments giving the full name, a description of the form, and the number of the clause in this International Standard in which the form is defined.

Individual attributes have a full name and description comment.

4.3 Constraints

Comments labeled "Constraints" define additional semantic or syntactic constraints on the constructs they follow. Constraint comments that follow the name of a form define constraints on the use of that form in general. Constraint comments that follow a component of a declaration (for example, the default value prescription of an attribute declaration), define the specific constraints on that component.

4.4 Note

Note comments provide additional information not provided by the other comment types and are informational rather than constraining.

5 Topic maps architecture

5.1 General

This clause defines the syntax of topic maps. The topic maps syntax makes use of the base, location address, and hyperlinking modules of the HyTime architecture as defined in Clauses 6, 7 and 8 of ISO/IEC 10744:1997.

NOTE 1   The entire formal definition of the topic maps syntax, the topic maps meta-DTD, is found in normative Annex A of this International Standard.

When interchanged, topic maps are HyTime bounded object sets (BOSs). The hub document of such a BOS must contain a topic maps architectural support declaration (see Annex B for examples).

Only one of the hyperlink syntaxes defined by HyTime is used in the topic map syntax: **variable link** (*varlink*).

The HyTime architecture provides a comprehensive set of addressing mechanisms and a standard syntax for using them. In addition, it provides means whereby any addressing syntax can be declared and used. The topic map architecture preserves these features of HyTime. Thus, the topic maps architecture allows topic map authors to use any addressing scheme, including proprietary addressing mechanisms driven by expressions in any notations, provided each such notation is formally declared as a notation in the manner prescribed by the SGML and HyTime International Standards.

NOTE 2   For example, in an XML environment, location addressing can be accomplished using IETF Uniform Resource Locator (URL) notation.

5.2 Topic map architectural form

The **topic map** (*topicmap*) element form is used as the document element of all documents that conform to the topic maps architecture defined by this International Standard.

The effect of specifying the **added themes** (*addthems*) attribute is to add the themes that it references to the scopes of all of the topic characteristic assignments made throughout the document of which the element is the root element.

NOTE 1   See the definition of "added themes".