

Australian Standard™

**Information technology—Multimedia
content description interface**

Part 5: Multimedia description schemes

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Australian Standard™

Information technology—Multimedia content description interface

Part 5: Multimedia description schemes

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PREFACE

This Standard was prepared by the Standards Australia Committee IT-029, Coded Representation of Picture, Audio and Multimedia/Hypermedia Information. This Standard is identical with and has been reproduced from ISO/IEC 15938-5:2003, *Information technology—Multimedia content description interface—Part 5: Multimedia description schemes*.

The objective of this Standard is to provide the generic description tools pertaining to multimedia including audio and visual content.

This Standard is Part 5 of AS 15938, *Information technology—Multimedia content description interface*, which, when complete, will consist of the following:

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

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<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
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3166	Codes for the representation of names of countries and their subdivisions	2632	Codes for the representation of names of countries and their subdivisions
3166-1	Part 1: Country codes	2632.1	Part 1: Country codes
		AS/NZS	
		2632	Codes for the representation of names of countries and their subdivisions
3166-2	Part 2: Country subdivision code	2632.2	Part 2: Country subdivision code
		AS	
4217	Codes for the representation of currencies and funds	3759	Codes for the representation of currencies and funds
8601	Data elements and interchange formats—Information interchange—Representation of dates and times	AS/NZS 3802	Data elements and interchange formats—Information interchange—Representation of dates and times

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AUSTRALIAN STANDARD

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.

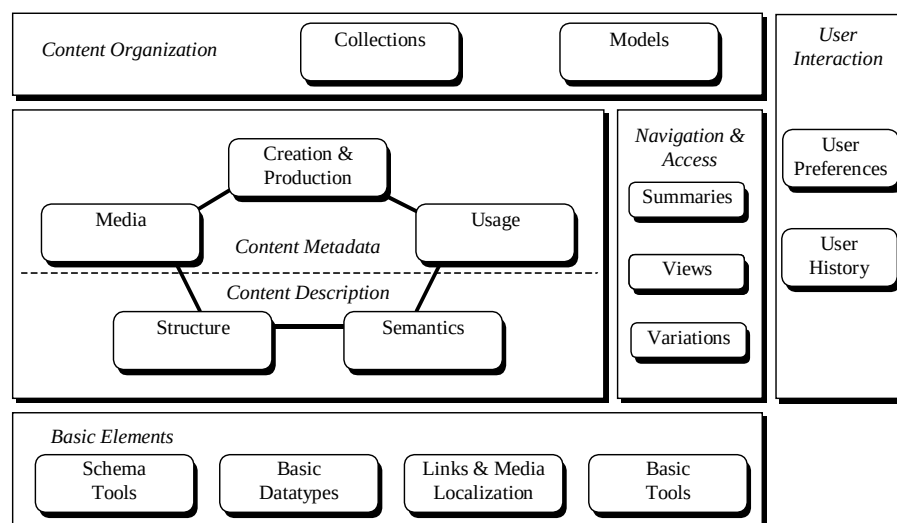


Figure 1 — Overview of the Multimedia Description Scheme (MDS) description tools

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*

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:

- o 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/>.
- o 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>.

3 Terms and definitions

3.1 Conventions

3.1.1 Description tools

This part of ISO/IEC 15938 specifies the multimedia description tools as follows:

- **Description Scheme (DS)** – a description tool that describes entities or relationships pertaining to multimedia content. DSs specify the structure and semantics of their components, which may be Description Schemes, Descriptors, or datatypes.
- **Descriptor (D)** – a description tool that describes a feature, attribute, or group of attributes of multimedia content.
- **Datatype** – a basic reusable datatype employed by Description Schemes and Descriptors.
- **Description Tool (or tool)** – refers to a Description Scheme, Descriptor, or Datatype.

3.1.2 Naming convention

In order to specify the multimedia description tools, this part of ISO/IEC 15938 uses constructs provided by the Description Definition Language (DDL) specified in ISO/IEC 15938-2, such as "element," "attribute," "simpleType" and "complexType." The names associated to these constructs are created on the basis of the following conventions:

- If the name is composed of multiple words, the first letter of each word is capitalized, with the exception that the capitalization of the first word depends on the type of construct as follows:
- Element naming: the first letter of the first word is capitalized (e.g. TimePoint element of TimeType).
- Attribute naming: the first letter of the first word is not capitalized (e.g. timeUnit attribute of IncrDurationType).
- complexType naming: the first letter of the first word is capitalized, and the suffix "Type" is used at the end of the name (e.g. PersonType).
- simpleType naming: the first letter of the first word is not capitalized, the suffix "Type" may be used at the end of the name (e.g. timePointType).

Note that when referencing a complexType or simpleType in the definition of a description tool, the "Type" suffix is not used. For instance, the text refers to the "Time datatype" (instead of "TimeType datatype"), to the "MediaLocator D" (instead of "MediaLocatorType D") and to the "Person DS" (instead of PersonType DS).

3.1.3 Documentation convention

The syntax of each description tool is specified using the constructs provided by the DDL specified in ISO/IEC 15938-2, and is presented in this document using a specific font and background as shown in the following example:

```
<complexType name="ExampleType">
  <sequence>
    <element name="Element1" type="string"/>
  </sequence>
  <attribute name="attribute1" type="string" default="attrvalue1"/>
</complexType>
```

The semantics of each description tool is specified in text using a table format, where each row contains the name and a definition of a type, element or attribute as shown in the following example:

Name	Definition
ExampleType	Specifies an ...
element1	Describes the ...
attribute1	Describes the ...

Diagrammatic notation is sometimes used to depict overviews of the description tools. Such overview diagrams generally depict aggregation and generalization relationships between description tools or the entities being described. In these diagrams, rectangular shapes containing a name denote description tools (DSs or Ds) that are used to describe entities. In some diagrams, multiple description tools are listed in a single rectangle. Large diamond shapes containing a name denote description tools (DSs or Ds) that are used to describe relationships. Furthermore, paths between rectangles or diamonds denote association, generalization or aggregation relationships. Generalization relationships are indicated by a solid path with a filled triangle pointing at the more

general entity. Aggregation (composition) relationships are indicated by a solid path with a (filled) diamond at the aggregating (composing) entity. Aggregation relationship paths may be accompanied by an indication of the multiplicity (minOccurs, maxOccurs) of the relation in text form.

The informative examples are included in separate subclauses, and are presented in this document using a separate font and background as shown in the following example:

```
<Example attribute1="example attribute value">
  <Element1>example element content</Element1>
</Example>
```

Moreover, the schema or set of description tools defined in this document follows a type-centric approach. The description tools are specified by defining the complexType or simpleType for each tool, but not declaring an element of this type at the global scope with the exception of the root element. However, in order to illustrate informative example descriptions in this document, the examples assume that an element of the example type (complexType or simpleType) has been declared, such as a member of another complexType or simpleType. For example, the description above assumes that the following declaration has been made:

```
<element name="Example" type="mpeg7:ExampleType">
```

The term "reserved" is used in specifying the semantics of some description tools. The term "reserved" indicates that particular values are reserved for use in future extensions of ISO/IEC 15938.

3.2 Wrapper of the schema

The description examples and syntax of description tools specified in this document assume that a schema wrapper is provided which identifies the XML Schema namespace (XML Schema) and MPEG-7 namespace:

```
<schema xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:mpeg7="urn:mpeg:mpeg7:schema:2001"
  targetNamespace="urn:mpeg:mpeg7:schema:2001"
  elementFormDefault="qualified" attributeFormDefault="unqualified">
  <!-- Multimedia Description Schemes ISO/IEC 15938-5 -->
```

The following tag is used to close the schema:

```
</schema>
```

3.3 Terminology

For the purposes of this part of ISO/IEC 15938, the following terms and definitions apply.

3.3.1 Schema-related terminology

3.3.1.1

Attribute

A field of a **description tool** which is of simple type.

3.3.1.2

Base type

A **type** that serves as the root **type** of a derivation hierarchy for other **types**.

3.3.1.3

Datatype

A primitive reusable **type** employed by **Description Schemes** and **Descriptors**.

3.3.1.4

Derived type

A **type** that is defined in terms of extension or restriction of other **types**.

3.3.1.5

Description

An instantiation of one or more **description tools**.

3.3.1.6

Description Scheme

A **description tool** that describes 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**.

3.3.1.7

Description Tool

A **Description Scheme**, **Descriptor**, or **datatype**.

3.3.1.8

Descriptor

A **description tool** that describes a feature, attribute, or group of attributes of multimedia content.

3.3.1.9

Instantiation

Assignment of values to the fields (elements, attributes) of one or more **description tools**.

3.3.1.10

Element

A field of a **description tool** which is of complex type.

3.3.1.11

Schema

The set of related **description tools**, for example, those specified in ISO/IEC 15938.

3.3.1.12

Type

The format used for collection of letters, digits, and/or symbols, to depict values of an element or attribute of **description tool**. A **type** consists of a set of distinct values, a set of lexical representations, and a set of facets that characterize properties of the value space, individual values, or lexical items.

3.3.2 Content-related terminology

3.3.2.1

Abstraction

A secondary representation that is created from or is related to the **content**. For example, a **summary** of a **video** or a **model** of a **feature**.

3.3.2.2

Acquisition

The process of acquiring **audio** or **visual** data from a source.

3.3.2.3

Action

A semantically identifiable behaviour of an object or group of objects, for example, a soccer player kicking ball.

3.3.2.4**Agent**

A person, organization, or group of persons.

3.3.2.5**Audio**

Time-varying **data** or signal intended for listening or hearing. Also, related to the aural modality.

3.3.2.6**Audio-visual**

content consisting of both **audio** and **video** data.

3.3.2.7**Automatic**

Processing of **multimedia data**, **content**, or **metadata** by means of computer, hardware, or other software device.

3.3.2.8**Classification Scheme**

A list of defined terms and their meanings.

3.3.2.9**Content****Multimedia content**

A representation of the information contained in or related to **multimedia data** in a formalized manner suitable for interpretation by human means. **Content** refers to the **data** and the **metadata**.

3.3.2.10**Copyright**

A right that establishes the ownership of **data**, **content**, or **metadata**.

3.3.2.11**Data****Essence****Multimedia Data**

A representation of **multimedia** in a formalized manner suitable for communication, interpretation, or processing by automatic means.

3.3.2.12**Editing**

The process of combining, extracting, and refining **multimedia data**.

3.3.2.13**Entity**

Any concrete or abstract thing of interest related to the **multimedia content**.

3.3.2.14**Event**

A noteworthy occurrence that happens at a point in time or during a temporal interval. Alternatively used as a change in state.

3.3.2.15**Feature**

A distinctive characteristic of **multimedia content** that signifies something to a human observer, such as the "color" or "texture" of an image.

3.3.2.16**Filtering**

A process for selecting multimedia content that satisfies certain criteria. This process may include ranking the content according to the extent that it satisfies the criteria.

3.3.2.17**Format**

The characteristics of the stored or physical representation of the **data**.

3.3.2.18**Frame**

A single **image** from a **video**.

3.3.2.19**Image**

2D spatially-varying visual data acquired from a visual source.

3.3.2.20**Key frame**

A representative **frame** of a **video** or a **segment**.

3.3.2.21**Locator**

Specifies the location or address of **multimedia data** or a **segment**.

3.3.2.22**Model**

A parametric or statistical representation of multimedia **content** or **features**.

3.3.2.23**Manual**

Processing of **multimedia data**, **content**, or **metadata** by human means.

3.3.2.24**Metadata**

The information and documentation which makes **multimedia data** understandable and shareable to users over time.

3.3.2.25**Multimedia**

Data comprising one or modalities, such as images, audio, video, 3D models, ink content, and so forth.

3.3.2.26**Navigation**

A process by which a **user** accesses **multimedia content** and steers a course through the content in a controlled manner.

3.3.2.27**Object**

An object with a physical representation in the natural world.

3.3.2.28**Region**

A spatial unit of **multimedia**, for example, a 2D spatial **region** of an **image**, or a moving region of **video**.

3.3.2.29**Relation**

Any association among entities.

3.3.2.30**Rights**

Information that determines the ownership and terms of use of **multimedia data**, **content**, or **metadata**. Refers to Intellectual Property Rights, Copyrights, and the Access Rights.

3.3.2.31**Scene**

An episode or sequence of events representing continuous action in one location.

3.3.2.32**Search**

A process for searching **multimedia content** that satisfies certain criteria. This process may include ranking the content according to the extent that it satisfies the criteria.

3.3.2.33**Segment**

A spatial or temporal unit of **multimedia**, for example, a temporal **segment** of **video**, or a **segment** of an **image**.

3.3.2.34**Semantics**

Information relating to the underlying meaning or understanding of **multimedia content**. Alternatively, refers to the specification of the meaning of **description tools**.

3.3.2.35**Summary**

An abstraction of **multimedia content** that summarizes the **content**.

3.3.2.36**User**

An end-user or consumer of **multimedia content**.

3.3.2.37**User Preferences**

The preferences of a **user** pertaining to **multimedia content**. This includes the user's tastes, likes and dislikes with respect to the content and its properties, as well as preferences with respect to the consumption process.

3.3.2.38**Usage History**

A history of actions that a **user** of **multimedia content** has carried out over a certain period of time, such as recording a specific piece of content, or playing back recorded content at a specific time.

3.3.2.39**Variation**

An alternative version of **multimedia content**, which may be derived through transcoding, summarization, translation, reduction, and so forth.

3.3.2.40**Video**

A space- and time-varying visual **data** or **signal** intended for viewing; commonly represented as a discrete sequence of **images** or **frames**.

3.3.2.41**View**

A portion of an **image**, **video** or **audio** signal, defined in terms of a partition. A partition is a multi-dimensional region defined in the space, time and/or frequency plane.

3.3.2.42**Visual**

Related to the visual modality.

3.3.2.43**View Decomposition**

An organized set of **views** that provides a structured decomposition of an **image**, **video** or **audio** signal in multi-dimensional space, time and/or frequency.

3.4 Symbols and abbreviated terms

For the purposes of this part of ISO/IEC 15938, the symbols and abbreviated terms given in the following apply.

AV:	Audio-visual
CS:	Classification Scheme
D:	Descriptor
Ds:	Descriptors
DCT:	Discrete Cosine Transform
DDL:	Description Definition Language
DS:	Description Scheme
DSs:	Description Schemes
IANA:	Internet Assigned Numbers Authority
IETF:	Internet Engineering Task Force
IPMP:	Intellectual Property Management and Protection
ISO:	International Organization for Standardization
JPEG:	Joint Photographic Experts Group
MDS:	Multimedia Description Schemes
MPEG:	Moving Picture Experts Group
MPEG-2:	Generic coding of moving pictures and associated audio information (see ISO/IEC 13818)
MPEG-4:	Coding of audio-visual objects (see ISO/IEC 14496)
MPEG-7:	Multimedia Content Description Interface Standard (see ISO/IEC 15938)
MP3:	MPEG-2 layer 3 audio coding
QCIF:	Quarter Common Intermediate Format
SMPT:	Society of Motion Picture and Television Engineers
TZ:	Time Zone
TZD:	Time Zone Difference
URI:	Uniform Resource Identifier (see RFC 2396)
URL:	Uniform Resource Locator (see RFC 2396)
W3C:	World Wide Web Consortium
XML:	Extensible Markup Language

4 Schema tools

4.1 Introduction

This clause specifies the schema tools that facilitate the making of descriptions. The following description tools are specified: (1) the base type hierarchy of the description tools defined in ISO/IEC 15938, (2) the root element, (3) the top-level tools, (4) the multimedia content entity tools, (5) package tool, and (6) description metadata tool. The functionality of these tools is given as follows:

Table 4 — Overview of Schema Tools

<i>Tool</i>	<i>Functionality</i>
Base types	Forms the type hierarchy for description tools.
Root element	Describes the initial wrapper or root element of descriptions.
Top-level tools	Describes the elements that follow the root element in descriptions.
Multimedia content entity tools	Describes different types of multimedia content such as images, video, audio, mixed multimedia, collections, and so forth.
Package tool	Describes an organization or packaging of description tools.
Description metadata tool	Describes metadata about descriptions.

4.2 Base types

4.2.1 Introduction

This subclause specifies the base types of the description tools, as shown in Figure 2.

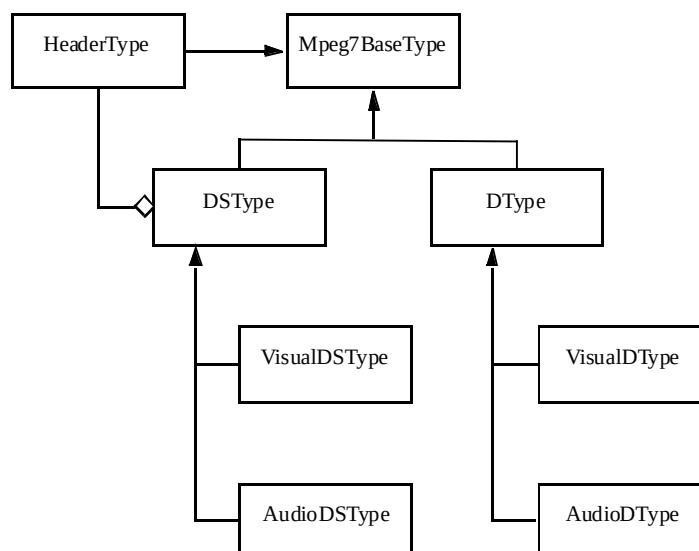


Figure 2 — Organization of base types of Mpeg7BaseType, DType, DType, and HeaderType

The following base types are defined in this subclause:

- **Mpeg7BaseType**: provides the base abstract type of the type hierarchy. The **DSType**, **DType** and **HeaderType** extend **Mpeg7BaseType**.
 - o **DType**: extends **Mpeg7BaseType** and provides a base abstract type for Descriptors. The audio and visual Descriptors extend **DType**.
 - **VisualDType**: extends **DType** and provides a base abstract type for visual Descriptors. Descriptors that describe visual features of multimedia content extend **VisualDType**.
 - **AudioDType**: extends **DType** and provides a base abstract type for audio Descriptors. Descriptors that describe audio features of multimedia content extend **AudioDType**.
 - o **DSType**: extends **Mpeg7BaseType** and provides a base abstract type for Description Schemes. The audio and visual Description Schemes extend **DSType**. The **DSType** contains an element of type **HeaderType**.
 - **VisualDSType**: extends **DSType** and provides a base abstract type for visual Description Schemes. Description Schemes that describe visual concepts and visual features of multimedia content extend **VisualDSType**.
 - **AudioDSType**: extends **DSType** and provides a base abstract type for audio Description Schemes. Description Schemes that describe audio concepts and audio features extend **AudioDSType**.
 - o **HeaderType**: extends **Mpeg7BaseType** and provides a base abstract type for headers. A header collects information that recurs in a description in order to allow referencing using a reference tool.

4.2.2 Base types syntax

```

<!-- ##### -->
<!-- Definition of MPEG-7 Base types (4.2) -->
<!-- ##### -->

<!-- Definition of MPEG-7 base type -->
<complexType name="Mpeg7BaseType" abstract="true">
  <complexContent>
    <restriction base="anyType"/>
  </complexContent>
</complexType>

<!-- Definition of generic D -->
<complexType name="DType" abstract="true">
  <complexContent>
    <extension base="mpeg7:Mpeg7BaseType"/>
  </complexContent>
</complexType>

<!-- Definition of generic DS -->
<complexType name="DSType" abstract="true">
  <complexContent>
    <extension base="mpeg7:Mpeg7BaseType">
      <sequence>
        <element name="Header" type="mpeg7:HeaderType" minOccurs="0"
          maxOccurs="unbounded"/>
      </sequence>
      <attribute name="id" type="ID" use="optional"/>
      <attributeGroup ref="mpeg7:timePropertyGrp"/>
      <attributeGroup ref="mpeg7:mediaTimePropertyGrp"/>
    </extension>
  </complexContent>
</complexType>

```

```

    </complexContent>
  </complexType>

  <!-- Definition of Visual D -->
  <complexType name="VisualDType" abstract="true">
    <complexContent>
      <extension base="mpeg7:DType"/>
    </complexContent>
  </complexType>

  <!-- Definition of Audio D -->
  <complexType name="AudioDType" abstract="true">
    <complexContent>
      <extension base="mpeg7:DType"/>
    </complexContent>
  </complexType>

  <!-- Definition of Visual DS -->
  <complexType name="VisualDSType" abstract="true">
    <complexContent>
      <extension base="mpeg7:DSType"/>
    </complexContent>
  </complexType>

  <!-- Definition of Audio DS -->
  <complexType name="AudioDSType" abstract="true">
    <complexContent>
      <extension base="mpeg7:DSType"/>
    </complexContent>
  </complexType>

  <!-- Definition of Header datatype -->
  <complexType name="HeaderType" abstract="true">
    <complexContent>
      <extension base="mpeg7:Mpeg7BaseType">
        <attribute name="id" type="ID" use="optional"/>
      </extension>
    </complexContent>
  </complexType>

```

4.2.3 Base types semantics

Semantics of the Mpeg7BaseType:

Name	Definition
Mpeg7BaseType	Provides the topmost type of the base type hierarchy (abstract). The DSType, DType, and HeaderType extend Mpeg7BaseType.

Semantics of the DType:

Name	Definition
DType	Describes a feature of multimedia content. DType extends Mpeg7BaseType and provides a base abstract type for Descriptors. The AudioDType and VisualDType extend DType.

Semantics of the DType:

<i>Name</i>	<i>Definition</i>
DType	Describes entities or relationships related to the multimedia content. DType extends Mpeg7BaseType and provides a base abstract type for Description Schemes. The audio and visual Description Schemes extend DType. The DType contains an element of type HeaderType.
Header	Describes the header of a description (optional). Header collects information that recurs in a description in order to allow referencing using a reference tool.
id	Identifies the id of a multimedia entity or relationship (optional). The id shall be used for referencing and relations in order to connect descriptions.
timePropertyGrp	Describes the properties of a time line associated with AV content (optional). timePropertyGrp is defined in 6.4.8.
mediaTimePropertyGrp	Describes the properties of a time line associated with AV media (optional). mediaTimePropertyGrp is defined in 6.4.16.

Semantics of the VisualDType:

<i>Name</i>	<i>Definition</i>
VisualDType	Describes visual features of multimedia content (abstract). VisualDType extends DType and provides a base abstract type for visual Descriptors.

Semantics of the AudioDType:

<i>Name</i>	<i>Definition</i>
AudioDType	Describes audio features of multimedia content (abstract). AudioDType extends DType and provides a base abstract type for audio Descriptors.

Semantics of the VisualDSType:

<i>Name</i>	<i>Definition</i>
VisualDSType	Describes visual concepts and visual features of multimedia content (abstract). VisualDSType extends DType and provides a base abstract type for visual Description Schemes.

Semantics of the AudioDSType:

<i>Name</i>	<i>Definition</i>
AudioDSType	Describes audio concepts and audio features of multimedia content (abstract). AudioDSType extends DType and provides a base abstract type for audio Description Schemes.

Semantics of the HeaderType:

Name	Definition
HeaderType	Describes information that recurs in a description in order to allow referencing using a reference tool (abstract). HeaderType extends Mpeg7BaseType and provides a base abstract type for headers.
id	Identifies the id of the HeaderType (optional). The id shall be used for referencing (see 6.2) and relations (see 7.7) in order to reuse the information in the header in different parts of a description.

4.3 Root element

4.3.1 Introduction

This subclause specifies the root type and the root element. The root element shall be used as the topmost element in a description. The root type provides metadata about the description as well as information that is common to the description, such as the language of the text and the convention for specifying time. The root element provides a choice of elements for creating either a complete description or a description unit, which are defined as follows:

- **Complete Description:** describes multimedia content using the top-level types. For example, the description of an image is a complete description.
- **Description Unit:** describes an instance of a D, DS, or header. A description unit can be used to represent partial information from a complete description. For example, the description of a shape or color is a description unit.

4.3.2 Root element syntax

```
<!-- ##### -->
<!-- Definition of MPEG-7 root element (4.3) -->
<!-- ##### -->

<!-- Definition of Mpeg7 Type-->
<complexType name="Mpeg7Type" abstract="true">
  <sequence>
    <element name="DescriptionMetadata" type="mpeg7:DescriptionMetadataType"
      minOccurs="0"/>
  </sequence>
  <attribute ref="xml:lang" use="optional"/>
  <attributeGroup ref="mpeg7:timePropertyGrp"/>
  <attributeGroup ref="mpeg7:mediaTimePropertyGrp"/>
</complexType>

<!-- Definition of Mpeg7 Element -->
<element name="Mpeg7">
  <complexType>
    <complexContent>
      <extension base="mpeg7:Mpeg7Type">
        <choice>
          <element name="DescriptionUnit" type="mpeg7:Mpeg7BaseType"/>
          <element name="Description" type="mpeg7:CompleteDescriptionType"
            minOccurs="1" maxOccurs="unbounded"/>
        </choice>
      </extension>
    </complexContent>
  </complexType>
</element>
```

4.3.3 Root element semantics

Semantics of the Mpeg7Type:

<i>Name</i>	<i>Definition</i>
Mpeg7Type	The type of the root element.
DescriptionMetadata	Describes the metadata for the descriptions contained within the instance of the root type (optional). The description metadata applies to the elements contained within the instance of the root element unless new description metadata is described for those elements. DescriptionMetadataType is defined in 4.5.3.
xml:lang	Identifies the language of the textual content in the description (optional). If not specified, the language is unknown. xml:lang is defined in (XML).
timePropertyGrp	Describes the properties of a time line associated with AV content (optional). timePropertyGrp is defined in 6.4.8.
mediaTimePropertyGrp	Describes the properties of a time line associated with AV media (optional). mediaTimePropertyGrp is defined in 6.4.16.

Semantics of the Mpeg7 root element:

<i>Name</i>	<i>Definition</i>
Mpeg7	Serves as the root element of the description. Mpeg7 shall be used as the topmost element in a description.
DescriptionUnit	Describes an instance of one of a D, DS, or header (optional). A description unit can be used to represent partial information from a complete description. For example, DescriptionUnit can be used to describe a shape using the RegionShape D (defined in ISO/IEC 15938-3).
Description	Describes multimedia content using the top-level types (optional). For example, Description can be used to describe an image using ContentEntityType, where MultimediaContent is of type ImageType.

4.3.4 Root element examples (informative)

The following example shows the use of the root element for describing an instance of the ScalableColor D (defined in ISO/IEC 15398-3) using DescriptionUnit.

```
<Mpeg7>
  <DescriptionMetadata>
    <Version>1.0</Version>
    <PrivateIdentifier>descriptionUnitExample</PrivateIdentifier>
  </DescriptionMetadata>
  <DescriptionUnit xsi:type="ScalableColorType" numOfCoeff="16"
    numOfBitplanesDiscarded="0">
    <Coeff> 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 </Coeff>
  </DescriptionUnit>
</Mpeg7>
```

The following example shows the use of root element for describing an image using Description.

```
<Mpeg7>
  <DescriptionMetadata>
    <Confidence>1.0</Confidence>
    <Version>1.1</Version>
    <LastUpdate>2001-09-20T03:20:25+09:00</LastUpdate>
    <PublicIdentifier type="UUID">
      098f2470-bae0-11cd-b579-08002b30bfeb
    </PublicIdentifier>
    <PrivateIdentifier>completeDescriptionExample</PrivateIdentifier>
    <Creator>
      <Role href="creatorCS"><Name>Creator</Name></Role>
      <Agent xsi:type="PersonType">
        <Name>
          <GivenName>Yoshiaki</GivenName>
          <FamilyName>Shibata</FamilyName>
        </Name>
      </Agent>
    </Creator>
    <CreationLocation>
      <Region>jp</Region>
      <AdministrativeUnit>Tokyo</AdministrativeUnit>
    </CreationLocation>
    <CreationTime>2000-10-10T19:45:00+09:00</CreationTime>
    <Instrument>
      <Tool>
        <Name>Wizzo Extracto ver. 2</Name>
      </Tool>
      <Setting name="sensitivity" value="0.5"/>
    </Instrument>
    <Rights>
      <RightsID>RID#</RightsID>
    </Rights>
  </DescriptionMetadata>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="ImageType">
      <Image>
        <!-- more elements here -->
      </Image>
    </MultimediaContent>
  </Description>
</Mpeg7>
```

4.4 Top-level types

4.4.1 Introduction

This subclause specifies the top-level types. The top-level types are used in complete descriptions to describe multimedia content and metadata related to content management. Each top-level type contains the description tools that are relevant for a particular description task, i.e., describing an image or a video. The following top-level types are defined in this subclause:

- **CompleteDescriptionType** (abstract): top-level type for complete descriptions.
 - o **ContentDescriptionType** (abstract): top-level type for complete descriptions of multimedia content.
 - **ContentEntityType**: top-level type for describing multimedia content entities such as images, videos, audio, collections, and so forth.
 - **ContentAbstractionType** (abstract): top-level type for describing abstractions of multimedia content:
 - **SemanticDescriptionType**: top-level type for describing semantics of multimedia content.
 - **ModelDescriptionType**: top-level type for describing models of multimedia content.
 - **SummaryDescriptionType**: top-level type for describing summaries of multimedia content.
 - **ViewDescriptionType**: top-level type for describing views and view decompositions of audio-visual signals.
 - **VariationDescriptionType**: top-level type for describing variations of multimedia content.
 - o **ContentManagementType** (abstract): top-level type for describing metadata related to content management:
 - **UserDescriptionType**: top-level type for describing a user of a multimedia system.
 - **MediaDescriptionType**: top-level type for describing the media information of multimedia content.
 - **CreationDescriptionType**: top-level type for describing the process of creating multimedia content.
 - **UsageDescriptionType**: top-level type for describing the usage of multimedia content.
 - **ClassificationSchemeDescriptionType**: top-level type for describing a classification scheme for multimedia content.

The top-level types are organized under the type hierarchy shown in Figure 3. The **CompleteDescriptionType** forms the root base type of the hierarchy. The top-level types **ContentDescriptionType** and **ContentManagementType** extend **CompleteDescriptionType**. The top-level types **ContentEntityType** and **ContentAbstractionType** extend **ContentDescriptionType**.

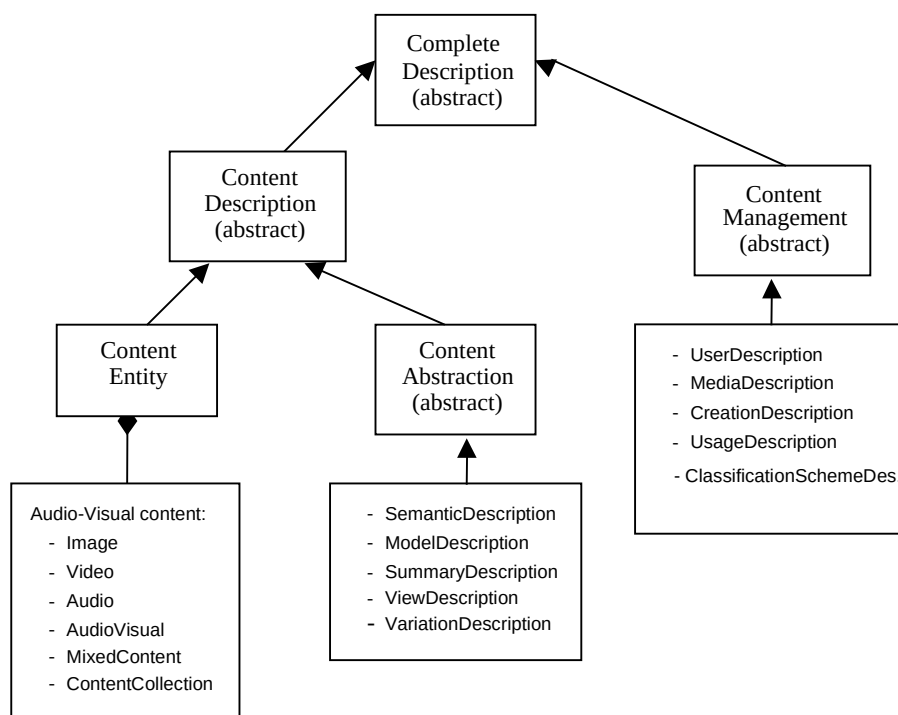


Figure 3 — Illustration of the type derivation hierarchy for top-level types

4.4.2 Complete description types

4.4.2.1 Introduction

The complete description types describe multimedia content, abstractions of multimedia content, and metadata related to the management of multimedia content. CompleteDescriptionType is the base type for ContentDescriptionType and ContentManagementType. Since the root element allows the instantiation of multiple complete description top-level types in a single description, the CompleteDescriptionType includes a Relationships element of type GraphType that describes the relationships among the DS instances in the description. The CompleteDescriptionType includes description metadata that describes the metadata for the descriptions contained within the instance of the complete description top-level type.

4.4.2.2 Complete description type syntax

```

<!-- ##### -->
<!-- Definition of Complete description top-level types (4.4.2) -->
<!-- ##### -->

<!-- Definition of CompleteDescription Top-level Type -->
<complexType name="CompleteDescriptionType" abstract="true">
  <sequence>
    <element name="DescriptionMetadata"
      type="mpeg7:DescriptionMetadataType" minOccurs="0"/>
    <element name="Relationships" type="mpeg7:GraphType"
      minOccurs="0" maxOccurs="unbounded"/>
    <element name="OrderingKey" type="mpeg7:OrderingKeyType"
      minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
</complexType>
  
```

4.4.2.3 Complete description type semantics

Semantics of the CompleteDescriptionType:

Name	Definition
CompleteDescriptionType	Describes multimedia content, abstractions of multimedia content, and management of multimedia content (abstract). CompleteDescriptionType is the base type for ContentDescriptionType and ContentManagementType.
DescriptionMetadata	Describes the metadata for the descriptions contained within the instance of the top-level type (optional). The description metadata applies to the elements contained within the instance of the root element unless new description metadata is described for those elements. DescriptionMetadataType is defined in 4.5.3.
Relationships	Describes a graph of the relationships among the DS instances in the description (optional). Also describes relationships across different individual sub-descriptions that appear under a single root element. GraphType is defined in 7.7.2.
OrderingKey	Describes an ordering of instances within a description (optional). The ordering does not constrain the actual order of appearance within the description itself. OrderingKeyType is defined in 7.8.2.

4.4.3 Content description types

4.4.3.1 Introduction

The content description top-level types describe multimedia content entities and abstractions of multimedia content.

4.4.3.2 Content description types syntax

```

<!-- ##### -->
<!-- Definition of Content description top-level types (4.4.3) -->
<!-- ##### -->
<!-- Definition of ContentDescription Top-level Type -->
<complexType name="ContentDescriptionType" abstract="true">
  <complexContent>
    <extension base="mpeg7:CompleteDescriptionType">
      <sequence>
        <element name="Affective" type="mpeg7:AffectiveType" minOccurs="0"
          maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of ContentEntity Top-level Type -->
<complexType name="ContentEntityType">
  <complexContent>
    <extension base="mpeg7:ContentDescriptionType">
      <sequence>
        <element name="MultimediaContent" type="mpeg7:MultimediaContentType"
          minOccurs="1" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

```

```

        </sequence>
    </extension>
</complexContent>
</complexType>

<!-- Definition of ContentAbstraction Top-level Type -->
<complexType name="ContentAbstractionType" abstract="true">
    <complexContent>
        <extension base="mpeg7:ContentDescriptionType"/>
    </complexContent>
</complexType>

<!-- Definition of SemanticDescription Top-level Type -->
<complexType name="SemanticDescriptionType">
    <complexContent>
        <extension base="mpeg7:ContentAbstractionType">
            <choice>
                <element name="Semantics" type="mpeg7:SemanticType" minOccurs="1"
                    maxOccurs="unbounded"/>
                <element name="ConceptCollection" type="mpeg7:ConceptCollectionType"
                    minOccurs="1" maxOccurs="unbounded"/>
            </choice>
        </extension>
    </complexContent>
</complexType>

<!-- Definition of ModelDescription Top-level Type -->
<complexType name="ModelDescriptionType">
    <complexContent>
        <extension base="mpeg7:ContentAbstractionType">
            <sequence>
                <element name="Model" type="mpeg7:ModelType" minOccurs="1"
                    maxOccurs="unbounded"/>
            </sequence>
        </extension>
    </complexContent>
</complexType>

<!-- Definition of SummaryDescription Top-level Type -->
<complexType name="SummaryDescriptionType">
    <complexContent>
        <extension base="mpeg7:ContentAbstractionType">
            <sequence>
                <element name="Summarization" type="mpeg7:SummarizationType"
                    minOccurs="1" maxOccurs="unbounded"/>
            </sequence>
        </extension>
    </complexContent>
</complexType>

<!-- Definition of ViewDescription Top-level Type -->
<complexType name="ViewDescriptionType">
    <complexContent>
        <extension base="mpeg7:ContentAbstractionType">
            <choice>
                <element name="View" type="mpeg7:ViewType" minOccurs="1"
                    maxOccurs="unbounded"/>
                <element name="ViewSet" type="mpeg7:ViewSetType" minOccurs="1"
                    maxOccurs="unbounded"/>
                <element name="ViewDecomposition" type="mpeg7:ViewDecompositionType"

```

```

        minOccurs="1" maxOccurs="unbounded"/>
    </choice>
</extension>
</complexContent>
</complexType>

<!-- Definition of VariationDescription Top-level Type -->
<complexType name="VariationDescriptionType">
    <complexContent>
        <extension base="mpeg7:ContentAbstractionType">
            <choice>
                <element name="VariationSet" type="mpeg7:VariationSetType"
                    minOccurs="1" maxOccurs="unbounded"/>
                <element name="Variation" type="mpeg7:VariationType" minOccurs="1"
                    maxOccurs="unbounded"/>
            </choice>
        </extension>
    </complexContent>
</complexType>

```

4.4.3.3 Content description types semantics

Semantics of the ContentDescriptionType:

Name	Definition
ContentDescriptionType	Top-level type for describing multimedia content and abstractions of multimedia content (abstract). Provides the base type of ContentEntityType and ContentAbstractionType. ContentDescriptionType extends CompleteDescriptionType.
Affective	Describes the affective response of users to the multimedia content (optional). The AffectiveType is defined in 7.9.

Semantics of the ContentEntityType:

Name	Definition
ContentEntityType	Top-level type for describing multimedia content entities such as images, video, audio, and so forth. ContentEntityType extends ContentDescriptionType.
MultimediaContent	Describes an instance of multimedia content.

Semantics of the ContentAbstractionType:

Name	Definition
ContentAbstractionType	Top-level type for describing abstractions of multimedia content (abstract). An abstraction is a secondary content representation that is created from or is related to the multimedia content. For example, a summary of video or a model of audio-visual features is an abstraction of the multimedia content. ContentAbstractionType extends ContentDescriptionType.

Semantics of the SemanticDescriptionType:

<i>Name</i>	<i>Definition</i>
SemanticDescriptionType	Top-level type for describing semantics of multimedia content including real-life events, objects, concepts, and narratives. SemanticDescriptionType extends ContentAbstractionType.
Semantics	Describes the semantics of multimedia content (optional). SemanticType is defined in 12.3.4.
ConceptCollection	Describes a collection of semantic concepts related to multimedia content (optional). ConceptCollectionType is defined in 14.2.5.

Semantics of the ModelDescriptionType:

<i>Name</i>	<i>Definition</i>
ModelDescriptionType	Top-level type for describing models of multimedia content. ModelDescriptionType extends ContentAbstractionType.
Model	Describes a model of multimedia content. ModelType is defined in 14.3.

Semantics of the SummaryDescriptionType:

<i>Name</i>	<i>Definition</i>
SummaryDescriptionType	Top-level type for describing summaries of AV content. SummaryDescriptionType extends ContentAbstractionType.
Summarization	Describes a summarization of AV content. SummarizationType is defined in 13.2

Semantics of the ViewDescriptionType:

<i>Name</i>	<i>Definition</i>
ViewDescriptionType	Top-level type for describing views, sets of views, and view decompositions of image, video, or audio signal. ViewDescriptionType extends ContentAbstractionType.
View	Describes a view of an image, video, or audio signal (optional). ViewType is defined in 13.3.5
ViewSet	Describes a set of views of an image, video, or audio signal (optional). ViewSetType is defined in 13.3.12.
ViewDecomposition	Describes a view decomposition of an image, video, or audio signal (optional). ViewDecompositionType is defined in 13.3.11.

Semantics of the VariationDescriptionType:

Name	Definition
VariationDescriptionType	Top-level type for describing variations of multimedia content. VariationDescriptionType extends ContentAbstractionType.
VariationSet	Describes a set of variations of multimedia content (optional). VariationSetType is defined in 13.4.2.
Variation	Describes a variation of multimedia content (optional). VariationType is defined in 13.4.2.

4.4.3.4 Content description types examples (informative)

The following example shows the use of the content description type ContentEntityType for describing a photographic image depicting a sunset. The image description includes a text annotation and a description of the image color using ScalableColor D (defined in ISO/IEC 15938-3).

```
<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="ImageType">
      <Image>
        <MediaLocator>
          <MediaUri>image.jpg</MediaUri>
        </MediaLocator>
        <TextAnnotation>
          <FreeTextAnnotation> Sunset scene </FreeTextAnnotation>
        </TextAnnotation>
        <VisualDescriptor xsi:type="ScalableColorType" numOfCoeff="16"
          numOfBitplanesDiscarded="0">
          <Coeff> 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 </Coeff>
        </VisualDescriptor>
      </Image>
    </MultimediaContent>
  </Description>
</Mpeg7>
```

The following example shows the use of the content description type SemanticDescriptionType for describing a car that is depicted in an image (image.jpg). The Semantic DS is defined in 12.3.4.

```
<Mpeg7>
  <Description xsi:type="SemanticDescriptionType">
    <Semantics>
      <Label>
        <Name> Car </Name>
      </Label>
      <Definition>
        <FreeTextAnnotation>
          Four wheel motorized vehicle
        </FreeTextAnnotation>
      </Definition>
      <MediaOccurrence>
        <MediaLocator>
          <MediaUri> image.jpg </MediaUri>
        </MediaLocator>
      </MediaOccurrence>
    </Semantics>
```

```

</Description>
</Mpeg7>

```

The following example shows the use of the content description type `ModelDescriptionType` for describing a collection model of "sunsets" that contains two images depicting sunset scenes. The `CollectionModel` DS is defined in 14.5.3.

```

<Mpeg7>
  <Description xsi:type="ModelDescriptionType">
    <Model xsi:type="CollectionModelType" confidence="0.75" reliability="0.5"
      function="described">
      <Label>
        <Name>Sunsets</Name>
      </Label>
      <Collection xsi:type="ContentCollectionType">
        <Content xsi:type="ImageType">
          <Image>
            <MediaLocator xsi:type="ImageLocatorType">
              <MediaUri>sunset1.jpg</MediaUri>
            </MediaLocator>
          </Image>
        </Content>
        <Content xsi:type="ImageType">
          <Image>
            <MediaLocator xsi:type="ImageLocatorType">
              <MediaUri>sunset2.jpg</MediaUri>
            </MediaLocator>
          </Image>
        </Content>
      </Collection>
    </Model>
  </Description>
</Mpeg7>

```

The following example shows the use of the content description type `SummaryDescriptionType` for describing a hierarchical summary of video. The hierarchical summary has two levels: level 0 consists of three summary segments, and level 1 consists of one summary segment. The `HierarchicalSummary` DS is defined in 13.2.4.

```

<Mpeg7>
  <Description xsi:type="SummaryDescriptionType">
    <Summarization>
      <Summary xsi:type="HierarchicalSummaryType"
        components="keyVideoClips" hierarchy="dependent">
        <SourceLocator>
          <MediaUri>file://disk/video001.mpg</MediaUri>
        </SourceLocator>
        <SummarySegmentGroup level="0">
          <SummarySegment> <!-- segment #1 at level 0 --> </SummarySegment>
          <SummarySegment> <!-- segment #2 at level 0 --> </SummarySegment>
          <SummarySegment> <!-- segment #3 at level 0 --> </SummarySegment>
          <SummarySegmentGroup level="1">
            <SummarySegment> <!-- segment #1 at level 1 --> </SummarySegment>
          </SummarySegmentGroup>
        </SummarySegmentGroup>
      </Summary>
    </Summarization>
  </Description>
</Mpeg7>

```

The following example shows the use of the content description type `ViewDescriptionType` for describing a spatial view of an image, which corresponds to the upper-right quarter of the image. The `SpaceView` DS is defined in 13.3.6.

```
<Mpeg7>
  <Description xsi:type="ViewDescriptionType">
    <View xsi:type="SpaceViewType">
      <Target>
        <ImageSignal>
          <MediaLocator>
            <MediaUri> view.jpg </MediaUri>
          </MediaLocator>
        </ImageSignal>
      </Target>
      <Source>
        <ImageSignal>
          <MediaLocator>
            <MediaUri> image.jpg </MediaUri>
          </MediaLocator>
        </ImageSignal>
      </Source>
      <SpacePartition>
        <Origin xOrigin="left" yOrigin="top"/>
        <Start xsi:type="SignalPlaneFractionType" x="0.5" y="0"/>
        <End xsi:type="SignalPlaneFractionType" x="0.5" y="0.5"/>
      </SpacePartition>
    </View>
  </Description>
</Mpeg7>
```

The following example shows the use of the content description type `VariationDescriptionType` for describing an image that is a variation of a video in which the image has been extracted from the video. The `VariationSet` DS is defined in 13.4.2.

```
<Mpeg7>
  <Description xsi:type="VariationDescriptionType">
    <VariationSet>
      <Source xsi:type="VideoType">
        <Video>
          <MediaLocator>
            <MediaUri>file://video-A.mpg</MediaUri>
          </MediaLocator>
        </Video>
      </Source>
      <Variation fidelity="0.85" priority="1">
        <Content xsi:type="ImageType">
          <Image>
            <MediaLocator>
              <MediaUri>file://image-B.jpg</MediaUri>
            </MediaLocator>
          </Image>
        </Content>
        <VariationRelationship>extraction</VariationRelationship>
      </Variation>
    </VariationSet>
  </Description>
</Mpeg7>
```

4.4.4 Content management types

4.4.4.1 Introduction

This subclause specifies top-level types that support the management of multimedia content.

4.4.4.2 Content management types syntax

```
<!-- ##### -->
<!-- Definition of Content management top-level types (4.4.4) -->
<!-- ##### -->

<!-- Definition of ContentManagement Top-level Type -->
<complexType name="ContentManagementType" abstract="true">
  <complexContent>
    <extension base="mpeg7:CompleteDescriptionType"/>
  </complexContent>
</complexType>

<!-- Definition of UserDescription Top-level Type -->
<complexType name="UserDescriptionType">
  <complexContent>
    <extension base="mpeg7:ContentManagementType">
      <sequence>
        <element name="User" type="mpeg7:AgentType"
          minOccurs="0"/>
        <element name="UserPreferences" type="mpeg7:UserPreferencesType"
          minOccurs="0" maxOccurs="unbounded"/>
        <element name="UsageHistory" type="mpeg7:UsageHistoryType"
          minOccurs="0" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of MediaDescription Top-level Type -->
<complexType name="MediaDescriptionType">
  <complexContent>
    <extension base="mpeg7:ContentManagementType">
      <sequence>
        <element name="MediaInformation"
          type="mpeg7:MediaInformationType" minOccurs="1"
          maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of CreationDescription Top-level Type -->
<complexType name="CreationDescriptionType">
  <complexContent>
    <extension base="mpeg7:ContentManagementType">
      <sequence>
        <element name="CreationInformation"
          type="mpeg7:CreationInformationType" minOccurs="1"
          maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
```

```

</complexType>

<!-- Definition of UsageDescription Top-level Type -->
<complexType name="UsageDescriptionType">
  <complexContent>
    <extension base="mpeg7:ContentManagementType">
      <sequence>
        <element name="UsageInformation" type="mpeg7:UsageInformationType"
          minOccurs="1" maxOccurs="unbounded"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of ClassificationSchemeDescription Top-level Type -->
<complexType name="ClassificationSchemeDescriptionType">
  <complexContent>
    <extension base="mpeg7:ContentManagementType">
      <choice>
        <element name="ClassificationScheme"
          type="mpeg7:ClassificationSchemeType" minOccurs="1"
          maxOccurs="unbounded"/>
        <element name="ClassificationSchemeBase"
          type="mpeg7:ClassificationSchemeBaseType" minOccurs="1"
          maxOccurs="unbounded"/>
      </choice>
    </extension>
  </complexContent>
</complexType>

```

4.4.4.3 Content management types semantics

Semantics of the ContentManagementType:

Name	Definition
ContentManagementType	Top-level type for describing metadata related to the management of multimedia content (abstract). ContentManagementType extends CompleteDescriptionType.

Semantics of the UserDescriptionType:

Name	Definition
UserDescriptionType	Top-level type for describing users of multimedia systems. UserDescriptionType extends ContentManagementType.
User	Describes a user of a multimedia system (optional). A user can be a person, a group of persons, or an organization. User if of type AgentType, which is defined in 7.5.
UserPreferences	Describes the preferences of the user of a multimedia system (optional). UserPreferencesType is defined in 15.2.
UsageHistory	Describes the usage history of the user of a multimedia system (optional). UsageHistoryType is defined in 15.3.

Semantics of the MediaDescriptionType:

<i>Name</i>	<i>Definition</i>
MediaDescriptionType	Top-level type for describing the media information of multimedia content. MediaDescriptionType extends ContentManagementType.
MediaInformation	Describes the media information of multimedia content. MediaInformationType is defined in 8.2.

Semantics of the CreationDescriptionType:

<i>Name</i>	<i>Definition</i>
CreationDescriptionType	Top-level type for describing the processes of creating multimedia content. CreationDescriptionType extends ContentManagementType.
CreationInformation	Describes the information about the creation of multimedia content. CreationInformationType is defined in 9.2.

Semantics of the UsageDescriptionType:

<i>Name</i>	<i>Definition</i>
UsageDescriptionType	Top-level type for describing the usage of multimedia content. UsageDescriptionType extends ContentManagementType.
UsageInformation	Describes usage rights of multimedia content. UsageInformationType is defined in 10.2.

Semantics of the ClassificationSchemeDescriptionType:

<i>Name</i>	<i>Definition</i>
ClassificationSchemeDescriptionType	Top-level type for describing classification schemes for multimedia content. ClassificationSchemeDescriptionType extends ContentManagementType.
ClassificationScheme	Describes a classification scheme or ontology for multimedia content. ClassificationSchemeType is defined in 7.4.2.
ClassificationSchemeBase	Describes a classification scheme or ontology for multimedia content using the base type for classification schemes. ClassificationSchemeBaseType is defined in 7.4.2.

4.4.4.4 Content management types example (informative)

The following example shows the use of the content management type UserDescriptionType for describing the user preferences of a user of a multimedia system. The UserPreferences DS is defined in 15.2.3.

```

<Mpeg7>
  <Description xsi:type="UserDescriptionType">
    <User xsi:type="PersonType">
      <Name xml:lang="en">
        <GivenName> John </GivenName>
        <FamilyName> Smith </FamilyName>
      </Name>
    </User>
    <UserPreferences>
      <UserIdentifier>
        <Name> jrsmith </Name>
      </UserIdentifier>
      <FilteringAndSearchPreferences>
        <!-- more elements here -->
      </FilteringAndSearchPreferences>
    </UserPreferences>
  </Description>
</Mpeg7>

```

The following example shows the use of the content management type MediaDescriptionType for describing the media information of a news video. The MediaInformation DS is defined in 8.2.1.

```

<Mpeg7>
  <Description xsi:type="MediaDescriptionType">
    <MediaInformation id="news1_media">
      <MediaIdentification>
        <EntityIdentifier organization="MPEG" type="MPEG7ContentSetId">
          mpeg7_content:news1
        </EntityIdentifier>
        <VideoDomain href="urn:mpeg:mpeg7:cs:VideoDomainCS:2001:1.2">
          <Name xml:lang="en">Natural</Name>
        </VideoDomain>
      </MediaIdentification>
      <MediaProfile>
        <MediaFormat>
          <Content href="MPEG7ContentCS">
            <Name>audiovisual</Name>
          </Content>
          <Medium href="urn:mpeg:mpeg7:cs:MediumCS:2001:1.1">
            <Name xml:lang="en">CD</Name>
          </Medium>
          <FileFormat href="urn:mpeg:mpeg7:cs:FileFormatCS:2001:3">
            <Name xml:lang="en">mpeg</Name>
          </FileFormat>
          <FileSize>666478608</FileSize>
          <VisualCoding>
            <Format href="urn:mpeg:mpeg7:cs:VisualCodingFormatCS:2001:1"
              colorDomain="color">
              <Name xml:lang="en">MPEG-1 Video</Name>
            </Format>
            <Pixel aspectRatio="0.75" bitsPer="8"/>
            <Frame height="288" width="352" rate="25"/>
          </VisualCoding>
        </MediaFormat>
      </MediaProfile>
    </MediaInformation>
  </Description>
</Mpeg7>

```

The following example shows the use of the content management type `CreationDescriptionType` for describing the creation information for a sports video. The `CreationInformation` DS is defined in 9.2.1.

```
<Mpeg7>
  <Description xsi:type="CreationDescriptionType">
    <CreationInformation>
      <Creation>
        <Title xml:lang="en" type="popular">Subway series</Title>
        <Abstract>
          <FreeTextAnnotation> Game among city rivals
          </FreeTextAnnotation>
        </Abstract>
        <Creator>
          <Role href="urn:mpeg:mpeg7:cs:RoleCS:2001:PUBLISHER"/>
          <Agent xsi:type="OrganizationType">
            <Name>Sports Channel</Name>
          </Agent>
        </Creator>
      </Creation>
    </CreationInformation>
  </Description>
</Mpeg7>
```

The following example shows the use of the content management type `UsageDescriptionType` for describing the usage information for a sport video released for the Internet. The `UsageInformation` DS is defined in 10.2.1.

```
<Mpeg7>
  <Description xsi:type="UsageDescriptionType">
    <UsageInformation>
      <Rights>
        <RightsID organization="NBC" type="NBCCopyRightsID">
          nbc:20010618:td2
        </RightsID>
      </Rights>
      <Availability id="sports">
        <InstanceRef href="onlinemp7cs17sports1"/>
        <Dissemination>
          <Format href="urn:mpeg:mpeg7:cs:DisseminationFormatCS:2001:4">
            <Name xml:lang="en">Internet</Name>
          </Format>
          <Location>
            <Region>us</Region>
          </Location>
        </Dissemination>
        <AvailabilityPeriod type="payPerUse">
          <TimePoint>2001-06-16T21:00+01:00</TimePoint>
          <Duration>PT30M</Duration>
        </AvailabilityPeriod>
      </Availability>
    </UsageInformation>
  </Description>
</Mpeg7>
```

The following example shows the use of the content management type `ClassificationSchemeDescriptionType` for describing a classification scheme for audio domain. The `ClassificationScheme` DS is defined in 7.4.2.

```

<Mpeg7>
  <Description xsi:type="ClassificationSchemeDescriptionType">
    <ClassificationScheme uri="urn:mpeg:mpeg7:cs:MyAudioDomainCS"
      domain="//MediaInformation/MediaProfile/MediaIdentification/AudioDomain">
      <Header xsi:type="DescriptionMetadataType">
        <Version>1.0</Version>
      </Header>
      <Term termID="1">
        <Name xml:lang="en">Source</Name>
        <Definition xml:lang="en">Type of audio source</Definition>
        <Term termID="1.1">
          <Name xml:lang="en">Synthetic</Name>
        </Term>
        <Term termID="1.2">
          <Name xml:lang="en">Natural</Name>
        </Term>
      </Term>
    </ClassificationScheme>
  </Description>
</Mpeg7>

```

4.4.5 Multimedia content entity description tools

4.4.5.1 Introduction

This subclause specifies tools for describing different multimedia content entities. The different multimedia content entity tools correspond to the different types of multimedia content: images, video, audio, AV data, mixed multimedia content, signals, ink content, and edited video.

4.4.5.2 Multimedia content entity description tools syntax

```

<!-- ##### -->
<!-- Definition of Multimedia content entity tools (4.4.5) -->
<!-- ##### -->

<!-- Definition of MultimediaContent Content Entity -->
<complexType name="MultimediaContentType" abstract="true">
  <complexContent>
    <extension base="mpeg7:DSType">
    </extension>
  </complexContent>
</complexType>

<!-- Definition of Image Content Entity -->
<complexType name="ImageType">
  <complexContent>
    <extension base="mpeg7:MultimediaContentType">
      <sequence>
        <element name="Image" type="mpeg7:StillRegionType"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of Video Content Entity -->
<complexType name="VideoType">
  <complexContent>
    <extension base="mpeg7:MultimediaContentType">
      <sequence>

```

```

        <element name="Video" type="mpeg7:VideoSegmentType"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of Audio Content Entity -->
<complexType name="AudioType">
  <complexContent>
    <extension base="mpeg7:MultimediaContentType">
      <sequence>
        <element name="Audio" type="mpeg7:AudioSegmentType"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of AudioVisual Content Entity -->
<complexType name="AudioVisualType">
  <complexContent>
    <extension base="mpeg7:MultimediaContentType">
      <sequence>
        <element name="AudioVisual" type="mpeg7:AudioVisualSegmentType"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of Multimedia Content Entity -->
<complexType name="MultimediaType">
  <complexContent>
    <extension base="mpeg7:MultimediaContentType">
      <sequence>
        <element name="Multimedia" type="mpeg7:MultimediaSegmentType"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of MultimediaCollection Content Entity -->
<complexType name="MultimediaCollectionType">
  <complexContent>
    <extension base="mpeg7:MultimediaContentType">
      <choice>
        <element name="Collection" type="mpeg7:CollectionType" minOccurs="1"
          maxOccurs="unbounded"/>
        <element name="StructuredCollection"
          type="mpeg7:StructuredCollectionType" minOccurs="1"
          maxOccurs="unbounded"/>
      </choice>
    </extension>
  </complexContent>
</complexType>

<!-- Definition of Signal Content Entity -->
<complexType name="SignalType">
  <complexContent>
    <extension base="mpeg7:MultimediaContentType">
      <choice>
        <element name="ImageSignal" type="mpeg7:StillRegionType"/>

```

```

        <element name="VideoSignal" type="mpeg7:VideoSegmentType"/>
        <element name="AudioSignal" type="mpeg7:AudioSegmentType"/>
        <element name="SignalRef" type="mpeg7:ReferenceType"/>
    </choice>
</extension>
</complexContent>
</complexType>

<!-- Definition of InkContent Content Entity -->
<complexType name="InkContentType">
    <complexContent>
        <extension base="mpeg7:MultimediaContentType">
            <sequence>
                <element name="InkContent" type="mpeg7:InkSegmentType"/>
            </sequence>
        </extension>
    </complexContent>
</complexType>

<!-- Definition of AnalyticEditedVideo Content Entity -->
<complexType name="AnalyticEditedVideoType">
    <complexContent>
        <extension base="mpeg7:MultimediaContentType">
            <sequence>
                <element name="AnalyticEditedVideo"
                    type="mpeg7:AnalyticEditedVideoSegmentType"/>
            </sequence>
        </extension>
    </complexContent>
</complexType>

```

4.4.5.3 Multimedia content entity description tools semantics

Semantics of the MultimediaContentType:

Name	Definition
MultimediaContentType	Describes a multimedia content entity (abstract). The multimedia content entity shall correspond to one of a variety of multimedia content types including images, video, audio, content collections, ink content, and so forth. MultimediaContentType extends DSType.

Semantics of the ImageType:

<i>Name</i>	<i>Definition</i>
ImageType	Multimedia content entity for describing an image. An image refers to 2D spatially-varying visual data acquired from a visual source. ImageType extends MultimediaContentType.
Image	Describes the image. The image may refer to 2D spatial data or to a video frame. The image may correspond to a still region of an image or video frame. Image is of type StillRegionType, which is defined in 11.4.2.

Semantics of the VideoType:

<i>Name</i>	<i>Definition</i>
VideoType	Multimedia content entity for describing a video. Video refers to time-varying 2-D spatial data commonly represented as a temporally discrete sequence of images or video frames. VideoType extends MultimediaContentType.
Video	Describes the video. The video may be a full video sequence or a temporal segment, shot, or clip extracted from a video sequence. Video is of type VideoSegmentType, which is defined in 11.4.8.

Semantics of the AudioType:

<i>Name</i>	<i>Definition</i>
AudioType	Multimedia content entity for describing audio. Audio refers to time-varying 1-D data intended for listening or hearing. AudioType extends MultimediaContentType.
Audio	Describes the audio. The audio may be a full audio sequence or a temporal segment or clip extracted from an audio sequence. Audio is of type AudioSegmentType, which is defined in 11.5.2.

Semantics of the AudioVisualType:

<i>Name</i>	<i>Definition</i>
AudioVisualType	Multimedia content entity for describing AV data. AV refers to content consisting of both audio and video. AudioVisualType extends MultimediaContentType.
AudioVisual	Describes the AV data. The AV data may be a full AV sequence or a temporal segment or clip extracted from an AV sequence. AudioVisual is of type AudioVisualSegmentType, which is defined in 11.6.2.

Semantics of the MultimediaType:

<i>Name</i>	<i>Definition</i>
MultimediaType	Multimedia content entity for describing multimedia data. Multimedia refers to content comprising one or modalities or content types, such as images, audio, video, 3D models, ink content, and so forth. MultimediaType extends MultimediaContentType.
Multimedia	Describes the multimedia data. The multimedia data may be a composite of multimedia content or a single item of multimedia content that forms a multimedia presentation. Multimedia is of type MultimediaSegmentType, which is defined in 11.7.2.

Semantics of the MultimediaCollectionType:

<i>Name</i>	<i>Definition</i>
MultimediaCollectionType	Multimedia content entity for describing a collection of multimedia data. A multimedia collection is loose collection that does not necessarily form a single coherent presentation. The multimedia collection may contain multiple collections of content and segment. MultimediaCollectionType extends MultimediaContentType.
Collection	Describes a collection related to multimedia content. Examples include collections of multimedia content, collections of segments, and collections of descriptor instances. Each collection is an unordered, unbounded, nested set of items related to multimedia content. CollectionType is defined in 14.2.1.

Semantics of the SignalType:

<i>Name</i>	<i>Definition</i>
SignalType	Multimedia content entity for describing an image, video, or audio signal that can be represented as continuous or discrete sample data in space and/or time. For example, a signal can correspond to a discrete 1-D audio signal, a 2-D discrete spatial lattice of image data, or a time-varying video signal. These signal types of image, video, or audio signal data are distinguished from other types of multimedia content, such as complex multimedia presentations, in order to allow the description of views in space, time, and frequency. SignalType is used in ViewType for describing views, partitions, and decompositions of discrete lattice data. SignalType extends MultimediaContentType.
ImageSignal	Describes the image signal. ImageSignal is of type StillRegionType, which is defined in 11.4.2.
VideoSignal	Describes the video signal. VideoSignal is of type VideoSegmentType, which is defined in 11.4.8.
AudioSignal	Describes the audio signal. AudioSignal is of type AudioSegmentType, which is defined in 11.5.2.
SignalRef	Describes a reference to a description of an image, video, or audio signal. SignalRef is of type ReferenceType, which is defined in 6.2.1.

Semantics of the InkContentType:

Name	Definition
InkContentType	Multimedia content entity for describing ink content. Ink content refers to digital written or stroke data generated from various pen devices as well as ink applications (e.g., electronic whiteboard applications, form filling and ink messaging). InkContentType extends MultimediaContentType.
InkContent	Describes the ink content. The ink content may be a full ink document or a segment extracted from an ink document. InkContent is of type InkSegmentType, which is defined in 11.8.2.

Semantics of the AnalyticEditedVideoType:

Name	Definition
AnalyticEditedVideoType	Multimedia content entity for describing the video in terms of the analysis of its editing of clips and transitions. AnalyticEditedVideoType extends MultimediaContentType.
AnalyticEditedVideo	Describes the edited video. The analytic edited video may be a full edited video or a segment of edited video. AnalyticEditedVideo is of type AnalyticEditedVideoSegmentType, which is defined in 11.9.2.

4.4.5.4 Multimedia content entity description tools examples (informative)

The following example shows the use of the multimedia content entity ImageType for describing an image.

```
<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="ImageType">
      <Image>
        <MediaLocator>
          <MediaUri>image.jpg</MediaUri>
        </MediaLocator>
        <CreationInformation>
          <Creation>
            <Title> World Series Game 3 </Title>
          </Creation>
        </CreationInformation>
        <TextAnnotation>
          <FreeTextAnnotation> Game winning homerun </FreeTextAnnotation>
        </TextAnnotation>
        <Semantic>
          <Label>
            <Name>Last inning</Name>
          </Label>
          <SemanticBase xsi:type="EventType">
            <Label>
              <Name>Game winning homerun </Name>
            </Label>
          </SemanticBase>
        </Semantic>
        <VisualDescriptor xsi:type="ScalableColorType" numOfCoeff="16"
```

```

        numOfBitplanesDiscarded="0">
        <Coeff> 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 </Coeff>
    </VisualDescriptor>
</Image>
</MultimediaContent>
</Description>
</Mpeg7>

```

The following example shows the use of the multimedia content entity VideoType for describing a video.

```

<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="VideoType">
      <Video>
        <CreationInformation>
          <Creation>
            <Title> Worldcup Soccer </Title>
          </Creation>
        </CreationInformation>
        <MediaTime>
          <MediaTimePoint>T00:00:00</MediaTimePoint>
          <MediaDuration>PT1M30S</MediaDuration>
        </MediaTime>
        <VisualDescriptor xsi:type="GoFGoPColorType" aggregation="Average">
          <ScalableColor numOfCoeff="16" numOfBitplanesDiscarded="0">
            <Coeff> 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 </Coeff>
          </ScalableColor>
        </VisualDescriptor>
      </Video>
    </MultimediaContent>
  </Description>
</Mpeg7>

```

The following example shows the use of the multimedia content entity AudioType for describing audio content.

```

<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="AudioType">
      <Audio>
        <CreationInformation>
          <Creation>
            <Title> Morning Radio </Title>
          </Creation>
        </CreationInformation>
        <MediaTime>
          <MediaTimePoint>T00:00:00</MediaTimePoint>
          <MediaDuration>PT30M00S</MediaDuration>
        </MediaTime>
      </Audio>
    </MultimediaContent>
  </Description>
</Mpeg7>

```

The following example shows the use of the multimedia content entity `AudioVisualType` for describing audiovisual content.

```
<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="AudioVisualType">
      <AudioVisual>
        <MediaLocator>
          <MediaUri>program.mpg</MediaUri>
        </MediaLocator>
        <CreationInformation>
          <Creation>
            <Title> News Flash</Title>
          </Creation>
        </CreationInformation>
        <TextAnnotation>
          <FreeTextAnnotation> Afternoon news program </FreeTextAnnotation>
        </TextAnnotation>
        <MediaTime>
          <MediaTimePoint>T00:00:00</MediaTimePoint>
          <MediaDuration>PT10M300S</MediaDuration>
        </MediaTime>
      </AudioVisual>
    </MultimediaContent>
  </Description>
</Mpeg7>
```

The following example shows the use of the multimedia content entity `MultimediaType` for describing multimedia content.

```
<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="MultimediaType">
      <Multimedia>
        <MediaSourceDecomposition gap="false" overlap="false">
          <Segment xsi:type="StillRegionType">
            <TextAnnotation>
              <FreeTextAnnotation> image </FreeTextAnnotation>
            </TextAnnotation>
          </Segment>
          <Segment xsi:type="VideoSegmentType">
            <TextAnnotation>
              <FreeTextAnnotation> video </FreeTextAnnotation>
            </TextAnnotation>
            <MediaTime>
              <MediaTimePoint>T00:00:00</MediaTimePoint>
              <MediaDuration>PT0M15S</MediaDuration>
            </MediaTime>
          </Segment>
          <Segment xsi:type="AudioSegmentType">
            <TextAnnotation>
              <FreeTextAnnotation> audio </FreeTextAnnotation>
            </TextAnnotation>
          </Segment>
        </MediaSourceDecomposition>
      </Multimedia>
    </MultimediaContent>
  </Description>
</Mpeg7>
```

The following example shows the use of the multimedia content entity `MultimediaCollectionType` for describing a collection consisting of one image and one video.

```
<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="MultimediaCollectionType">
      <Collection xsi:type="ContentCollectionType">
        <Content xsi:type="ImageType">
          <Image>
            <MediaLocator xsi:type="ImageLocatorType">
              <MediaUri>image.jpg</MediaUri>
            </MediaLocator>
          </Image>
        </Content>
        <Content xsi:type="VideoType">
          <Video>
            <MediaLocator xsi:type="TemporalSegmentLocatorType">
              <MediaUri>video.mpg</MediaUri>
            </MediaLocator>
          </Video>
        </Content>
      </Collection>
    </MultimediaContent>
  </Description>
</Mpeg7>
```

The following example shows the use of the multimedia content entity `SignalType` for describing an image signal.

```
<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="SignalType">
      <ImageSignal>
        <MediaLocator xsi:type="ImageLocatorType">
          <MediaUri>video.mpg</MediaUri>
        </MediaLocator>
      </ImageSignal>
    </MultimediaContent>
  </Description>
</Mpeg7>
```

The following example shows the use of the multimedia content entity `InkContentType` for describing ink content.

```
<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="InkContentType">
      <InkContent>
        <MediaLocator>
          <MediaUri>ink.mpg</MediaUri>
        </MediaLocator>
        <InkMediaInformation>
          <InputDevice resolutionS="133">
            <Device>
              <Name xml:lang="en">PenDevice</Name>
            </Device>
          </InputDevice>
          <Handedness>right</Handedness>
          <Style>mixed</Style>
        </InkMediaInformation>
      </InkContent>
    </MultimediaContent>
  </Description>
</Mpeg7>
```

```

        </InkMediaInformation>
      </InkContent>
    </MultimediaContent>
  </Description>
</Mpeg7>

```

The following example shows the use of the multimedia content entity `AnalyticEditedVideoType` for describing an edited video.

```

<Mpeg7>
  <Description xsi:type="ContentEntityType">
    <MultimediaContent xsi:type="AnalyticEditedVideoType">
      <AnalyticEditedVideo xsi:type="EditedVideoType">
        <MediaLocator>
          <MediaUri> video.mpg </MediaUri>
        </MediaLocator>
        <CreationInformation>
          <Creation>
            <Title> Worldcup Soccer </Title>
          </Creation>
        </CreationInformation>
        <MediaTime>
          <MediaTimePoint>T00:00:00</MediaTimePoint>
          <MediaDuration>PT1M30S</MediaDuration>
        </MediaTime>
        <AnalyticEditingTemporalDecomposition>
          <Shot> <!-- ... --> </Shot>
        </AnalyticEditingTemporalDecomposition>
      </AnalyticEditedVideo>
    </MultimediaContent>
  </Description>
</Mpeg7>

```

4.5 Description metadata tools

4.5.1 Introduction

This subclause specifies tools for describing metadata about descriptions. The description metadata includes packages of description tools and description metadata about the creation of descriptions.

4.5.2 Package DS

4.5.2.1 Introduction

The Package DS organizes and labels the description tools for ease of use and navigation of the description tools. The Package DS allows nesting of package descriptions within package descriptions.

4.5.2.2 Package DS syntax

```

<!-- ##### -->
<!-- Definition of Package DS (4.5.2) -->
<!-- ##### -->

<!-- Definition of Package DS -->
<complexType name="PackageType">
  <complexContent>

```

```

<extension base="mpeg7:DSType">
  <choice minOccurs="0" maxOccurs="unbounded">
    <element name="Scheme">
      <complexType>
        <attribute name="name" type="QName" use="required" />
      </complexType>
    </element>
    <element name="Package" type="mpeg7:PackageType" />
  </choice>
  <attribute name="name" type="string" use="required" />
</extension>
</complexContent>
</complexType>

```

4.5.2.3 Package DS semantics

Semantics of the PackageType:

Name	Definition
PackageType	Describes a package of description tools.
Scheme	Describes a description tool by giving its name.
name	Identifies the name of a description tool.
Package	Describes the nesting of package descriptions with the package (optional).
name	Identifies the name of the title of the package.

4.5.2.4 Package DS examples (informative)

The following example shows the use of the Package DS for describing a package of description tools for collections and models. The package consists of one package named "Content Organization," which consists of another package that lists four tools: ContentCollectionType, DescriptorCollectionType, ConceptCollectionType, and MixedCollectionType, and another package named "Probability Models," which consists of two additional packages named: "Probability Distributions," "Continuous Probability Distribution," and "Finite State Models"

```

<Mpeg7>
  <DescriptionMetadata>
    <Version>1.0</Version>
    <Package name="Content Organization">
      <Package name="Collections">
        <Scheme name="ContentCollectionType"/>
        <Scheme name="DescriptorCollectionType"/>
        <Scheme name="ConceptCollectionType"/>
        <Scheme name="MixedCollectionType"/>
      </Package>
      <Package name="Models">
        <Package name="Probability Models">
          <Package name="Probability Distributions">
            <Package name="Discrete Probability Distributions">
              <Scheme name="HistogramProbabilityType"/>
              <Scheme name="BinomialDistributionType"/>
              <Scheme name="PoissonDistributionType"/>
            </Package>
          </Package>
        </Package>
      </Package>
    </Package>
  </DescriptionMetadata>
</Mpeg7>

```

```

        </Package>
        <Package name="Continuous Probability Distributions">
            <Scheme name="GaussianDistributionType"/>
            <Scheme name="GeneralizedGaussianDistributionType"/>
        </Package>
    </Package>
    <Package name="Finite State Models">
        <Scheme name="StateTransitionModelType"/>
        <Scheme name="HiddenMarkovModelType"/>
    </Package>
</Package>
</DescriptionMetadata>
<!-- more elements here -->
</Mpeg7>

```

4.5.3 DescriptionMetadata Header

4.5.3.1 Introduction

The DescriptionMetadata Header describes metadata concerning a description. Such metadata includes information identifying the description (privately or publicly) and describing the creation of the description, the version of the description, and the rights associated with the description.

4.5.3.2 DescriptionMetadata header syntax

```

<!-- ##### -->
<!-- Definition of DescriptionMetadata Header (4.5.3) -->
<!-- ##### -->

<!-- Definition of DescriptionMetadata Header -->
<complexType name="DescriptionMetadataType">
    <complexContent>
        <extension base="mpeg7:HeaderType">
            <sequence>
                <element name="Confidence" type="mpeg7:zeroToOneType" minOccurs="0"/>
                <element name="Version" type="string" minOccurs="0"/>
                <element name="LastUpdate" type="mpeg7:timePointType" minOccurs="0"/>
                <element name="Comment" type="mpeg7:TextAnnotationType" minOccurs="0"/>
                <element name="PublicIdentifier" type="mpeg7:UniqueIDType"
                    minOccurs="0" maxOccurs="unbounded"/>
                <element name="PrivateIdentifier" type="string"
                    minOccurs="0" maxOccurs="unbounded"/>
                <element name="Creator" type="mpeg7:CreatorType"
                    minOccurs="0" maxOccurs="unbounded"/>
                <element name="CreationLocation" type="mpeg7:PlaceType" minOccurs="0"/>
                <element name="CreationTime" type="mpeg7:timePointType" minOccurs="0"/>
                <element name="Instrument" type="mpeg7:CreationToolType"
                    minOccurs="0" maxOccurs="unbounded"/>
                <element name="Rights" type="mpeg7:RightsType" minOccurs="0"/>
                <element name="Package" type="mpeg7:PackageType" minOccurs="0"/>
            </sequence>
        </extension>
    </complexContent>
</complexType>

```