

# 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](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

## Contents

Page

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

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

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

## 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](http://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](http://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](http://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](http://www.iso.org/members.html).

## 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  $R \rightarrow V/V \rightarrow R$  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  $R \rightarrow V/V \rightarrow R$  Adaptation is deliberately informative and left open for industry competition.

This is a preview - click here to buy the full publication

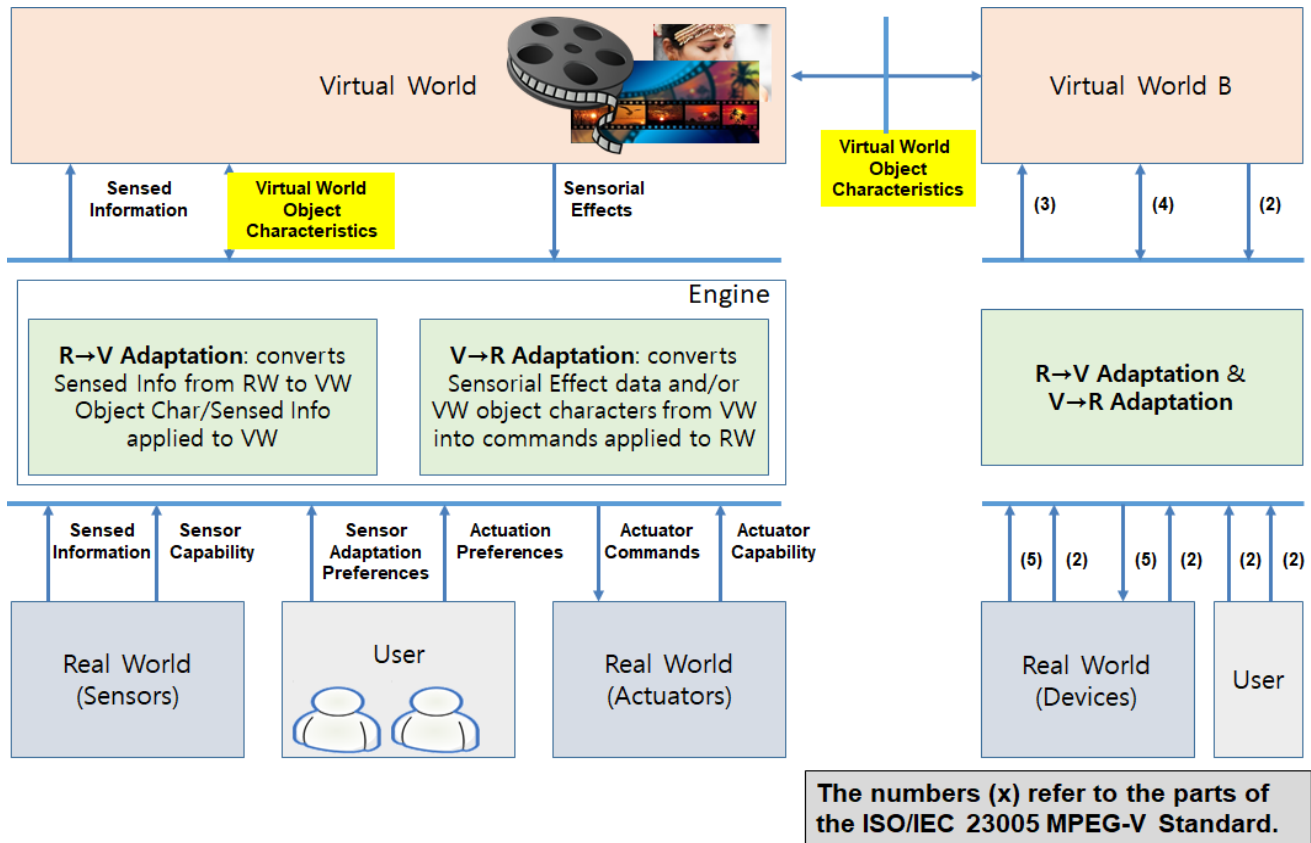


Figure 1 — Scope of the ISO/IEC 23005 series (showing this document in yellow)

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](http://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.



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

[This is a preview - click here to buy the full publication](#)

# 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:—,<sup>1</sup> *Information technology — Media context and control — Part 6: Common types and tools*

---

<sup>1</sup> Under preparation. Stage at time of publication: ISO/IEC FDIS 23005-6:2018.