
**Information technology — Multimedia
content description interface —**

**Part 5:
Multimedia description schemes**

*Technologies de l'information — Interface de description du contenu
multimédia —*

Partie 5: Schémas de description multimédia

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of the joint technical committee is to prepare International Standards. 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.

ISO/IEC 15938-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 15938 consists of the following parts, under the general title *Information technology — Multimedia content description interface*:

- *Part 1: Systems*
- *Part 2: Description definition language*
- *Part 3: Visual*
- *Part 4: Audio*
- *Part 5: Multimedia description schemes*
- *Part 6: Reference software*
- *Part 7: Conformance testing*
- *Part 8: Extraction and use of MPEG-7 descriptions*

Annex B forms a normative part of this part of ISO/IEC 15938. Annexes A, C and D are for information only.

Introduction

This standard, also known as "Multimedia Content Description Interface," provides a standardized set of technologies for describing multimedia content. The standard addresses a broad spectrum of multimedia applications and requirements by providing a metadata system for describing the features of multimedia content.

The following are specified in this standard:

- **Description Schemes (DS)** describe entities or relationships pertaining to multimedia content. Description Schemes specify the structure and semantics of their components, which may be Description Schemes, Descriptors, or datatypes.
- **Descriptors (D)** describe features, attributes, or groups of attributes of multimedia content.
- **Datatypes** are the basic reusable datatypes employed by Description Schemes and Descriptors
- **Systems tools** support delivery of descriptions, multiplexing of descriptions with multimedia content, synchronization, file format, and so forth.

This standard is subdivided into eight parts:

Part 1 – Systems: specifies the tools for preparing descriptions for efficient transport and storage, compressing descriptions, and allowing synchronization between content and descriptions.

Part 2 – Description definition language: specifies the language for defining the standard set of description tools (DSs, Ds, and datatypes) and for defining new description tools.

Part 3 – Visual: specifies the description tools pertaining to visual content.

Part 4 – Audio: specifies the description tools pertaining to audio content.

Part 5 – Multimedia description schemes: specifies the generic description tools pertaining to multimedia including audio and visual content.

Part 6 – Reference software: provides a software implementation of the standard.

Part 7 – Conformance testing: specifies the guidelines and procedures for testing conformance of implementations of the standard.

Part 8 – Extraction and use of MPEG-7 descriptions: provides guidelines and examples of the extraction and use of descriptions.

This document specifies the Multimedia Description Schemes (MDS) part of the ISO/IEC 15938 standard. This document specifies the MDS description tools and provides informative examples of descriptions. The normative syntax of the MDS description tools is specified in this document using the Description Definition Language (DDL) and the normative semantics is specified using text.

Information technology — Multimedia content description interface —

Part 5: Multimedia description schemes

1 Scope

1.1 Organization of the document

This International Standard specifies a metadata system for describing multimedia content. This document specifies the Multimedia Description Schemes (MDS) description tools (Description Schemes, Descriptors, and datatypes) that comprise ISO/IEC 15938-5. The following set of subclauses are provided for each MDS description tool, where optional subclauses are indicated as (optional):

- Syntax: specifies the normative syntax of the description tool using Description Definition Language (DDL) (see ISO/IEC 15938-2).
- Binary syntax (optional): specifies the normative binary representation for the description tool, where relevant. If a binary syntax is not specified, then the binary coding method of ISO/IEC 15938-1 shall apply for the description tool.
- Semantic: specifies the normative semantics of the description tool and each of its components (attributes and elements).
- Informative examples (optional): provides informative examples that illustrate the use or instantiation of the description tool in creating descriptions.

1.2 Overview of Multimedia Description Schemes

The MDS description tools are organized on the basis of functionality as shown in Figure 1.

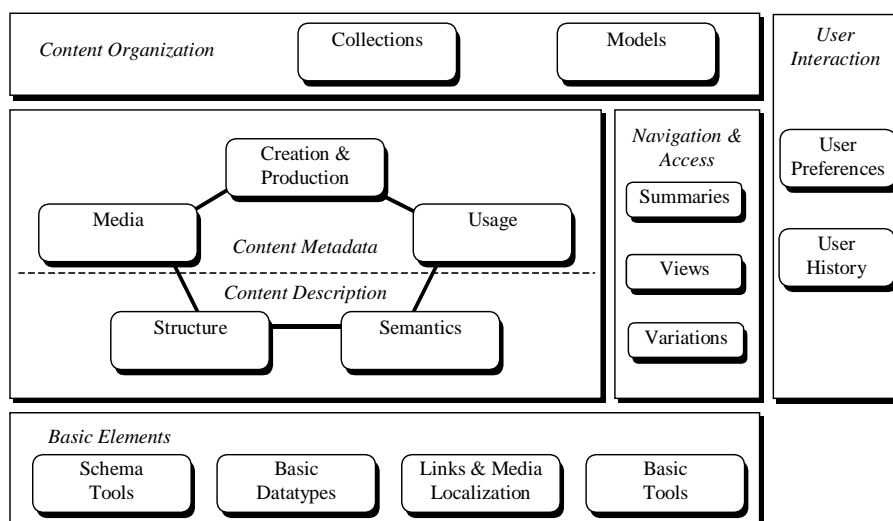


Figure 1 — Overview of the Multimedia Description Scheme (MDS) description tools

The basic elements, which are shown at the bottom level in Figure 1, form the building blocks for the higher-level description tools. The following basic elements are defined: schema tools (the root element, top-level types, description metadata, and packages), basic datatypes (integers, reals, vectors, matrices), linking and media localization tools (spatial and temporal localization), basic description tools (language, text, classification schemes). The basic elements are specified in the following clauses: clause 4 (Schema tools), clause 5 (Basic datatypes), clause 6 (Linking, identification and localization tools), and clause 7 (Basic description tools). Table 1 summarizes the basic elements.

Table 1 — Overview of basic elements

| <i>Set of description tools</i> | <i>Functionality</i> |
|---|---|
| Schema tools (clause 4) | Specifies schema tools that facilitate the making of descriptions. The schema tools include the base type hierarchy of the description tools defined in ISO/IEC 15938, the root element and top-level tools, the multimedia content entity tools, and the package and description metadata tools. |
| Basic datatypes (clause 5) | Specifies the basic datatypes used by description tools defined in the ISO/IEC 15938. |
| Linking, identification and localization tools (clause 6) | Specifies the basic datatypes that are used for referencing within descriptions and linking of descriptions to multimedia content. |
| Basic description tools (clause 7) | Specifies basic tools that are used as components for building other description tools. |

The content description tools, which are shown at the middle level in Figure 1, describe the features of the multimedia content and the immutable metadata related to the multimedia content. The following description tools for content description are defined: structure description tools (spatio-temporal segments of multimedia content) and semantic description tools (objects, events). The following description tools for content metadata are defined: media description (storage format, encoding), creation & production (title, creator, classification), and usage (access rights, publication). The content description and metadata tools are related in the sense that the content description tools use the content metadata tools. For example, a description of creation and production or media information can be attached to an individual video or video segment in order to describe the structure and creation and production of the multimedia content. Table 2 summarizes tools for describing content and related metadata.

Table 2 — Overview of tools for describing content and related metadata

| <i>Set of description tools</i> | <i>Functionality</i> |
|---|--|
| Media description tools (clause 8) | Describes the storage of the multimedia data. The media features include the format, encoding, storage media. The tools allow multiple media description instances for the same multimedia content. |
| Creation and production description tools (clause 9) | Describes the creation and production of the multimedia content. The creation and production features include title, creator, classification, purpose of the creation, and so forth. The creation and production information is typically not extracted from the content but corresponds to metadata related to the content. |
| Usage description tools (clause 10) | Describes the usage of the multimedia content. The usage features include access rights, publication, and financial information. The usage information may change during the lifetime of the multimedia content. |
| Structure description tools (clause 11) | Describes the structure of the multimedia content. The structural features include spatial, temporal or spatio-temporal segments of the multimedia content. |
| Semantics description tools (clause 12) | Describes the "real-world" semantics related to or captured by the multimedia content. The semantic features include objects, events, concepts, and so forth. |

The tools for navigation and access, which are shown at the middle level in Figure 1, describe the browsing, summarization, and access of content. These tools are specified in clause 13 (Navigation and access tools). The tools for content organization tools, shown at the top level in Figure 1, describe collections and models of multimedia content. These tools are specified in clause 14 (Content organization tools). The tools for user interaction, shown on the right in Figure 1, describe user preferences pertaining to consumption of multimedia and usage history. These tools are specified in clause 15 (User interaction tools). Table 3 summarizes tools for describing content organization, navigation and access, and user interaction.

Table 3 — Overview of tools for describing content organization, navigation and access, and user interaction

| <i>Set of description tools</i> | <i>Functionality</i> |
|--|---|
| Navigation and access tools (clause 13) | Specifies tools that describe the navigation and access of multimedia. The navigation and access tools describe multimedia summaries and abstracts; describe partitions, views and decompositions of image, video, and audio signals in space, time and frequency; and describe the relationships between different variations of multimedia content. |
| Content organization tools (clause 14) | Specifies tools that describe the organization and modeling of multimedia content. The content organization tools include collections, probability models, analytic models, cluster models, and classification models. |
| User interaction tools (clause 15) | Specifies tools related to user interaction with multimedia content. The user interaction tools describe user preferences pertaining to multimedia content, and describe the usage history of users of multimedia content. |

Finally, classification schemes, which organize terms that are used by the description tools, are specified in Annex B (Classification Schemes).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 15938. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 15938 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau maintains a list of currently valid ITU-T Recommendations.

- ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*
- ISO 639 (all parts), *Codes for the representation of names of languages*
- ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*
- ISO 3166-2, *Codes for the representation of names of countries and their subdivisions — Part 2: Country subdivision code*

Note: The current list of valid ISO 3166-1 country and ISO 3166-2 region codes is maintained by the ISO 3166 maintenance agency at the ISO Central Secretariat. Information on the current list of valid region and country codes can be found at <http://www.iso.org/mara/iso3166>.

- ISO 4217, *Codes for the representation of currencies and funds*

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Note: The current list of valid ISO 4217 currency codes is maintained by the official maintenance authority British Standards Institution (<http://www.bsi-global.com/iso4217currency>).

- XML, *Extensible Markup Language (XML) 1.0*, 6 October 2000 (<http://www.w3.org/TR/2000/REC-xml-20001006>)
- XML Schema, *W3C Recommendation*, 2 May 2001 (<http://www.w3.org/XML/Schema>)
- XML Schema Part 0: *Primer*, W3C Recommendation, 2 May 2001 (<http://www.w3.org/TR/xmlschema-0/>)
- XML Schema Part 1: *Structures*, W3C Recommendation, 2 May 2001 (<http://www.w3.org/TR/xmlschema-1/>)
- XML Schema Part 2: *Datatypes*, W3C Recommendation, 2 May 2001 (<http://www.w3.org/TR/xmlschema-2/>)
- XPath, *XML Path Language, W3C Recommendation*, 16 November 1999 (<http://www.w3.org/TR/1999/REC-xpath-19991116>)

Note: These documents are maintained by the W3C (<http://www.w3.org>).

- RFC 2045 *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*
- RFC 2046 *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*
- RFC 2048, *Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures*
- RFC 2045-CHARSETS, *Registered Character set codes of RFC2045*
- RFC 2046-MIMETYPES, *Registered Mimetypes of RFC2046*

Note: The relevant lists can be obtained as follows:

- MIMETYPES. The current list of registered mimetypes, as defined in RFC2046, RFC2048, is maintained by IANA (Internet Assigned Numbers Authority). It is available from <ftp://ftp.isi.edu/in-notes/iana/assignments/media-types/media-types/>.
- CHARSETS. The current list of registered character set codes, as defined in RFC2045 and RFC2048 is maintained by IANA (Internet Assigned Numbers Authority). It is available from <ftp://ftp.isi.edu/in-notes/iana/assignments/character-sets>.