INTERNATIONAL STANDARD

ISO/IEC 23005-4

Fourth edition
2018-09

Information technology — Media context and control —

Part 4: Virtual world object characteristics

Technologies de l'information — Contrôle et contexte de supports —
Partie 4: Caractéristiques d'objet du monde virtuel

Reference number
ISO/IEC 23005-4:2018(E)

© ISO/IEC 2018



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

1 Scope 1
2 Normative references 1
3 Terms, definitions, abbreviated terms, schema documents and prefixes 1
3.1 Terms and definitions 1
3.2 Schema documents 3
3.3 Use of prefixes 3
4 Virtual world object metadata 4
4.1 General 4
4.2 Schema wrapper conventions 5
4.3 Root element and top-level tools 6
4.3.1 General 6
4.3.2 XML representation syntax 6
4.3.3 Binary representation syntax 6
4.3.4 Semantics 7
4.3.5 Examples 8
4.4 Virtual world object base type 9
4.4.1 General 9
4.4.2 XML representation syntax 10
4.4.3 Binary representation syntax 11
4.4.4 Semantics 13
4.4.5 Examples 14
4.4.6 IdentificationType 15
4.4.7 VWOSoundListType 18
4.4.8 VWOScentListType 19
4.4.9 VWOControlListType 20
4.4.10 VWOEventListType 20
4.4.11 VWOBehaviorModelListType 21
4.4.12 VWOSoundType 22
4.4.13 VWOScentType 24
4.4.14 VWOControlType 26
4.4.15 VWOEventType 29
4.4.16 VWOSensoryEffectType 33
4.4.17 VWOBehaviourModelType 35
4.5 Virtual world object common data types 37
4.5.1 VWOHapticPropertyType 38
4.5.2 AnimationDescriptionType 45
4.5.3 AnimationResourcesDescriptionType 48
4.5.4 Common simple data types 53
5 Avatar metadata 61
5.1 General 61
5.2 AvatarType 62
5.2.1 XML representation syntax 62
5.2.2 Binary representation syntax 63
5.2.3 Semantics 65
5.3 AvatarAppearanceType 67
5.3.1 XML representation syntax 67
5.3.2 Binary representation syntax 74
5.3.3 Semantics 111
5.3.4 Examples 143
5.4 AvatarAnimationType 145

© ISO/IEC 2018 – All rights reserved

5.4.1 XML representation syntax 145
5.4.2 Binary representation syntax 146
5.4.3 Semantics 150
5.4.4 Examples 172
5.5 AvatarCommunicationSkillsType 172
5.5.1 XML representation syntax 172
5.5.2 Binary representation syntax 173
5.5.3 Semantics 174
5.5.4 Examples 175
5.6 VerbalCommunicationType 176
5.6.1 XML representation syntax 176
5.6.2 Binary representation syntax 176
5.6.3 Semantics 177
5.7 LanguageType 178
5.7.1 XML representation syntax 178
5.7.2 Binary representation syntax 178
5.7.3 Semantics 178
5.8 communicationPreferenceType 178
5.8.1 XML representation syntax 178
5.8.2 Binary representation syntax 178
5.8.3 Semantics 179
5.9 communicationPreferenceLevelType 179
5.9.1 XML representation syntax 179
5.9.2 Binary representation syntax 179
5.9.3 Semantics 179
5.10 NonVerbalCommunicationType 179
5.10.1 XML representation syntax 179
5.10.2 Binary representation syntax 180
5.10.3 Semantics 181
5.11 SignLanguageType 181
5.11.1 XML representation syntax 181
5.11.2 Binary representation syntax 181
5.11.3 Semantics 182
5.12 AvatarPersonalityType 182
5.12.1 XML representation syntax 182
5.12.2 Binary representation syntax 182
5.12.3 Semantics 183
5.13 AvatarControlFeaturesType 184
5.13.1 XML representation syntax 184
5.13.2 Binary representation syntax 185
5.13.3 Semantics 185
5.13.4 Examples 186
5.14 ControlBodyFeaturesType 186
5.14.1 XML representation syntax 186
5.14.2 Binary representation syntax 187
5.14.3 Semantics 188
5.14.4 Examples 191
5.15 ControlBodyFeaturesDescriptionType 192
5.15.1 XML representation syntax 192
5.15.2 Binary representation syntax 193
5.15.3 Semantics 193
5.16 ControlFaceFeaturesType 194
5.16.1 XML representation syntax 194
5.16.2 Binary representation syntax 195
5.16.3 Semantics 197
5.16.4 Examples 202
5.17 OutlineType 203
5.17.1 XML representation syntax 203
5.17.2 Binary representation syntax 203

 © ISO/IEC 2018 – All rights reserved

5.17.3 Semantics 204
5.18 Outline4PointsType 204
5.18.1 XML representation syntax 204
5.18.2 Binary representation syntax 205
5.18.3 Semantics 205
5.19 Outline5PointsType 205
5.19.1 XML representation syntax 205
5.19.2 Binary representation syntax 206
5.19.3 Semantics 206
5.20 Outline8PointsType 206
5.20.1 XML representation syntax 206
5.20.2 Binary representation syntax 207
5.20.3 Semantics 207
5.21 Outline14PointsType 208
5.21.1 XML representation syntax 208
5.21.2 Binary representation syntax 209
5.21.3 Semantics 209
5.22 VWOHapticPropertyListType 210
5.22.1 XML representation syntax 210
5.22.2 Binary representation syntax 210
5.22.3 Semantics 210
5.23 MakeupAvatarType 211
5.23.1 XML representation syntax 211
5.23.2 Binary representation syntax 212
5.23.3 Semantics 212
5.24 CosmeticType 213
5.24.1 XML representation syntax 213
5.24.2 Binary representation 214
5.24.3 Semantics 218
5.25 MakeupInfoType 222
5.25.1 XML representation syntax 222
5.25.2 Binary Representation 222
5.25.3 Semantics 222
5.26 MakeupToolType 223
5.26.1 XML representation syntax 223
5.26.2 Binary representation 223
5.26.3 Semantics 224
5.27 MakeupRegionType 226
5.27.1 XML representation syntax 226
5.27.2 Binary representation 227
5.27.3 Semantics 227
5.27.4 Examples 229

6 Virtual object metadata 231
6.1 General 231
6.2 VirtualObjectType 231
6.2.1 XML representation syntax 231
6.2.2 Binary representation syntax 232
6.2.3 Semantics 233
6.2.4 Examples 233
6.2.5 VOAnimationType 234

Annex A (normative) Classification schemes 238

Annex B (informative) Virtual world object characteristics schema 288

Annex C (informative) Possible usage of the schema in this document 289

Bibliography 291

© ISO/IEC 2018 – All rights reserved

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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

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

This fourth edition cancels and replaces the third edition (ISO/IEC 23005-4:2016), which has been technically revised.

The main changes compared to the previous edition are the addition of:

— new element “SensoryEffectList” to VWOBaseType.

A list of all parts in the ISO/IEC 23005 series can be found on the ISO website.

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

 © ISO/IEC 2018 – All rights reserved

Introduction

The ISO/IEC 23005 series provides an architecture and specifies information representation of data flowing in and out of the real world and virtual worlds.

The data for the real world are communicated through sensors and actuators. The data for virtual worlds consist of properties of virtual objects and multi-sensorial data embedded in audio-visual content. MPEG-V specifies data formats for sensors, actuators, virtual objects, and audio-visual content.

Data captured from the real world may need to be adapted for use in a virtual world and data from virtual worlds may also need to be adapted for use in the real world. The ISO/IEC 23005 series does not specify how the adaptation is carried out but only specifies the interfaces.

Data for sensors are sensor capabilities, sensed data, and sensor adaptation preferences.

Data for actuators are sensory device capabilities, sensory device commands, and sensory effect preferences.

Data for virtual objects are characteristics of avatars and virtual world objects.

Sensory effect may be needed to enrich audio-visual contents.

The system architecture of the ISO/IEC 23005 series is depicted in Figure 1 and the scope of this document is highlighted in yellow. The information representation that acts as an input to the possible R→V/V→R Adaptation and as an exchangeable information format to support interoperability between the virtual worlds – as defined in ISO/IEC 23005-1 – is specified in this document.

NOTE The actual R→V/V→R Adaptation is deliberately informative and left open for industry competition.

© ISO/IEC 2018 – All rights reserved

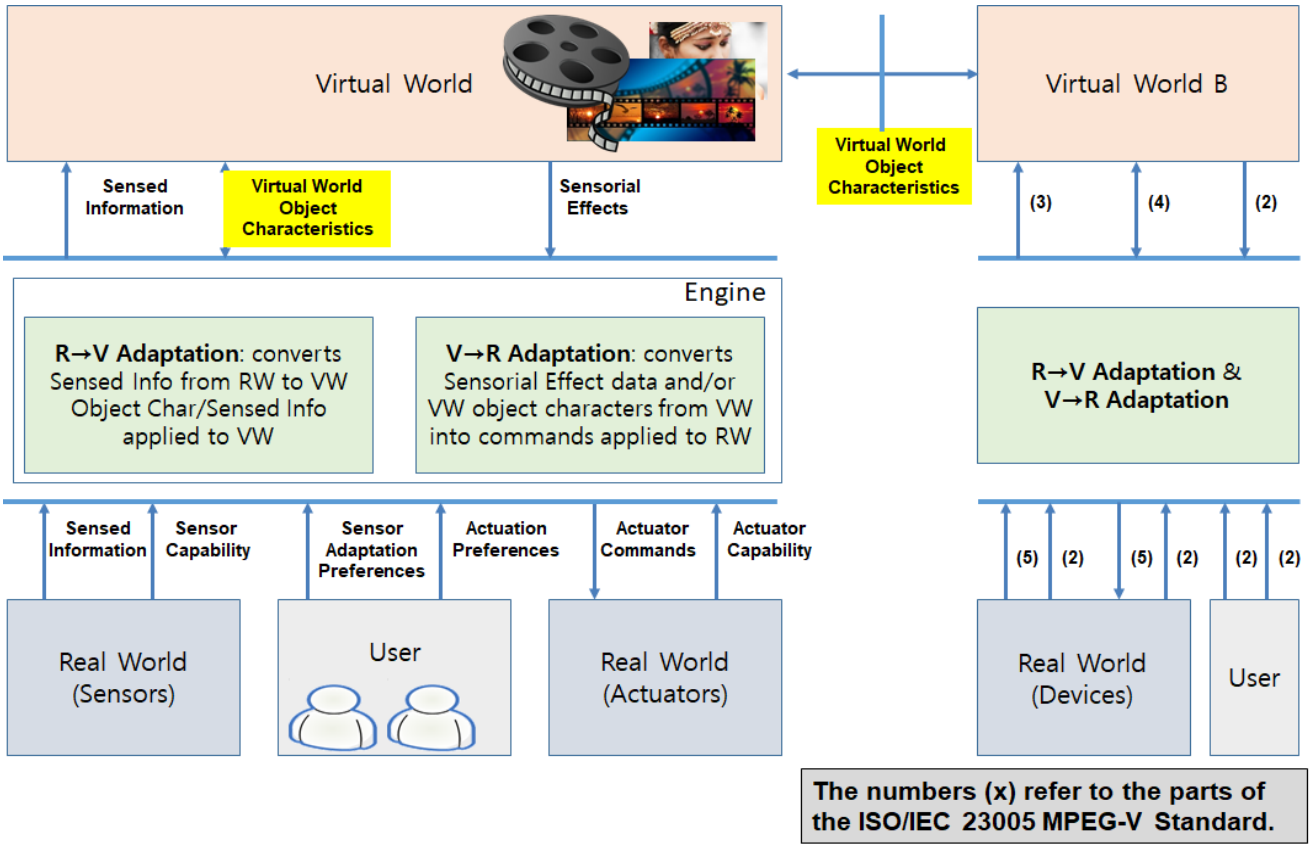


Figure 1 — Scope of the ISO/IEC 23005 series (showing this document in yellow)

This document contains the tools for describing the virtual world object characteristics making it possible to migrate a virtual world object (or only its characteristics) from one virtual world to another and to control a virtual world object in a virtual world by real world devices (Annex C). It addresses the normative aspects of the virtual world object characteristics including avatars and virtual objects, and also illustrates some non-normative examples.

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of patents.

ISO and the IEC take no position concerning the evidence, validity and scope of these patent rights. The holders of these patent rights have assured ISO and the IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patents right are registered with ISO and the IEC. Information may be obtained from the companies listed below.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified in this annex. ISO and the IEC shall not be held responsible for identifying any or all such patent rights.

ISO (www.iso.org/patents) and IEC (http://patents.iec.ch) maintain online databases of patents relevant to their standards. Users are encouraged to consult the databases for the most up to date information concerning patents.

© ISO/IEC 2018 – All rights reserved

Company	Address
Samsung Electronics Co.Ltd.	416, Maetan-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, 152-848, Republic of Korea
Gwangju Institute of Science and Technology	261 Cheomdan - gwagiro (Oryong-dong), Buk-gu, Gwangju 500-712, Republic of Korea
Electronics and Telecommunications Research Institute (ETRI)	218 Gajeongno, Yuseong-gu, Daejeon, 305-700, Republic of Korea
Konkuk University	1 Hwayang-dong, Gwangjin-gu, Seoul, 143-701, Republic of Korea
Myongji University	116 Myongji-ro, Cheoin-gu, Yongin, 449-728, Republic of Korea

© ISO/IEC 2018 – All rights reserved

Information technology — Media context and control —

Part 4:
Virtual world object characteristics

1 Scope

The technologies of this document specified are description languages and vocabularies to describe virtual world objects.

The adaptation engine is not within the scope of this document.

This document specifies syntax and semantics of the tools used to characterize a virtual world object related metadata:

— Virtual World Object Characteristics (VWOC) as an XML Schema-based language which enables one to describe a basic structure of avatars and virtual world objects in virtual environments.

2 Normative references

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

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

ISO/IEC 15938-5:2003, *Information technology — Multimedia content description interface — Part 5: Multimedia description schemes*

ISO/IEC 21000-5, *Information technology — Multimedia framework (MPEG-21) — Part 5: Rights Expression Language*

ISO/IEC 23005-6:—,[1] *Information technology — Media context and control — Part 6: Common types and tools*

3 Terms, definitions, abbreviated terms, schema documents and prefixes

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 23005-6 and the following apply.

[1] Under preparation. Stage at time of publication: ISO/IEC FDIS 23005-6:2018.

© ISO/IEC 2018 – All rights reserved

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

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

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

3.1.1
avatar
entity that can be used as a (visual) representation of the user inside the virtual environments

EXAMPLE A player's representation in the video game and human or fantastic representations of a person's self in non-gaming online worlds.

3.1.2
avatar metadata
definition of the description schemes and descriptors to represent *avatars* (3.1.1)

3.1.3
extensible markup language
XML
set of rules for encoding documents in machine-readable form

3.1.4
rights expression language
REL
machine-readable language that declares rights and permissions

3.1.5
uniform resource identifier
URI
compact string of characters for identifying an abstract or physical resource

3.1.6
uniform resource locator
URL
compact string representation for a resource available via the Internet

3.1.7
virtual object
entity that is any (visual) object except for avatars in the virtual environment

3.1.8
virtual object metadata
definition of the description schemes and descriptors to represent *virtual objects* (3.1.7)

3.1.9
virtual world object
entity that includes avatars and virtual objects in the virtual world

3.1.10
virtual world object metadata
definition of the description schemes and descriptors to represent *virtual world objects* (3.1.9)

 © ISO/IEC 2018 – All rights reserved

3.2 Schema documents

In the main text of this document, the syntax of description schemes and descriptors is provided whenever possible as a single schema document.

In order to form a valid schema document, these schema components should be gathered in a same document with the schema wrapper provided at the head of the clause. For better readability, the relevant schema documents are provided in Annex B.

In all cases, each schema document has a `version` attribute, the value of which is "ISO/IEC 23005-4". Furthermore, an informative identifier is given as the value of the `id` attribute of the `schema` component. This identifier is non-normative and used as a convention in this document to reference another schema document. In particular, it is used for the `schemaLocation` attribute of the `include` and `import` schema components.

In addition, Annex A specifies a set of classification schemes that may be used by applications using description tools specified in this document.

3.3 Use of prefixes

For clarity, throughout this document, consistent namespace prefixes are used.

`"xsi:"` prefix is not normative. It is a naming convention in this document to refer to an element of the `http://www.w3.org/2001/XMLSchema-instance` namespace.

`"xml:"` and `"xmlns:"` are normative prefixes defined in [1]. The prefix `"xml:"` is by definition bound to `"http://www.w3.org/XML/1998/namespace"`. The prefix `"xmlns:"` is used only for namespace bindings and is not itself bound to any namespace name.

All other prefixes used in either the text or examples of this document are not normative, e.g., `"sedl:"`, `"sev:"`, `"dia:"`, `"si:"`, `"mpeg7:"`.

In particular, most of the informative examples in this document are provided as XML fragments without the normally required XML document declaration and, thus, miss a correct namespace binding context declaration. In these descriptions fragments the different prefixes are bound to the namespaces as given in Table 1.

Table 1 — Mapping of prefixes to namespaces in examples and text

Prefix	Corresponding namespace
ct	urn:mpeg:mpeg-v:2018:01-CT-NS
sedl	urn:mpeg:mpeg-v:2018:01-SEDL-NS
sev	urn:mpeg:mpeg-v:2018:01-SEV-NS
dia	urn:mpeg:mpeg21:2003:01-DIA-NS
si	urn:mpeg:mpeg21:2003:01-DIA-XSI-NS
mpeg7	urn:mpeg:mpeg7:schema:2004
xsi	http://www.w3.org/2001/XMLSchema-instance
xsd	http://www.w3.org/2001/XMLSchema

© ISO/IEC 2018 – All rights reserved