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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

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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

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Foreword

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

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.

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.

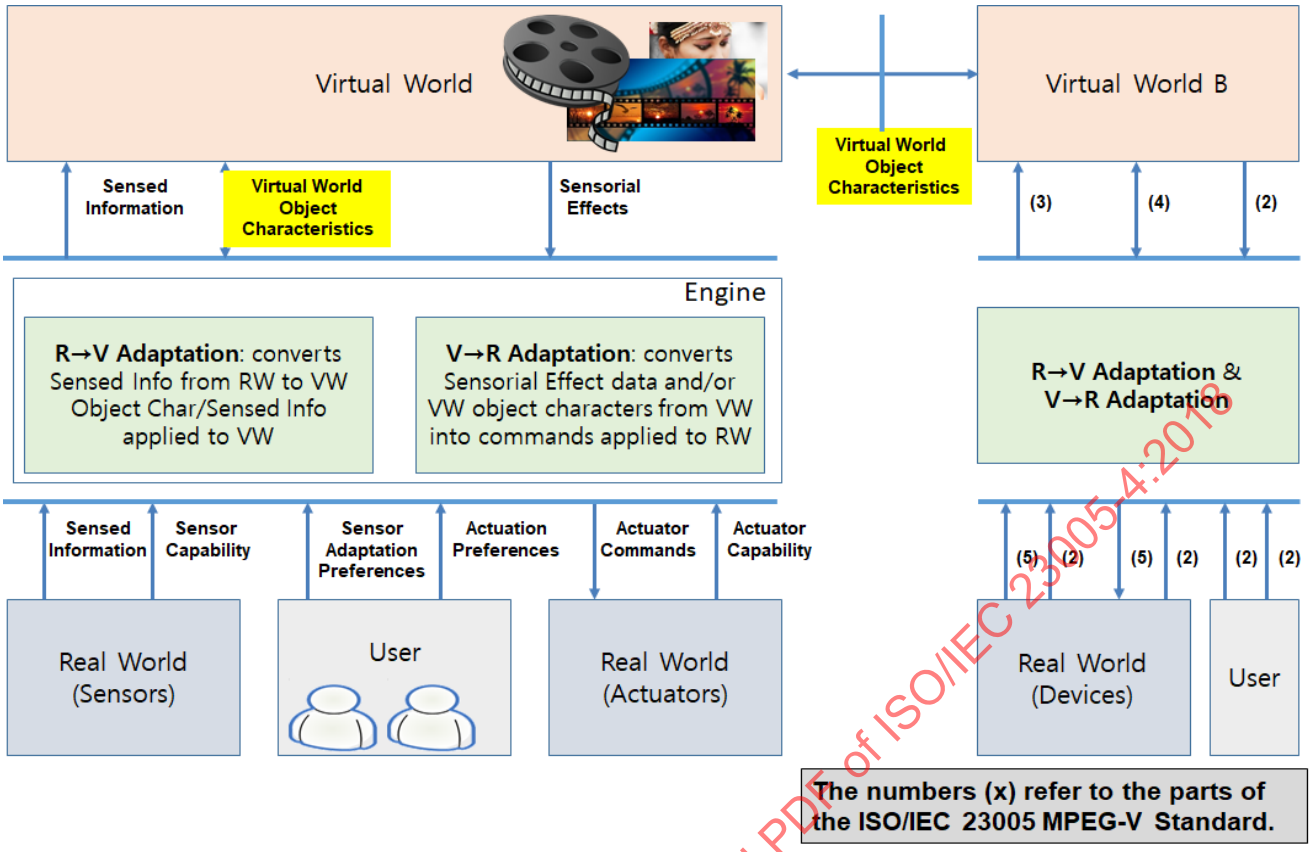

Figure 1 — Scope of the ISO/IEC 23005 series (showing this document in yellow)

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.

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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.

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

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 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)

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

4 Virtual world object metadata

4.1 General

A specificity of virtual environments (VEs) with respect to other multimedia applications consists in the representation of virtual world objects inside the environment. The "virtual world object" can be classified into two types: avatars and virtual objects. An avatar can be used as a (visual) representation of the user inside the environment. These virtual world objects serve different purposes:

— characterize various kinds of objects within the VE;

— provide an interaction with the VE.

In general, creating an object is a time consuming task. Even though some components of the object may be related to the VE (e.g. the avatar wearing a medieval suit in a contemporary style VE may be inappropriate), there is a real need of being able to create the object once and import/use it in different VEs. To serve the latter purpose, it should be possible to control the object from external applications (e.g. the emotions one avatar exposes in the VE can be obtained by processing the associated user's physiological sensors). This document proposes an XML schema, called virtual world object characteristics XSD, for describing an object by considering three main requirements:

— it should be possible to easily create importers/exporters from various VEs implementations;

— it should be easy to control an object within an VE;

— it should be possible to modify a proprietary template (specific to the virtual world) of the object by using data contained in the virtual world object characteristics file.

In detail, once the object is created (possibly by an authoring tool specific to a virtual world), it can be used in any other virtual worlds (VW). In case of avatars, a user can have one's own unique presentation inside all VWs, like in real life. He can change and upgrade his avatar, i.e. "virtual himself" in one VW and then all the updated properties will be reflected in all the other VWs. The avatar itself contains representation and animation features but also higher level semantic information. However, each VW may have its own internal structure for handling avatars. The ISO/IEC 23005 series does not impose any specific constraints on the internal structure of representing data by the VW, but proposes a descriptive format able to drive the transformation of a template or a creation from scratch of an avatar compliant with the VW. All the associated characteristics of the avatar (including the associated motion) can be exported from a VW and then imported to another VW. Similarly, any virtual object created by a user can also be exchangeable between VWs by exporting and importing the associated characteristics of the object. In case of interfacing between virtual worlds and the real world, the sensed real world information will be processed to obtain the meaningful data which can be used as control parameters on the associated characteristics of the object in the VW. As for avatar, the captured gesture of a user can be used to control the gesture of the avatar in the VW by updating the associated characteristics of the avatar. Similarly, the avatar motions created in the virtual world can be mapped onto a real robot for use in dangerous areas, for maintenance tasks, to support disabled and/or elderly people, and so on.

The proposed schema deals only with metadata and does not include representation of the geometry, sound, scent, animation or texture. To represent the latter, references to media resources are used. To provide a full interoperable solution, it may be combined with ISO/IEC 14496-16, which includes a framework for defining and animating avatars, and/or ISO/IEC 14496-11, which includes a framework for defining graphical assets.

There is a base type of attributes and characteristics of the virtual world objects which is shared by both avatars and virtual objects.

The base type of the virtual world object characteristics is composed of following type of data.

— **Identity**: contains identification descriptors.

— **Sound**: contains sound resources and the related properties.

— **Scent**: contains scent resources and the related properties.

— **Control**: contains a set of descriptors for controlling motion features of an object such as translation, orientation and scaling.

— **Event**: contains a set of descriptors providing input events from a mouse, keyboard and etc.

— **Behaviour model**: contains a set of descriptors defining the behaviour information of the object according to input events.

— **id**: contains a unique identifier for identifying individual virtual world object information.

The virtual world object base type is inherited to both avatar metadata and virtual object metadata to extend the specific aspects of each of metadata.

4.2 Schema wrapper conventions

The syntax defined in this Clause assumes the following schema wrapper to form a valid XML schema document.

```
<schema xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:mpeg7="urn:mpeg:mpeg7:schema:2004" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-
NS" xmlns:mpegvct="urn:mpeg:mpeg-v:2018:01-CT-NS" xmlns:vwoc="urn:mpeg:mpeg-
v:2018:01-VWOC-NS" targetNamespace="urn:mpeg:mpeg-v:2018:01-VWOC-NS"
elementFormDefault="qualified" attributeFormDefault="unqualified"
version="ISO/IEC 23005-4" id="MPEG-V-VWOC.xsd">
   <!-- ################################################ -->
   <!--  Import of reference schema                      -->
   <!-- ################################################ -->
   <import namespace="urn:mpeg:mpeg7:schema:2004"
schemaLocation="http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-
7_schema_files/mpeg7-v2.xsd"/>
   <import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS"
schemaLocation="http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-
21_schema_files/rel-r/rel-r.xsd"/>
   <import namespace="urn:mpeg:mpeg-v:2018:01-CT-NS"
schemaLocation="http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-
V_schema_files/MPEG-V-CT.xsd"/>
```

Additionally, the following line should be appended to the resulting schema document in order to obtain a well-formed XML document.

```
</schema>
```

4.3 Root element and top-level tools

4.3.1 General

This subclause specifies the root element and the top-level tools which can follow root element in virtual world object characteristics information. The root element is the only element which can appear as the topmost element when the world object characteristics information specified in this document is instantiated. The top-level tools are defined as the elements which are allowed to appear as the topmost element within the root element.

4.3.2 XML representation syntax

```
<!-- ################################################ -->
<!--  Declaration of Root Element                     -->
<!-- ################################################ -->
<element name="VWOCInfo" type="vwoc:VWOCInfoType"/>

<complexType name="VWOCInfoType">
    <sequence>
        <element name="AvatarList" type="vwoc:AvatarListType" minOccurs="0"/>
        <element name="VirtualObjectList" type="vwoc:VirtualObjectListType"
minOccurs="0"/>
    </sequence>
</complexType>

<complexType name="AvatarListType">
    <sequence>
        <element name="Avatar" type="vwoc:AvatarBaseType" maxOccurs="unbounded"/>
    </sequence>
</complexType>

<complexType name="VirtualObjectListType">
    <sequence>
        <element name="VirtualObject" type="vwoc:VirtualObjectBaseType"
maxOccurs="unbounded"/>
    </sequence>
</complexType>
```

4.3.3 Binary representation syntax

	Number of bits	Mnemonic
VWOCInfo		VWOCInfoType
VWOCInfoType{		
AvatarListFlag	1	bslbf
VritualObjectListFlag	1	bslbf
if(AvatarListFlag){		
AvatarList		AvatarListType
}		

	Number of bits	Mnemonic
if(VirtualObjectListFlag){		
VirtualObjectList		VirtualObjectListType
}		
AvatarListType{		
NumAvatarType		vluimsbf5
for(k=0;k< NumAvatarType;k++){		
IndividualAvatarType	8	bslbf
Avatar		AvatarBaseType
}		
}		
VirtualObjectListType{		
NumVirtualObjectType		vluimsbf5
for(k=0;k< NumVirtualObjectType;k++){		
IndividualVirtualObjectType	16	bslbf
VirtualObject		VirtualObjectBaseType
}		
}		

4.3.4 Semantics

Name	Description
`VWOCInfo`	The root element that serves as the topmost element in the virtual world object characteristics description.
`VWOCInfoType`	The root type provides basic structure that the virtual world object characteristics information description should follow through the root element.
`AvatarListFlag`	This field, which is only present in the binary representation, signals the presence of the `AvatarList` element. ”1” means that the element shall be used. ”0” means that the element shall not be used.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>VirtualObjectListFlag</td><td>This field, which is only present in the binary representation, signals the presence of the VirtualObjectList element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>AvatarList</td><td>Optional wrapper element that serves as the placeholder for the list of avatar characteristics information.</td></tr>
<tr><td>VirtualObjectList</td><td>Optional wrapper element that serves as the placeholder for the list of virtual object characteristics information.</td></tr>
<tr><td>AvatarListType</td><td>Wrapper element type which allows multiple occurrences of avatar characteristics information.</td></tr>
<tr><td>NumAvatarType</td><td>This field, which is only present in the binary representation, specifies the number of Avatar information contained in the AvatarListType.</td></tr>
<tr><td>Avatar</td><td>Specifies the description of avatar characteristics information.</td></tr>
<tr><td>AvatarBaseType</td><td>AvatarBaseType is a type providing a characteristic description of an individual avatar.</td></tr>
<tr><td>IndividualAvatarType</td><td>This field, which is only presented in the binary representation, specifies the types of each avatar.
<table>
<tr><th>Individual Avatar Type</th><th>Binary representation for avatar type (8 bits)</th></tr>
<tr><td>AvatarType</td><td>00000000</td></tr>
<tr><td>MakeupAvatarType</td><td>00000001</td></tr>
<tr><td>Reserved</td><td>00000010-11111111</td></tr>
</table></td></tr>
<tr><td>VirtualObjectList Type</td><td>Wrapper element type which allows multiple occurrences of virtual object characteristics information.</td></tr>
<tr><td>NumVirtualObjectType</td><td>This field, which is only present in the binary representation, specifies the number of virtual object information contained in the virtual object list type.</td></tr>
<tr><td>VirtualObject</td><td>Specifies the description of virtual object characteristics information.</td></tr>
<tr><td>VirtualObjectBaseType</td><td>VirtualObjectBaseType is a type providing a characteristic description of an individual virtual object.</td></tr>
<tr><td>IndividualVirtualObjectType</td><td>This field, which is only presented in the binary representation, specifies the types of each virtual object.
<table>
<tr><th>Individual Virtual Object Type</th><th>Binary representation for virtual object type (16 bits)</th></tr>
<tr><td>VirtualObjectType</td><td>0000hex</td></tr>
<tr><td>Reserved</td><td>0001hex-FFFFhex</td></tr>
</table></td></tr>
</table>

4.3.5 Examples

The following shows two use cases of VWOCInfo element, which are for listing avatar characteristics information and for listing virtual object characteristics information.

The first example shows the case when the VWOCInfo is used for AvatarList.

```
<vwoc:VWOCInfo xsi:schemaLocation="urn:mpeg:mpeg-v:2018:01-VWOC-NS
VWOCSchema.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:mpegvct="urn:mpeg:mpeg-v:2012:01-CT-NS" xmlns:vwoc="urn:mpeg:mpeg-
v:2018:01-VWOC-NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
xmlns:mpeg7="urn:mpeg:mpeg7:schema:2004">
   <vwoc:AvatarList>
      <vwoc:Avatar xsi:type="vwoc:AvatarType" id="ID_1" gender="male">
         . . .
      </vwoc:Avatar>
   </vwoc:AvatarList>
</vwoc:VWOCInfo>
```

The second example shows the case when the VWOCInfo is used for VirtualObjectList.

```
<vwoc:VWOCInfo xsi:schemaLocation="urn:mpeg:mpeg-v:2018:01-VWOC-NS
VWOCSchema.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:mpegvct="urn:mpeg:mpeg-v:2012:01-CT-NS" xmlns:vwoc="urn:mpeg:mpeg-
v:2018:01-VWOC-NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
xmlns:mpeg7="urn:mpeg:mpeg7:schema:2004">
   <vwoc:VirtualObjectList>
      <vwoc:VirtualObject xsi:type="vwoc:VirtualObjectType" id="ID_80">
         . . .
      </vwoc:VirtualObject>
   </vwoc:VirtualObjectList>
</vwoc:VWOCInfo>
```

Note that these examples are only showing a part of the complete XML description to show the use of the root element, VWOCInfo, with the AvatarList and the VirtualObjectList.

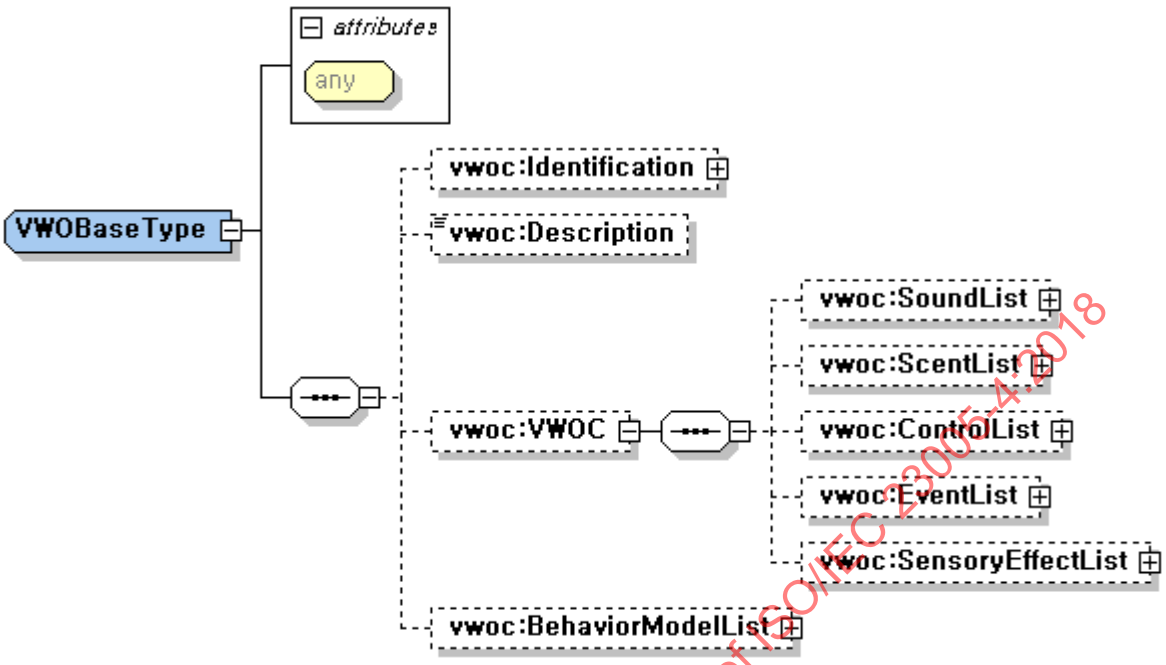
4.4 Virtual world object base type

4.4.1 General

This subclause defines a complex type of VWOBaseType, which the avatar characteristics information and virtual object characteristics information should inherit.

4.4.2 XML representation syntax

Diagram



Source

```
<complexType name="VWOBaseType" abstract="true">
  <complexContent>
    <restriction base="anyType">
      <sequence>
        <element name="Identification" type="vwoc:IdentificationType" minOccurs="0"/>
        <element name="Description" type="string" minOccurs="0"/>
        <element name="VWOC" minOccurs="0">
          <complexType>
            <sequence>
              <element name="SoundList" type="vwoc:VWOSoundListType" minOccurs="0"/>
              <element name="ScentList" type="vwoc:VWOScentListType" minOccurs="0"/>
              <element name="ControlList" type="vwoc:VWOControlListType" minOccurs="0"/>
              <element name="EventList" type="vwoc:VWOEventListType" minOccurs="0"/>
              <element name="SensoryEffectList" type="vwoc:VWOSensoryEffectType"
minOccurs="0"/>
            </sequence>
          </complexType>
        </element>
        <element name="BehaviorModelList" type="vwoc:VWOBehaviorModelListType" minOccurs="0"/>
      </sequence>
      <attribute name="id" type="ID" use="optional"/>
    </restriction>
  </complexContent>
</complexType>

<complexType name="AvatarBaseType" abstract="true">
  <complexContent>
    <extension base="vwoc:VWOBaseType"/>
  </complexContent>
</complexType>

<complexType name="VirtualObjectBaseType" abstract="true">
  <complexContent>
    <extension base="vwoc:VWOBaseType"/>
  </complexContent>
</complexType>
```

4.4.3 Binary representation syntax

VWOBaseType{	Number of bits	Mnemonic
IdentificationFlag	1	Bslbf
DescriptionFlag	1	Bslbf
VWOCFlag	1	Bslbf
BehaviorModelListFlag	1	bslbf
IdFlag	1	bslbf
if(IdentificationFlag) {		
Identification		IdentificationType
}		
if(DescriptionFlag) {		
Description	See ISO/IEC 10646[8]	UTF-8
}		
if(VWOCFlag) {		
SoundListFlag	1	bslbf
ScentListFlag	1	bslbf
ControlListFlag	1	bslbf
EventListFlag	1	bslbf
SensoryEffectListFlag	1	bslbf
if(SoundListFlag) {		
SoundList		VWOSoundListType
}		
if(ScentListFlag) {		
ScentList		VWOScentListType
}		

VWOBaseType{	Number of bits	Mnemonic
if(ControlListFlag) {		
ControlList		VWOControlListType
}		
if(EventListFlag) {		
EventList		VWOEventListType
}		
If(SensoryEffectListFlag) {		
SensoryEffectList		VWOSensoryEffectListType
}		
}		
if(BehaviorModelListFlag) {		
BehaviorModelList		VWOBehaviorModelListType
}		
if(IdFlag) {		
id	See ISO/IEC 10646[8]	UTF-8
}		
}		
AvatarBaseType {		
VWOBase		VWOBaseType
}		
VirtualObjectBaseType {		
VWOBase		VWOBaseType
}		

4.4.4 Semantics

Name	Description
VWOBaseType	The base type that describes common attributes and elements in both avatars and virtual objects.
DescriptionFlag	This field, which is only presented in the binary representation, signals the presence of the description element. "1" means that the element shall be used. "0" means that the element shall not be used.
VWOCFlag	This field, which is only presented in the binary representation, signals the presence of the VWOC element which contains sound, scent, control and event lists. "1" means that the element shall be used. "0" means that the element shall not be used.
IdFlag	This field, which is only presented in the binary representation, signals the presence of the id attribute. "1" means that the element shall be used. "0" means that the element shall not be used.
IdentificationFlag	This field, which is only present in the binary representation, signals the presence of the Identification element. "1" means that the element shall be used. "0" means that the element shall not be used.
SoundListFlag	This field, which is only present in the binary representation, signals the presence of the Sound element list. "1" means that the element shall be used. "0" means that the element shall not be used.
ScentListFlag	This field, which is only present in the binary representation, signals the presence of the Scent element list. "1" means that the element shall be used. "0" means that the element shall not be used.
ControlListFlag	This field, which is only present in the binary representation, signals the presence of the Control element list. "1" means that the element shall be used. "0" means that the element shall not be used.
EventListFlag	This field, which is only present in the binary representation, signals the presence of the Event element list. "1" means that the element shall be used. "0" means that the element shall not be used.
SensoryEffectListFlag	This field, which is only present in the binary representation, signals the presence of the SensoryEffect element list. "1" means that the element shall be used. "0" means that the element shall not be used.
BehaviorModelListFlag	This field, which is only present in the binary representation, signals the presence of the BehaviorModel element list. "1" means that the element shall be used. "0" means that the element shall not be used.
Identification	Describes the identification of the virtual world object.
Description	Contains the description of the virtual world object.
VWOC	Describes a set of characteristics of the virtual world objects.
SoundList	Describes a list of the sound effects associated to the virtual world object.
ScentList	Describes a list of the scent effects associated to the virtual world object.
ControlList	Describes a list of the controls associated to the virtual world object.

Name	Description
EventList	Describes a list of the input events associated to the virtual world object.
SensoryEffectList	Describes a list of the sensory effects associated to the virtual world object.
BehaviorModelList	Describes a list of the behaviour models associated to the virtual world object.
id	Unique identifier for identifying individual virtual world object information.
AvatarBaseType	A type providing a characteristic description of an individual avatar.
VirtualObjectBaseType	A type providing a characteristic description of an individual virtual object.

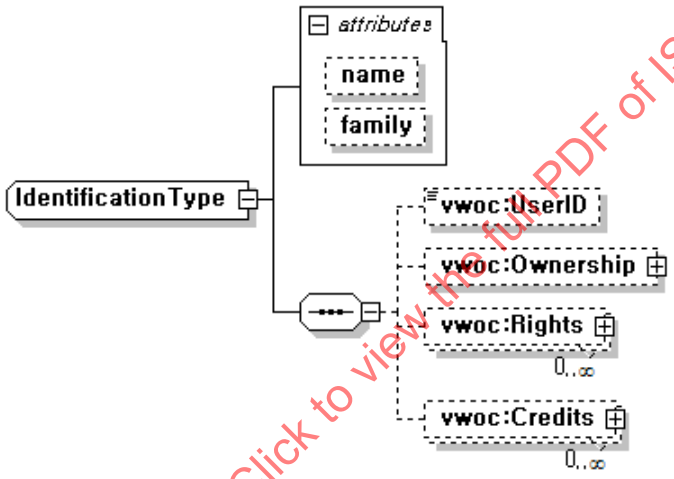
4.4.5 Examples

```
<vwoc:VWOCInfo xsi:schemaLocation="urn:mpeg:mpeg-v:2018:01-VWOC-NS
VWOCSchema.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:mpegvct="urn:mpeg:mpeg-v:2012:01-CT-NS" xmlns:vwoc="urn:mpeg:mpeg-
v:2018:01-VWOC-NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
xmlns:mpeg7="urn:mpeg:mpeg7:schema:2004">
    <vwoc:AvatarList>
        <vwoc:Avatar xsi:type="vwoc:AvatarType" id="AVATARID_1" gender="male">
            <vwoc:VWOC>
                <vwoc:SoundList>
                    <vwoc:Sound loop="1" soundID="SOUNDID_10" duration="10"
intensity="3" name="BurpSound">
                    <vwoc:ResourcesURL>http://www.BurpSound.info</vwoc:ResourcesURL>
                    </vwoc:Sound>
                </vwoc:SoundList>
                <vwoc:ScentList>
                    <vwoc:Scent loop="2" duration="1" intensity="3"
name="BurpingScent" scentID="SCENTID_11">
                        <vwoc:ResourcesURL>http://www.Burp.info</vwoc:ResourcesURL>
                    </vwoc:Scent>
                </vwoc:ScentList>
                <vwoc:ControlList>
                    <vwoc:Control controlID="CTRLID_12">
                        <vwoc:MotionFeatureControl>
                            <vwoc:Position>
                                <mpegvct:X>1</mpegvct:X>
                                <mpegvct:Y>1</mpegvct:Y>
                                <mpegvct:Z>10</mpegvct:Z>
                            </vwoc:Position>
                            <vwoc:Orientation>
                                <mpegvct:X>0</mpegvct:X>
                                <mpegvct:Y>0</mpegvct:Y>
                                <mpegvct:Z>0</mpegvct:Z>
                            </vwoc:Orientation>
                            <vwoc:ScaleFactor>
                                <mpegvct:X>1</mpegvct:X>
                                <mpegvct:Y>1</mpegvct:Y>
                                <mpegvct:Z>3</mpegvct:Z>
                            </vwoc:ScaleFactor>
                        </vwoc:MotionFeatureControl>
                    </vwoc:Control>
                </vwoc:ControlList>
                <vwoc:EventList>
```

```
                    <vwoc:Event eventID="ID_13">
                        <vwoc:Mouse>urn:mpeg:mpeg-v:01-VWOC-MouseEventCS-NS:click
</vwoc:Mouse>
                    </vwoc:Event>
                </vwoc:EventList>
            </vwoc:VWOC>
            <vwoc:BehaviorModelList>
                <vwoc:BehaviorModel>
                    <vwoc:BehaviorInput eventIDRef="ID_13"/>
                    <vwoc:BehaviorOutput controlIDRefs="CTRLID_12"
scentIDRefs="SCENTID_11" soundIDRefs="SOUNDID_10"/>
                </vwoc:BehaviorModel>
            </vwoc:BehaviorModelList>
        </vwoc:Avatar>
    </vwoc:AvatarList>
</vwoc:VWOCInfo>
```

4.4.6 IdentificationType

4.4.6.1 XML representation syntax

Diagram	
Source	<complexType name="IdentificationType"> <sequence> <element name="UserID" type="anyURI" minOccurs="0"/> <element name="Ownership" type="mpeg7:AgentType" minOccurs="0"/> <element name="Rights" type="r:License" minOccurs="0" maxOccurs="unbounded"/> <element name="Credits" type="mpeg7:AgentType" minOccurs="0" maxOccurs="unbounded"/> </sequence> <attribute name="name" type="string" use="optional"/> <attribute name="family" type="string" use="optional"/> </complexType>

4.4.6.2 Binary representation syntax

IdentificationType {	Number of bits	Mnemonic
UserIDFlag	1	bslbf
OwnershipFlag	1	bslbf
RightsFlag	1	bslbf
CreditsFlag	1	bslbf

IdentificationType {	Number of bits	Mnemonic
nameFlag	1	bslbf
familyFlag	1	bslbf
if(UserIDFlag) {		
UserID	See ISO/IEC 10646[8]	UTF-8
}		
if(OwnershipFlag) {		
Ownership		AgentType
}		
if(RightsFlag) {		
NumRights		vluimsbf5
for(k=0; k< NumRights; k++){		
Rights[k]	See ISO/IEC 21000-16	LicenseType
}		
}		
if(CreditsFlag) {		
NumCredits		vluimsbf5
for(k=0; k< NumCredits; k++){		
Credits[k]		AgentType
}		
}		
if(nameFlag) {		
name	See ISO/IEC 10646[8]	UTF-8
}		
if(familyFlag) {		
family	See ISO/IEC 10646[8]	UTF-8

IdentificationType {	**Number of bits**	**Mnemonic**
}		
}		
AgentType{	**Number of bits**	**Mnemonic**
mpeg7:AgentType		UTF-8
}		
LicenseType{	**Number of bits**	**Mnemonic**
r:LicenseType		UTF-8
}		

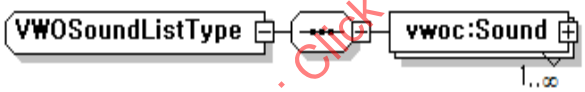
4.4.6.3 Semantics

Name	Definition
`IdentificationType`	Describes the identification of a virtual world object.
`UserIDFlag`	This field, which is only present in the binary representation, signals the presence of the `UserID` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`OwnershipFlag`	This field, which is only present in the binary representation, signals the presence of the `Ownership` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`RightsFlag`	This field, which is only presented in the binary representation, signals the presence of the `rights` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`CreditsFlag`	This field, which is only presented in the binary representation, signals the presence of the `credits` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`nameFlag`	This field, which is only present in the binary representation, signals the presence of the `name` attribute. "1" means that the element shall be used. "0" means that the element shall not be used.
`familyFlag`	This field, which is only present in the binary representation, signals the presence of the `family` attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used.

Name	Definition
UserID	Contains the user identification associated to the virtual world object
Ownership	Describes the ownership of the virtual world object which shall be based on the type "AgentType" defined in ISO/IEC 15938-5:2003, 7.4.2. In the binary representation, the "AgentType" shall be encoded by UTF-8.
NumRights	This field, which is only present in the binary representation, specifies the number of rights information.
Rights	Describes the rights of the virtual world object which shall be based on the type "LicenseType" defined in ISO/IEC 21000-5. In the binary representation, the "LicenseType" shall be encoded by UTF-8.
NumCredits	This field, which is only present in the binary representation, specifies the number of credits information.
Credits	Describes the contributors of the virtual object in chronological order which shall be based on the type "AgentType" defined in ISO/IEC 15938-5:2003, 7.4.2. In the binary representation, the "AgentType" shall be encoded by UTF-8. Note: The 1st listed credit describes an original author of a virtual world object. The subsequent credits represent the list of the contributors of the virtual world object chronologically.
name	Describes the name of the virtual world object.
family	Describes the relationship with other virtual world objects.

4.4.7 VWOSoundListType

4.4.7.1 XML representation syntax

Diagram	
Source	<complexType name="VWOSoundListType"> <sequence> <element name="Sound" type="vwoc:VWOSoundType" maxOccurs="unbounded"/> </sequence> </complexType>

4.4.7.2 Binary representation syntax

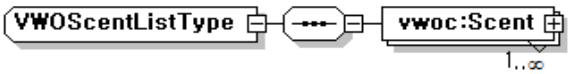
VWOSoundListType {	Number of bits	Mnemonic
NumVWOSoundType		vluimsbf5
for(k=0; k< NumVWOSoundType; k++){		
Sound[k]		VWOSoundType
}		
}		

4.4.7.3 Semantics

Name	Definition
VWOSoundListType	Wrapper element type which allows multiple occurrences of sound effects associated to the virtual world object.
NumVWOSoundType	This field, which is only present in the binary representation, specifies the number of Sound information contained in the sound list type.
Sound	Describes a sound effect associated to the virtual world object.

4.4.8 VWOScentListType

4.4.8.1 XML representation syntax

Diagram	
Source	<complexType name="VWOScentListType"> <sequence> <element name="Scent" type="vwoc:VWOScentType" maxOccurs="unbounded"/> </sequence> </complexType>

4.4.8.2 Binary representation syntax

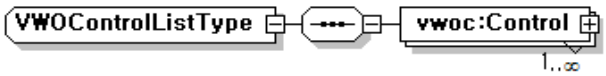
VWOScentListType {	Number of bits	Mnemonic
NumVWOScentType		vluimsbf5
for(k=0; k< NumVWOScentType; k++){		
Scent[k]		VWOScentType
}		
}		

4.4.8.3 Semantics

Name	Definition
VWOScentListType	Wrapper element type which allows multiple occurrences of Scent effects associated to the virtual world object.
NumVWOScentType	This field, which is only present in the binary representation, specifies the number of Scent information contained in the scent list type.
Scent	Describes a scent effect associated to the virtual world object.

4.4.9 VWOControlListType

4.4.9.1 XML representation syntax

Diagram	
Source	<complexType name="VWOControlListType"> <sequence> <element name="Control" type="vwoc:VWOControlType" maxOccurs="unbounded"/> </sequence> </complexType>

4.4.9.2 Binary representation syntax

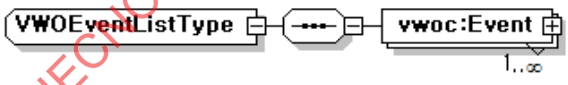
VWOControlListType {	**Number of bits**	**Mnemonic**
NumVWOControlType		vluimsbf5
for(k=0; k< NumVWOControlType; k++){		
Control[k]		VWOControlType
}		
}		

4.4.9.3 Semantics

Name	**Definition**
`VWOControlListType`	Wrapper element type which allows multiple occurrences of the controls associated to the virtual world object.
`NumVWOControlType`	This field, which is only present in the binary representation, specifies the number of `control` information contained in the Control list type.
`Control`	Describes a control associated to the virtual world object.

4.4.10 VWOEventListType

4.4.10.1 XML representation syntax

Diagram	
Source	<complexType name="VWOEventListType"> <sequence> <element name="Event" type="vwoc:VWOEventType" maxOccurs="unbounded"/> </sequence> </complexType>

4.4.10.2 Binary representation syntax

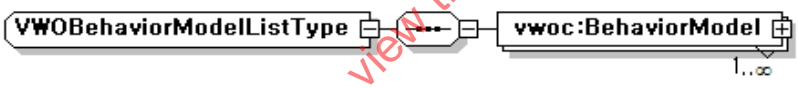
VWOEventListType {	Number of bits	Mnemonic
NumVWOEventType		vluimsbf5
for(k=0; k< NumVWOEventType; k++){		
Event[k]		VWOEventType
}		
}		

4.4.10.3 Semantics

Name	Definition
VWOEventListType	Wrapper element type which allows multiple occurrences of the input events associated to the virtual world object.
NumVWOEventType	This field, which is only present in the binary representation, specifies the number of Event information contained in the Event list type.
Event	Describes an input event associated to the virtual world object.

4.4.11 VWOBehaviorModelListType

4.4.11.1 XML representation syntax

Diagram	
Source	<complexType name="VWOBehaviorModelListType"> <sequence> <element name="BehaviorModel" type="vwoc:VWOBehaviorModelType" maxOccurs="unbounded"/> </sequence> </complexType>

4.4.11.2 Binary representation syntax

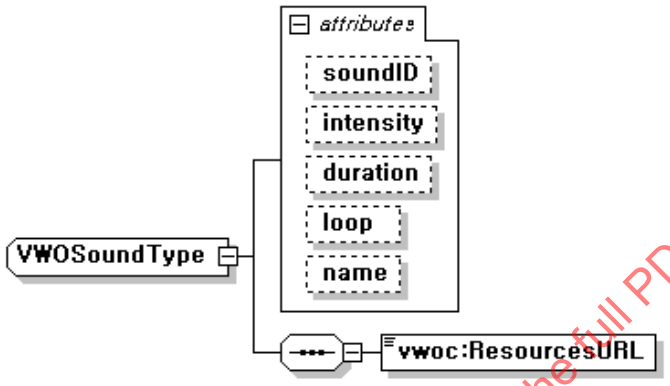
VWOBehaviorModelListType {	Number of bits	Mnemonic
NumVWOBehaviorModelType		vluimsbf5
for(k=0;k<NumVWOBehaviorModelType;k++){		
BehaviorModel[k]		VWOBehaviorModelType
}		
}		

4.4.11.3 Semantics

Name	Definition
VWOBehaviorModelListType	Wrapper element type which allows multiple occurrences of the behaviour models associated to the virtual world object.
NumVWOBehaviorModelType	This field, which is only present in the binary representation, specifies the number of BehaviorModel information contained in the behaviour model list type.
BehaviorModel	Describes a behaviour model associated to the virtual world object.

4.4.12 VWOSoundType

4.4.12.1 XML representation syntax

Diagram	
Source	<complexType name="VWOSoundType"> <sequence> <element name="ResourcesURL" type="anyURI"/> </sequence> <attribute name="soundID" type="ID" use="optional"/> <attribute name="intensity" type="float" use="optional"/> <attribute name="duration" type="unsignedInt" use="optional"/> <attribute name="loop" type="unsignedInt" use="optional"/> <attribute name="name" type="string" use="optional"/> </complexType>

4.4.12.2 Binary representation syntax

VWOSoundType{	Number of bits	Mnemonic
SoundIDFlag	1	bslbf
IntensityFlag	1	bslbf
DurationFlag	1	bslbf
LoopFlag	1	bslbf
NameFlag	1	bslbf
ResourcesURL	See ISO/IEC 10646[8]	UTF-8
if(SoundIDFlag) {		

VWOSoundType{	Number of bits	Mnemonic
soundID	See ISO/IEC 10646[8]	UTF-8
}		
if(IntensityFlag) {		
intensity	32	fsbf
}		
if(DurationFlag) {		
duration	32	uimsbf
}		
if(LoopFlag) {		
loop	8	uimsbf
}		
if(NameFlag) {		
name	See ISO/IEC 10646[8]	UTF-8
}		
}		

4.4.12.3 Semantics

Name	Definition
VWOSoundType	A type that contains the descriptions of a sound effect associated to the virtual world object.
SoundIDFlag	This field, which is only present in the binary representation, signals the presence of the ID attribute of the sound. "1" means the attribute shall be used and "0" means the attribute shall not be used.
IntensityFlag	This field, which is only present in the binary representation, signals the presence of the intensity attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.
DurationFlag	This field, which is only present in the binary representation, signals the presence of the duration attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.
LoopFlag	This field, which is only present in the binary representation, signals the presence of the loop attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.
NameFlag	This field, which is only present in the binary representation, signals the presence of the name attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.

Name	Definition
SoundResources URL	Element that contains a link to sound file, usually MP4 file..
soundID	A unique identifier of the object sound.
intensity	The strength(volume) of the sound
duration	The length of time that the sound lasts. The default unit is ms.
loop	A playing option to describe the number of repetition (default value: 1, 0: indefinite repetition, 1:once, 2: twice, …, n: n times)
name	The name of the sound.

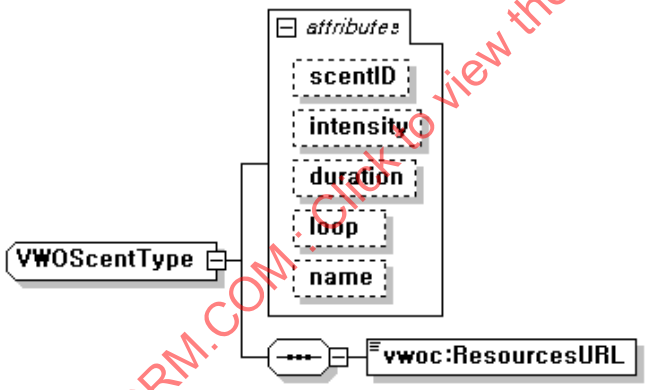
4.4.12.4 Examples

This example shows the description of the sound information associated to an object with the following semantics. The sound resource whose name is "BigAlarm" is saved at "http://sounddb.com/alarmsound_0001.wav" and the value of soundID, its identifier is "SoundID3" The length of the sound is 30 seconds. The sound shall be played with the volume of intensity = "50 %" repeatedly.

```
<vwoc:Sound loop="0" soundID="SoundID3" duration="30" intensity="0.5"
name="BigAlarm">
    <vwoc:ResourcesURL>http://sounddb.com/alarmsound_0001.wav</vwoc:ResourcesURL>
</vwoc:Sound>
```

4.4.13 VWOScentType

4.4.13.1 XML representation syntax

Diagram	
Source	<complexType name="VWOScentType"> <sequence> <element name="ResourcesURL" type="anyURI"/> </sequence> <attribute name="scentID" type="ID" use="optional"/> <attribute name="intensity" type="float" use="optional"/> <attribute name="duration" type="unsignedInt" use="optional"/> <attribute name="loop" type="unsignedInt" use="optional"/> <attribute name="name" type="string" use="optional"/> </complexType>

4.4.13.2 Binary representation syntax

VWOScentType{	Number of bits	Mnemonic
ScentIDFlag	1	bslbf
IntensityFlag	1	bslbf
DurationFlag	1	bslbf
LoopFlag	1	bslbf
NameFlag	1	bslbf
ResourcesURL	See ISO/IEC 10646[8]	UTF-8
if(ScentIDFlag) {		
scentID	See ISO/IEC 10646[8]	UTF-8
}		
if(IntensityFlag) {		
intensity	32	fsbf
}		
if(DurationFlag) {		
duration	32	uimsbf
}		
if(LoopFlag) {		
loop	8	uimsbf
}		
if(NameFlag) {		
name	See ISO/IEC 10646[8]	UTF-8
}		
}		

4.4.13.3 Semantics

Name	Definition
VWOScentType	A type that contains the descriptions of a scent effect associated to the virtual world object.
ScentIDFlag	This field, which is only present in the binary representation, signals the presence of the ID attribute of the scent. "1" means the attribute shall be used and "0" means the attribute shall not be used.
IntensityFlag	This field, which is only present in the binary representation, signals the presence of the intensity attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.
DurationFlag	This field, which is only present in the binary representation, signals the presence of the duration attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.
LoopFlag	This field, which is only present in the binary representation, signals the presence of the loop attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.
NameFlag	This field, which is only present in the binary representation, signals the presence of the name attribute. "1" means the attribute shall be used and "0" means the attribute shall not be used.
ScentResourcesURL	Element that contains a link to a scent file.
scentID	A unique identifier of the object scent.
intensity	The strength of the scent
duration	The length of time that the scent lasts. The default unit is ms.
loop	A playing option to describe the number of repetition (default value: 1, 0: indefinite repetition, 1:once, 2: twice, ..., n: n times)
name	The name of the scent.

4.4.13.4 Examples

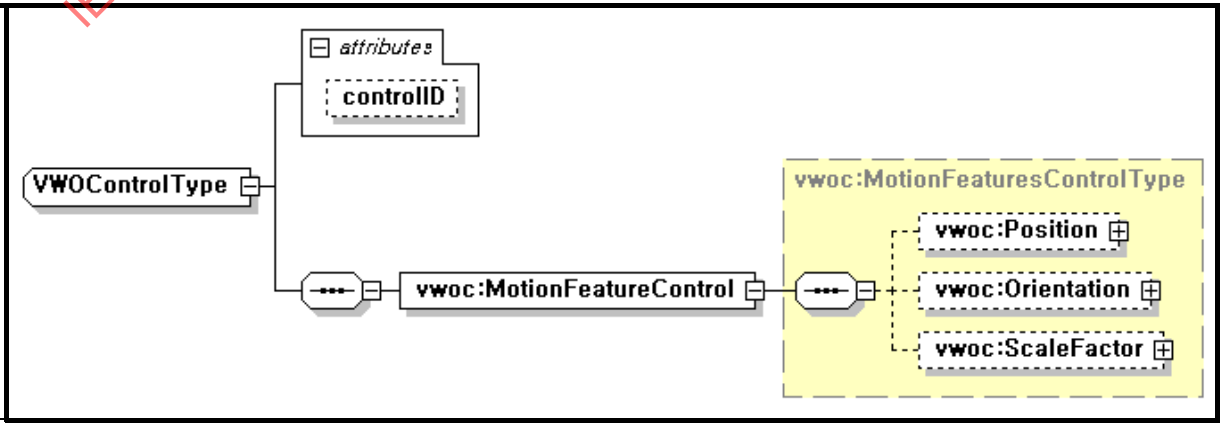
This example shows the description of the scent information associated to the object. The scent resource whose name is "rose" is saved at "http://scentdb.com/flower_0001.sct" and the value of scentID, its identifier is "ScentID5" The intensity shall be 20 % with duration of 20 seconds.

```
<vwoc:Scent duration="20" intensity="0.2" name="rose" scentID="ScentID5">
   <vwoc:ResourcesURL>http://scentdb.com/flower_0001.sct</vwoc:ResourcesURL>
</vwoc:Scent>
```

4.4.14 VWOControlType

4.4.14.1 XML representation syntax

Diagram



Source	<complexType name="VWOControlType"> <sequence> <element name="MotionFeatureControl" type="vwoc:MotionFeaturesControlType"/> </sequence> <attribute name="controlID" type="ID" use="optional"/> </complexType> <complexType name="MotionFeaturesControlType"> <sequence> <element name="Position" type="mpegvct:Float3DVectorType" minOccurs="0"/> <element name="Orientation" type="mpegvct:Float3DVectorType" minOccurs="0"/> <element name="ScaleFactor" type="mpegvct:Float3DVectorType" minOccurs="0"/> </sequence> </complexType>

4.4.14.2 Binary representation syntax

VWOControlType {	Number of bits	Mnemonic
ControlIDFlag	1	bslbf
MotionFeatureControl		MotionFeatureControlType
if(ControlIDFlag) {		
controlID	See ISO/IEC 10646[8]	UTF-8
}		
}		
MotionFeaturesControlType{		
PositionFlag	1	bslbf
OrientationFlag	1	bslbf
ScaleFactorFlag	1	bslbf
if(PositionFlag) {		
Position		Float3DVectorType
}		
if(OrientationFlag) {		
Orientation		Float3DVectorType
}		
if(ScaleFactorFlag) {		
ScaleFactor		Float3DVectorType
}		

VWOControlType {	Number of bits	Mnemonic
}		

4.4.14.3 Semantics

Name	Definition
VWOControlType	A type that contains the descriptions of a control associated to the virtual world object.
ControlIDFlag	This field, which is only present in the binary representation, signals the presence of the ControlID element. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
MotionFeatureControl	Set of elements that control position, orientation and scale of the virtual object.
controlID	A unique identifier of the control.

Element	Information
MotionFeatureControlType	A type that provides three types of controls such as position control, orientation control, and scaling control.
PositionFlag	This field, which is only present in the binary representation, signals the presence of the Position element. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
OrientationFlag	This field, which is only present in the binary representation, signals the presence of the Orientation element. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
ScaleFactorFlag	This field, which is only present in the binary representation, signals the presence of the ScaleFactor element. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
Position	The position of the object in the scene with 3D floating point vector (x, y, z).
Orientation	The orientation of the object in the scene with 3D floating point vector as an Euler angle (yaw, pitch, roll).
ScaleFactor	The scale of the object in the scene expressed as 3D floating point vector (Sx, Sy, Sz).

NOTE 1 If two controllers are associated to the same object but on different parts of the object and if these parts exist hierarchical structures (parent and children relationship) then the controllers do perform the relative motion of the children. If the controllers are associated with the same part, the controller does the scaling or similar effects for the entire object.

NOTE 2 The reference coordinate system of this part is the right-handed coordinate system.

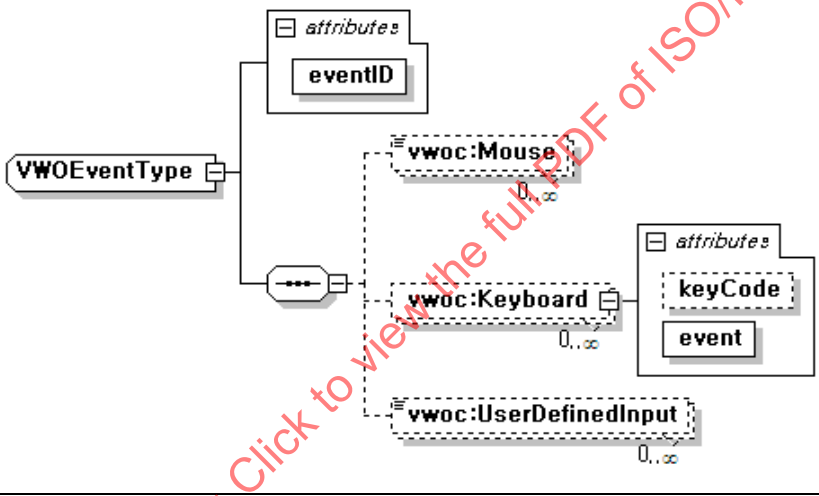
4.4.14.4 Examples

This example shows the description of object control information with the following semantics. The motion feature control of changing a position is given and its value of controlID, its identifier is "CtrlID7" The object shall be positioned at X="122.0", Y="150.0" and Z="40.0".

```
<vwoc:Control controlID="CtrlID7">
   <vwoc:MotionFeatureControl>
      <vwoc:Position>
         <mpegvct:X>122.0</mpegvct:X>
         <mpegvct:Y>150.0</mpegvct:Y>
         <mpegvct:Z>40.0</mpegvct:Z>
      </vwoc:Position>
   </vwoc:MotionFeatureControl>
</vwoc:Control>
```

4.4.15 VWOEventType

4.4.15.1 XML representation syntax

Diagram	
Source	<complexType name="VWOEventType"> <sequence> <element name="Mouse" type="mpeg7:termReferenceType" minOccurs="0" maxOccurs="unbounded"/> <element name="Keyboard" minOccurs="0" maxOccurs="unbounded"> <complexType> <attribute name="keyCode" type="mpeg7:unsigned8" use="optional"/> <attribute name="event" use="required"> <simpleType> <restriction base="string"> <enumeration value="pressed"/> <enumeration value="clicked"/> <enumeration value="released"/> </restriction> </simpleType> </attribute> </complexType> </element> <element name="UserDefinedInput" type="string" minOccurs="0" maxOccurs="unbounded"/> </sequence> <attribute name="eventID" type="ID" use="required"/> </complexType>

4.4.15.2 Binary representation syntax

VWOEventType {	Number of bits	Mnemonic
MouseFlag	1	bslbf
KeyboardFlag	1	bslbf
UserDefinedInputFlag	1	bslbf
if(MouseFlag) {		
NumOfMouse		vluimsbf5
for (k=0; k<NumOfMouse; k++) {		
Mouse[k]		MouseEventCS
}		
}		
if(KeyboardFlag) {		
NumOfKeyboard		vluimsbf5
for(k=0; k< NumOfKeyboard; k++) {		
keyCodeFlag[k]	1	bslbf
if(keyCodeFlag[k]) {		
keyCode	8	uimsbf
}		
event[k]	2	bslbf
}		
}		
if(UserDefinedInputFlag) {		
NumOfUserDefinedInput		vluimsbf5
for(k=0; k<NumOfUserDefinedInput; k++) {		
UserDefinedInput[k]	See ISO/IEC 10646[8]	UTF-8
}		

VWOEventType {	Number of bits	Mnemonic
}		
eventID	See ISO/IEC 10646[8]	UTF-8
}		

4.4.15.3 Semantics

Name	Definition
`VWOEventType`	A type that contains the descriptions of an input event associated to the virtual world object.
`MouseFlag`	This field, which is only present in the binary representation, signals the presence of the `mouse` element. "1" means the element shall be used, and "0" means the element shall not be used.
`KeyboardFlag`	This field, which is only present in the binary representation, signals the presence of the `keyboard` element. "1" means the element shall be used, and "0" means the element shall not be used.
`UserDefinedInputFlag`	This field, which is only present in the binary representation, signals the presence of the `UserDefinedInput` element. "1" means the element shall be used, and "0" means the element shall not be used.
`NumOfMouse`	This field, which is only present in the binary representation, specifies the number of mouse events contained in the `VWOEventType`.
`Mouse`	Describes a mouse event as a reference to a classification scheme (CS) term that shall be using the `mpeg7:termReferenceType` defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the `MouseEventCS` defined in A.2.1.

Name	Element (4 bits)	Description
click	0000	Describes the event of click the left button of a mouse. (click)
doubleclick	0001	Describes the event of double-click the left button of a mouse. (doubleclick)
leftBtnDown	0010	Describes the event which takes place at the moment of holding down the left button of a mouse. (LeftButtonDown)
leftBtnUp	0011	Describes the event which takes place at the moment of releasing the left button of a mouse. (LeftButtonUP)
rightBtnDown	0100	Describes the event which takes place at the moment of holding down the left button of a mouse. (RightButtonDown)

Name	Definition		
	rightBtnUp	0101	Describes the event which takes place at the moment of releasing the left button of a mouse. (RightButtonUP)
	move	0110	Describes the event which takes place while changing the mouse position. (Move)
		0111 - 1111	Reserved
NumOfKeyboard	This field, which is only present in the binary representation, specifies the number of keyboard events contained in the VWOEventType.		
keyCodeFlag	This field, which is only present in the binary representation, signals the presence of the keycode input element. "1" means that the element shall be used, and "0" means that the element shall not be used.		
keyCode	Describes the corresponding key code (0-255) of each key.		
event	Describes the keyboard event (pressed, clicked, or released). In the binary representation, the keyboard events are presented as follows. (pressed: 00, clicked: 01, released: 10, and reserved: 11)		
NumOfUserDefinedInput	This field, which is only present in the binary representation, specifies the number of user-defined input events contained in the VWOEventType.		
UserDefinedInput	Describes an input event defined by user.		
eventID	A unique identifier of the event.		

4.4.15.4 Examples

EXAMPLE 1 This example shows the description of an input event with the following semantics. The mouse as an input device produces new input value, "click." For identifying this input, the value of eventID is "EventID1."

```
<vwoc:Event eventID="EventID1">
    <vwoc:Mouse>urn:mpeg:mpeg-v:01-VWOC-MouseEventCS-NS:click</vwoc:Mouse>
</vwoc:Event>
```

EXAMPLE 2 This example shows the description of an input event with the following semantics. The Keyboard as an input device produces a new input value which is pressing the key code of "65". For identifying this input, the value of eventID is "EventID2."

```
<vwoc:Event eventID="EventID2">
    <vwoc:Keyboard keyCode="65" event="pressed"/>
</vwoc:Event>
```

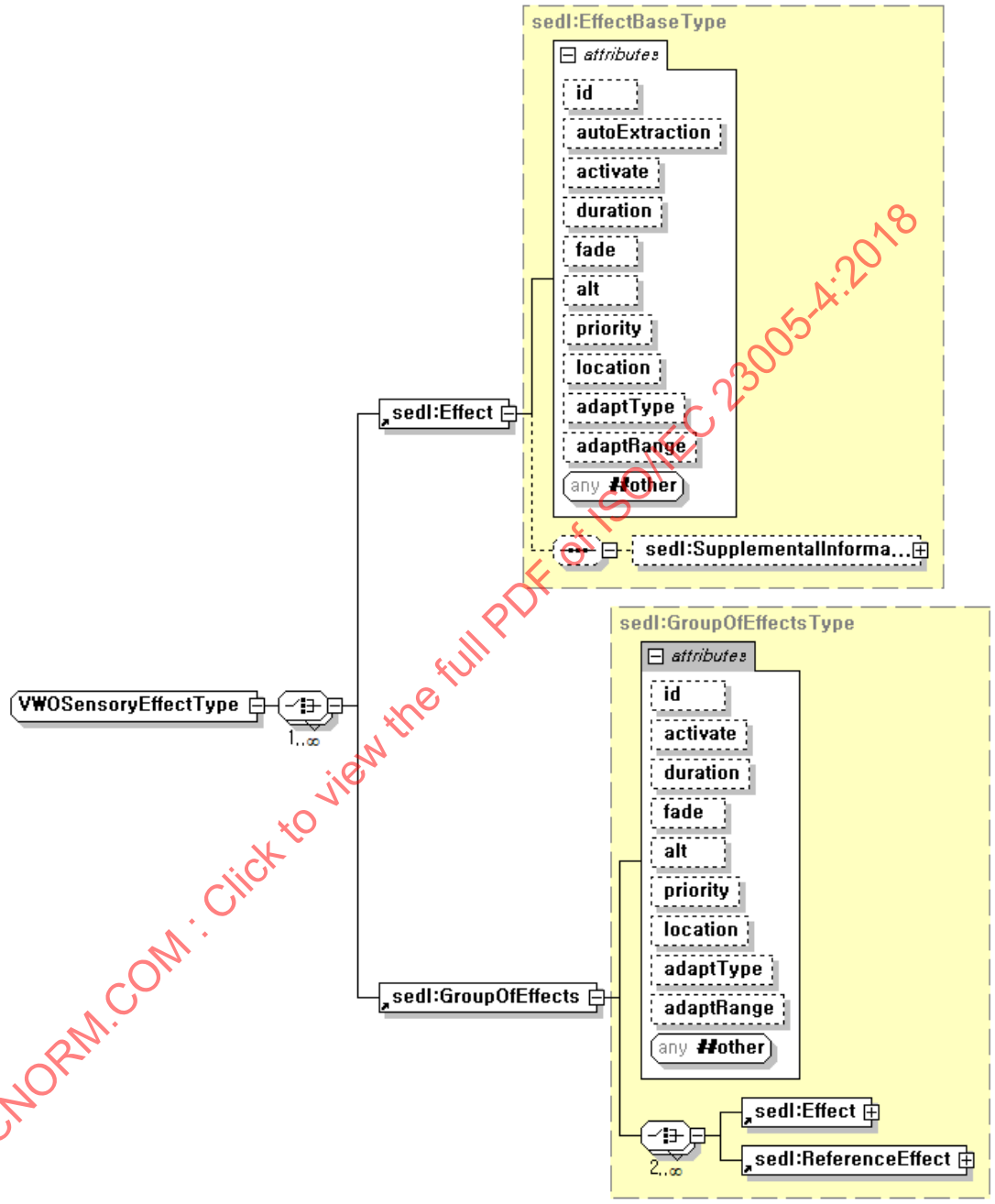
EXAMPLE 3 This example shows the description of an input event with the following semantics. The Keyboard produces a new input event of pressing the two keys "shift" + "a". One of the keyboard events is the pressing event, "pressed", of the "shift" key whose code is "16", and the other one is the pressing event, "pressed", of the "a" key whose code is "65". For identifying this input, the value of eventID is "EventID3."

```
<vwoc:Event eventID="EventID3">
    <vwoc:Keyboard keyCode="16" event="pressed"/>
    <vwoc:Keyboard keyCode="65" event="pressed"/>
</vwoc:Event>
```

4.4.16 VWOSensoryEffectType

4.4.16.1 XML representation syntax

Diagram



Source

```
<complexType name="VWOSensoryEffectType">
    <choice maxOccurs="unbounded">
        <element ref="sedl:Effect"/>
        <element ref="sedl:GroupOfEffects"/>
    </choice>
</complexType>
```

4.4.16.2 Binary representation syntax

VWOSensoryEffectType {	Number of bits	Mnemonic
EffectFlag	1	bslbf
GroupOfEffectsFlag	1	bslbf
If(EffectFlag) {		
EffectBaseType		EffectBaseType
}		
If(GroupOfEffectsFlag) {		
GroupOfEffectsType		GroupOfEffectType
}		
}		

4.4.16.3 Semantics

Name	Definition
`VWOSensoryEffectType`	A type that contains the descriptions of sensorial effects associated to the virtual world object.
`EffectFlag`	This field, which is only present in the binary representation, signals the presence of the `effect` element. "1" means the element shall be used, and "0" means the element shall not be used.
`GroupOfEffectsFlag`	This field, which is only present in the binary representation, signals the presence of the `GroupOfEffect` element. "1" means the element shall be used, and "0" means the element shall not be used.
`Effect`	Describes a sensory effect.
`GroupOfEffects`	Describes a group of sensory effects. NOTE The purpose of grouping is to remove some redundancy from its child elements. All attributes included here are inherited to its child elements.

4.4.16.4 Examples

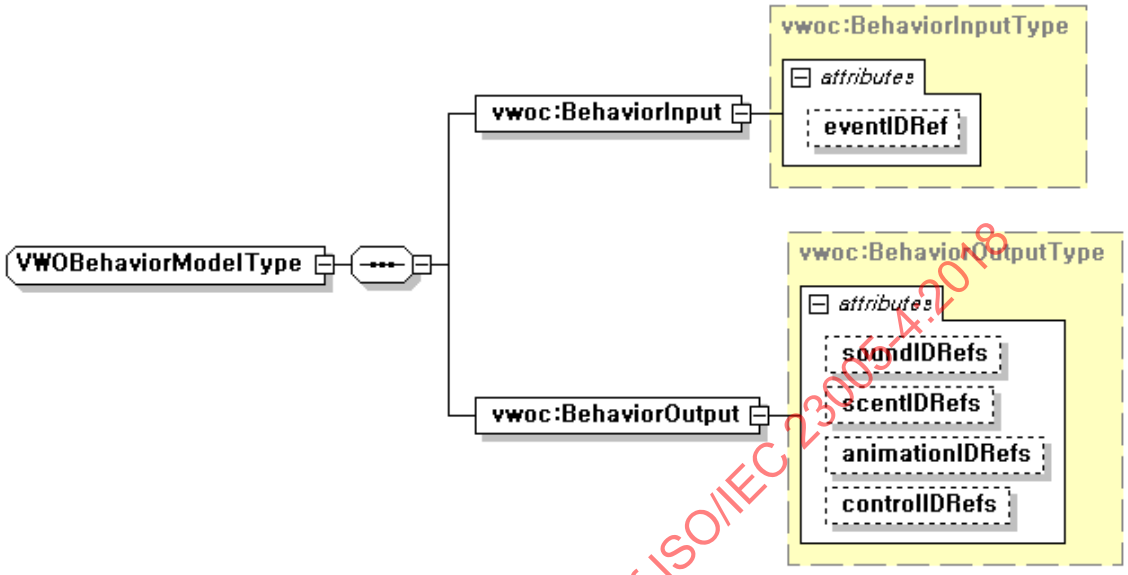
This example shows the description of a VWO Sensory effect list with the following semantics.

```
<vwoc:SensoryEffectList>
   <sedl:Effect xsi:type="sev:LightType" duration="5" activate="true">
   </sedl:Effect>
</vwoc:SensoryEffectList>
```

4.4.17 VWOBehaviourModelType

4.4.17.1 XML representation syntax

Diagram



Source

```
<complexType name="VWOBehaviorModelType">
      <sequence>
            <element name="BehaviorInput" type="vwoc:BehaviorInputType"/>
            <element name="BehaviorOutput" type="vwoc:BehaviorOutputType"/>
      </sequence>
</complexType>
<complexType name="BehaviorInputType">
      <attribute name="eventIDRef" type="IDREF"/>
</complexType>

<complexType name="BehaviorOutputType">
      <attribute name="soundIDRefs" type="IDREFS" use="optional"/>
      <attribute name="scentIDRefs" type="IDREFS" use="optional"/>
      <attribute name="animationIDRefs" type="IDREFS" use="optional"/>
      <attribute name="controlIDRefs" type="IDREFS" use="optional"/>
</complexType>
```

4.4.17.2 Binary representation syntax

VWOBehaviorModelType{	Number of bits	Mnemonic
BehaviorInput		BehaviorInputType
BehaviorOutput		BehaviorOutputType
}		
BehaviorInputType{		
EventIDRefFlag	1	bslbf
if(EventIDRefFlag){		
eventIDRef	See ISO/IEC 10646[8]	UTF-8

VWOBehaviorModelType{	Number of bits	Mnemonic
}		
}		
BehaviorOutputType{		
SoundIDFlag	1	bslbf
ScentIDFlag	1	bslbf
AnimationIDFlag	1	bslbf
ControlIDFlag	1	bslbf
if(SoundIDFlag) {		
SoundIDRefs	See ISO/IEC 10646[8]	UTF-8
}		
if(ScentIDFlag) {		
ScentIDRefs	See ISO/IEC 10646[8]	UTF-8
}		
if(AnimationIDFlag) {		
AnimationIDRefs	See ISO/IEC 10646[8]	UTF-8
}		
if(ControlIDFlag) {		
ControlIDRefs	See ISO/IEC 10646[8]	UTF-8
}		
}		

4.4.17.3 Semantics

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>VWOBehaviorModelType</td><td>A type that describes a container of an input event and the associated output object behaviours.</td></tr>
<tr><td>BehaviorInput</td><td>An input event to make an object behaviour.</td></tr>
<tr><td>BehaviorInputType</td><td>Refers to an input event ID
<table>
<tr><th>Element</th><th>Information</th></tr>
<tr><td>eventIDRef</td><td>Input event ID</td></tr>
<tr><td>EventIDRef Flag</td><td>This field, which is only present in the binary representation, signals the presence of the eventIDRef element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
</table></td></tr>
<tr><td>BehaviorOutput</td><td>Object behaviour output according to an input event.</td></tr>
<tr><td>BehaviorOutputType</td><td>Refers to a list of object behavioural outputs.
<table>
<tr><th>Element</th><th>Information</th></tr>
<tr><td>SoundFlag</td><td>This field, which is only present in the binary representation, signals the presence of the sound element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ScentFlag</td><td>This field, which is only present in the binary representation, signals the presence of the scent element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>AnimationFlag</td><td>This field, which is only present in the binary representation, signals the presence of the animation element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ControlFlag</td><td>This field, which is only present in the binary representation, signals the presence of the control element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>soundIDRefs</td><td>It refers soundIDs to provide sound effects of the object.</td></tr>
<tr><td>scentIDRefs</td><td>It refers scentIDs to provide scent effects of the object.</td></tr>
<tr><td>animationIDRefs</td><td>It refers animationIDs to provide animation clips of the object.</td></tr>
<tr><td>controlIDRefs</td><td>It refers controlIDs to provide controls of the object.</td></tr>
</table></td></tr>
</table>

4.4.17.4 Examples

This example shows the description of a VWO behaviour model with the following semantics. If eventID =”EventID1” is given as BehaviorInput, then BehaviorOutput shall be executed related to soundID=”SoID5” and animationID=”AniID4”.

```
<vwoc:BehaviorModel>
   <vwoc:BehaviorInput eventIDRef="EventID1"/>
   <vwoc:BehaviorOutput animationIDRefs="AniID4" soundIDRefs="SoID5"/>
</vwoc:BehaviorModel>
```

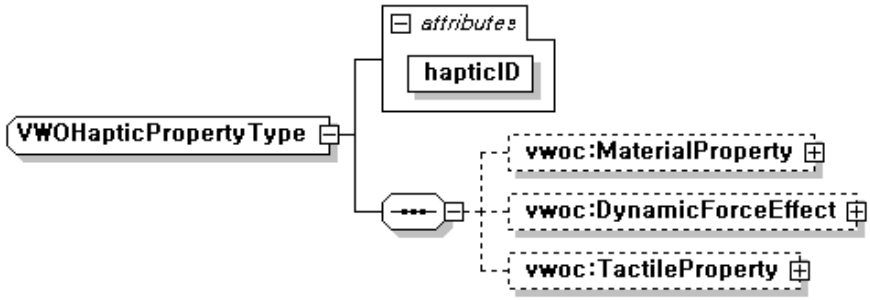
4.5 Virtual world object common data types

This subclause specifies syntax and semantics of the common datatypes for avatar and virtual object metadata. To be specific, basic data types which are used as basic building blocks, such as haptic

properties, animation description, and other simple data types.

4.5.1 VWOHapticPropertyType

4.5.1.1 XML representation syntax

Diagram	
Source	<complexType name="VWOHapticPropertyType"> <sequence> <element name="MaterialProperty" type="vwoc:MaterialPropertyType" minOccurs="0"/> <element name="DynamicForceEffect" type="vwoc:DynamicForceEffectType" minOccurs="0"/> <element name="TactileProperty" type="vwoc:TactileType" minOccurs="0"/> </sequence> <attribute name="hapticID" type="ID" use="required"/> </complexType>

4.5.1.2 Binary representation syntax

VWOHapticPropertyType {	Number of bits	Mnemonic
MaterialPropertyFlag	1	bslbf
DynamicForceEffectFlag	1	bslbf
TactilePropertyFlag	1	bslbf
if(MaterialPropertyFlag) {		
MaterialProperty		MaterialPropertyType
}		
if(DynamicForceEffectFlag) {		
DynamicForceEffect		DynamicForceEffectType
}		
if(TactilePropertyFlag) {		
TactileProperty		TactilePropertyType
}		
hapticID	See ISO/IEC 10646[8]	UTF-8

VWOHapticPropertyType {	Number of bits	Mnemonic
}		

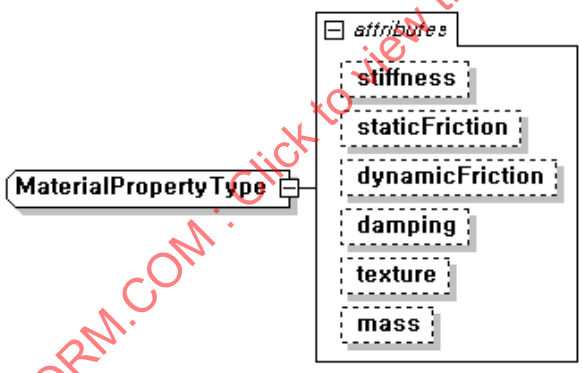
4.5.1.3 Semantics

Name	Description
VWOHapticPropertyType	A type that contains the descriptions of a haptic property associated to the virtual world object.
MaterialPropertyFlag	This field, which is only present in the binary representation, signals the presence of the MaterialProperty element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
DynamicForceEffectFlag	This field, which is only present in the binary representation, signals the presence of the DynamicForceEffect element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
TactilePropertyFlag	This field, which is only present in the binary representation, signals the presence of the TactileProperty element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
MaterialProperty	This type contains parameters characterizing material properties.
DynamicForceEffect	This type contains parameters characterizing force effects.
TactileProperty	This type contains parameters characterizing tactile properties.
hapticID	A unique identifier of the haptic property.

4.5.1.4 MaterialPropertyType

4.5.1.4.1 XML representation syntax

Diagram



Source

```
<complexType name="MaterialPropertyType">
    <attribute name="stiffness" type="float" use="optional"/>
    <attribute name="staticFriction" type="float" use="optional"/>
    <attribute name="dynamicFriction" type="float" use="optional"/>
    <attribute name="damping" type="float" use="optional"/>
    <attribute name="texture" type="anyURI" use="optional"/>
    <attribute name="mass" type="float" use="optional"/>
</complexType>
```

4.5.1.4.2 Binary representation syntax

MaterialPropertyType{	Number of bits	Mnemonic
StiffnessFlag	1	bslbf
StaticFrictionFlag	1	bslbf

MaterialPropertyType{	Number of bits	Mnemonic
DynamicFrictionFlag	1	bslbf
DampingFlag	1	bslbf
TextureFlag	1	bslbf
MassFlag	1	bslbf
if(StiffnessFlag) {		
stiffness	32	fsbf
}		
if(StaticFrictionFlag) {		
staticFriction	32	fsbf
}		
if(DynamicFrictionFlag) {		
dynamicFriction	32	fsbf
}		
if(DampingFlag) {		
damping	32	fsbf
}		
if(TextureFlag) {		
texture	See ISO/IEC 10646[8]	UTF-8
}		
if(MassFlag) {		
mass	32	fsbf
}		
}		

4.5.1.4.3 Semantics

Name	Description
`MaterialPropertyType`	A type that contains the descriptions of a material property associated to the virtual world object.
`StiffnessFlag`	This field, which is only present in the binary representation,

	signals the presence of the `Stiffness` element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
`StaticFrictionFlag`	This field, which is only present in the binary representation, signals the presence of the `StaticFriction` element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
`DynamicFrictionFlag`	This field, which is only present in the binary representation, signals the presence of the `DynamicFriction` element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
`DampingFlag`	This field, which is only present in the binary representation, signals the presence of the `Damping` element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
`TextureFlag`	This field, which is only present in the binary representation, signals the presence of the `Texture` element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
`MassFlag`	This field, which is only present in the binary representation, signals the presence of the `Mass` element. "1" means the attribute shall be used and "0" means the attribute shall not be used.
`stiffness`	The stiffness of the virtual world object (in N/mm).
`staticFriction`	The static friction of the virtual world object.
`dynamicFriction`	The dynamic friction of the virtual world object.
`damping`	The damping of the virtual world object.
`texture`	Contains a link to haptic texture file (e.g. bump image)
`mass`	The mass of the virtual world object.

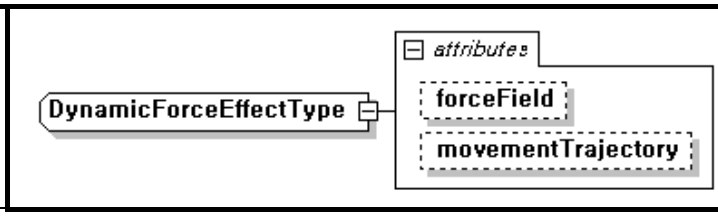
4.5.1.4.4 Examples

This example shows the material properties of a virtual world object which has 0.5 N/mm of stiffness, 0.3 of static coefficient of friction, 0.02 of kinetic coefficient of friction, 0,001 damping coefficient, 0.7 of mass and it's surface haptic texture is loaded from the given URL with the id of MID30.

```
<vwoc:HapticProperty hapticID="MID30">
   <vwoc:MaterialProperty stiffness="0.5" staticFriction="0.3"
dynamicFriction="0.02"
damping="0.001" texture="http://haptic.kr/tactile/texture1.bmp" mass="0.7"/>
</vwoc:HapticProperty>
```

4.5.1.5 DynamicForceEffectType

4.5.1.5.1 XML representation syntax

Diagram	

Source	<complexType name="DynamicForceEffectType"> <attribute name="forceField" type="anyURI" use="optional"/> <attribute name="movementTrajectory" type="anyURI" use="optional"/> </complexType>

4.5.1.5.2 Binary representation syntax

DynamicForceEffectType{	Number of bits	Mnemonic
ForceFieldFlag	1	bslbf
MovementTrajectoryFlag	1	bslbf
if(ForceFieldFlag) {		
forceField	See ISO/IEC 10646[8]	UTF-8
}		
if(MovementTrajectoryFlag) {		
movementTrajectory	See ISO/IEC 10646[8]	UTF-8
}		
}		

4.5.1.5.3 Semantics

Name	Description
DynamicForceEffectType	A type that contains the descriptions of a dynamic force effect associated to the virtual world object.
ForceFieldFlag	This field, which is only present in the binary representation, signals the presence of the ForceField element. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
MovementTrajectoryFlag	This field, which is only present in the binary representation, signals the presence of the MovementTrajectory element. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
forceField	Contains link to force field vector file (sum of force field vectors).
movementTrajectory	Contains link to force trajectory file (e.g. .dat file including a sequence of motion data).

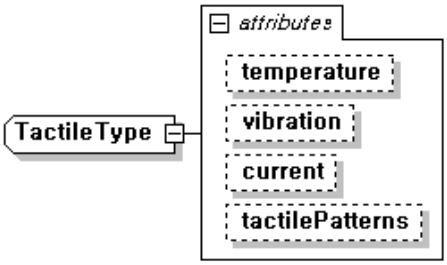
4.5.1.5.4 Examples

This example shows the dynamic force effect of an avatar. The force field characteristic of the avatar with its id of FFID30 is determined by the designed force field file from the URL.

```
<vwoc:HapticProperty hapticID="FFID30">
   <vwoc:DynamicForceEffect forceField="http://haptic.kr/avatar/forcefield.dat"/>
</vwoc:HapticProperty>
```

4.5.1.6 TactileType

4.5.1.6.1 XML representation syntax

Diagram	
Source	<complexType name="TactileType"> <attribute name="temperature" type="float" use="optional"/> <attribute name="vibration" type="float" use="optional"/> <attribute name="current" type="float" use="optional"/> <attribute name="tactilePatterns" type="anyURI" use="optional"/> </complexType>

4.5.1.6.2 Binary representation syntax

TactileType{	Number of bits	Mnemonic
TemperatureFlag	1	bslbf
VibrationFlag	1	bslbf
CurrentFlag	1	bslbf
TactilePatternsFlag	1	bslbf
if(TemperatureFlag) {		
temperature	32	fsbf
}		
if(VibrationFlag){		
vibration	32	fsbf
}		
if(CurrentFlag) {		
current	32	fsbf
}		
if(TactilePatternsFlag) {		
tactilePatterns	See ISO/IEC 10646[8]	UTF-8
}		

TactileType{	Number of bits	Mnemonic
}		

4.5.1.6.3 Semantics

Name	Description
TactileType	A type that contains the descriptions of a tactile property associated to the virtual world object.
TemperatureFlag	This field, which is only present in the binary representation, signals the presence of the temperature attribute. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
VibrationFlag	This field, which is only present in the binary representation, signals the presence of the vibration attribute. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
CurrentFlag	This field, which is only present in the binary representation, signals the presence of the electric current attribute. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
TactilePatternsFlag	This field, which is only present in the binary representation, signals the presence of the tactilePatterns attribute. ”1” means the attribute shall be used and ”0” means the attribute shall not be used.
temperature	The temperature of the virtual world object (in degree celcius).
vibration	The vibration of the virtual world object.
current	The electric current of the virtual world object (in mA).
tactilePatterns	Contains link to tactile pattern file (e.g. grayscale video (.avi, h.264, or .dat file.)

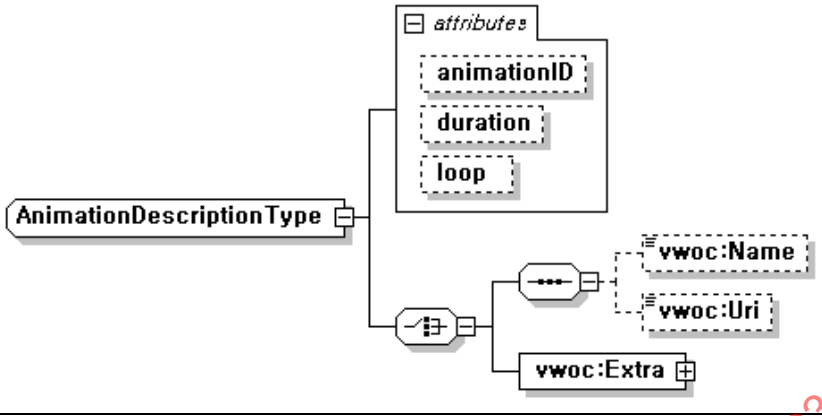
4.5.1.6.4 Examples

This example shows the tactile properties, with its id of DFEID30, which has 15 degree of temperature and a tactile effect based on the tactile information from the following URL (http://www.haptic.kr/avatar/tactile1.avi).

```
<vwoc:HapticProperty hapticID="DFEID30">
   <vwoc:TactileProperty temperature="15"
tactilePatterns="http://www.haptic.kr/avatar/tactile1.avi"/>
</vwoc:HapticProperty>
```

4.5.2 AnimationDescriptionType

4.5.2.1 XML representation syntax

Diagram	
Source	<complexType name="AnimationDescriptionType"> <choice> <sequence> <element name="Name" type="mpeg7:termReferenceType" minOccurs="0"/> <element name="Uri" type="anyURI" minOccurs="0"/> </sequence> <element name="Extra" type="vwoc:ExtraType"/> </choice> <attribute name="animationID" type="ID" use="optional"/> <attribute name="duration" type="unsignedInt" use="optional"/> <attribute name="loop" type="unsignedInt" use="optional"/> </complexType>

4.5.2.2 Binary representation syntax

AnimationDescriptionType{	Number of bits	Mnemonic
animationIDFlag	1	bslbf
durationFlag	1	bslbf
loopFlag	1	bslbf
SelectAnimationDescriptionType	1	bslbf
if(animationIDFlag){		
animationID	See ISO/IEC 10646[8]	UTF-8
}		
if(durationFlag){		
duration	32	uimsbf
}		
if(loopFlag){		

AnimationDescriptionType{	Number of bits	Mnemonic
Loop	8	uimsbf
}		
if(SelectAnimationDescriptionType){		
Extra		ExtraType
}		
else {		
NameFlag	1	bslbf
UriFlag	1	bslbf
if(NameFlag){		
TypeOfAnimationCS	8	bslbf
Name	10	Number of bits are defined by the type of AnimationCS
}		
if(UriFlag){		
Uri	See ISO/IEC 10646[8]	UTF-8
}		
}		
}		

4.5.2.3 Semantics

Name	Description
`AnimationDescriptionType`	A type that contains descriptions and a link to the animation file.
`animationIDFlag`	This field, which is only present in the binary representation, signals whether `animationID` attribute is used or not. "1" means that the attribute shall be used, and "0" means that attribute shall not be used.
`durationFlag`	This field, which is only present in the binary representation, signals whether `duration` attribute is used or not. "1" means that the attribute shall be used, and "0" means that attribute shall not be used.
`loopFlag`	This field, which is only present in the binary representation, signals whether `loop` attribute is used or not. "1" means that the attribute

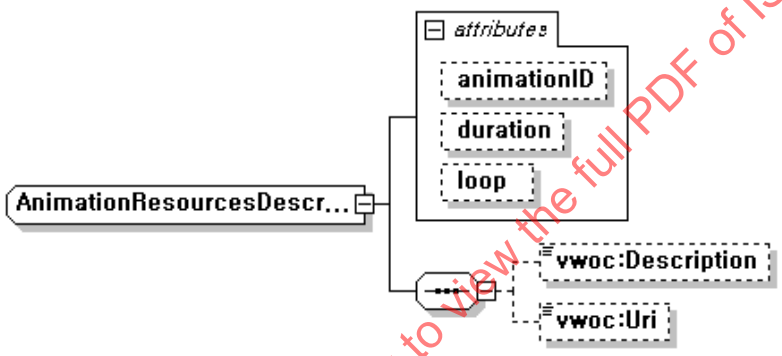
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>shall be used, and “0” means that attribute shall not be used.</td></tr>
<tr><td>SelectAnimationDescriptionType</td><td>This field, which is only present in the binary representation, signals which type of animation description shall be used. ”0” means that the proprietary description shall be used, and “1” means that the specified name in the classification schemes and the URI shall be used to describe the animation.</td></tr>
<tr><td>animationID</td><td>A unique identifier of the animation.</td></tr>
<tr><td>duration</td><td>The length of time that the animation lasts. The default unit is ms.</td></tr>
<tr><td>loop</td><td>A playing option to describe the number of repetition. (default value: 1, 0:indefinite repetition, 1:once, 2: twice, …, n: n times)</td></tr>
<tr><td>Extra</td><td>Describes an animation in the form of any proprietary but well-formed XML metadata.</td></tr>
<tr><td>NameFlag</td><td>This field, which is only present in the binary representation, signals whether the name element is used or not. ”1” means that the element shall be used, and “0” means that element shall not be used.</td></tr>
<tr><td>UriFlag</td><td>This field, which is only present in the binary representation, signals whether the Uri element is used or not. ”1” means that the element shall be used, and “0” means that element shall not be used.</td></tr>
<tr><td>TypeOfAnimationCS</td><td>This field, which is only present in the binary representation, describes a class of the animation as one of the classification schemes (CS). The CSs that may be used for this purpose is defined in A.4 and A.5.
<table>
<tr><th>Type of AnimationCS</th><th>Binary representation for sensor type (8 bits)</th></tr>
<tr><td>IdleAnimationCS</td><td>00000000</td></tr>
<tr><td>GreetingAnimationCS</td><td>00000001</td></tr>
<tr><td>DanceAnimationCS</td><td>00000010</td></tr>
<tr><td>WalkAnimationCS</td><td>00000011</td></tr>
<tr><td>MovesAnimationCS</td><td>00000100</td></tr>
<tr><td>FightingAnimationCS</td><td>00000101</td></tr>
<tr><td>HearingAnimationCS</td><td>00000110</td></tr>
<tr><td>SmokeAnimationCS</td><td>00000111</td></tr>
<tr><td>CongratulationsAnimationCS</td><td>00001000</td></tr>
<tr><td>CommonActionsAnimationCS</td><td>00001001</td></tr>
<tr><td>SpecificActionsAnimationCS</td><td>00001010</td></tr>
<tr><td>FacialExpressionAnimationCS</td><td>00001011</td></tr>
</table></td></tr>
</table>

Name	Description
	BodyExpressionAnimationCS: 00001100 VODeformationCS: 00001101 VOMotionCS: 00001110 Reserved: 00001111-11111111
Name	Describes a type of the animation as a reference to classification schemes (CSs) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. The CSs that may be used for this purpose is defined in A.4 and A.5.
Uri	Contains a link to an animation file, usually MP4 file.

4.5.3 AnimationResourcesDescriptionType

4.5.3.1 XML representation syntax

Diagram



Source

```
<complexType name="AnimationResourcesDescriptionType">
    <sequence>
        <element name="Description" type="string" minOccurs="0"/>
        <element name="Uri" type="anyURI" minOccurs="0"/>
    </sequence>
    <attribute name="animationID" type="ID" use="optional"/>
    <attribute name="duration" type="unsignedInt" use="optional"/>
    <attribute name="loop" type="unsignedInt" use="optional"/>
</complexType>
```

4.5.3.2 Binary representation syntax

AnimationResourcesDescriptionType{	Number of bits	Mnemonic
animationIDFlag	1	bslbf
durationFlag	1	bslbf
loopFlag	1	bslbf
DescriptionFlag	1	bslbf
UriFlag	1	bslbf

AnimationResourcesDescriptionType{	Number of bits	Mnemonic
if(animationIDFlag){		
animationID	See ISO/IEC 10646[8]	UTF-8
}		
if(durationFlag){		
duration	8	uimsbf
}		
if(loopFlag){		
loop	8	uimsbf
}		
if(DescriptionFlag){		
Description	See ISO/IEC 10646[8]	UTF-8
}		
if(UriFlag){		
Uri	See ISO/IEC 10646[8]	UTF-8
}		
}		

4.5.3.3 Semantics

Name	Description
AnimationResourcesDescriptionType	A type that contains a link to an animation file and its description.
Description	Contains the description of the animation resource.
Uri	Contains a link to an animation file, usually MP4 file.
animationID	A unique identifier of the animation.
duration	The length of time that the animation lasts.
loop	A playing option to describe the number of repetition. (default value: 1, 0: indefinite repetition, 1: once, 2: twice, …, n: n times)

4.5.3.4 PointType

4.5.3.4.1 XML representation syntax

Diagram	—
Source	<complexType name="PointType" abstract="true"/> <complexType name="LogicalPointType"> <complexContent> <extension base="vwoc:PointType"> <attribute name="name" type="string" use="optional"/> <attribute name="sensorID" type="anyURI" use="optional"/> </extension> </complexContent> </complexType> <complexType name="Physical3DPointType"> <complexContent> <extension base="vwoc:PointType"> <attribute name="x" type="float" use="required"/> <attribute name="y" type="float" use="required"/> <attribute name="z" type="float" use="required"/> </extension> </complexContent> </complexType>

4.5.3.4.2 Binary representation syntax

PointType{	Number of bits	Mnemonic
PointTypeSelect	1	bslbf
if (PointTypeSelect) {		
Point		LogicalPointType
}		
else{		
Point		Physical3DPointType
}		
}		
LogicalPointType {		
nameflag	1	bslbf
sensorIDflag	1	bslbf
if(nameflag){		
name	See ISO/IEC 10646[8]	UTF-8

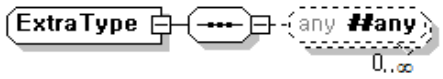
PointType{	Number of bits	Mnemonic
if(sensorIDflag){		
sensorID	See ISO/IEC 10646[8]	UTF-8
}		
}		
Physical3DPointType{		
x	32	fsbf
y	32	fsbf
z	32	fsbf
}		

4.5.3.4.3 **Semantics**

Name	Description
PointType	An astract type providing root for two different point types, which are LogicalPointType and Physical3DPointType for specifying a feature point for face feature control.
PointTypeSelect	This field, which is only present in the binary representation, signals whether the type of point is logical point type or the type of point is a physical 3D positional point."1" means that the logical point type shall be used, and "0" means that the physical 3D point type shall be used.
LogicalPointType	A type providing the name of the feature point
nameflag	This field, which is only present in the binary representation, signals whether name is used or not. "1" means that the name shall be used, and "0" means that name shall not be used.
sensorIDflag	This field, which is only present in the binary representation, signals whether sensorID is used or not. "1" means that the sensorID shall be used, and "0" means that the sensorID shall not be used.
name	The name of the feature point
sensorID	The sensor ID corresponding to the feature point
Physical3DPointType	A type providing a three dimensional point vector value.
x	The point value on x-axis in 3 dimensional space
y	The point value on y-axis in 3 dimensional space
z	The point value on z-axis in 3 dimensional space

4.5.3.5 ExtraType

4.5.3.5.1 XML representation syntax

Diagram	
Source	<complexType name="ExtraType"> <annotation> <appinfo>enable-xmlns</appinfo> </annotation> <sequence> <any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/> </sequence> </complexType>

4.5.3.5.2 Binary representation syntax

ExtraType {	Number of bits	Mnemonic
XMLDataFlag	1	bslbf
if (XMLDataFlag) {		
NumXMLData		vluimsbf5
for(k=0; k<NumXMLData; k++) {		
XMLLength		vluimsbf5
XMLData	See ISO/IEC 10646[8]	UTF-8
}		
}		
}		

4.5.3.5.3 Semantics

Name	Description
ExtraType	A type that can contain any well-formed XML data
XMLDataFlag	This field, which is only present in the binary representation, signals whether XML data is used or not. ”1” means that the XML data shall be used, and ”0” means that XML data shall not be used.
NumXMLData	This field, which is only present in the binary representation, specifies the number of XML data contained in the ExtraType element.
XMLLength	This field, which is only present in the binary representation, specifies the number of characters in terms of UTF-8 in each XML data.
XMLData	This field contains any well-formed XML data. In the binary representation, the field is encoded by UTF-8.

NOTE Element defined as type <ExtraType> allows extending the MPEG-V schema with proprietary but well-defined or at least well-formatted data.

4.5.4 Common simple data types

4.5.4.1 IndicateOfLHType

4.5.4.1.1 XML representation syntax

Source	<simpleType name="indicateOfLHType"> <restriction base="string"> <enumeration value="low"/> <enumeration value="high"/> </restriction> </simpleType>

4.5.4.1.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfLHType	1	bslbf

4.5.4.1.3 Semantics

Name	Description
indicateOfLHType	A type of which the value is either low or high. The binary representation of the type is defined as follows. (0: low, 1: high)

4.5.4.2 IndicateOfLMHType

4.5.4.2.1 XML representation syntax

Source	<simpleType name="indicateOfLMHType"> <restriction base="string"> <enumeration value="low"/> <enumeration value="medium"/> <enumeration value="high"/> </restriction> </simpleType>

4.5.4.2.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfLMHType	2	bslbf

4.5.4.2.3 Semantics

Name	Description
indicateOfLMHType	A type of which the value is among low, medium or high. The binary representation of the type is defined as follows. (0: low, 1: medium, 2: high, 3: reserved)

4.5.4.3 IndicateOfSMBType

4.5.4.3.1 XML representation syntax

Source	<simpleType name="indicateOfSMBType"> <restriction base="string"> <enumeration value="small"/> <enumeration value="medium"/> <enumeration value="big"/> </restriction> </simpleType>

4.5.4.3.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfSMBType	2	bslbf

4.5.4.3.3 Semantics

Name	Description
`indicateOfSMBType`	A type of which the value is among small, medium or big. The binary representation of the type is defined as follows. (0: small, 1: medium, 2: big, 3: reserved)

4.5.4.4 IndicateOfSMLType

4.5.4.4.1 XML representation syntax

Source	<simpleType name="indicateOfSMLType"> <restriction base="string"> <enumeration value="short"/> <enumeration value="medium"/> <enumeration value="long"/> </restriction> </simpleType>

4.5.4.4.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfSMLType	2	bslbf

4.5.4.4.3 Semantics

Name	Description
`indicateOfSMLType`	A type of which the value is among short, medium or long. The binary representation of the type is defined as follows. (0: short, 1: medium, 2: long, 3: reserved)

4.5.4.5 IndicateOfDMUType

4.5.4.5.1 XML representation syntax

Source	<simpleType name="indicateOfDMUType"> <restriction base="string"> <enumeration value="down"/> <enumeration value="medium"/> <enumeration value="up"/> </restriction> </simpleType>

4.5.4.5.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfDMUType	2	bslbf

4.5.4.5.3 Semantics

Name	Description
`indicateOfDMUType`	A type of which the value is among down, medium or up. The binary representation of the type is defined as follows. (0: down, 1: medium, 2: up, 3: reserved)

4.5.4.6 IndicateOfDUType

4.5.4.6.1 XML representation syntax

Source	<simpleType name="indicateOfDUType"> <restriction base="string"> <enumeration value="down"/> <enumeration value="up"/> </restriction> </simpleType>

4.5.4.6.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfDUType	1	bslbf

4.5.4.6.3 Semantics

Name	Description
`indicateOfDUType`	A type of which the value is either down or up. The binary representation of the type is defined as follows. (0: down, 1: up)

4.5.4.7 IndicateOfPMNType

4.5.4.7.1 XML representation syntax

Source	<simpleType name="indicateOfPMNType"> <restriction base="string"> <enumeration value="pointed"/> <enumeration value="middle"/> <enumeration value="notpointed"/> </restriction> </simpleType>

4.5.4.7.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfPMNType	2	bslbf

4.5.4.7.3 Semantics

Name	Description
`indicateOfPMNType`	A type of which the value is among pointed, middle or not pointed. The binary representation of the type is defined as follows. (0: short, 1: medium, 2: long, 3: reserved)

4.5.4.8 IndicateOfRCType

4.5.4.8.1 XML representation syntax

Source	<simpleType name="indicateOfRCType"> <restriction base="string"> <enumeration value="round"/> <enumeration value="cleft"/> </restriction> </simpleType>

4.5.4.8.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfRCType	1	bslbf

4.5.4.8.3 Semantics

Name	Description
`indicateOfRCType`	A type of which the value is either round or cleft. The binary representation of the type is defined as follows. (0: round, 1: cleft)

4.5.4.9 IndicateOfLRType

4.5.4.9.1 XML representation syntax

Source	<simpleType name="indicateOfLRType"> <restriction base="string"> <enumeration value="left"/> <enumeration value="right"/>

	</restriction> </simpleType>

4.5.4.9.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfLRType	1	bslbf

4.5.4.9.3 Semantics

Name	Description
indicateOfLRType	A type of which the value is either left or right. The binary representation of the type is defined as follows. (0: left, 1: right)

4.5.4.10 IndicateOfLMRType

4.5.4.10.1 XML representation syntax

Source	<simpleType name="indicateOfLMRType"> <restriction base="string"> <enumeration value="left"/> <enumeration value="middle"/> <enumeration value="right"/> </restriction> </simpleType>

4.5.4.10.2 Binary representation syntax

	Number of bits	Mnemonic
indicateOfLMRType	2	bslbf

4.5.4.10.3 Semantics

Name	Description
indicateOfLMRType	A type of which the value is amoung left, middle or right. The binary representation of the type is defined as follows. (0: left, 1: middle, 2: right, 3: reserved)

4.5.4.11 measureUnitLMHType

4.5.4.11.1 XML representation syntax

Source	<simpleType name="measureUnitLMHType"> <union memberTypes="vwoc:indicateOfLMHType float"/> </simpleType>

4.5.4.11.2 Binary representation syntax

measureUnitLMHType{	Number of bits	Mnemonic
selectType	1	bslbf
if(selectType == 0){		

measureUnitLMHType{	Number of bits	Mnemonic
indicationOfLMH		indicateOfLMHType
}else{		
measure	32	fsbf
}		
}		

4.5.4.11.3 Semantics

Name	Description
measureUnitLMHType	A type which may be either indicateOfLMHType or float.
selectType	This field, which is only present in the binary representation, signals whether a floating point value is used or the indicateOfLMHType is used. "1" means that the indicateOfLMHType shall be used, and "0" means that a floating point value shall not be used.
measure	This field, which is only present in the binary representation, the value of which is a floating point value.

4.5.4.12 measureUnitSMBType

4.5.4.12.1 XML representation syntax

Source	<simpleType name="measureUnitSMBType"> <union memberTypes="vwoc:indicateOfSMBType float"/> </simpleType>

4.5.4.12.2 Binary representation syntax

measureUnitSMBType{	Number of bits	Mnemonic
selectType	1	bslbf
if(selectType == 0){		
indicateOfSMB		indicateOfSMBType
}else{		
measure	32	fsbf
}		
}		

4.5.4.12.3 Semantics

Name	Description
measureUnitSMBType	A type which may be either indicateOfSMBType or float.
selectType	This field, which is only present in the binary representation, signals whether a floating point value is used or the indicateOfSMBType is used. "1" means that the indicateOfSMBType shall be used, and "0" means that a floating point value shall not be used.
measure	This field, which is only present in the binary representation, the value of which is a floating point value.

4.5.4.13 levelOf5Type

4.5.4.13.1 XML representation syntax

Source	<simpleType name="levelOf5Type"> <restriction base="integer"> <minInclusive value="1"/> <maxInclusive value="5"/> </restriction> </simpleType>

4.5.4.13.2 Binary representation syntax

	Number of bits	Mnemonic
levelOf5Type	3	uimsbf

4.5.4.13.3 Semantics

Name	Description
levelOf5Type	A type of which the integer value is from one to five. The binary representation of the type is defined as follows. (0:0, 1:1, 2:2, 3:3, 4:4, 5:5, 6-8:reserved)

4.5.4.14 angleType

4.5.4.14.1 XML representation syntax

Source	<simpleType name="angleType"> <restriction base="float"> <minInclusive value="0"/> <maxInclusive value="360"/> </restriction> </simpleType>

4.5.4.14.2 Binary representation syntax

	Number of bits	Mnemonic
angleType	32	fsbf

4.5.4.14.3 Semantics

Name	Description
angleType	A type of which the floating point value is from 0 degree to 360 degree.

4.5.4.15 percentageType

4.5.4.15.1 XML representation syntax

Source	<simpleType name="percentageType"> <restriction base="float"> <minInclusive value="0"/> <maxInclusive value="100"/> </restriction> </simpleType>

4.5.4.15.2 Binary representation syntax

	Number of bits	Mnemonic
percentageType	32	fsbf

4.5.4.15.3 Semantics

Name	Description
percentageType	A type of which the floating point value is from 0 percent to 100 percent.

4.5.4.16 unlimitedPertageType

4.5.4.16.1 XML representation syntax

Source	<simpleType name="unlimitedPercentageType"> <restriction base="float"> <minInclusive value="0"/> </restriction> </simpleType>

4.5.4.16.2 Binary representation syntax

	Number of bits	Mnemonic
unlimitedPercentageType	32	fsbf

4.5.4.16.3 Semantics

Name	Description
unlimitedPercentageType	A type of which the floating point value is from 0 percent.

5 Avatar metadata

5.1 General

Avatar metadata as a (visual) representation of the user inside the environment serves the following purposes:

— makes visible the presence of a real user into the VE,

— characterizes the user within the VE,

— interacts with the VE.

The "Avatar" element is composed of following type of data with the extension of the base type of avatar.

— **Appearance**: contains the high level description of the appearance and may refer a media containing the exact geometry and texture.

— **Animation**: contains the description of a set of animation sequences that the avatar is able to perform and may refer to several media containing the exact (geometric transformations) animation parameters.

— **CommunicationSkills**: contains a set of descriptors providing information on the different modalities an avatar is able to communicate.

— **Personality**: contains a set of descriptors defining the personality of the avatar.

— **ControlFeatures**: contains a set of descriptors defining possible place-holders for sensors on body skeleton and face feature points.

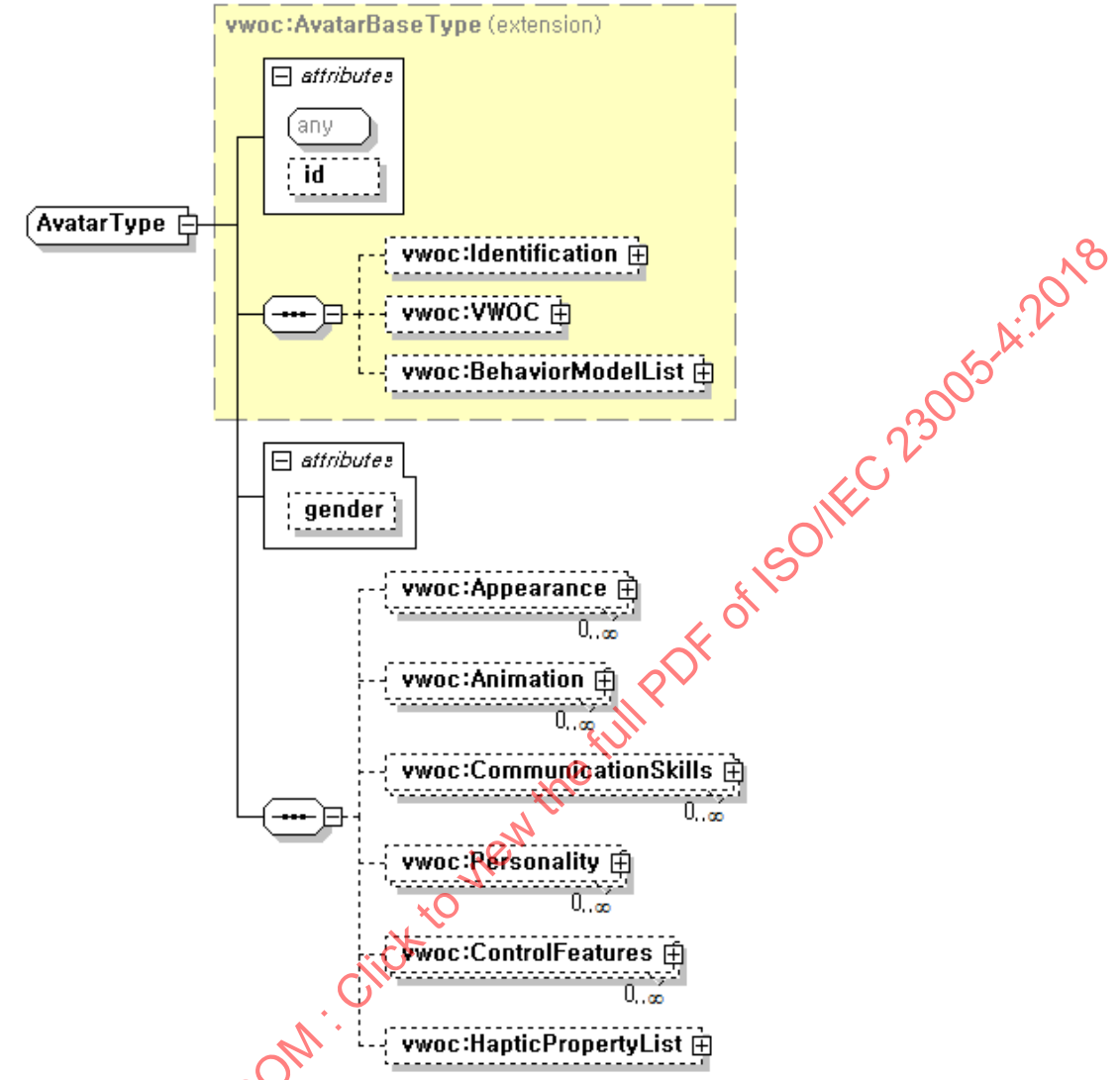
— **HapticPropertyList**: contains a list of high level descriptors of the haptic properties.

— **Gender**: describes the gender of the avatar.

5.2 AvatarType

5.2.1 XML representation syntax

Diagram



Source

```
<complexType name="AvatarType">
    <complexContent>
        <extension base="vwoc:AvatarBaseType">
            <sequence>
                <element name="Appearance" type="vwoc:AvatarAppearanceType" minOccurs="0"
maxOccurs="unbounded"/>
                <element name="Animation" type="vwoc:AvatarAnimationType" minOccurs="0"
maxOccurs="unbounded"/>
                <element name="CommunicationSkills" type="vwoc:AvatarCommunicationSkillsType"
minOccurs="0" maxOccurs="unbounded"/>
                <element name="Personality" type="vwoc:AvatarPersonalityType" minOccurs="0"
maxOccurs="unbounded"/>
                <element name="ControlFeatures" type="vwoc:AvatarControlFeaturesType" minOccurs="0"
maxOccurs="unbounded"/>
                <element name="HapticPropertyList" type="vwoc:VWOHapticPropertyListType"
minOccurs="0"/>
            </sequence>
            <attribute name="gender" type="string" use="optional"/>
        </extension>
    </complexContent>
</complexType>
```

5.2.2 Binary representation syntax

AvatarType{	Number of bits	Mnemonic
AvatarBase		AvatarBaseType
AppereanceFlag	1	bslbf
AnimationFlag	1	bslbf
CommunicationSkillsFlag	1	bslbf
PersonalityFlag	1	bslbf
ControlFeaturesFlag	1	bslbf
HapticPropertyListFlag	1	bslbf
genderFlag	1	bslbf
if(AppereanceFlag){		
LoopAvatarAppereance		vluimsbf5
for(k=0; k< LoopAvatarAppereance; k++){		
Appereance[k]		AvatarAppereanceType
}		
}		
if(AnimationFlag){		
LoopAvatarAnimation		vluimsbf5
for(k=0; k<LoopAvatarAnimation; k++){		
Animation[k]		AvatarAnimationType
}		
}		
if(CommunicationSkillsFlag){		

AvatarType{	Number of bits	Mnemonic
LoopAvatarCommunicationSkills		vluimsbf5
for(k=0;k<LoopAvatarCommunicationSkills; k++){		
CommunicationSkills[k]		AvatarCommunicationSkillsType
}		
}		
if(PersonalityFlag){		
LoopAvatarPersonality		vluimsbf5
for(k=0;k<LoopAvatarPersonality; k++){		
Personality[k]		AvatarPersonalityType
}		
}		
if(ControlFeaturesFlag){		
LoopAvatarControlFeatures		vluimsbf5
for(k=0;k<LoopAvatarControlFeatures; k++){		
ControlFeatures[k]		AvatarControlFeaturesType
}		
}		
if(HapticPropertyListFlag){		
HapticPropertyList		VWOHapticPropertyListType
}		

AvatarType{	Number of bits	Mnemonic
if(genderFlag){		
gender	See ISO/IEC 10646[8]	UTF-8
}		
}		

5.2.3 Semantics

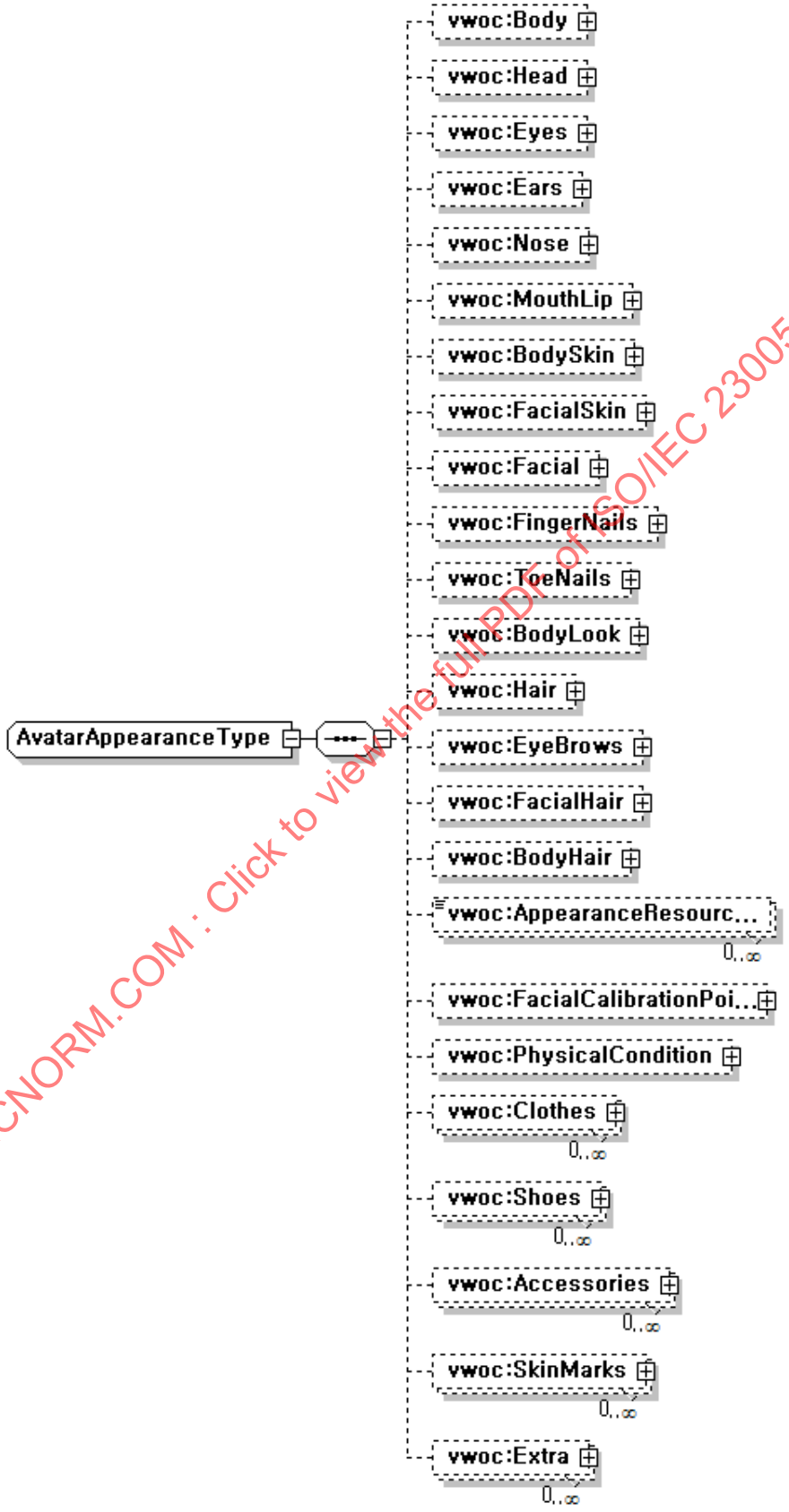
Name	Description
AvatarType	A type that represents the user inside the virtual world environment.
AvatarBase	Contains the base type defined by AvatarBaseType.
AppearanceFlag	This field, which is only present in the binary representation, signals the presence of the Appearance elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
AnimationFlag	This field, which is only present in the binary representation, signals the presence of the Animation elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
CommunicationSkillsFlag	This field, which is only present in the binary representation, signals the presence of the CommunicationSkills elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
PersonalityFlag	This field, which is only present in the binary representation, signals the presence of the Personality elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
ControlFeaturesFlag	This field, which is only present in the binary representation, signals the presence of the ControlFeatures elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
HapticPropertyListFlag	This field, which is only present in the binary representation, signals the presence of the HapticPropertyList elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
genderFlag	This field, which is only present in the binary representation, signals the presence of the gender attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used.
LoopAvatarAppearance	This field, which is only present in the binary representation, specifies the number of appearance information contained in the avatar characteristics.
Appearance	Contains the high level description of the appearance of an avatar.
LoopAvatarAnimation	This field, which is only present in the binary representation, specifies the number of animation information contained in the avatar characteristics.
Animation	Contains the description of a set of animation sequences that the avatar is able to perform.
LoopAvatarCommunicationSkills	This field, which is only present in the binary representation, specifies the number of communication skills information contained in the avatar characteristics.

Name	Description
CommunicationSkills	Contains a set of descriptors providing information on the different modalities an avatar is able to communicate.
LoopAvatarPersonality	This field, which is only present in the binary representation, specifies the number of personality information contained in the avatar characteristics.
Personality	Contains a set of descriptors defining the personality of the avatar.
LoopAvatarControlFeatures	This field, which is only present in the binary representation, specifies the number of feature control information contained in the avatar characteristics.
ControlFeatures	Contains a set of descriptors defining possible place-holders for sensors on body skeleton and face feature points.
HapticPropertyListFlag	This field, which is only present in the binary representation, signals the presence of the HapticPropertyList. "1" means that the element shall be used. "0" means that the element shall not be used.
HapticPropertyList	Contains a list of high level descriptors of the haptic properties.
genderFlag	This field, which is only present in the binary representation, signals the presence of the gender attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used.
gender	Describes the gender of the avatar.

5.3 AvatarAppearanceType

5.3.1 XML representation syntax

Diagram



Source

```
<complexType name="AvatarAppearanceType">
	<sequence>
		<element name="Body" type="vwoc:BodyType" minOccurs="0"/>
		<element name="Head" type="vwoc:HeadType" minOccurs="0"/>
		<element name="Eyes" type="vwoc:EyesType" minOccurs="0"/>
		<element name="Ears" type="vwoc:EarsType" minOccurs="0"/>
		<element name="Nose" type="vwoc:NoseType" minOccurs="0"/>
		<element name="MouthLip" type="vwoc:MouthLipType" minOccurs="0"/>
		<element name="BodySkin" type="vwoc:SkinType" minOccurs="0"/>
		<element name="FacialSkin" type="vwoc:SkinType" minOccurs="0"/>
		<element name="Facial" type="vwoc:FacialType" minOccurs="0"/>
		<element name="FingerNails" type="vwoc:NailType" minOccurs="0"/>
		<element name="ToeNails" type="vwoc:NailType" minOccurs="0"/>
		<element name="BodyLook" type="vwoc:BodyLookType" minOccurs="0"/>
		<element name="Hair" type="vwoc:HairType" minOccurs="0"/>
		<element name="EyeBrows" type="vwoc:EyebrowsType" minOccurs="0"/>
		<element name="FacialHair" type="vwoc:FacialHairType" minOccurs="0"/>
		<element name="BodyHair" type="vwoc:BodyHairType" minOccurs="0"/>
		<element name="AppearanceResources" type="anyURI" minOccurs="0" maxOccurs="unbounded"/>
		<element name="FacialCalibrationPoints" type="vwoc:FacialCalibrationPointsType" minOccurs="0"/>
		<element name="PhysicalCondition" type="vwoc:PhysicalConditionType" minOccurs="0"/>
		<element name="Clothes" type="vwoc:VirtualObjectType" minOccurs="0" maxOccurs="unbounded"/>
		<element name="Shoes" type="vwoc:VirtualObjectType" minOccurs="0" maxOccurs="unbounded"/>
		<element name="Accessories" type="vwoc:VirtualObjectType" minOccurs="0"
maxOccurs="unbounded"/>
		<element name="SkinMarks " type="vwoc:VirtualObjectType" minOccurs="0"
maxOccurs="unbounded"/>
		<element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
	</sequence>
</complexType>

<complexType name="BodyType">
	<sequence>
		<element name="BodyHeight" type="float" minOccurs="0"/>
		<element name="BodyThickness" type="float" minOccurs="0"/>
		<element name="BodyFat" type="vwoc:measureUnitLMHType" minOccurs="0"/>
		<element name="TorsoMuscles" type="vwoc:measureUnitLMHType" minOccurs="0"/>
		<element name="NeckThikness" type="float" minOccurs="0"/>
		<element name="NeckLength" type="float" minOccurs="0"/>
		<element name="Shoulders" type="float" minOccurs="0"/>
		<element name="Pectorials" type="float" minOccurs="0"/>
		<element name="ArmLength" type="float" minOccurs="0"/>
		<element name="HeadSize" type="float" minOccurs="0"/>
		<element name="TorsoLength" type="float" minOccurs="0"/>
		<element name="LoveHandles" type="float" minOccurs="0"/>
		<element name="BellySize" type="float" minOccurs="0"/>
		<element name="LegMuscles" type="float" minOccurs="0"/>
		<element name="LegLength" type="float" minOccurs="0"/>
		<element name="HipWidth" type="float" minOccurs="0"/>
		<element name="HipLength" type="float" minOccurs="0"/>
		<element name="ButtSize" type="float" minOccurs="0"/>
		<element name="Package" type="vwoc:indicateOfSMBType" minOccurs="0"/>
		<element name="SaddleBags" type="vwoc:indicateOfSMBType" minOccurs="0"/>
		<element name="KneeAngle" type="vwoc:angleType" minOccurs="0"/>
		<element name="FootSize" type="float" minOccurs="0"/>
		<element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
	</sequence>
	<attribute name="hapticIDRef" type="IDREF" use="optional"/>
</complexType>

<complexType name="HeadType">
	<sequence>
		<element name="HeadSize" type="vwoc:measureUnitSMBType" minOccurs="0"/>
		<element name="HeadStretch" type="vwoc:unlimitedPercentageType" minOccurs="0"/>
		<element name="HeadShape" minOccurs="0">
```

```
                    <simpleType>
                        <restriction base="string">
                            <enumeration value="square"/>
                            <enumeration value="round"/>
                            <enumeration value="oval"/>
                            <enumeration value="long"/>
                        </restriction>
                    </simpleType>
                </element>
                <element name="EggHead" type="boolean" minOccurs="0"/>
                <element name="HeadLength" type="float" minOccurs="0"/>
                <element name="FaceShear" type="float" minOccurs="0"/>
                <element name="ForeheadSize" type="float" minOccurs="0"/>
                <element name="ForeheadAngle" type="vwoc:angleType" minOccurs="0"/>
                <element name="BrowSize" type="float" minOccurs="0"/>
                <element name="FaceSkin" minOccurs="0">
                    <simpleType>
                        <restriction base="string">
                            <enumeration value="dry"/>
                            <enumeration value="normal"/>
                            <enumeration value="greassy"/>
                        </restriction>
                    </simpleType>
                </element>
                <element name="Cheeks" type="vwoc:measureUnitSMBType" minOccurs="0"/>
                <element name="CheeksDepth" type="float" minOccurs="0"/>
                <element name="CheeksShape" minOccurs="0">
                    <simpleType>
                        <restriction base="string">
                            <enumeration value="chubby"/>
                            <enumeration value="high"/>
                            <enumeration value="bone"/>
                        </restriction>
                    </simpleType>
                </element>
                <element name="UpperCheeks" type="vwoc:measureUnitSMBType" minOccurs="0"/>
                <element name="LowerCheeks" type="vwoc:measureUnitSMBType" minOccurs="0"/>
                <element name="CheekBones" type="vwoc:indicateOfDMUType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
            </sequence>
            <attribute name="hapticIDRef" type="IDREF" use="optional"/>
        </complexType>

        <complexType name="EyesType">
            <sequence>
                <element name="EyeSize" type="float" minOccurs="0"/>
                <element name="EyeOpening" type="vwoc:unlimitedPercentageType" minOccurs="0"/>
                <element name="EyeSpacing" type="float" minOccurs="0"/>
                <element name="OuterEyeCorner" type="vwoc:indicateOfDMUType" minOccurs="0"/>
                <element name="InnerEyeCorner" type="vwoc:indicateOfDMUType" minOccurs="0"/>
                <element name="EyeDepth" type="float" minOccurs="0"/>
                <element name="UpperEyelidFold" type="float" minOccurs="0"/>
                <element name="EyeBags" type="float" minOccurs="0"/>
                <element name="PuffyEyeLids" type="vwoc:indicateOfSMBType" minOccurs="0"/>
                <element name="EyelashLength" type="float" minOccurs="0"/>
                <element name="EyePop" type="float" minOccurs="0"/>
                <element name="EyeColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="EyeLightness" type="vwoc:percentageType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
            </sequence>
            <attribute name="hapticIDRef" type="IDREF" use="optional"/>
        </complexType>

        <complexType name="EarsType">
            <sequence>
```

```
            <element name="EarSize" type="float" minOccurs="0"/>
            <element name="EarPosition" type="vwoc:indicateOfDMUType" minOccurs="0"/>
            <element name="EarAngle" minOccurs="0">
                <simpleType>
                    <restriction base="vwoc:angleType">
                        <maxInclusive value="180"/>
                    </restriction>
                </simpleType>
            </element>
            <element name="AttachedEarlobes" type="float" minOccurs="0"/>
            <element name="EarTips" type="vwoc:indicateOfPMNType" minOccurs="0"/>
            <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
        <attribute name="hapticIDRef" type="IDREF" use="optional"/>
</complexType>

<complexType name="NoseType">
        <sequence>
            <element name="NoseSize" type="float" minOccurs="0"/>
            <element name="NoseWidth" type="float" minOccurs="0"/>
            <element name="NostrillWidth" type="float" minOccurs="0"/>
            <element name="NostrillDivision" type="float" minOccurs="0"/>
            <element name="NoseThickness" type="float" minOccurs="0"/>
            <element name="UpperBridge" type="float" minOccurs="0"/>
            <element name="LowerBridge" type="float" minOccurs="0"/>
            <element name="BridgeWidth" type="float" minOccurs="0"/>
            <element name="NoseTipAngle" type="vwoc:indicateOfDUType" minOccurs="0"/>
            <element name="NoseTipShape" minOccurs="0">
                <simpleType>
                    <restriction base="string">
                        <enumeration value="pointy"/>
                        <enumeration value="bulbous"/>
                    </restriction>
                </simpleType>
            </element>
            <element name="CrookedNose" type="vwoc:indicateOfLRType" minOccurs="0"/>
            <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
        <attribute name="hapticIDRef" type="IDREF" use="optional"/>
</complexType>

<complexType name="MouthLipType">
        <sequence>
            <element name="LipWidth" type="float" minOccurs="0"/>
            <element name="LipFullness" type="float" minOccurs="0"/>
            <element name="LipThickness" type="float" minOccurs="0"/>
            <element name="LipRatio" type="float" minOccurs="0"/>
            <element name="MouthSize" type="float" minOccurs="0"/>
            <element name="MouthPosition" type="float" minOccurs="0"/>
            <element name="MouthCorner" type="vwoc:indicateOfDMUType" minOccurs="0"/>
            <element name="LipCleftDepth" type="float" minOccurs="0"/>
            <element name="LipCleft" type="float" minOccurs="0"/>
            <element name="ShiftMouth" type="vwoc:indicateOfLMRType" minOccurs="0"/>
            <element name="ChinAngle" minOccurs="0">
                <simpleType>
                    <restriction base="string">
                        <enumeration value="inner"/>
                        <enumeration value="outer"/>
                    </restriction>
                </simpleType>
            </element>
            <element name="JawShape" type="vwoc:indicateOfPMNType" minOccurs="0"/>
            <element name="ChinDepth" type="float" minOccurs="0"/>
            <element name="JawAngle" type="float" minOccurs="0"/>
            <element name="JawJut" minOccurs="0">
```

```
                    <simpleType>
                        <restriction base="string">
                            <enumeration value="inside"/>
                            <enumeration value="outside"/>
                        </restriction>
                    </simpleType>
                </element>
                <element name="Jowls" type="float" minOccurs="0"/>
                <element name="ChinCleft" type="vwoc:indicateOfRCType" minOccurs="0"/>
                <element name="UpperChinCleft" type="vwoc:indicateOfRCType" minOccurs="0"/>
                <element name="ChinNeck" type="float" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
            </sequence>
            <attribute name="hapticIDRef" type="IDREF" use="optional"/>
        </complexType>

        <complexType name="SkinType">
            <sequence>
                <element name="SkinPigment" type="mpegvct:colorType" minOccurs="0"/>
                <element name="SkinRuddiness" type="vwoc:percentageType" minOccurs="0"/>
                <element name="SkinRainbowColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
            </sequence>
            <attribute name="hapticIDRef" type="IDREF" use="optional"/>
        </complexType>

        <complexType name="FacialType">
            <sequence>
                <element name="FacialDefinition" type="vwoc:levelOf5Type" minOccurs="0"/>
                <element name="Freckles" type="vwoc:levelOf5Type" minOccurs="0"/>
                <element name="Wrinkles" type="boolean" minOccurs="0"/>
                <element name="RosyComplexion" type="boolean" minOccurs="0"/>
                <element name="LipPinkness" type="vwoc:levelOf5Type" minOccurs="0"/>
                <element name="Lipstick" type="boolean" minOccurs="0"/>
                <element name="LipstickColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="LipGloss" type="vwoc:levelOf5Type" minOccurs="0"/>
                <element name="Blush" type="boolean" minOccurs="0"/>
                <element name="BlushColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="BlushOpacity" type="vwoc:percentageType" minOccurs="0"/>
                <element name="InnerShadow" type="boolean" minOccurs="0"/>
                <element name="InnerShadowColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="InnerShadowOpacity" type="vwoc:percentageType" minOccurs="0"/>
                <element name="OuterShadow" type="boolean" minOccurs="0"/>
                <element name="OuterShadowOpacity" type="vwoc:percentageType" minOccurs="0"/>
                <element name="EyeLiner" type="boolean" minOccurs="0"/>
                <element name="EyeLinerColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
            </sequence>
            <attribute name="hapticIDRef" type="IDREF" use="optional"/>
        </complexType>

        <complexType name="NailType">
            <sequence>
                <element name="NailPolish" type="boolean" minOccurs="0"/>
                <element name="NailPolishColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
            </sequence>
            <attribute name="hapticIDRef" type="IDREF" use="optional"/>
        </complexType>

        <complexType name="BodyLookType">
            <sequence>
                <element name="BodyDefinition" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="BodyFreckles" type="vwoc:levelOf5Type" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
```

```
        </sequence>
</complexType>

<complexType name="HairType">
        <sequence>
                <element name="HairSize" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="HairStyle" type="mpeg7:termReferenceType" minOccurs="0"/>
                <element name="HairColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="WhiteHair" type="vwoc:percentageType" minOccurs="0"/>
                <element name="RainbowColor" type="mpegvct:colorType" minOccurs="0"/>
                <element name="BlondeHair" type="vwoc:percentageType" minOccurs="0"/>
                <element name="RedHair" type="vwoc:percentageType" minOccurs="0"/>
                <element name="HairVolume" type="vwoc:indicateOfSMBType" minOccurs="0"/>
                <element name="HairFront" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="HairSides" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="HairBack" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="BigHairFront" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="BigHairTop" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="BigHairBack" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="FrontFrindge" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="SideFrindge" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="BackFrindge" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="FullHairSides" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="HairSweep" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="ShearFront" type="vwoc:indicateOfLMRType" minOccurs="0"/>
                <element name="ShearBack" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="TuperFront" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="TuperBack" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="RumpledHair" minOccurs="0">
                        <simpleType>
                                <restriction base="string">
                                        <enumeration value="low"/>
                                        <enumeration value="moderate"/>
                                        <enumeration value="high"/>
                                </restriction>
                        </simpleType>
                </element>
                <element name="PigTails" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="PonyTail" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="SprikedHair" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="HairTilt" type="float" minOccurs="0"/>
                <element name="HairMiddlePart" type="vwoc:indicateOfLHType" minOccurs="0"/>
                <element name="HairRightPart" type="vwoc:indicateOfLHType" minOccurs="0"/>
                <element name="HairLeftPart" type="vwoc:indicateOfLHType" minOccurs="0"/>
                <element name="HairPartsBangs" type="vwoc:indicateOfLHType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
        <attribute name="hapticIDRef" type="IDREF" use="optional"/>
</complexType>

<complexType name="EyebrowsType">
        <sequence>
                <element name="EyebrowSize" type="vwoc:indicateOfSMLType" minOccurs="0"/>
                <element name="EyebrowDensity" minOccurs="0">
                        <simpleType>
                                <restriction base="string">
                                        <enumeration value="low"/>
                                        <enumeration value="moderate"/>
                                        <enumeration value="high"/>
                                </restriction>
                        </simpleType>
                </element>
                <element name="EyebrowHeight" type="vwoc:measureUnitLMHType" minOccurs="0"/>
                <element name="EyebrowArc" minOccurs="0">
                        <simpleType>
```

```
                        <restriction base="string">
                            <enumeration value="flat"/>
                            <enumeration value="middle"/>
                            <enumeration value="arched"/>
                        </restriction>
                    </simpleType>
                </element>
                <element name="EyebrowPoints" type="vwoc:indicateOfDMUType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
        <attribute name="hapticIDRef" type="IDREF" use="optional"/>
</complexType>

<complexType name="FacialHairType">
        <sequence>
                <element name="FacialHairThickness" type="vwoc:measureUnitLMHType" minOccurs="0"/>
                <element name="FacialSideburns" type="mpegvct:colorType" minOccurs="0"/>
                <element name="FacialMustache" type="boolean" minOccurs="0"/>
                <element name="FacialChinCurtains" type="boolean" minOccurs="0"/>
                <element name="FacialsoulPatch" type="boolean" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
        <attribute name="hapticIDRef" type="IDREF" use="optional"/>
</complexType>

<complexType name="BodyHairType">
     <sequence>
       <element name="HairColor" type="mpegvct:colorType" minOccurs="0"/>
       <element name="HairThickness" type="vwoc:measureUnitLMHType" minOccurs="0"/>
       <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
     </sequence>
</complexType>

<complexType name="FacialCalibrationPointsType">
        <sequence>
                <element name="Sellion" type="vwoc:PointType" minOccurs="0"/>
                <element name="RInfraorbitale" type="vwoc:PointType" minOccurs="0"/>
                <element name="LInfraorbitale" type="vwoc:PointType" minOccurs="0"/>
                <element name="Supramenton" type="vwoc:PointType" minOccurs="0"/>
                <element name="RTragion" type="vwoc:PointType" minOccurs="0"/>
                <element name="RGonion" type="vwoc:PointType" minOccurs="0"/>
                <element name="LTragion" type="vwoc:PointType" minOccurs="0"/>
                <element name="LGonion" type="vwoc:PointType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
</complexType>

<complexType name="PhysicalConditionType">
        <sequence>
                <element name="BodyStrength" type="vwoc:unlimitedPercentageType" minOccurs="0"/>
                <element name="BodyFlexibility" type="vwoc:indicateOfLMHType" minOccurs="0"/>
                <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
</complexType>
```

5.3.2 Binary representation syntax

AvatarAppearanceType{	Number of bits	Mnemonic
BodyFlag	1	bslbf
HeadFlag	1	bslbf
EyesFlag	1	bslbf
EarsFlag	1	bslbf
NoseFlag	1	bslbf
MouthLipFlag	1	bslbf
BodySkinFlag	1	bslbf
FacialSkinFlag	1	bslbf
FacialFlag	1	bslbf
FingerNailsFlag	1	bslbf
ToeNailsFlag	1	bslbf
BodyLookFlag	1	bslbf
HairFlag	1	bslbf
EyeBrowsFlag	1	bslbf
FacialHairFlag	1	bslbf
BodyHairFlag	1	bslbf
AppearanceResourcesFlag	1	bslbf
FacialCalibrationPointsFlag	1	bslbf
PhysicalConditionFlag	1	bslbf
ClothesFlag	1	bslbf
ShoesFlag	1	bslbf
AccessoriesFlag	1	bslbf
SkinMarksFlag	1	bslbf
ExtraFlag	1	bslbf
if(BodyFlag){		

Body		BodyType
}		
if(HeadFlag){		
Head		HeadType
}		
if(EyesFlag){		
Eyes		EyesType
}		
if(EarsFlag){		
Ears		EarsType
}		
if(NoseFlag){		
Nose		NoseType
}		
if(MouthLipFlag){		
MouthLip		MouthLipType
}		
if(BodySkinFlag){		
BodySkin		SkinType
}		
if(FacialSkinFlag){		
FacialSkin		SkinType
}		
if(FacialFlag){		
Facial		FacialType
}		
if(FingerNailsFlag){		

FingerNails		NailType
}		
if(ToeNailsFlag){		
ToeNails		NailType
}		
if(BodyLookFlag){		
BodyLook		BodyLookType
}		
if(HairFlag){		
Hair		HairType
}		
if(EyeBrowsFlag){		
EyeBrows		EyeBrowsType
}		
if(FacialHairFlag){		
FacialHair		FacialHairType
}		
if(BodyHairFlag){		
BodyHair		BodyHairType
}		
if(AppearanceResourcesFlag){		
NumAppearanceResources		vluimsbf5
for(k=0; k< NumAppearanceResources; k++){		
AppearanceResources[k]	See ISO/IEC 10646[8]	UTF-8
}		
}		

if(FacialCalibrationPointsFlag){		
FacialCalibrationPoints		FacialCalibrationPointsType
}		
if(PhysicalConditionFlag){		
PhysicalCondition		PhysicalConditionType
}		
if(ClothesFlag){		
NumClothes		vluimsbf5
for(k=0; k< NumClothes; k++){		
Clothes[k]		VirtualObjectType
}		
}		
if(ShoesFlag){		
NumShoes		vluimsbf5
for(k=0; k< NumShoes; k++){		
Shoes[k]		VirtualObjectType
}		
}		
if(AccessoriesFlag){		
NumAccessories		vluimsbf5
for(k=0; k< NumAccessories; k++){		
Accessories[k]		VirtualObjectType
}		
}		
if(SkinMarksFlag){		
NumSkinMarks		vluimsbf5

for(k=0; k< NumSkinMarks; k++){		
SkinMarks[k]		VirtualObjectType
}		
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
}		

BodyType{	**Number of bits**	**Mnemonic**
BodyHeightFlag	1	bslbf
BodyThicknessFlag	1	bslbf
BodyFatFlag	1	bslbf
TorsoMusclesFlag	1	bslbf
NeckThiknessFlag	1	bslbf
NeckLengthFlag	1	bslbf
ShouldersFlag	1	bslbf
PectorialsFlag	1	bslbf
ArmLengthFlag	1	bslbf
HeadSizeFlag	1	bslbf
TorsoLengthFlag	1	bslbf
LoveHandlesFlag	1	bslbf
BellySizeFlag	1	bslbf
LegMusclesFlag	1	bslbf

LegLengthFlag	1	bslbf
HipWidthFlag	1	bslbf
HipLengthFlag	1	bslbf
ButtSizeFlag	1	bslbf
PackageFlag	1	bslbf
SaddleBagsFlag	1	bslbf
KneeAngleFlag	1	bslbf
FootSizeFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(BodyHeightFlag) {		
BodyHeight	32	fsbf
}		
if(BodyThicknessFlag) {		
BodyThickness	32	fsbf
}		
if(BodyHeightFlag) {		
BodyFat		measureUnitLMHType
}		
if(TorsoMusclesFlag) {		
TorsoMuscles		measureUnitLMHType
}		
if(NeckThicknessFlag) {		
NeckThickness	32	fsbf
}		
if(NeckLengthFlag) {		

NeckLengthness	32	fsbf
}		
if(ShouldersFlag) {		
Shoulders	32	fsbf
}		
if(PectorialsFlag) {		
Pectorials	32	fsbf
}		
if(ArmLengthFlag) {		
ArmLength	32	fsbf
}		
if(HeadSizeFlag) {		
HeadSize	32	fsbf
}		
if(TorsoLengthFlag) {		
TorsoLength	32	fsbf
}		
if(LoveHandlesFlag) {		
LoveHandles	32	fsbf
}		
if(BellySizeFlag) {		
BellySize	32	fsbf
}		
if(LegMusclesFlag) {		
LegMuscles	32	fsbf
}		
if(LegLengthFlag) {		

LegLength	32	fsbf
}		
if(HipWidthFlag) {		
HipWidth	32	fsbf
}		
if(HipLengthFlag) {		
HipLength	32	fsbf
}		
if(ButtSizeFlag) {		
ButtSize	32	fsbf
}		
if(PackageFlag) {		
Package		indicateOfSMBType
}		
if(SaddleBagsFlag) {		
SaddleBags		indicateOfSMBType
}		
if(KneeAngleFlag) {		
KneeAngle		angleType
}		
if(FootSizeFlag) {		
FootSize	32	fsbf
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType

}		
}		
if(hapticIDRefFlag) {		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		
HeadType{	**Number of bits**	**Mnemonic**
HeadSizeFlag	1	bslbf
HeadStrechFlag	1	bslbf
HeadShapeFlag	1	bslbf
EggHeadFlag	1	bslbf
HeadLengthFlag	1	bslbf
FaceShearFlag	1	bslbf
ForeheadSizeFlag	1	bslbf
ForeheadAngleFlag	1	bslbf
BrowSizeFlag	1	bslbf
FaceSkinFlag	1	bslbf
CheeksFlag	1	bslbf
CheeksDepthFlag	1	bslbf
CheeksShapeFlag	1	bslbf
UpperCheeksFlag	1	bslbf
LowerCheeksFlag	1	bslbf
CheekBonesFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf

if(HeadSizeFlag){		
HeadSize		measureUnitSMBType
}		
if(HeadStrechFlag){		
HeadStrech	32	unlimitedPercentageType
}		
if(HeadShapeFlag){		
HeadShape	2	bslbf
}		
if(EggHeadFlag){		
EggHead	1	bslbf
}		
if(HeadLengthFlag){		
HeadLength	32	fsbf
}		
if(FaceShearFlag){		
FaceShear	32	fsbf
}		
if(ForeheadSizeFlag){		
ForeheadSize	32	fsbf
}		
if(ForeheadAngleFlag){		
ForeheadAngle		angleType
}		
if(BrowSizeFlag){		
BrowSize	32	fsbf

}		
if(FaceSkinFlag){		
FaceSkin	2	bslbf
}		
if(CheeksFlag){		
Cheeks		measureUnitSMBType
}		
if(CheeksDepthFlag){		
CheeksDepth	32	fsbf
}		
if(CheeksShapeFlag){		
CheeksShape	2	bslbf
}		
if(UpperCheeksFlag){		
UpperCheeks		measureUnitSMBType
}		
if(LowerCheeksFlag){		
LowerCheeks		measureUnitSMBType
}		
if(CheekBonesFlag){		
CheekBones		indicateOfDMUType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		

Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		
EyesType{	**Number of bits**	**Mnemonic**
EyeSizeFlag	1	bslbf
EyeOpeningFlag	1	bslbf
EyeSpacingFlag	1	bslbf
OuterEyeCornerFlag	1	bslbf
InnerEyeCornerFlag	1	bslbf
EyeDepthFlag	1	bslbf
UpperEyelidFoldFlag	1	bslbf
EyeBagsFlag	1	bslbf
PuffyEyeLidsFlag	1	bslbf
EyelashLengthFlag	1	bslbf
EyePopFlag	1	bslbf
EyeColorFlag	1	bslbf
EyeLightnessFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(EyeSizeFlag){		
EyeSize	32	fsbf

}		
if(EyeOpeningFlag){		
EyeOpening		unlimitedPercentageType
}		
if(EyeSpacingFlag){		
EyeSpacing	32	fsbf
}		
if(OuterEyeCornerFlag){		
OuterEyeCorner		indicateOfDMUType
}		
if(InnerEyeCornerFlag){		
InnerEyeCorner		indicateOfDMUType
}		
if(EyeDepthFlag){		
EyeDepth	32	fsbf
}		
if(UpperEyelidFoldFlag){		
UpperEyelidFold	32	fsbf
}		
if(EyeBagsFlag){		
EyeBags	32	fsbf
}		
if(PuffyEyeLidsFlag){		
PuffyEyeLids		indicateOfSMBType
}		
if(EyelashLengthFlag){		

EyelashLength	32	fsbf
}		
if(EyePopFlag){		
EyePop	32	fsbf
}		
if(EyeColorFlag){		
EyeColor		colorType
}		
if(EyeLightnessFlag){		
EyeLightness		percentageType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		

EarsType{	Number of bits	Mnemonic
EarSizeFlag	1	bslbf
EarPositionFlag	1	bslbf
EarAngleFlag	1	bslbf
AttachedEarlobesFlag	1	bslbf
EarTipsFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(EyeSizeFlag){		
EarSize	32	fsbf
}		
if(EarPositionFlag){		
EarPosition		indicateOfDMUType
}		
if(EarAngleFlag){		
EarAngle		angleType
}		
if(AttachedEarlobesFlag){		
AttachedEarlobes	32	fsbf
}		
if(EarTipsFlag){		
EarTips		indicateOfPMNType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType

}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		
NoseType{	**Number of bits**	**Mnemonic**
NoseSizeFlag	1	bslbf
NoseWidthFlag	1	bslbf
NostrillWidthFlag	1	bslbf
NostrillDivisionFlag	1	bslbf
NoseThicknessFlag	1	bslbf
UpperBridgeFlag	1	bslbf
LowerBridgeFlag	1	bslbf
BridgeWidthFlag	1	bslbf
NoseTipAngleFlag	1	bslbf
NoseTipShapeFlag	1	bslbf
CrookedNoseFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(NoseSizeFlag){		
NoseSize	32	fsbf
}		
if(NoseWidthFlag){		
NoseWidth	32	fsbf

}		
if(NostrillWidthFlag){		
NostrillWidth	32	fsbf
}		
if(NostrillDivisionFlag){		
NostrillDivision	32	fsbf
}		
if(NoseThicknessFlag){		
NoseThickness	32	fsbf
}		
if(UpperBridgeFlag){		
UpperBridge	32	fsbf
}		
if(LowerBridgeFlag){		
LowerBridge	32	fsbf
}		
if(BridgeWidthFlag){		
BridgeWidth	32	fsbf
}		
if(NoseTipAngleFlag){		
NoseTipAngle		indicateOfDUType
}		
if(NoseTipShapeFlag){		
NoseTipShape	1	bslbf
}		
if(CrookedNoseFlag){		
CrookedNose		indicateOfLRType

}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		
MouthLipType{	**Number of bits**	**Mnemonic**
LipWidthFlag	1	bslbf
LipFullnessFlag	1	bslbf
LipThicknessFlag	1	bslbf
LipRatioFlag	1	bslbf
MouthSizeFlag	1	bslbf
MouthPositionFlag	1	bslbf
MouthCornerFlag	1	bslbf
LipCleftDepthFlag	1	bslbf
LipCleftFlag	1	bslbf
ShiftMouthFlag	1	bslbf
ChinAngleFlag	1	bslbf
JawShapeFlag	1	bslbf
ChinDepthFlag	1	bslbf

JawAngleFlag	1	bslbf
JawJutFlag	1	bslbf
JowlsFlag	1	bslbf
ChinCleftFlag	1	bslbf
UpperChinCleftFlag	1	bslbf
ChinNeckFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(LipWidthFlag){		
LipWidth	32	fsbf
}		
if(LipFullnessFlag){		
LipFullness	32	fsbf
}		
if(LipThicknessFlag){		
LipThickness	32	fsbf
}		
if(LipRatioFlag){		
LipRatio	32	fsbf
}		
if(MouthSizeFlag){		
MouthSize	32	fsbf
}		
if(MouthPositionFlag){		
MouthPosition	32	fsbf
}		
if(MouthCornerFlag){		

MouthCorner		indicateOfDMUType
}		
if(LipCleftDepthFlag){		
LipCleftDepth	32	fsbf
}		
if(LipCleftFlag){		
LipCleft	32	fsbf
}		
if(ShiftMouthFlag){		
ShiftMouth		indicateOfLMRType
}		
if(ChinAngleFlag){		
ChinAngle	1	bslbf
}		
if(JawShapeFlag){		
JawShape		indicateOfPMNType
}		
if(ChinDepthFlag){		
ChinDepth	32	fsbf
}		
if(JawAngleFlag){		
JawAngle	32	fsbf
}		
if(JawJutFlag){		
JawJut	1	bslbf
}		
if(JowlsFlag){		

Jowls	32	fsbf
}		
if(ChinCleftFlag){		
ChinCleft		indicateOfRCType
}		
if(UpperChinCleftFlag){		
UpperChinCleft		indicateOfRCType
}		
if(ChinNeckFlag){		
ChinNeck	32	fsbf
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		

SkinType{	Number of bits	Mnemonic
SkinPigmentFlag	1	bslbf
SkinRuddinessFlag	1	bslbf
SkinRainbowColorFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(SkinPigmentFlag){		
SkinPigment		colorType
}		
if(SkinRuddinessFlag){		
SkinRuddiness		percentageType
}		
if(SkinRainbowColorFlag){		
SkinRainbowColor		colorType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		

FacialType{	Number of bits	Mnemonic
FacialDefinitionFlag	1	bslbf
FrecklesFlag	1	bslbf
WrinklesFlag	1	bslbf
RosyComplexionFlag	1	bslbf
LipPinknessFlag	1	bslbf
LipstickFlag	1	bslbf
LipstickColorFlag	1	bslbf
LipGlossFlag	1	bslbf
BlushFlag	1	bslbf
BlushColorFlag	1	bslbf
BlushOpacityFlag	1	bslbf
InnerShadowFlag	1	bslbf
InnerShadowColorFlag	1	bslbf
InnerShadowOppacityFlag	1	bslbf
OuterShadowFlag	1	bslbf
OuterShadowOppacityFlag	1	bslbf
EyeLinerFlag	1	bslbf
EyeLinerColorFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(FacialDefinitionFlag){		
FacialDefinition		levelOf5Type
}		
if(FrecklesFlag){		
Freckles		levelOf5Type
}		

if(WrinklesFlag){		
Wrinkles	1	bslbf
}		
if(RosyComplexionFlag){		
RosyComplexion	1	bslbf
}		
if(LipPinknessFlag){		
LipPinkness		levelOf5Type
}		
if(LipstickFlag){		
Lipstick	1	bslbf
}		
if(LipstickColorFlag){		
LipstickColor		colorType
}		
if(LipGlossFlag){		
LipGloss		levelOf5Type
}		
if(BlushFlag){		
Blush	1	bslbf
}		
if(BlushColorFlag){		
BlushColor		colorType
}		
if(BlushOpacityFlag){		
BlushOpacity		percentageType
}		

if(InnerShadowFlag){		
InnerShadow	1	bslbf
}		
if(InnerShadowColorFlag){		
InnerShadowColor		colorType
}		
if(InnerShadowOppacityFlag){		
InnerShadowOppacity		percentageType
}		
if(OuterShadowFlag){		
OuterShadow	1	bslbf
}		
if(OuterShadowOppacityFlag){		
OuterShadowOppacity		percentageType
}		
if(EyeLinerFlag){		
EyeLiner	1	bslbf
}		
if(EyeLinerColorFlag){		
EyeLinerColor		colorType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		

if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		
NailType{	**Number of bits**	**Mnemonic**
NailPolishFlag	1	bslbf
NailPolishColorFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(NailPolishFlag){		
NailPolish	1	bslbf
}		
if(NailPolishColorFlag){		
NailPolishColor		colorType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		

BodyLookType{	**Number of bits**	**Mnemonic**
BodyDefinitionFlag	1	bslbf
BodyFrecklesFlag	1	bslbf
ExtraFlag	1	bslbf
if(BodyDefinitionFlag){		
BodyDefinition		indicateOfSMLType
}		
if(BodyFrecklesFlag){		
BodyFreckles		levelOf5Type
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
}		
HairType{	**Number of bits**	**Mnemonic**
HairSizeFlag	1	bslbf
HairStyleFlag	1	bslbf
HairColorFlag	1	bslbf
WhiteHairFlag	1	bslbf
RainbowColorFlag	1	bslbf
BlondeHairFlag	1	bslbf
RedHairFlag	1	bslbf

HairVolumeFlag	1	bslbf
HairFrontFlag	1	bslbf
HairSidesFlag	1	bslbf
HairBackFlag	1	bslbf
BigHairFrontFlag	1	bslbf
BigHairTopFlag	1	bslbf
BigHairBackFlag	1	bslbf
FrontFringeFlag	1	bslbf
SideFringeFlag	1	bslbf
BackFringeFlag	1	bslbf
FullHairSidesFlag	1	bslbf
HairSweepFlag	1	bslbf
ShearFrontFlag	1	bslbf
ShearBackFlag	1	bslbf
TuperFrontFlag	1	bslbf
TuperBackFlag	1	bslbf
RumpledhairFlag	1	bslbf
PigtailsFlag	1	bslbf
PonytailFlag	1	bslbf
SpikedHairFlag	1	bslbf
HairTiltFlag	1	bslbf
HairMiddlePartFlag	1	bslbf
HairRightPartFlag	1	bslbf
HairLeftPartFlag	1	bslbf
HairPartBangsFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf

if(HairSizeFlag){		
HairSize		indicateOfSMLType
}		
if(HairStyleFlag){		
HairStyle		bslbf
}		
if(HairColorFlag){		
HairColor		colorType
}		
if(WhiteHairFlag){		
WhiteHair		percentageType
}		
if(RainbowColorFlag){		
RainbowColor		colorType
}		
if(BlondeHairFlag){		
BlondeHair		percentageType
}		
if(RedHairFlag){		
RedHair		percentageType
}		
if(HairVolumeFlag){		
HairVolume		indicateOfSMBType
}		
if(HairFrontFlag){		
HairFront		indicateOfSMLType
}		

if(HairSidesFlag){		
HairSides		indicateOfSMLType
}		
if(HairBackFlag){		
HairBack		indicateOfSMLType
}		
if(BigHairFrontFlag){		
BigHairFront		indicateOfSMLType
}		
if(BigHairTopFlag){		
BigHairTop		indicateOfSMLType
}		
if(BigHairBackFlag){		
BigHairBack		indicateOfSMLType
}		
if(FrontFringeFlag){		
FrontFringe		indicateOfSMLType
}		
if(SideFringeFlag){		
SideFringe		indicateOfSMLType
}		
if(BackFringeFlag){		
BackFringe		indicateOfSMLType
}		
if(FullHairSidesFlag){		
FullHairSides		indicateOfSMLType
}		

if(HairSweepFlag){		
HairSweep		indicateOfSMLType
}		
if(ShearFrontFlag){		
ShearFront		indicateOfLMRType
}		
if(ShearBackFlag){		
ShearBack		indicateOfSMLType
}		
if(TuperFrontFlag){		
TuperFront		indicateOfSMLType
}		
if(TuperBackFlag){		
TuperBack		indicateOfSMLType
}		
if(RumpledhairFlag){		
Rumpledhair	2	bslbf
}		
if(PigtailsFlag){		
Pigtails		indicateOfSMLType
}		
if(PonytailFlag){		
Ponytail		indicateOfSMLType
}		
if(SpikedHairFlag){		
SpikedHair		indicateOfSMLType
}		

if(HairTiltFlag){		
HairTilt	32	fsbf
}		
if(HairMiddlePartFlag){		
HairMiddlePart		indicateOfLHType
}		
if(HairRightPartFlag){		
HairRightPart		indicateOfLHType
}		
if(HairLeftPartFlag){		
HairLeftPart		indicateOfLHType
}		
if(HairPartBangsFlag){		
HairPartBangs		indicateOfLHType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		

EyebrowsType{	Number of bits	Mnemonic
EyebrowSizeFlag	1	bslbf
EyebrowDensityFlag	1	bslbf
EyebrowHeightFlag	1	bslbf
EyebrowArcFlag	1	bslbf
EyebrowPointsFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(EyebrowSizeFlag){		
EyebrowSize		indicateOfSMLType
}		
if(EyebrowDensityFlag){		
EyebrowDensity	2	bslbf
}		
if(EyebrowHeightFlag){		
EyebrowHeight		measureUnitLMHType
}		
if(EyebrowArcFlag){		
EyebrowArc	2	bslbf
}		
if(EyebrowPointsFlag){		
EyebrowPoints		indicateOfDMUType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		

Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		
FacialHairType{	**Number of bits**	**Mnemonic**
FacialHairThicknessFlag	1	bslbf
FacialSideburnsFlag	1	bslbf
FacialMustacheFlag	1	bslbf
FacialChinCurtainsFlag	1	bslbf
FacialSoulPatchFlag	1	bslbf
ExtraFlag	1	bslbf
hapticIDRefFlag	1	bslbf
if(FacialHairThicknessFlag){		
FacialHairThickness		measureUnitLMHType
}		
if(FacialSideburnsFlag){		
FacialSideburns		colorType
}		
if(FacialMustacheFlag){		
FacialMustache	1	bslbf
}		
if(FacialChinCurtainsFlag){		

FacialChinCurtains	1	Bslbf
}		
if(FacialSoulPatchFlag){		
FacialSoulPatch	1	bslbf
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
if(hapticIDRefFlag){		
hapticIDRef	See ISO/IEC 10646[8]	UTF-8
}		
}		
BodyHairType {	**Number of bits**	**Mnemonic**
HairColorFlag	1	bslbf
HairThicknessFlag	1	bslbf
ExtraFlag	1	bslbf
if(HairColorFlag) {		
HairColor		colorType
}		
if(HairThicknessFlag) {		
HairThickness		measureUnitLMHType
}		

if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
}		
FacialCalibrationPointsType{	**Number of bits**	**Mnemonic**
SellionFlag	1	bslbf
RInfraorbitaleFlag	1	bslbf
LinfraorbitaleFlag	1	bslbf
SupramentonFlag	1	bslbf
RtragionFlag	1	bslbf
RgonionFlag	1	bslbf
LtragionFlag	1	bslbf
LgonionFlag	1	bslbf
ExtraFlag	1	bslbf
if(SellionFlag){		
Sellion		PointType
}		
if(RinfraorbitaleFlag){		
Rinfraorbitale		PointType
}		
if(LinfraorbitaleFlag){		
Linfraorbitale		PointType
}		

if(SupramentonFlag){		
Supramenton		PointType
}		
if(RtragionFlag){		
Rtragion		PointType
}		
if(RgonionFlag){		
Rgonion		PointType
}		
if(LtragionFlag){		
Ltragion		PointType
}		
if(LgonionFlag){		
Lgonion		PointType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
}		
PhysicalConditionType{	**Number of bits**	**Mnemonic**
BodyStrengthFlag	1	bslbf
BodyFlexibilityFlag	1	bslbf
ExtraFlag	1	bslbf

if(BodyStrengthFlag){		
BodyStrength		unlimitedPercentageType
}		
if(BodyFlexibilityFlag){		
BodyFlexibility		indicateOfLMHType
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
}		

5.3.3 Semantics

Name	Description
AvatarAppearanceType	A type that contains the high level description of the avatar appearance and may refer a media containing the exact geometry and texture.
BodyFlag	This field, which is only present in the binary representation, signals the presence of the Body element. "1" means that the element shall be used. "0" means that the element shall not be used.
HeadFlag	This field, which is only present in the binary representation, signals the presence of the Head element. "1" means that the element shall be used. "0" means that the element shall not be used.
EyesFlag	This field, which is only present in the binary representation, signals the presence of the Eyes element. "1" means that the element shall be used. "0" means that the element shall not be used.
EarsFlag	This field, which is only present in the binary representation, signals the presence of the Ears element. "1" means that the element shall be used. "0" means that the element shall not be used.
NoseFlag	This field, which is only present in the binary representation, signals the presence of the Nose element. "1" means that the element shall be used. "0" means that the element shall not be used.
MouthLipFlag	This field, which is only present in the binary representation, signals the presence of the Mouthlip element. "1" means that the element shall be used. "0" means that the element shall not be used.
BodySkinFlag	This field, which is only present in the binary representation, signals the presence of the BodySkin element. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description
FacialSkinFlag	This field, which is only present in the binary representation, signals the presence of the FacialSkin element. "1" means that the element shall be used. "0" means that the element shall not be used.
FacialFlag	This field, which is only present in the binary representation, signals the presence of the facial element. "1" means that the element shall be used. "0" means that the element shall not be used.
FingerNailsFlag	This field, which is only present in the binary representation, signals the presence of the FingerNails element. "1" means that the element shall be used. "0" means that the element shall not be used.
ToeNailsFlag	This field, which is only present in the binary representation, signals the presence of the ToeNails element. "1" means that the element shall be used. "0" means that the element shall not be used.
BodyLookFlag	This field, which is only present in the binary representation, signals the presence of the BodyLook element. "1" means that the element shall be used. "0" means that the element shall not be used.
HairFlag	This field, which is only present in the binary representation, signals the presence of the Hair element. "1" means that the element shall be used. "0" means that the element shall not be used.
EyeBrowsFlag	This field, which is only present in the binary representation, signals the presence of the Eyebrows element. "1" means that the element shall be used. "0" means that the element shall not be used.
FacialHairFlag	This field, which is only present in the binary representation, signals the presence of the FacialHair element. "1" means that the element shall be used. "0" means that the element shall not be used.
BodyHairFlag	This field, which is only present in the binary representation, signals the presence of the BodyHair element. "1" means that the element shall be used. "0" means that the element shall not be used.
AppearanceResourcesFlag	This field, which is only present in the binary representation, signals the presence of the AppearanceResource element. "1" means that the element shall be used. "0" means that the element shall not be used.
FacialCalibrationPointsFlag	This field, which is only present in the binary representation, signals the presence of the FacialCalibrationPoints element. "1" means that the element shall be used. "0" means that the element shall not be used.
PhysicalConditionFlag	This field, which is only present in the binary representation, signals the presence of the PhysicalCondition element. "1" means that the element shall be used. "0" means that the element shall not be used.
ClothesFlag	This field, which is only present in the binary representation, signals the presence of the clothes element. "1" means that the element shall be used. "0" means that the element shall not be used.
ShoesFlag	This field, which is only present in the binary representation, signals the presence of the shoes element. "1" means that the element shall be used. "0" means that the element shall not be used.
AccessoriesFlag	This field, which is only present in the binary representation, signals the presence of the accessories element. "1" means that the element shall be used. "0" means that the element shall not be used.
SkinMarksFlag	This field, which is only present in the binary representation, signals the presence of the SkinMarks element. "1" means that the element shall be used. "0" means that the element shall not be used.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the extra type element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>Body</td><td>Set of descriptions for body of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>BodyType</td><td>A type that describes avatar body.</td></tr>
<tr><td>BodyHeightFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BodyHeight element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BodyThicknessFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BodyThickness element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BodyFatFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BodyFat element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>TorsoMusclesFlag</td><td>This field, which is only present in the binary representation, signals the presence of the TorsoMuscles element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>NeckThiknessFlag</td><td>This field, which is only present in the binary representation, signals the presence of the NeckThikness element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>NeckLengthFlag</td><td>This field, which is only present in the binary representation, signals the presence of the NeckLength element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ShouldersFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Shoulders element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>PectorialsFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Pectorials element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ArmLengthFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ArmLength element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
</table></td></tr>
</table>

Name	Description	
	HeadSizeFlag	This field, which is only present in the binary representation, signals the presence of the HeadSize element. "1" means that the element shall be used. "0" means that the element shall not be used.
	TorsoLengthFlag	This field, which is only present in the binary representation, signals the presence of the TorsoLength element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LoveHandlesFlag	This field, which is only present in the binary representation, signals the presence of the LoveHandles element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BellySizeFlag	This field, which is only present in the binary representation, signals the presence of the BellySize element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LegMusclesFlag	This field, which is only present in the binary representation, signals the presence of the LegMuscles element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LegLengthFlag	This field, which is only present in the binary representation, signals the presence of the LegLength element. "1" means that the element shall be used. "0" means that the element shall not be used.
	HipWidthFlag	This field, which is only present in the binary representation, signals the presence of the HipWidth element. "1" means that the element shall be used. "0" means that the element shall not be used.
	HipLengthFlag	This field, which is only present in the binary representation, signals the presence of the HipLength element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ButtSizeFlag	This field, which is only present in the binary representation, signals the presence of the ButtSize element. "1" means that the element shall be used. "0" means that the element shall not be used.
	PackageFlag	This field, which is only present in the binary representation, signals the presence of the Package element. "1" means that the element shall be used. "0" means that the element shall not be used.
	SaddleBagsFlag	This field, which is only present in the binary representation, signals the presence of the SaddleBags element. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description	
	KneeAngleFlag	This field, which is only present in the binary representation, signals the presence of the KneeAngle element. "1" means that the element shall be used. "0" means that the element shall not be used.
	FootSizeFlag	This field, which is only present in the binary representation, signals the presence of the FootSize element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ExtraFlag	This field, which is only present in the binary representation, signals the presence of the ExtraType element. "1" means that the element shall be used. "0" means that the element shall not be used.
	hapticIDRefFlag	This field, which is only present in the binary representation, signals the presence of hapticIDRef of the body type element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BodyHeight	Full height of the character (always in metres)
	BodyThickness	This indicates the weight of the bounding box of the avatar (always in metres)
	BodyFat	This should be one of Low, Medium, High and indicates the fatness of the body
	TorsoMuscles	This should be one of Low, Medium, High and indicates the average muscularity of the avatar's body
	NeckThikness	The diameter of the neck (always in metres)
	NeckLength	The height of the neck (always in metres)
	Shoulders	The width of the shoulders (always in metres)
	Pectorials	The size of the pectoral muscles (always in metres)
	ArmLength	Length of complete arm (always in metres)
	HandSize	Size of the whole hand including fingers (always in metres)
	TorsoLength	The length of torso(between pectorals and legs) (always in metres)
	LoveHandles	Size of the love handles (always in metres)
	BellySize	Diameter of the belly (always in metres)
	LegMucles	Size of all leg muscles (always in metres)
	LegLength	Length of complete leg (always in metres)
	HipWidth	The width of the hip area (always in metres)
	HipLength	The vertical size of the hip area (always in metres)
	ButtSize	Diameter of the butt's avatar (always in metres)
	Package	Size of the package (small, medium, big)
	SaddleBags	Volume of saddle bags (small, medium, big)
	KneeAngle	The angle between the upper end lower leg, normally 0 when they are aligned (in degrees, from 0 to 360)
	FootSize	Size of the whole foot including toes (always in metres)
	NumExtra	This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the BodyType.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>Extra</td><td>Describes any other descriptions of body.</td></tr>
<tr><td>hapticIDRef</td><td>Identifier that refers to the haptic properties of the body.</td></tr>
</table>
</td></tr>
<tr><td>Head</td><td>Set of descriptions for head of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>HeadType</td><td>A type that describes avatar head.</td></tr>
<tr><td>HeadSizeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HeadSize element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HeadStrechFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HeadStrech element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HeadShapeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HeadShape element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EggHeadFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EggHead element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HeadLengthFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HeadLength element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>FaceShearFlag</td><td>This field, which is only present in the binary representation, signals the presence of the FaceShear element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ForeheadSizeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ForeheadSize element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ForeheadAngleFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ForeheadAngle element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BrowSizeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BrowSize element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
</table>
</td></tr>
</table>

Name	Description	
	FaceSkinFlag	This field, which is only present in the binary representation, signals the presence of the FaceSkin element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	CheeksFlag	This field, which is only present in the binary representation, signals the presence of the Cheeks element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	CheeksDepthFlag	This field, which is only present in the binary representation, signals the presence of the CheeksDepth element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	CheeksShapeFlag	This field, which is only present in the binary representation, signals the presence of the CheeksShape element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	UpperCheeksFlag	This field, which is only present in the binary representation, signals the presence of the UpperCheeks element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	LowerCheeksFlag	This field, which is only present in the binary representation, signals the presence of the LowerCheeks element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	CheekBonesFlag	This field, which is only present in the binary representation, signals the presence of the CheekBones element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	ExtraFlag	This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
	hapticIDRefFlag	This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. ”1” means that the attribute shall be used. ”0” means that the attribute shall not be used.
	HeadSize	Size of the entire head (small, medium, big)
	HeadStrech	Vertical stretch of the head in %
	HeadShape	This can be one of "square", "round", “oval”, or "long”
	EggHead	Head is larger on the top than on the bottom or vice versa. This can be "yes" or "not"
	HeadLength	The distance between the face and the back of the head, flat head or long head, measured in metres

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>FaceShear</td><td>Changes the height difference between the two sides of the face (always in metres)</td></tr>
<tr><td>ForeheadSize</td><td>The height of the forehead measured in metres</td></tr>
<tr><td>ForeheadAngle</td><td>The angle of the forehead measured in degrees</td></tr>
<tr><td>BrowSize</td><td>Measures how much the eyebrows are extruded from the face (in metres)</td></tr>
<tr><td>FaceSkin</td><td>Describe the type of face skin (dry, normal, greasy)</td></tr>
<tr><td>Cheeks</td><td>The size of the complete cheeks (small, medium, big)</td></tr>
<tr><td>CheeksDepth</td><td>The depth of the complete cheeks (always in metres)</td></tr>
<tr><td>CheeksShape</td><td>Different cheeks shapes (one of the following values: chubby, high, bone)</td></tr>
<tr><td>UpperCheeks</td><td>The volume of the upper cheeks (small, medium, big)</td></tr>
<tr><td>LowerCheeks</td><td>The volume of the lower cheeks (small, medium, big)</td></tr>
<tr><td>CheekBones</td><td>The vertical position of the cheek bones (down, medium, up)</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the HeadType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of head.</td></tr>
<tr><td>hapticIDRef</td><td>Identifier that refers to the haptic properties of the head.</td></tr>
</table>
</td></tr>
<tr><td>Eyes</td><td>Set of descriptions for eyes of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>EyesType</td><td>A type that describes avatar eyes.</td></tr>
<tr><td>EyeSizeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyeSize element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EyeOpeningFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyeOpening element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EyeSpacingFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyeSpacing element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>OuterEyeCornerFlag</td><td>This field, which is only present in the binary representation, signals the presence of the OuterEyeCorner element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>InnerEyeCornerFlag</td><td>This field, which is only present in the binary representation, signals the presence of the InnerEyeCorner element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
</table>
</td></tr>
</table>

Name	Description	
	EyeDepthFlag	This field, which is only present in the binary representation, signals the presence of the EyeDepth element. "1" means that the element shall be used. "0" means that the element shall not be used.
	UpperEyelidFoldFlag	This field, which is only present in the binary representation, signals the presence of the UpperEyelidFold element. "1" means that the element shall be used. "0" means that the element shall not be used.
	EyeBagsFlag	This field, which is only present in the binary representation, signals the presence of the EyeBags element. "1" means that the element shall be used. "0" means that the element shall not be used.
	PuffyEyeLidsFlag	This field, which is only present in the binary representation, signals the presence of the PuffyEyeLids element. "1" means that the element shall be used. "0" means that the element shall not be used.
	EyelashLengthFlag	This field, which is only present in the binary representation, signals the presence of the EyelashLength element. "1" means that the element shall be used. "0" means that the element shall not be used.
	EyePopFlag	This field, which is only present in the binary representation, signals the presence of the EyePop element. "1" means that the element shall be used. "0" means that the element shall not be used.
	EyeColorFlag	This field, which is only present in the binary representation, signals the presence of the EyeColor element. "1" means that the element shall be used. "0" means that the element shall not be used.
	EyeLightnessFlag	This field, which is only present in the binary representation, signals the presence of the EyeLightness element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ExtraFlag	This field, which is only present in the binary representation, signals the presence of the ExtraType element. "1" means that the element shall be used. "0" means that the element shall not be used.
	hapticIDRefFlag	This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used.
	EyeSize	The size of the entire eyes (always in metres)
	EyeOpening	How much the eyelids are opened (always in metres)
	EyeSpacing	Distance between the eyes (always in metres)

Name	Description	
	OuterEyeCorner	Vertical position of the outer eye corner (down, middle, up)
	InnerEyeCorner	Vertical position of the inner eye corner (down, middle, up)
	EyeDepth	How much the eyes are inside the head (always in metres)
	UpperEyelidFold	How much the upper eyelid covers the eye (always in metres)
	EyeBags	The size of the eye bags (always in metres)
	PuffyEyelids	The volume of the eye bags (small, medium, big)
	EyelashLength	The length of the eyelashes (always in metres)
	EyePop	The size difference between the left and right eye (always in metres)
	EyeColor	The color type defined in ISO/IEC 23005-6 shall be used for eye colour.
	EyeLightness	The reflectivity of the eye in %
	Extra	Describes any other descriptions of eyes.
	NumExtra	This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the EyesType.
	hapticIDRef	Identifier that refers to the haptic properties of the eyes.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Ears</td><td>Set of descriptions for ears of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>EarsType</td><td>A type that describes avatar ears.</td></tr>
<tr><td>EarSizeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EarSize element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EarPositionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EarPosition element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EarAngleFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EarAngle element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>AttachedEarlobesFlag</td><td>This field, which is only present in the binary representation, signals the presence of the AttachedEarlobes element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EarTipsFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EarTips element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>hapticIDRefFlag</td><td>This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. ”1” means that the attribute shall be used. ”0” means that the attribute shall not be used.</td></tr>
<tr><td>EarSize</td><td>Size of the entire ear (always in metres)</td></tr>
<tr><td>EarPosition</td><td>Vertical ear position on the head (down, middle, up)</td></tr>
<tr><td>EarAngle</td><td>The angle between the ear and the head in degrees</td></tr>
<tr><td>AttachedEarlobes</td><td>The size of the earlobes (always in metres)</td></tr>
<tr><td>EarTips</td><td>How much the ear tips are pointed (pointed, medium, not pointed)</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the EarsType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of ears.</td></tr>
<tr><td>hapticIDRef</td><td>Identifier that refers to the haptic properties of the ears.</td></tr>
</table></td></tr>
<tr><td>Nose</td><td>Set of descriptions for nose of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>NoseType</td><td>A type that describes avatar nose.</td></tr>
</table></td></tr>
</table>

Name	Description	
	NoseSizeFlag	This field, which is only present in the binary representation, signals the presence of the NoseSize element. "1" means that the element shall be used. "0" means that the element shall not be used.
	NoseWidthFlag	This field, which is only present in the binary representation, signals the presence of the NoseWidth element. "1" means that the element shall be used. "0" means that the element shall not be used.
	NostrillWidthFlag	This field, which is only present in the binary representation, signals the presence of the NostrillWidth element. "1" means that the element shall be used. "0" means that the element shall not be used.
	NostrillDivisionFlag	This field, which is only present in the binary representation, signals the presence of the NostrillDivision element. "1" means that the element shall be used. "0" means that the element shall not be used.
	NoseThicknessFlag	This field, which is only present in the binary representation, signals the presence of the NoseThickness element. "1" means that the element shall be used. "0" means that the element shall not be used.
	UpperBridgeFlag	This field, which is only present in the binary representation, signals the presence of the UpperBridge element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LowerBridgeFlag	This field, which is only present in the binary representation, signals the presence of the LowerBridge element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BridgeWidthFlag	This field, which is only present in the binary representation, signals the presence of the BridgeWidth element. "1" means that the element shall be used. "0" means that the element shall not be used.
	NoseTipAngleFlag	This field, which is only present in the binary representation, signals the presence of the NoseTipAngle element. "1" means that the element shall be used. "0" means that the element shall not be used.
	NoseTipShapeFlag	This field, which is only present in the binary representation, signals the presence of the NoseTipShape element. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description
	CrookedNoseFlag: This field, which is only present in the binary representation, signals the presence of the CrookedNose element. "1" means that the element shall be used. "0" means that the element shall not be used. ExtraFlag: This field, which is only present in the binary representation, signals the presence of the ExtraType element. "1" means that the element shall be used. "0" means that the element shall not be used. hapticIDRefFlag: This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used. NoseSize: The height of the nose from its bottom (always in metres) NoseWidth: The width of the complete nose (always in metres) NostrillWidth: Width of only the nostrils (always in metres) NostrillDivision: The size of the nostril division (always in metres) NoseThickness: The size of the tip of the nose (always in metres) UpperBridge: The height of the upper part of the nose (always in metres) LowerBridge: The height of the lower part of the nose (always in metres) BridgeWidth: The width of the upper part of the nose (always in metres) NoseTipAngle: The angle of the nose tip, "up" or "down" NoseTipShape: The shape of the nose tip, "pointy" or "bulbous" CrookedNose: Displacement of the nose on the left or right side NumExtra: This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the NoseType. Extra: Describes any other descriptions of nose. hapticIDRef: Identifier that refers to the haptic properties of the nose.
MouthLip	Set of descriptions for mouth and lips of the avatar. MouthLipType: A type that describes avatar eyes. LipWidthFlag: This field, which is only present in the binary representation, signals the presence of the LipWidth element. "1" means that the element shall be used. "0" means that the element shall not be used. LipFullnessFlag: This field, which is only present in the binary representation, signals the presence of the LipFullness element. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description	
	LipThicknessFlag	This field, which is only present in the binary representation, signals the presence of the LipThickness element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LipRatioFlag	This field, which is only present in the binary representation, signals the presence of the LipRatio element. "1" means that the element shall be used. "0" means that the element shall not be used.
	MouthSizeFlag	This field, which is only present in the binary representation, signals the presence of the MouthSize element. "1" means that the element shall be used. "0" means that the element shall not be used.
	MouthPositionFlag	This field, which is only present in the binary representation, signals the presence of the MouthPosition element. "1" means that the element shall be used. "0" means that the element shall not be used.
	MouthCornerFlag	This field, which is only present in the binary representation, signals the presence of the MouthCorner element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LipCleftDepthFlag	This field, which is only present in the binary representation, signals the presence of the LipCleftDepth element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LipCleftFlag	This field, which is only present in the binary representation, signals the presence of the LipCleft element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ShiftMouthFlag	This field, which is only present in the binary representation, signals the presence of the ShiftMouth element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ChinAngleFlag	This field, which is only present in the binary representation, signals the presence of the ChinAngle element. "1" means that the element shall be used. "0" means that the element shall not be used.
	JawShapeFlag	This field, which is only present in the binary representation, signals the presence of the JawShape element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ChinDepthFlag	This field, which is only present in the binary representation, signals the presence of the ChinDepth element. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description	
	JawAngleFlag	This field, which is only present in the binary representation, signals the presence of the JawAngle element. "1" means that the element shall be used. "0" means that the element shall not be used.
	JawJutFlag	This field, which is only present in the binary representation, signals the presence of the JawJut element. "1" means that the element shall be used. "0" means that the element shall not be used.
	JowlsFlag	This field, which is only present in the binary representation, signals the presence of the Jowls element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ChinCleftFlag	This field, which is only present in the binary representation, signals the presence of the ChinCleft element. "1" means that the element shall be used. "0" means that the element shall not be used.
	UpperChinCleftFlag	This field, which is only present in the binary representation, signals the presence of the UpperChinCleft element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ChinNeckFlag	This field, which is only present in the binary representation, signals the presence of the ChinNeck element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ExtraFlag	This field, which is only present in the binary representation, signals the presence of the ExtraType element. "1" means that the element shall be used. "0" means that the element shall not be used.
	hapticIDRefFlag	This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used.
	LipWidth	The width of the lips (m)
	LipFullness	The fullness of the lip (m)
	LipThickness	The thickness of the lip (m)
	LipRatio	Difference between the upper and lower lip (m)
	MouthSize	The size of the complete mouth (m)
	MouthPosition	Vertical position of the mouth on the face (m)
	MouthCorner	Vertical position of the mouth corner (down, middle, up)
	LipCleftDepth	The height of the lip cleft (m)
	LipCleft	The width of the lip cleft (m)
	ShiftMouth	Horizontal position of mouth on the face (left, middle, right)
	ChinAngle	The curvature of the chin, outer or inner
	JawShape	Pointy to Square jaw (pointed, middle, not pointed)
	ChinDepth	Vertical height of the chin (m)
	JawAngle	The height of the jaw (m)

Name	Description
	JawJut: Position of the jaw inside or out of the face (inside , outside) Jowls: The size of the jowls (m) ChinCleft: The shape of the chin cleft, "round" or "cleft" UpperChinCleft: The shape of the upper chin cleft, "round" or "cleft" ChinNeck: The size of the chin neck (m) NumExtra: This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the MouthLipType. Extra: Describes any other descriptions of mouthlip. hapticIDRef: Identifier that refers to the haptic properties of the mouth and lips.
BodySkin,	Set of descriptions for body skin of the avatar. **Name** / **Description** SkinType: A type that describes avatar skin. SkinPigmentFlag: This field, which is only present in the binary representation, signals the presence of the SkinPigment element. "1" means that the element shall be used. "0" means that the element shall not be used. SkinRuddinessFlag: This field, which is only present in the binary representation, signals the presence of the SkinRuddiness element. "1" means that the element shall be used. "0" means that the element shall not be used. SkinRainbowColorFlag: This field, which is only present in the binary representation, signals the presence of the SkinRainbowColor element. "1" means that the element shall be used. "0" means that the element shall not be used. ExtraFlag: This field, which is only present in the binary representation, signals the presence of the ExtraType element. "1" means that the element shall be used. "0" means that the element shall not be used. hapticIDRefFlag: This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used. SkinPigment: Body skin pigment (very light, light, average, olive, brown, black) SkinRuddiness: Body skin ruddiness (few, medium, lot) SkinRainbowColor: The color type defined in ISO/IEC 23005-6 shall be used for body skin rainbow colour. NumExtra: This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the BodySkinType. Extra: Describes any other descriptions of body skin. hapticIDRef: Identifier that refers to the haptic properties of the body skin.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>FacialSkin</td><td>Set of descriptions for facial skin of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>SkinType</td><td>A type that describes avatar skin.</td></tr>
<tr><td>SkinPigmentFlag</td><td>This field, which is only present in the binary representation, signals the presence of the SkinPigment element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>SkinRuddinessFlag</td><td>This field, which is only present in the binary representation, signals the presence of the SkinRuddiness element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>SkinRainbowColorFlag</td><td>This field, which is only present in the binary representation, signals the presence of the SkinRainbowColor element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>hapticIDRefFlag</td><td>This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. ”1” means that the attribute shall be used. ”0” means that the attribute shall not be used.</td></tr>
<tr><td>SkinPigment</td><td>Facial skin pigment (very light, light, average, olive, brown, black)</td></tr>
<tr><td>SkinRuddiness</td><td>Facial skin ruddiness (few, medium, lot)</td></tr>
<tr><td>SkinRainbowColor</td><td>The color type defined in ISO/IEC 23005-6 shall be used for facial skin rainbow colour.</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the FacialSkinType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of facial skin.</td></tr>
<tr><td>hapticIDRef</td><td>Identifier that refers to the haptic properties of the skin.</td></tr>
</table></td></tr>
<tr><td>Facial</td><td>Set of descriptions for face of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>FacialType</td><td>A type that describes avatar face.</td></tr>
<tr><td>FacialDefinitionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the FacialDefinition element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>FrecklesFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Freckles element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
</table></td></tr>
</table>

Name	Description	
	WrinklesFlag	This field, which is only present in the binary representation, signals the presence of the Wrinkles element. "1" means that the element shall be used. "0" means that the element shall not be used.
	RosyComplexionFlag	This field, which is only present in the binary representation, signals the presence of the RosyComplexion element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LipPinknessFlag	This field, which is only present in the binary representation, signals the presence of the LipPinkness element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LipstickFlag	This field, which is only present in the binary representation, signals the presence of the Lipstick element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LipstickColorFlag	This field, which is only present in the binary representation, signals the presence of the LipstickColor element. "1" means that the element shall be used. "0" means that the element shall not be used.
	LipGlossFlag	This field, which is only present in the binary representation, signals the presence of the LipGloss element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BlushFlag	This field, which is only present in the binary representation, signals the presence of the Blush element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BlushColorFlag	This field, which is only present in the binary representation, signals the presence of the BlushColor element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BlushOpacityFlag	This field, which is only present in the binary representation, signals the presence of the BlushOpacity element. "1" means that the element shall be used. "0" means that the element shall not be used.
	InnerShadowFlag	This field, which is only present in the binary representation, signals the presence of the InnerShadow element. "1" means that the element shall be used. "0" means that the element shall not be used.
	InnerShadowColorFlag	This field, which is only present in the binary representation, signals the presence of the InnerShadowColor element. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description	
	InnerShadowOppacityFlag	This field, which is only present in the binary representation, signals the presence of the InnerShadowOppacity element. "1" means that the element shall be used. "0" means that the element shall not be used.
	OuterShadowFlag	This field, which is only present in the binary representation, signals the presence of the OuterShadow element. "1" means that the element shall be used. "0" means that the element shall not be used.
	OuterShadowOppacityFlag	This field, which is only present in the binary representation, signals the presence of the OuterShadowOppacity element. "1" means that the element shall be used. "0" means that the element shall not be used.
	EyeLinerFlag	This field, which is only present in the binary representation, signals the presence of the EyeLiner element. "1" means that the element shall be used. "0" means that the element shall not be used.
	EyeLinerColorFlag	This field, which is only present in the binary representation, signals the presence of the EyeLinerColor element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ExtraFlag	This field, which is only present in the binary representation, signals the presence of the ExtraType element. "1" means that the element shall be used. "0" means that the element shall not be used.
	hapticIDRefFlag	This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used.
	FacialDefinition	Level of brightness of the face from 1-lighted to 5 dark
	Freckles	Freckles (5 levels, 1=smallest, 5= biggest)
	Wrinkles	Wrinkles (yes or no)
	RosyComplexion	Rosy Complexion (yes or no)
	LipPinkness	Lip Pinkness (5 levels, 1=smallest, 5= biggest)
	Lipstick	Lipstick (yes or no)
	LipstickColor	The color type defined in ISO/IEC 23005-6 shall be used for lipstick colour.
	Lipgloss	Lipgloss (5 levels, 1=smallest, 5= biggest)
	Blush	Blush (yes or no)
	BlushColor	The color type defined in ISO/IEC 23005-6 shall be used for blush colour.
	BlushOpacity	Blush Opacity (%)
	InnerShadow	Inner Shadow (yes or no)
	InnerShadowColor	The color type defined in ISO/IEC 23005-6 shall be used for inner shadow colour.

Name	Description
	InnerShadowOpacity: Inner Shadow Opacity (%) OuterShadow: Outer Shadow (yes or no) OuterShadowOpacity: Outer Shadow Opacity (%) Eyeliner: Eyeliner (yes or no) EyelinerColor: The color type defined in ISO/IEC 23005-6 shall be used for eyeliner colour. NumExtra: This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the FacialType. Extra: Describes any other descriptions of face. hapticIDRef: Identifier that refers to the haptic properties of the face.
FingerNails	Set of descriptions for finger nails of the avatar. NailType: A type that describes avatar nail. NailPolishFlag: This field, which is only present in the binary representation, signals the presence of the NailPolish element. "1" means that the element shall be used. "0" means that the element shall not be used. NailPolishColorFlag: This field, which is only present in the binary representation, signals the presence of the NailPolishColor element. "1" means that the element shall be used. "0" means that the element shall not be used. ExtraFlag: This field, which is only present in the binary representation, signals the presence of the ExtraType element. "1" means that the element shall be used. "0" means that the element shall not be used. hapticIDRefFlag: This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used. NailPolish: Finger nail polish (yes or no) NailPolishColor: The color type defined in ISO/IEC 23005-6 shall be used for finger nail polish colour. NumExtra: This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the NailsType. Extra: Describes any other descriptions of finger nails. hapticIDRef: Identifier that refers to the haptic properties of the nails.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>ToeNails</td><td>Set of descriptions for toe nails of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>NailType</td><td>A type that describes avatar nail.</td></tr>
<tr><td>NailPolishFlag</td><td>This field, which is only present in the binary representation, signals the presence of the NailPolish element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>NailPolishColorFlag</td><td>This field, which is only present in the binary representation, signals the presence of the NailPolishColor element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>hapticIDRefFlag</td><td>This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. ”1” means that the attribute shall be used. ”0” means that the attribute shall not be used.</td></tr>
<tr><td>NailPolish</td><td>Toe nail polish (yes or no)</td></tr>
<tr><td>NailPolishColor</td><td>The color type defined in ISO/IEC 23005-6 shall be used for toe nail polish colour.</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the NailsType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of toe nails.</td></tr>
<tr><td>hapticIDRef</td><td>Identifier that refers to the haptic properties of the nails.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>BodyLook</td><td>Set of descriptions for body look of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>BodyLookType</td><td>A type that describes avatar body look.</td></tr>
<tr><td>BodyDefinitionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BodyDefinition element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BodyFrecklesFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BodyFreckles element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BodyDefinition</td><td>Body definition (small, medium, large)</td></tr>
<tr><td>BodyFreckles</td><td>Body freckles (5 levels, 1=smallest, 5= biggest)</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the BodyLookType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of bodylook.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Hair</td><td>Set of elements for general avatar hair description. Containing elements:
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>HairType</td><td>A type that describes avatar hair.</td></tr>
<tr><td>HairSizeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairSize element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairStyleFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairStyle element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairColorFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairColor element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>WhiteHairFlag</td><td>This field, which is only present in the binary representation, signals the presence of the WhiteHair element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>RainbowColorFlag</td><td>This field, which is only present in the binary representation, signals the presence of the RainbowColor element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BlondeHairFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BlondeHair element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>RedHairFlag</td><td>This field, which is only present in the binary representation, signals the presence of the RedHair element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairVolumeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairVolume element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairFrontFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairFront element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairSidesFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairSides element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
</table></td></tr>
</table>

Name	Description	
	HairBackFlag	This field, which is only present in the binary representation, signals the presence of the HairBack element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BigHairFrontFlag	This field, which is only present in the binary representation, signals the presence of the BigHairFront element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BigHairTopFlag	This field, which is only present in the binary representation, signals the presence of the BigHairTop element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BigHairBackFlag	This field, which is only present in the binary representation, signals the presence of the BigHairBack element. "1" means that the element shall be used. "0" means that the element shall not be used.
	FrontFringeFlag	This field, which is only present in the binary representation, signals the presence of the FrontFringe element. "1" means that the element shall be used. "0" means that the element shall not be used.
	SideFringeFlag	This field, which is only present in the binary representation, signals the presence of the SideFringeFlag element. "1" means that the element shall be used. "0" means that the element shall not be used.
	BackFringeFlag	This field, which is only present in the binary representation, signals the presence of the BackFringe element. "1" means that the element shall be used. "0" means that the element shall not be used.
	FullHairSidesFlag	This field, which is only present in the binary representation, signals the presence of the FullHairSides element. "1" means that the element shall be used. "0" means that the element shall not be used.
	HairSweepFlag	This field, which is only present in the binary representation, signals the presence of the HairSweep element. "1" means that the element shall be used. "0" means that the element shall not be used.
	ShearFrontFlag	This field, which is only present in the binary representation, signals the presence of the ShearFront element. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description	
	ShearBackFlag	This field, which is only present in the binary representation, signals the presence of the ShearBack element. "1" means that the element shall be used. "0" means that the element shall not be used.
	TuperFrontFlag	This field, which is only present in the binary representation, signals the presence of the TuperFront element. "1" means that the element shall be used. "0" means that the element shall not be used.
	TuperBackFlag	This field, which is only present in the binary representation, signals the presence of the TuperBack element. "1" means that the element shall be used. "0" means that the element shall not be used.
	RumpledhairFlag	This field, which is only present in the binary representation, signals the presence of the RumpledhairFlag element. "1" means that the element shall be used. "0" means that the element shall not be used.
	PigtailsFlag	This field, which is only present in the binary representation, signals the presence of the Pigtails element. "1" means that the element shall be used. "0" means that the element shall not be used.
	PonytailFlag	This field, which is only present in the binary representation, signals the presence of the Ponytail element. "1" means that the element shall be used. "0" means that the element shall not be used.
	SpikedHairFlag	This field, which is only present in the binary representation, signals the presence of the SpikedHair element. "1" means that the element shall be used. "0" means that the element shall not be used.
	HairTiltFlag	This field, which is only present in the binary representation, signals the presence of the HairTilt element. "1" means that the element shall be used. "0" means that the element shall not be used.
	HairMiddlePartFlag	This field, which is only present in the binary representation, signals the presence of the HairMiddlePart element. "1" means that the element shall be used. "0" means that the element shall not be used.
	HairRightPartFlag	This field, which is only present in the binary representation, signals the presence of the HairRightPart element. "1" means that the element shall be used. "0" means that the element shall not be used.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>HairLeftPartFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairLeftPart element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairPartBangsFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairPartBangs element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>hapticIDRefFlag</td><td>This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. ”1” means that the attribute shall be used. ”0” means that the attribute shall not be used.</td></tr>
<tr><td>HairSize</td><td>The length of the hair (can be one of short, medium or long)</td></tr>
<tr><td>HairStyle</td><td>The style of the hair as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the HairStyleCS defined in A.3.
<table>
<tr><th>Name</th><th>Binary representation (8 bits)</th><th>Description</th></tr>
<tr><td>afro</td><td>1</td><td>Afro hairstyle</td></tr>
<tr><td>bun</td><td>2</td><td>Bun hairstyle</td></tr>
<tr><td>combover</td><td>3</td><td>Combover hairstyle</td></tr>
<tr><td>crewcut</td><td>4</td><td>Crewcut hairstyle</td></tr>
<tr><td>mohawk</td><td>5</td><td>Mohawk hairstyle</td></tr>
<tr><td>odando</td><td>6</td><td>Odando hairstyle</td></tr>
<tr><td>pigtails</td><td>7</td><td>Pigtails hairstyle</td></tr>
<tr><td>pompadour</td><td>8</td><td>Pompadour hairstyle</td></tr>
<tr><td>ponytail</td><td>9</td><td>Ponytail hairstyle</td></tr>
<tr><td></td><td>0,10-255</td><td>Reserved</td></tr>
</table>
</td></tr>
<tr><td>HairColor</td><td>The color type defined in ISO/IEC 23005-6 shall be used for hair colour.</td></tr>
<tr><td>WhiteHair</td><td>Amount of white hair (%)</td></tr>
</table>
</td></tr>
</table>

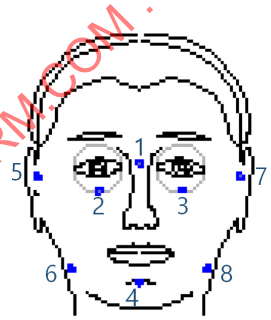
Name	Description	
	RainbowColor	The color type defined in ISO/IEC 23005-6 shall be used for rainbow hair colour.
	BlondeHair	How blond is the hair (%)
	RedHair	How red is the hair (%)
	HairVolume	The volume of the complete hair (small, medium or big)
	HairFront	How much the hair goes toward front (short, medium or long)
	HairSides	The height of the sides of the hair (short, medium or long)
	HairBack	How long is the hair at the back (short, medium or long)
	BigHairFront	How high is the hair at the front of the skull (short, medium or long)
	BigHairTop	How high is the hair at the top of the skull (short, medium or long)
	BigHairBack	How high is the hair at the back of the skull (short, medium or long)
	FrontFringe	The length of the front fringe of the hair (short, medium or long)
	SideFringe	The length of the side fringe of the hair (short, medium or long)
	BackFringe	The length of the back fringe of the hair (short, medium or long)
	FullHairSides	The width of the hair (short, medium or long)
	HairSweep	How much the hair is turned towards the front (left, middle, right)
	ShearFront	How much the hair extends towards front (short, medium or long)
	ShearBack	How much the hair extends towards back (short, medium or long)
	TuperFront	The width of the hair at the front (short, medium or long)
	TuperBack	The width of the hair on the back (short, medium or long)
	Rumpledhair	How much the hair is rumpled (low, moderate or high)
	Pigtails	The length of the pigtails (short, medium or long)
	Ponytail	The length of the ponytail (short, medium or long)
	SpikedHair	The length of the spikes in the hair (short, medium or long)
	HairTilt	The vertical position of the hair from the top of the head (m)
	HairMiddlePart	How much the hair is parted at the middle front (low, high)
	HairRightPart	How much the hair is parted at the right side (low, high)
	HairLeftPart	How much the hair is parted at the left side (low, high)
	HairPartBangs	How much the hair is parted at the middle (low, high)

Name	Description	
	NumExtra	This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the HairType.
	Extra	Describes any other descriptions of hair.
	hapticIDRef	Identifier that refers to the haptic properties of the hair.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Eyebrows</td><td>Set of descriptions for eyebrows.of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>EyebrowsType</td><td>A type that describes avatar eyebrows.</td></tr>
<tr><td>EyebrowSizeFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyebrowSize element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EyebrowDensityFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyebrowDensity element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EyebrowHeightFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyebrowHeight element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EyebrowArcFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyebrowArc element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>EyebrowPointsFlag</td><td>This field, which is only present in the binary representation, signals the presence of the EyebrowPoints element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>hapticIDRefFlag</td><td>This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. ”1” means that the attribute shall be used. ”0” means that the attribute shall not be used.</td></tr>
<tr><td>EyebrowSize</td><td>The length of the eyebrow (short, medium, long)</td></tr>
<tr><td>EyebrowDensity</td><td>The density (low, moderate, high)</td></tr>
<tr><td>EyebrowHeight</td><td>The vertical eyebrow position on the face (low, middle, high)</td></tr>
<tr><td>EyebrowArc</td><td>The curvature of the Eyebrow. It can be low (flat), middle or high (arced)</td></tr>
<tr><td>EyebrowPoints</td><td>The direction of the eyebrows, towards up or down (down, middle, up)</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the EyebrowType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of eyebrows.</td></tr>
<tr><td>hapticIDRef</td><td>Identifier that refers to the haptic properties of the eyebrows.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>FacialHair</td><td>Set of descriptions for facial hair of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>FacialHairType</td><td>A type that describes avatar facial hair.</td></tr>
<tr><td>FacialHairThicknessFlag</td><td>This field, which is only present in the binary representation, signals the presence of the FacialHairThickness element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>FacialSideburnsFlag</td><td>This field, which is only present in the binary representation, signals the presence of the FacialSideburns element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>FacialMustacheFlag</td><td>This field, which is only present in the binary representation, signals the presence of the FacialMustache element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>FacialChinCurtainsFlag</td><td>This field, which is only present in the binary representation, signals the presence of the FacialChinCurtains element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>FacialSoulPatchFlag</td><td>This field, which is only present in the binary representation, signals the presence of the FacialSoulPatch element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>hapticIDRefFlag</td><td>This field, which is only present in the binary representation, signals the presence of the hapticIDRef attribute. ”1” means that the attribute shall be used. ”0” means that the attribute shall not be used.</td></tr>
<tr><td>FacialHairThickness</td><td>The thick of the facial hair (low, middle, high)</td></tr>
<tr><td>FacialSideBurns</td><td>The color type defined in ISO/IEC 23005-6 shall be used for the color of the facial side.</td></tr>
<tr><td>FacialMoustache</td><td>The facial moustache (yes or no)</td></tr>
<tr><td>FacialchinCurtains</td><td>Facial chin curtains (yes or no)</td></tr>
<tr><td>FacialSoulPatch</td><td>Facial soul patch (yes or no)</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the FacialHairType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of facial hair.</td></tr>
<tr><td>hapticIDRef</td><td>Identifier that refers to the haptic properties of the facial hair.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>BodyHair</td><td>Set of descriptions for body hair of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>BodyHairType</td><td>A type that describes avatar body hair.</td></tr>
<tr><td>HairColorFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairColor element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairThicknessFlag</td><td>This field, which is only present in the binary representation, signals the presence of the HairThickness element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>HairColor</td><td>The color type defined in ISO/IEC 23005-6 shall be used for avatar body hair.</td></tr>
<tr><td>HairThickness</td><td>The thick of the body hair (low, middle, high)</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the BodyHairType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of body hair.</td></tr>
</table></td></tr>
<tr><td>Facial Calibration Points</td><td>Set of elements that are calibration points for the face feature control.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>FacialCalibrationPointsType</td><td>A type that describes calibration points for face feature control.</td></tr>
<tr><td>SellionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Sellion element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>RInfraorbitaleFlag</td><td>This field, which is only present in the binary representation, signals the presence of the RInfraorbitale element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>LinfraorbitaleFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Linfraorbitale element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>SupramentonFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Supramenton element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>RtragionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Rtragion element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
</table></td></tr>
</table>

Name	Description
	<table><tr><td>RgonionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Rgonion element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr><tr><td>LtragionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Ltragion element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr><tr><td>LgonionFlag</td><td>This field, which is only present in the binary representation, signals the presence of the Lgonion element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr><tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr><tr><td>Sellion</td><td>3D position (metres), point 1 in the figure below</td></tr><tr><td>RInfraorbitale</td><td>3D position (metres), point 2 in the figure below</td></tr><tr><td>LInfraorbitale</td><td>3D position (metres), point 3 in the figure below</td></tr><tr><td>Supramenton</td><td>3D position (metres), point 4 in the figure below</td></tr><tr><td>RTragion</td><td>3D position (metres), point 5 in the figure below</td></tr><tr><td>RGonion</td><td>3D position (metres), point 6 in the figure below</td></tr><tr><td>LTragion</td><td>3D position (metres), point 7 in the figure below</td></tr><tr><td>LGonion</td><td>3D position (metres), point 8 in the figure below</td></tr><tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the FacialCalibrationPointsType.</td></tr><tr><td>Extra</td><td>Describes any other descriptions of facial calibration points.</td></tr></table>  NOTE The calibration points are used for mapping captured face feature points onto an arbitrary face of an avatar.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>PhysicalCondition</td><td>This element contains a set of elements for describing the physical condition of the avatar.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>PhysicalConditionType</td><td>A type that describes the physical condition of the avatar.</td></tr>
<tr><td>BodyStrengthFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BodyStrength element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BodyFlexibilityFlag</td><td>This field, which is only present in the binary representation, signals the presence of the BodyFlexibility element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>ExtraFlag</td><td>This field, which is only present in the binary representation, signals the presence of the ExtraType element. ”1” means that the element shall be used. ”0” means that the element shall not be used.</td></tr>
<tr><td>BodyStrength</td><td>Avatar body strength (unlimited percentage (%))</td></tr>
<tr><td>BodyFlexibility</td><td>Avatar body flexibility with descriptive scale of low, medium, and high</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the PhysicalConditionType.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of physical condition.</td></tr>
</table></td></tr>
<tr><td>Clothes</td><td>A list of virtual clothes associated to the avatar. The type of this element is VirtualObjectType.</td></tr>
<tr><td>Shoes</td><td>A list of virtual shoes associated to the avatar. The type of this element is VirtualObjectType.</td></tr>
<tr><td>Accessories</td><td>A list of objects (ring, glasses, …) associated to the avatar. The type of this element is VirtualObjectType.</td></tr>
<tr><td>SkinMarks</td><td>A list of skin marks (birthmarks, scars, tattoos…, …) associated to the avatar. The type of this element is VirtualObjectType.</td></tr>
<tr><td>AppearanceResources</td><td>URL to file or streaming, containing the avatar visual representation. The avatar can be represented as 3D animated model, time-sequenced 3D model, 2D image, 2D video, 3D image, and 3D video, usually MP4 file.</td></tr>
<tr><td>Extra</td><td>Describes any other descriptions of avatar appearance.</td></tr>
</table>

5.3.4 Examples

This example shows the description of avatar appearance with the following semantics.

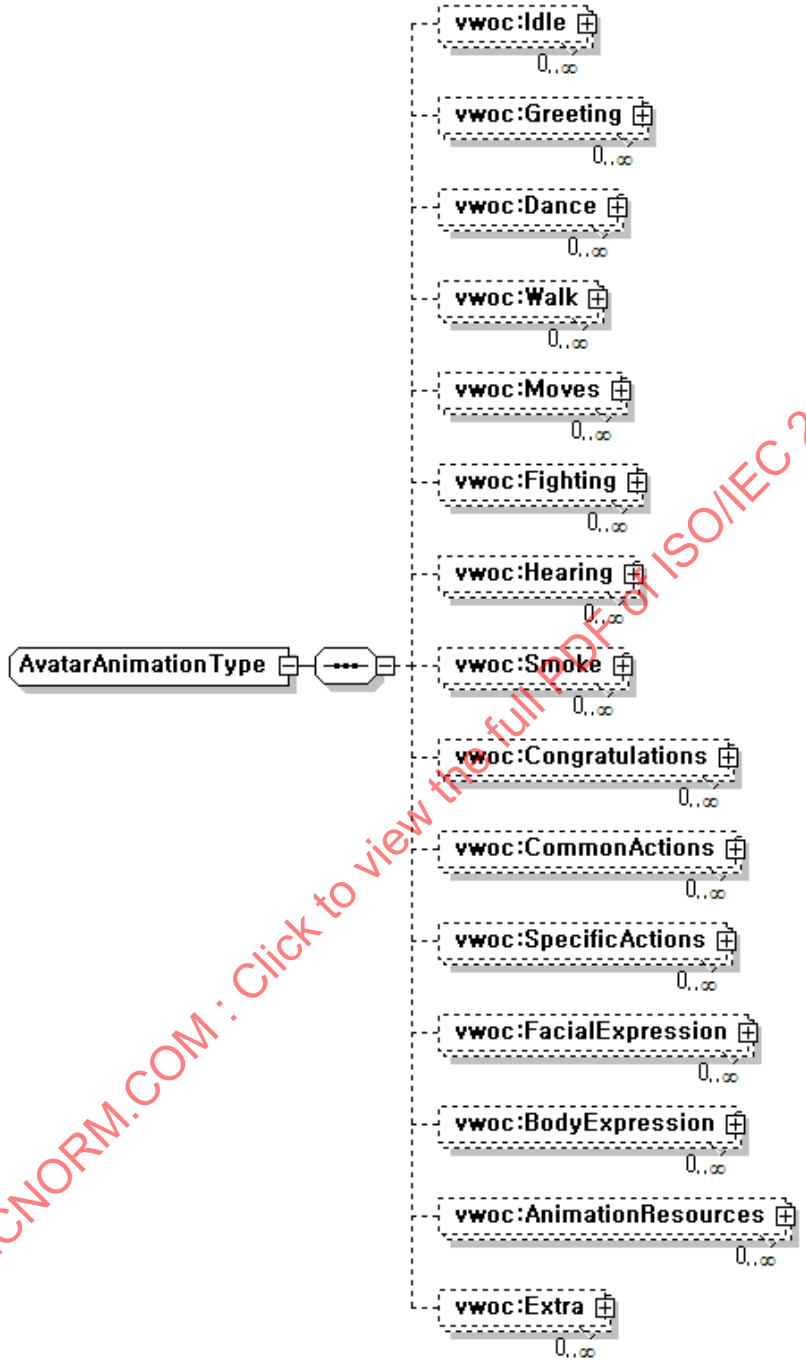
```
<vwoc:Appearance>
   <vwoc:Body>
      <vwoc:BodyHeight>5.2</vwoc:BodyHeight>
      <vwoc:BodyThickness>4.4</vwoc:BodyThickness>
      <vwoc:BodyFat>low</vwoc:BodyFat>
      <vwoc:TorsoMuscles>low</vwoc:TorsoMuscles>
      <vwoc:NeckThikness>2.1</vwoc:NeckThikness>
```

```
        <vwoc:NeckLength>1.8</vwoc:NeckLength>
        <vwoc:Package>small</vwoc:Package>
        <vwoc:SaddleBags>medium</vwoc:SaddleBags>
        <vwoc:KneeAngle>300</vwoc:KneeAngle>
        <vwoc:FootSize>3.1</vwoc:FootSize>
    </vwoc:Body>
    <vwoc:Head>
        <vwoc:HeadSize>small</vwoc:HeadSize>
        <vwoc:HeadStretch>1.1</vwoc:HeadStretch>
        <vwoc:HeadShape>square</vwoc:HeadShape>
        <vwoc:EggHead>true</vwoc:EggHead>
    </vwoc:Head>
    <vwoc:Eyes>
        <vwoc:EyeSize>1.1</vwoc:EyeSize>
    </vwoc:Eyes>
    <vwoc:Ears>
        <vwoc:EarSize>2.1</vwoc:EarSize>
    </vwoc:Ears>
    <vwoc:Nose>
        <vwoc:NoseSize>0.8</vwoc:NoseSize>
    </vwoc:Nose>
    <vwoc:FacialSkin>
        <vwoc:SkinRainbowColor>#FF8F69</vwoc:SkinRainbowColor>
    </vwoc:FacialSkin>
    <vwoc:ToeNails>
        <vwoc:NailPolish>true</vwoc:NailPolish>
        <vwoc:NailPolishColor>#CF8F69</vwoc:NailPolishColor>
    </vwoc:ToeNails>
    <vwoc:BodyLook>
        <vwoc:BodyDefinition>short</vwoc:BodyDefinition>
    </vwoc:BodyLook>
    <vwoc:Hair>
        <vwoc:HairSize>short</vwoc:HairSize>
        <vwoc:HairStyle>urn:mpeg:mpeg-v:01-VWOC-HairStyleCS-
NS:crewcut</vwoc:HairStyle>
    </vwoc:Hair>
    <vwoc:FacialCalibrationPoints>
        <vwoc:Sellion xsi:type="vwoc:Physical3DPointType" x="1.1" y="1.2"
z="1.2"/>
        <vwoc:RInfraorbitale xsi:type="vwoc:Physical3DPointType" x="1.1" y="1.2"
z="1.3"/>
    </vwoc:FacialCalibrationPoints>
    <vwoc:PhysicalCondition>
        <vwoc:BodyFlexibility>low</vwoc:BodyFlexibility>
    </vwoc:PhysicalCondition>
    <vwoc:Clothes id="vo_clothes_001">
        <vwoc:VirtualObjectComponents>
            <vwoc:VirtualObject xsi:type="vwoc:VirtualObjectType"
id="clothe_part_001">
                <vwoc:Appearance>id="virtualObject_001"</vwoc:Appearance>
            </vwoc:VirtualObject>
        </vwoc:VirtualObjectComponents>
    </vwoc:Clothes>
</vwoc:Appearance>
```

5.4 AvatarAnimationType

5.4.1 XML representation syntax

Diagram



Source

```
<complexType name="AvatarAnimationType">
    <sequence>
        <element name="Idle" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
        <element name="Greeting" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
        <element name="Dance" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
        <element name="Walk" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
        <element name="Moves" type="vwoc:AnimationDescriptionType" minOccurs="0"
```

```
maxOccurs="unbounded"/>
            <element name="Fighting" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="Hearing" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="Smoke" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="Congratulations" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="CommonActions" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="SpecificActions" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="FacialExpression" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="BodyExpression" type="vwoc:AnimationDescriptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <element name="AnimationResources" type="vwoc:AnimationResourcesDescriptionType"
minOccurs="0" maxOccurs="unbounded"/>
            <element name="Extra" type="vwoc:ExtraType" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
</complexType>
```

5.4.2 Binary representation syntax

AvatarAnimationType{	Number of bits	Mnemonic
IdleFlag	1	bslbf
GreetingFlag	1	bslbf
DanceFlag	1	bslbf
WalkFlag	1	bslbf
MovesFlag	1	bslbf
FightingFlag	1	bslbf
HearingFlag	1	bslbf
SmokeFlag	1	bslbf
CongratulationFlag	1	bslbf
CommonActionsFlag	1	bslbf
SpecificActionsFlag	1	bslbf
FacialExpressionFlag	1	bslbf
BodyExpressionFlag	1	bslbf
AnimationResourcesFlag	1	bslbf
ExtraFlag	1	bslbf

AvatarAnimationType{	Number of bits	Mnemonic
if(IdleFlag){		
NumIdle		vluimsbf5
for(k=0; k< NumIdle; k++){		
Idle[k]		AnimationDescriptionType
}		
}		
if(GreetingFlag){		
NumGreeting		vluimsbf5
for(k=0; k< NumGreeting; k++){		
Greeting[k]		AnimationDescriptionType
}		
}		
if(DanceFlag){		
NumDance		vluimsbf5
for(k=0; k< NumDance; k++){		
Dance[k]		AnimationDescriptionType
}		
}		
if(WalkFlag){		
NumWalk		vluimsbf5
for(k=0; k< NumWalk; k++){		
Walk[k]		AnimationDescriptionType
}		
}		
if(MovesFlag){		

AvatarAnimationType{	Number of bits	Mnemonic
NumMoves		vluimsbf5
for(k=0; k< NumMoves; k++){		
Moves[k]		AnimationDescriptionType
}		
}		
if(FightingFlag){		
NumFighting		vluimsbf5
for(k=0; k< NumFighting; k++){		
Fighting[k]		AnimationDescriptionType
}		
}		
if(HearingFlag){		
NumHearing		vluimsbf5
for(k=0; k< NumHearing; k++){		
Hearing[k]		AnimationDescriptionType
}		
}		
if(SmokeFlag){		
NumSmoke		vluimsbf5
for(k=0; k< NumSmoke; k++){		
Smoke[k]		AnimationDescriptionType
}		
}		
if(CongratulationsFlag){		
NumCongratulations		vluimsbf5

AvatarAnimationType{	Number of bits	Mnemonic
for(k=0; k< NumCongratulations; k++){		
Congratulations[k]		AnimationDescriptionType
}		
}		
if(CommonActionsFlag){		
NumCommonActions		vluimsbf5
for(k=0; k< NumCommonActions; k++){		
CommonActions[k]		AnimationDescriptionType
}		
}		
if(SpecificActionsFlag){		
NumSpecificActions		vluimsbf5
for(k=0; k< NumSpecificActions; k++){		
SpecificActions[k]		AnimationDescriptionType
}		
}		
if(FacialExpressionFlag){		
NumFacialExpression		vluimsbf5
for(k=0; k< NumFacialExpression; k++){		
FacialExpression[k]		AnimationDescriptionType
}		
}		
if(BodyExpressionFlag){		
NumBodyExpression		vluimsbf5
for(k=0; k< NumBodyExpression; k++){		

AvatarAnimationType{	Number of bits	Mnemonic
BodyExpression[k]		AnimationDescriptionType
}		
}		
if(AnimationResourcesFlag){		
NumAnimationResources		vluimsbf5
for(k=0; k< NumAnimationResources; k++){		
AnimationResources[k]		AnimationResourcesDescriptionType
}		
}		
if(ExtraFlag){		
NumExtra		vluimsbf5
for(k=0; k< NumExtra; k++){		
Extra[k]		ExtraType
}		
}		
}		

5.4.3 Semantics

Name	Description
`AvatarAnimationType`	A type that contains the description of a set of animation sequences that the avatar is able to perform and may refer to several medias containing the exact (geometric transformations) animation parameters.
`IdleFlag`	This field, which is only present in the binary representation, signals the presence of the `Idle` elements. "1" means that the element shall be used. "0" means that the element shall not be used.
`GreetingFlag`	This field, which is only present in the binary representation, signals the presence of the `Greeting` elements. "1" means that the element shall be used. "0" means that the element shall not be used.
`DanceFlag`	This field, which is only present in the binary representation, signals the presence of the `Dance` elements. "1" means that the element shall be used. "0" means that the element shall not be used.

Name	Description
WalkFlag	This field, which is only present in the binary representation, signals the presence of the Walk elements. "1" means that the element shall be used. "0" means that the element shall not be used.
MovesFlag	This field, which is only present in the binary representation, signals the presence of the Moves elements. "1" means that the element shall be used. "0" means that the element shall not be used.
FightingFlag	This field, which is only present in the binary representation, signals the presence of the Fighting elements. "1" means that the element shall be used. "0" means that the element shall not be used.
HearingFlag	This field, which is only present in the binary representation, signals the presence of the Hearing elements. "1" means that the element shall be used. "0" means that the element shall not be used.
SmokeFlag	This field, which is only present in the binary representation, signals the presence of the Smoke elements. "1" means that the element shall be used. "0" means that the element shall not be used.
CongratulationsFlag	This field, which is only present in the binary representation, signals the presence of the Congratulations elements. "1" means that the element shall be used. "0" means that the element shall not be used.
CommonActionsFlag	This field, which is only present in the binary representation, signals the presence of the CommonActions elements. "1" means that the element shall be used. "0" means that the element shall not be used.
SpecificActionsFlag	This field, which is only present in the binary representation, signals the presence of the SpecificActions elements. "1" means that the element shall be used. "0" means that the element shall not be used.
FacialExpressionFlag	This field, which is only present in the binary representation, signals the presence of the FacialExpression elements. "1" means that the element shall be used. "0" means that the element shall not be used.
BodyExpressionFlag	This field, which is only present in the binary representation, signals the presence of the BodyExpression elements. "1" means that the element shall be used. "0" means that the element shall not be used.
AnimationResourcesFlag	This field, which is only present in the binary representation, signals the presence of the AnimationResources elements. "1" means that the element shall be used. "0" means that the element shall not be used.
ExtraFlag	This field, which is only present in the binary representation, signals the presence of the ExtraType elements. "1" means that the element shall be used. "0" means that the element shall not be used.
NumIdle	This field, which is only present in the binary representation, signals the number of the Idle elements.
NumGreeting	This field, which is only present in the binary representation, signals the number of the Greeting elements.
NumDance	This field, which is only present in the binary representation, signals the number of the Dance elements.
NumWalk	This field, which is only present in the binary representation, signals the number of the Walk elements.
NumMoves	This field, which is only present in the binary representation, signals the number of the Moves elements.
NumFighting	This field, which is only present in the binary representation, signals the number of the Fighting elements.
NumHearing	This field, which is only present in the binary representation, signals the number of the Hearing elements.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>NumSmoke</td><td>This field, which is only present in the binary representation, signals the number of the Smoke elements.</td></tr>
<tr><td>NumCongratulations</td><td>This field, which is only present in the binary representation, signals the number of the Congratulations elements.</td></tr>
<tr><td>NumCommonActions</td><td>This field, which is only present in the binary representation, signals the number of the CommonActions elements.</td></tr>
<tr><td>NumSpecificActions</td><td>This field, which is only present in the binary representation, signals the number of the SpecificActions elements.</td></tr>
<tr><td>NumFacialExpression</td><td>This field, which is only present in the binary representation, signals the number of the FacialExpression elements.</td></tr>
<tr><td>NumBodyExpression</td><td>This field, which is only present in the binary representation, signals the number of the BodyExpression elements.</td></tr>
<tr><td>NumAnimationResources</td><td>This field, which is only present in the binary representation, signals the number of the AnimationResources elements.</td></tr>
<tr><td>Idle</td><td>Describes an idle type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the IdleAnimationCS defined in A.4.2.
<table>
<tr><th>Name</th><th>Binary representation (4 bits)</th><th>Description</th></tr>
<tr><td>defaultIdle</td><td>1</td><td>default idle</td></tr>
<tr><td>restPose</td><td>2</td><td>rest pose</td></tr>
<tr><td>breathe</td><td>3</td><td>breathe</td></tr>
<tr><td>bodyNoise</td><td>4</td><td>body noise</td></tr>
<tr><td></td><td>0,5-15</td><td>reserved</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Greeting</td><td>Describes a greeting type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the GreetingAnimationCS defined in A.4.3.
<table>
<tr><th>Name</th><th>Binary representation (4 bits)</th><th>Description</th></tr>
<tr><td>salute</td><td>1</td><td>salute</td></tr>
<tr><td>cheer</td><td>2</td><td>cheer</td></tr>
<tr><td>greet</td><td>3</td><td>greet</td></tr>
<tr><td>wave</td><td>4</td><td>wave</td></tr>
<tr><td>hello</td><td>5</td><td>hello</td></tr>
<tr><td>bow</td><td>6</td><td>bow</td></tr>
<tr><td>courtBow</td><td>7</td><td>court bow</td></tr>
<tr><td>flourish</td><td>8</td><td>flourish</td></tr>
<tr><td></td><td>0,8-15</td><td>reserved</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Dance</td><td>Describes a dance type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the DanceAnimationCS defined in A.4.4.
<table>
<tr><th>Name</th><th>Binary representation (5 bits)</th><th>Description</th></tr>
<tr><td>bodyPopDance</td><td>1</td><td>body pop dance</td></tr>
<tr><td>breakDance</td><td>2</td><td>break dance</td></tr>
<tr><td>cabbagePatchDance</td><td>3</td><td>cabbage patch dance</td></tr>
<tr><td>casualDance</td><td>4</td><td>casual dance</td></tr>
<tr><td>dance</td><td>5</td><td>dance</td></tr>
<tr><td>raveDance</td><td>6</td><td>rave dance</td></tr>
<tr><td>robotDance</td><td>7</td><td>robot dance</td></tr>
<tr><td>rockDance</td><td>8</td><td>rock dance</td></tr>
<tr><td>rockRollDance</td><td>9</td><td>rock and roll dance</td></tr>
<tr><td>runningManDance</td><td>10</td><td>running man dance</td></tr>
<tr><td>salsaDance</td><td>11</td><td>salsa dance</td></tr>
<tr><td></td><td>0,12-31</td><td>reserved</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Walk</td><td>Describes a Walk type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the WalkAnimationCS defined in A.4.5.
<table>
<tr><th>Name</th><th>Binary representation (5 bits)</th><th>Description</th></tr>
<tr><td>slowWalk</td><td>1</td><td>slow walk</td></tr>
<tr><td>defaultWalk</td><td>2</td><td>default walk</td></tr>
<tr><td>fastWalk</td><td>3</td><td>fast walk</td></tr>
<tr><td>slowRun</td><td>4</td><td>slow run</td></tr>
<tr><td>defaultRun</td><td>5</td><td>default run</td></tr>
<tr><td>fastRun</td><td>6</td><td>fast run</td></tr>
<tr><td>crouch</td><td>7</td><td>crouch</td></tr>
<tr><td>crouchWalk</td><td>8</td><td>crouch walk</td></tr>
<tr><td></td><td>0,9-31</td><td>reserved</td></tr>
</table></td></tr>
<tr><td>Moves</td><td>Describes a moves type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the MovesAnimationCS defined in A.4.6.
<table>
<tr><th>Name</th><th>Binary representation (5 bits)</th><th>Description</th></tr>
<tr><td>moveDown</td><td>1</td><td>move down</td></tr>
<tr><td>moveLeft</td><td>2</td><td>move left</td></tr>
<tr><td>moveRight</td><td>3</td><td>move right</td></tr>
<tr><td>moveUp</td><td>4</td><td>move up</td></tr>
<tr><td>pointMe</td><td>5</td><td>point me</td></tr>
<tr><td>pointYou</td><td>6</td><td>point you</td></tr>
<tr><td>turn180</td><td>7</td><td>turn 180</td></tr>
<tr><td>turnBack180</td><td>8</td><td>turn back 180</td></tr>
<tr><td>turnLeft</td><td>9</td><td>turn left</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>turnRight</td><td>10</td><td>turn right</td></tr>
<tr><td>turn360</td><td>11</td><td>turn 360</td></tr>
<tr><td>turnBack360</td><td>12</td><td>turn back 360</td></tr>
<tr><td>freeDirection</td><td>13</td><td>free direction</td></tr>
<tr><td></td><td>0,14-31</td><td>reserved</td></tr>
</table>
</td></tr>
<tr><td>Fighting</td><td>Describes a Figting type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the FightingAnimationCS defined in A.4.7.
<table>
<tr><th>Name</th><th>Binary representation (7 bits)</th><th>Description</th></tr>
<tr><td>Aim</td><td>1</td><td>aim</td></tr>
<tr><td>aimLeft</td><td>2</td><td>aim left</td></tr>
<tr><td>aimRight</td><td>3</td><td>aim right</td></tr>
<tr><td>aimBow</td><td>4</td><td>aim bow</td></tr>
<tr><td>aimLeftBow</td><td>5</td><td>aim left bow</td></tr>
<tr><td>aimRightBow</td><td>6</td><td>aim right bow</td></tr>
<tr><td>aimLeftRifle</td><td>7</td><td>aim left rifle</td></tr>
<tr><td>aimRightRifle</td><td>8</td><td>aim right rifle</td></tr>
<tr><td>aimBazooka</td><td>9</td><td>aim bazooka</td></tr>
<tr><td>aimLeftBazooka</td><td>10</td><td>aim left bazooka</td></tr>
<tr><td>aimRightBazooka</td><td>11</td><td>aim right bazooka</td></tr>
<tr><td>aimHandgun</td><td>12</td><td>aim handgun</td></tr>
<tr><td>aimLeftHandgun</td><td>13</td><td>aim left handgun</td></tr>
<tr><td>aimRightHandgun</td><td>14</td><td>aim right handgun</td></tr>
<tr><td>holdWeapon</td><td>15</td><td>hold weapon</td></tr>
<tr><td>holdWeaponLeft</td><td>16</td><td>hold weapon left</td></tr>
<tr><td>holdWeaponRight</td><td>17</td><td>hold weapon right</td></tr>
</table>
</td></tr>
</table>

Name	Description		
	holdBow	18	hold bow
	holdBowLeft	19	hold bow left
	holdBowRight	20	hold bow right
	holdRifle	21	hold rifle
	holdRifleLeft	22	hold rifle left
	holdRifleRight	23	hold rifle right
	holdBazooka	24	hold bazooka
	holdBazookaLeft	25	hold bazooka left
	holdBazookaRight	26	hold bazooka right
	holdHandgun	27	hold handgun
	holdHandgunLeft	28	hold handgun left
	holdHandgunRight	29	hold handgun right
	holdWeaponThrow	30	hold weapon throw
	holdWeaponThrowReft	31	hold weapon throw left
	holdWeaponThrowRight	32	hold weapon throw right
	Shoot	33	shoot
	shootLeft	34	shoot left
	shootRight	35	shoot right
	shootBow	36	shoot bow
	shootBowLeft	37	shoot bow left
	shootBowRight	38	shoot bow right
	shootRifle	39	shoot rifle
	shootRifleLeft	40	shoot rifle left
	shootRifleRight	41	shoot rifle right
	shootBazooka	42	shoot bazooka

Name	Description
	shootBazookaLeft / 43 / shoot bazooka left shootBazookaRight / 44 / shoot bazooka right shootHandgun / 45 / shoot handgun shootHandgunLeft / 46 / shoot handgun left shootHandgunRight / 47 / shoot handgun right Strike / 48 / strike strikeSword / 49 / strike sword strikeSwordLeft / 50 / strike sword left strikeSwordRight / 51 / strike sword right Punch / 52 / punch punchLeft / 53 / punch left punchRight / 54 / punch right Throwing / 55 / throwing throwWeaponLeft / 56 / throw weapon left throwWeaponRight / 57 / throw weapon right 0, 58-127 / reserved
`Hearing`	Describes a `Hearing` type of animations as a reference to a classification scheme (CS) term that shall be using the `mpeg7:termReferenceType` defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the `HearingAnimationCS` defined in A.4.8.

Name	Binary representation (5 bits)	Description
startHearing	1	start hearing
stopHearing	2	stop hearing
earsExtend	3	ears extend
turnsHeadLeft	4	turns head left
turnsHeadRight	5	turns head right
holdsUpHand	6	holds up hand

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>tiltsHeadRight</td><td>7</td><td>tilts head right</td></tr>
<tr><td>tiltsHeadLeft</td><td>8</td><td>tilts head left</td></tr>
<tr><td>cocksHeadLeft</td><td>9</td><td>cocks head left</td></tr>
<tr><td>defaultHear</td><td>10</td><td>default hear</td></tr>
<tr><td></td><td>0,11-31</td><td>reserved</td></tr>
</table>
</td></tr>
<tr><td>Smoke</td><td>Describes a Smoke type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the SmokeAnimationCS defined in A.4.9.
<table>
<tr><th>Name</th><th>Binary representation (4 bits)</th><th>Description</th></tr>
<tr><td>smokeIdle</td><td>1</td><td>smoke idle</td></tr>
<tr><td>smokeInhale</td><td>2</td><td>smoke inhale</td></tr>
<tr><td>smokeThrowDown</td><td>3</td><td>smoke throw down</td></tr>
<tr><td></td><td>0,4-15</td><td>reserved</td></tr>
</table>
</td></tr>
<tr><td>Congratulations</td><td>Describes a Congratulations type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the CongratulationsAnimationCS defined in A.4.10.
<table>
<tr><th>Name</th><th>Binary representation (4 bits)</th><th>Description</th></tr>
<tr><td>applaude</td><td>1</td><td>applaud</td></tr>
<tr><td>clap</td><td>2</td><td>clap</td></tr>
<tr><td></td><td>0, 3-15</td><td>reserved</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>CommonActions</td><td>Describes a CommonActions type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the CommonActionsAnimationCS defined in A.4.11.
<table>
<tr><th>Name</th><th>Binary representation (7 bits)</th><th>Description</th></tr>
<tr><td>appear</td><td>1</td><td>appear</td></tr>
<tr><td>away</td><td>2</td><td>away</td></tr>
<tr><td>blowKiss</td><td>3</td><td>blow kiss</td></tr>
<tr><td>brush</td><td>4</td><td>brush</td></tr>
<tr><td>busy</td><td>5</td><td>busy</td></tr>
<tr><td>crazy</td><td>6</td><td>crazy</td></tr>
<tr><td>dead</td><td>7</td><td>dead</td></tr>
<tr><td>disappear</td><td>8</td><td>disappear</td></tr>
<tr><td>drink</td><td>9</td><td>drink</td></tr>
<tr><td>eat</td><td>10</td><td>eat</td></tr>
<tr><td>explain</td><td>11</td><td>explain</td></tr>
<tr><td>fallDown</td><td>12</td><td>fall down</td></tr>
<tr><td>flip</td><td>13</td><td>flip</td></tr>
<tr><td>fly</td><td>14</td><td>fly</td></tr>
<tr><td>gag</td><td>15</td><td>gag</td></tr>
<tr><td>getAttention</td><td>16</td><td>get attention</td></tr>
<tr><td>impatient</td><td>17</td><td>impatient</td></tr>
<tr><td>jump</td><td>18</td><td>jump</td></tr>
<tr><td>kick</td><td>19</td><td>kick</td></tr>
<tr><td>land</td><td>20</td><td>land</td></tr>
<tr><td>prejump</td><td>21</td><td>prejump</td></tr>
<tr><td>puke</td><td>22</td><td>puke</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>read</td><td>23</td><td>read</td></tr>
<tr><td>sit</td><td>24</td><td>sit</td></tr>
<tr><td>sleep</td><td>25</td><td>sleep</td></tr>
<tr><td>stand</td><td>26</td><td>stand</td></tr>
<tr><td>standUp</td><td>27</td><td>stand up</td></tr>
<tr><td>stretch</td><td>28</td><td>stretch</td></tr>
<tr><td>stride</td><td>29</td><td>stride</td></tr>
<tr><td>suggest</td><td>30</td><td>suggest</td></tr>
<tr><td>surf</td><td>31</td><td>surf</td></tr>
<tr><td>talk</td><td>32</td><td>talk</td></tr>
<tr><td>think</td><td>33</td><td>think</td></tr>
<tr><td>type</td><td>34</td><td>type</td></tr>
<tr><td>whisper</td><td>35</td><td>whisper</td></tr>
<tr><td>whistle</td><td>36</td><td>whistle</td></tr>
<tr><td>write</td><td>37</td><td>write</td></tr>
<tr><td>yawn</td><td>38</td><td>yawn</td></tr>
<tr><td>yeah</td><td>39</td><td>yeah</td></tr>
<tr><td>yoga</td><td>40</td><td>yoga</td></tr>
<tr><td></td><td>0, 41-127</td><td>reserved</td></tr>
</table>
</td></tr>
<tr><td>SpecificActions</td><td>Describes a SpecificActions type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the SpecificActionsAnimationCS defined in A.4.12.
<table>
<tr><th>Name</th><th>Binary representation (8 bits)</th><th>Description</th></tr>
<tr><td>airGuitar</td><td>1</td><td>air guitar</td></tr>
<tr><td>angryFingerWag</td><td>2</td><td>angry_fingerwag</td></tr>
<tr><td>angryTantrum</td><td>3</td><td>angry_tantrum</td></tr>
</table>
</td></tr>
</table>

Name	Description		
	backFlip	4	back flip
	beckOn	5	beck on
	bigYawn	6	big yawn
	boo	7	boo
	burp	8	burp
	candleStick	9	candle Stick
	comeAgain	10	come again
	decline	11	decline
	dismissive	12	Dismissive
	dontRecognize	13	don't recognize
	fartArm	14	fart arm
	fistPump	15	fist pump
	flySlow	16	fly slow
	guns	17	guns
	ha	18	ha
	hide	19	hide
	hmmm	20	hmmm
	hover	21	hover
	hoverDown	22	hover down
	hoverUp	23	hover up
	huh	24	Huh
	jumpForJoy	25	jump for joy
	kickRoundHouse	26	kick roundhouse
	kissMyButt	27	kiss my butt
	laughtShort	28	laught short
	lol	29	lol

Name	Description		
	loser	30	loser
	motorcycleSit	31	motorcycle sit
	muscleBeach	32	muscle beach
	noWay	33	no way
	noHead	34	no head
	noUnhappy	35	no unhappy
	nod	36	nod
	nope	37	nope
	nyanya	38	nyanya
	okay	39	okay
	oooh	40	oooh
	peace	41	peace
	point	42	point
	pose	43	pose
	punchOneTwo	44	punch one two
	rpsCountDown	45	rps countdown
	rpsPaper	46	rps paper
	rpsRock	47	rps rock
	rpsScissors	48	rps scissors
	score	49	score
	shakeFists	50	shake fists
	show	51	show
	sitGeneric	52	sit generic
	sitGround	53	sit ground
	sitGroundConstrained	54	sit ground constrained
	sitToStand	55	sit to stand

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>slowFly</td><td>56</td><td>slow fly</td></tr>
<tr><td>snapshot</td><td>57</td><td>snapshot</td></tr>
<tr><td>softLand</td><td>58</td><td>soft land</td></tr>
<tr><td>spin</td><td>59</td><td>spin</td></tr>
<tr><td>tantrum</td><td>60</td><td>tantrum</td></tr>
<tr><td>thumbsDown</td><td>61</td><td>thumbs down</td></tr>
<tr><td>thumbsUp</td><td>62</td><td>thumbs up</td></tr>
<tr><td>tongue</td><td>63</td><td>tongue</td></tr>
<tr><td>tryonShirt</td><td>64</td><td>tryon shirt</td></tr>
<tr><td>uncertain</td><td>65</td><td>uncertain</td></tr>
<tr><td>wassamatta</td><td>66</td><td>wassamatta</td></tr>
<tr><td>what</td><td>67</td><td>what</td></tr>
<tr><td>yay</td><td>68</td><td>yay</td></tr>
<tr><td>yesHappy</td><td>69</td><td>yes happy</td></tr>
<tr><td>yesHead</td><td>70</td><td>yes head</td></tr>
<tr><td></td><td>0, 71-255</td><td>reserved</td></tr>
</table>
</td></tr>
<tr><td>FacialExpression</td><td>Describes a FacialExpression type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the FacialExpressionAnimationCS defined in A.4.13.
<table>
<tr><th>Name</th><th>Binary representation (8 bits)</th><th>Description</th></tr>
<tr><td>affection</td><td>1</td><td>affected face</td></tr>
<tr><td>afraid</td><td>2</td><td>afraid face</td></tr>
<tr><td>agree</td><td>3</td><td>agree face</td></tr>
<tr><td>amusement</td><td>4</td><td>amused face</td></tr>
<tr><td>angry</td><td>5</td><td>angry face</td></tr>
<tr><td>annoyance</td><td>6</td><td>annoyance face</td></tr>
</table>
</td></tr>
</table>

Name	Description			
		anxiety	7	anxiety face
		bigSmile	8	big smile face
		blink	9	blink face
		bored	10	bored face
		calm	11	calm face
		concentrate	12	concentrate face
		confused	13	confused face
		contempt	14	contempt face
		content	15	content face
		courage	16	courage face
		cry	17	cry face
		dazed	18	dazed face
		defaultEmotion	19	default emotion face
		delight	20	delight face
		despair	21	despair face
		disagree	22	disagree face
		disappointment	23	disappointment face
		disdain	24	disdain face
		disgusted	25	disgusted face
		doubt	26	doubt face
		elation	27	elation face
		embarrassed	28	embarrassed face
		empathy	29	empathy face
		envy	30	envy face
		excitement	31	excitement face

Name	Description			
		fear	32	fear face
		friendliness	33	friendliness face
		frown	34	frown face
		frustration	35	frustration face
		grin	36	grin face
		guilt	37	guilt face
		happy	38	happy face
		helplessness	39	helpless face
		hope	40	hoping face
		hurt	41	hurt face
		interest	42	interested face
		irritation	43	irritated face
		joy	44	joy face
		kiss	45	kiss face
		laugh	46	laughing face
		lookDown	47	look down face
		lookDownBlink	48	look down blink face
		lookDownLeft	49	look down left face
		lookDownLeftBlink	50	look down left blink face
		lookDownLeftReturn	51	look down left return face
		lookDownReturn	52	look down return face
		lookDownRight	53	look down right face
		lookDownRightBlink	54	look down right blink face

Name	Description			
		lookDownRightReturn	55	look down right return face
		lookLeft	56	look left face
		lookLeftBlink	57	look left blink face
		lookLeftReturn	58	look left return face
		lookRight	59	look right face
		lookRightBlink	60	look right blink face
		lookRightReturn	61	look right return face
		lookUp	62	look up face
		lookUpBlink	63	look up blink face
		lookUpLeft	64	look up left face
		lookUpLeftBlink	65	look up left blink face
		lookUpLeftReturn	66	look up left return face
		lookUpReturn	67	look up return face
		lookUpRight	68	look up right face
		lookUpRightBlink	69	look up right blink face
		lookUpRightReturn	70	look up left return face
		love	71	love face
		mad	72	mad face
		neutral	73	neutral face
		openMouth	74	open mouth face
		pleasure	75	pleased face
		politeness	76	polite face
		powerlessness	77	powerlessness face

Name	Description		
	pride	78	pride face
	pucker	79	puckering
	relaxed	80	relaxed face
	relieved	81	relieved face
	repulsed	82	repulsed face
	sad	83	sad face
	satisfaction	84	satisfied face
	scream	85	screaming
	serene	86	serene face
	shame	87	shame face
	shock	88	shocked face
	shrug	89	shrug face
	sigh	90	sigh face
	smile	91	smiling face
	stress	92	stressed face
	surprise	93	surprised face
	tension	94	tension face
	tongueOut	95	tongue out face
	toothSmile	96	tooth smile face
	tired	97	tired face
	trust	98	trust face
	wink	99	wink face
	worry	100	worried face
	gestureRight	101	gesture right face
	gestureLeft	102	gesture left face
	gestureUp	103	gesture up face

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>gestureDown</td><td>104</td><td>gesture down face</td></tr>
<tr><td></td><td>0, 105-255</td><td>reserved</td></tr>
</table>
</td></tr>
<tr><td>BodyExpression</td><td>Describes a BodyExpression type of animations as a reference to a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the BodyExpressionAnimationCS defined in A.4.14.
<table>
<tr><th>Name</th><th>Binary representation (8 bits)</th><th>Description</th></tr>
<tr><td>affection</td><td>1</td><td>affected pose</td></tr>
<tr><td>afraid</td><td>2</td><td>afraid pose</td></tr>
<tr><td>agree</td><td>3</td><td>agree pose</td></tr>
<tr><td>amusement</td><td>4</td><td>amuse pose</td></tr>
<tr><td>angry</td><td>5</td><td>angry pose</td></tr>
<tr><td>annoyance</td><td>6</td><td>annoyance pose</td></tr>
<tr><td>anxiety</td><td>7</td><td>anxiety pose</td></tr>
<tr><td>bored</td><td>8</td><td>bored pose</td></tr>
<tr><td>calm</td><td>9</td><td>calm pose</td></tr>
<tr><td>concentrate</td><td>10</td><td>concentrate pose</td></tr>
<tr><td>confused</td><td>11</td><td>confused pose</td></tr>
<tr><td>contempt</td><td>12</td><td>contempt pose</td></tr>
<tr><td>content</td><td>13</td><td>content pose</td></tr>
<tr><td>courage</td><td>14</td><td>courage pose</td></tr>
<tr><td>cry</td><td>15</td><td>cry pose</td></tr>
<tr><td>dazed</td><td>16</td><td>dazed pose</td></tr>
<tr><td>delight</td><td>17</td><td>delight pose</td></tr>
<tr><td>despair</td><td>18</td><td>despair pose</td></tr>
<tr><td>disagree</td><td>19</td><td>disagree pose</td></tr>
<tr><td>disappointment</td><td>20</td><td>disappointed pose</td></tr>
</table>
</td></tr>
</table>

Name	Description		
	disdain	21	disdain pose
	disgusted	22	disgusted pose
	doubt	23	doubt pose
	elation	24	elation pose
	embarrassed	25	embarrassed pose
	empathy	26	empathy pose
	envy	27	envy pose
	excitement	28	excitement pose
	fear	29	fear pose
	friendliness	30	friendliness pose
	frown	31	frown pose
	frustration	32	frustrated pose
	grin	33	grin pose
	guilt	34	guilt pose
	happy	35	happy pose
	helplessness	36	helplessness pose
	hope	37	hoping pose
	hurt	38	hurt pose
	interest	39	interested pose
	irritation	40	irritated pose
	joy	41	joy pose
	laugh	42	laughing pose
	love	43	love pose
	mad	44	mad pose
	neutral	45	neutral pose
	pleasure	46	pleasure pose

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>politeness</td><td>47</td><td>politeness pose</td></tr>
<tr><td>powerlessness</td><td>48</td><td>powerlessness pose</td></tr>
<tr><td>pride</td><td>49</td><td>pride pose</td></tr>
<tr><td>pucker</td><td>50</td><td>puckering</td></tr>
<tr><td>relaxed</td><td>51</td><td>relaxed pose</td></tr>
<tr><td>relieved</td><td>52</td><td>relieved pose</td></tr>
<tr><td>repulsed</td><td>53</td><td>repulsed pose</td></tr>
<tr><td>sad</td><td>54</td><td>sad pose</td></tr>
<tr><td>satisfied</td><td>55</td><td>satisfied pose</td></tr>
<tr><td>scream</td><td>56</td><td>screaming</td></tr>
<tr><td>serene</td><td>57</td><td>serene pose</td></tr>
<tr><td>shame</td><td>58</td><td>shame pose</td></tr>
<tr><td>shock</td><td>59</td><td>shocked pose</td></tr>
<tr><td>shrug</td><td>60</td><td>shrug pose</td></tr>
<tr><td>sigh</td><td>61</td><td>sigh pose</td></tr>
<tr><td>smile</td><td>62</td><td>smiling pose</td></tr>
<tr><td>stress</td><td>63</td><td>stressed pose</td></tr>
<tr><td>surprise</td><td>64</td><td>surprised pose</td></tr>
<tr><td>tension</td><td>65</td><td>tension pose</td></tr>
<tr><td>tired</td><td>66</td><td>tired pose</td></tr>
<tr><td>worry</td><td>67</td><td>worried pose</td></tr>
<tr><td></td><td>0, 68-255</td><td>Reserved</td></tr>
</table>
</td></tr>
<tr><td>AnimationResources</td><td>Element that contains a link to animation file.</td></tr>
<tr><td>NumExtra</td><td>This field, which is only present in the binary representation, specifies the number of ExtraType elements contained in the AnimationType.</td></tr>
<tr><td>Extra</td><td>Describes any other categories of animations.</td></tr>
</table>

5.4.4 Examples

This example shows the description of avatar animation information with the following semantics. Among all animations, idle at default, saluting greeting, bow, dance, and salsa dance are given. The animation resources are saved at "http://avatarAnimationdb.com/default_idle.bvh", "http://avatarAnimationdb.com/salutes.bvh", "http://avatarAnimationdb.com/bowing.bvh", "http://avatarAnimationdb.com/dancing.bvh", and "http://avatarAnimationdb.com/salsa.bvh".

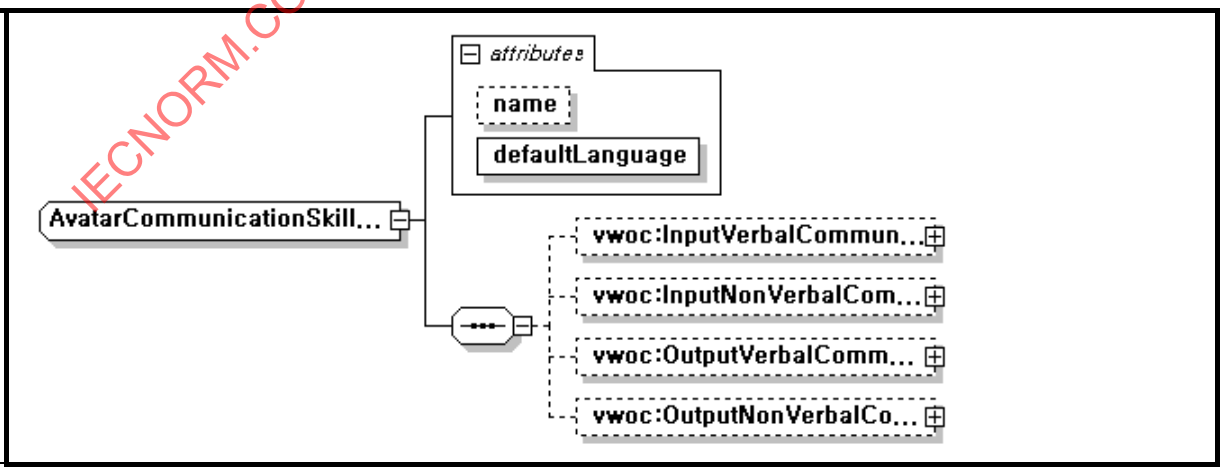
```
<vwoc:Animation>
    <vwoc:Idle>
        <vwoc:Name>urn:mpeg:mpeg-v:01-VWOC-IdleAnimationCS-
NS:defaultIdle</vwoc:Name>
        <vwoc:Uri>http://avatarAnimationdb.com/default_idle.bvh</vwoc:Uri>
    </vwoc:Idle>
    <vwoc:Greeting>
        <vwoc:Name>urn:mpeg:mpeg-v:01-VWOC-GreetingAnimationCS-
NS:salute</vwoc:Name>
        <vwoc:Uri>http://avatarAnimationdb.com/salutes.bvh</vwoc:Uri>
    </vwoc:Greeting>
    <vwoc:Greeting>
        <vwoc:Name>urn:mpeg:mpeg-v:01-VWOC-GreetingAnimationCS-NS:bow</vwoc:Name>
        <vwoc:Uri>http://avatarAnimationdb.com/bowing.bvh</vwoc:Uri>
    </vwoc:Greeting>
    <vwoc:Dance>
        <vwoc:Name>urn:mpeg:mpeg-v:01-VWOC-DanceAnimationCS-NS:dance</vwoc:Name>
        <vwoc:Uri>http://avatarAnimationdb.com/dancing.bvh</vwoc:Uri>
    </vwoc:Dance>
    <vwoc:Dance>
        <vwoc:Name>urn:mpeg:mpeg-v:01-VWOC-DanceAnimationCS-
NS:salsaDance</vwoc:Name>
        <vwoc:Uri>http://avatarAnimationdb.com/salsa.bvh</vwoc:Uri>
    </vwoc:Dance>
</vwoc:Animation>
```

5.5 AvatarCommunicationSkillsType

NOTE This element defines the communication skills[3] of the avatar in relation to other avatars.

5.5.1 XML representation syntax

Diagram



Source	<complexType name="AvatarCommunicationSkillsType"> <sequence> <element name="InputVerbalCommunication" type="vwoc:VerbalCommunicationType" minOccurs="0"/> <element name="InputNonVerbalCommunication" type="vwoc:NonVerbalCommunicationType" minOccurs="0"/> <element name="OutputVerbalCommunication" type="vwoc:VerbalCommunicationType" minOccurs="0"/> <element name="OutputNonVerbalCommunication" type="vwoc:NonVerbalCommunicationType" minOccurs="0"/> </sequence> <attribute name="name" type="string"/> <attribute name="defaultLanguage" type="language" use="required"/> </complexType>

5.5.2 Binary representation syntax

AvatarCommunicationSkillsType{	**Number of bits**	**Mnemonic**
InputVerbalCommunicationFlag	1	bslbf
InputNonVerbalCommunicationFlag	1	bslbf
OutputVerbalCommunicationFlag	1	bslbf
OutputNonVerbalCommaunicationFlag	1	bslbf
NameFlag	1	bslbf
if(InputVerbalCommunicationFlag){		
InputVerbalCommunication		VerbalCommunicationType
}		
if(InputNonVerbalCommunicationFlag){		
InputNonVerbalCommunication		NonVerbalCommunicationType
}		
if(OutputVerbalCommunicationFlag){		
OutputVerbalCommunication		VerbalCommunicationType
}		
if(OutputNonVerbalCommaunicationFlag){		
OutputNonVerbalCommaunication		NonVerbalCommaunicationType
}		

AvatarCommunicationSkillsType{	Number of bits	Mnemonic
if(NameFlag){		
name	See ISO/IEC 10646[8]	UTF-8
}		
DefaultLanguage	See ISO/IEC 10646[8]	UTF-8
}		

5.5.3 Semantics

The objective of the type is that the virtual world and the rest of avatars can adapt their inputs and outputs to these preferences (having a balance with their own preferences too). All inputs and outputs will be individually adapted for each avatar.

The communication preferences are defined by means of two input and two output channels that guarantee multimodality. They are the verbal and non-verbal recognition as input, and the verbal and non-verbal performance as output. These channels can be specified as either enabled or disabled. All channels enabled imply that an avatar is able to speak, to perform gestures and to recognize speak and gestures.

In verbal performance and verbal recognition channels the preference for using the channel either via text or via voice can be specified.

The non-verbal and non-verbal recognition channels specify the types of gesturing: "Nonverbal language", "sign language" and "cued speech communication"[2].

All the features dependent on the language (speaking via text or voice, speaking recognition via text or voice, and sign/cued language use/recognition) use a language attribute for defining the concrete language skills.

Name	Definition
`AvatarCommunicationSkillsType`	A type that contains a set of descriptors providing information on the different modalities an avatar is able to communicate.
`InputVerbalCommunicationFlag`	This field, which is only present in the binary representation, signals the presence of the `InputVerbalCommunication` element. ”1” means that the element shall be used. ”0” means that the element shall not be used.
`InputNonVerbalCommunicationFlag`	This field, which is only present in the binary representation, signals the presence of the `InputNonVerbalCommunication` element. ”1” means that the element shall be used. ”0” means that the element shall not be used.

Name	Definition
OutputVerbalCommunicationFlag	This field, which is only present in the binary representation, signals the presence of the OutputVerbalCommunication element. "1" means that the element shall be used. "0" means that the element shall not be used.
OutputNonVerbalCommaunicationFlag	This field, which is only present in the binary representation, signals the presence of the OutputNonVerbalCommaunication element. "1" means that the element shall be used. "0" means that the element shall not be used.
NameFlag	This field, which is only present in the binary representation, signals the presence of the Name element. "1" means that the element shall be used. "0" means that the element shall not be used.
VerbalCommunicationType	Defines the verbal (voice and text) communication skills of the avatar.
NonVerbalCommunicationType	Defines the non-verbal (body gesture) communication skills of the avatar.
name	A user defined chain of characters used for addressing the CommunicationType element.
defaultLanguage	The native language of the avatar (ex. en for English, es for Spanish. The language shall be written according to the ISO 639 series which lists short codes for language names.) NOTE defaultLanguage attribute specifies the avatar's preferred language for all the communication channels (it will be generally its native language). For each communication channel other languages that override this preference can be specified.

NOTE The ISO 639 series lists short codes for language names. A good reference to short codes for language names is http://en.wikipedia.org/wiki/ISO_639. In addition, another good reference is http://www.sil.org. The ISO 639 code tables can be found at http://www.sil.org/iso639-3/codes.asp.

5.5.4 Examples

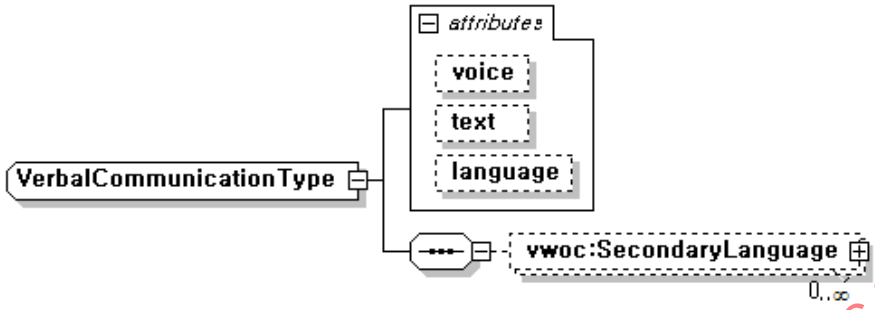
This example shows the description of avatar communication skills with the following semantics. The communication skills have a name of "Korean" which has the default language as "Korean". The preference of the primary input verbal communication is "Korean" as a language preferred for both voice and text. In addition, the secondary input verbal communication is English as a language with the preference of voice. As for the input non-verbal communication, "nod" is chosen for the complementary gesture. The preference of the primary output verbal communication is "Korean" as a language preferred for both voice and text. The secondary output verbal communication is "English" as a language with the preference of "voice". As for the output non-verbal communication, "nod" is chosen for the complementary gesture.

```
<vwoc:CommunicationSkills defaultLanguage="Korean" name="Korean">
   <vwoc:InputVerbalCommunication voice="preferred" text="preferred"
language="Korean">
      <vwoc:SecondaryLanguage preference="voice" name="English"/>
   </vwoc:InputVerbalCommunication>
   <vwoc:InputNonVerbalCommunication complementaryGesture="nod"/>
   <vwoc:OutputVerbalCommunication voice="preferred" text="preferred"
language="Korean">
```

```
        <vwoc:SecondaryLanguage preference="voice" name="English"/>
    </vwoc:OutputVerbalCommunication>
    <vwoc:OutputNonVerbalCommunication complementaryGesture="nod"/>
</vwoc:CommunicationSkills>
```

5.6 VerbalCommunicationType

5.6.1 XML representation syntax

Diagram	
Source	<complexType name="VerbalCommunicationType"> <sequence> <element name="SecondaryLanguage" type="vwoc:LanguageType" minOccurs="0" maxOccurs="unbounded"/> </sequence> <attribute name="voice" type="vwoc:communicationPreferenceLevelType"/> <attribute name="text" type="vwoc:communicationPreferenceLevelType"/> <attribute name="language" type="language"/> </complexType>

5.6.2 Binary representation syntax

VerbalCommunicationType{	Number of bits	Mnemonic
VoiceFlag	1	bslbf
TextFlag	1	bslbf
LanguageFlag	1	bslbf
SecondaryLanguageFlag	1	bslbf
if(VoiceFlag){		
voice		communicationPreferenceLevelType
}		
if(TextFlag){		
text		communicationPreferenceLevelType
}		
if(LanguageFlag){		

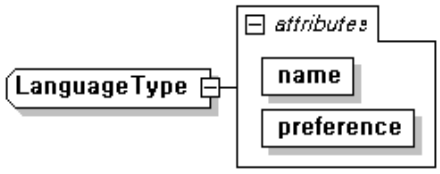
VerbalCommunicationType{	Number of bits	Mnemonic
language	See ISO/IEC 10646[8]	UTF-8
}		
if(SecondaryLanguageFlag){		
NumSecondaryLanguage		
for(k=0; k<NumSecondaryLanguage; k++) {		vluimsbf5
SecondaryLanguage[k]		LanguageType
}		
}		
}		

5.6.3 Semantics

Name	Definition
VerbalCommunicationType	Specifies the avatar's verbal communication skills. Voice and text can be defined as enabled, disabled or preferred in order to specify what the preferred verbal mode is and the availability of the other.
VoiceFlag	This field, which is only present in the binary representation, signals the presence of the Voice element. "1" means that the element shall be used. "0" means that the element shall not be used.
TextFlag	This field, which is only present in the binary representation, signals the presence of the Text element. "1" means that the element shall be used. "0" means that the element shall not be used.
PreferredLanguageFlag	This field, which is only present in the binary representation, signals the presence of the PreferredLanguage element. "1" means that the element shall be used. "0" means that the element shall not be used.
LanguageFlag	This field, which is only present in the binary representation, signals the presence of the Language element. "1" means that the element shall be used. "0" means that the element shall not be used.
PreferredLanguageLength	This field, which is only present in the binary representation, specifies the length of the following PreferredLanguage element.
SecondaryLanguage	Defines the preferred language for verbal communication according to the ISO 639 series which lists short codes for language names.
voice	Defines if the avatar is able or prefers to speak when used for OutputVerbalCommunication and understand when used for InputVerbalCommunication.
text	Defines if the avatar is able or prefers to write when used for OutputVerbalCommunication and read when used for InputVerbalCommunication.
language	Defines the preferred language for verbal communication. If it is not specified, the value of the attribute defaultLanguage defined in the CommunicationSkills type will be applied.

5.7 LanguageType

5.7.1 XML representation syntax

Diagram	
Source	<complexType name="LanguageType"> <attribute name="name" type="language" use="required"/> <attribute name="preference" type="vwoc:communicationPreferenceType" use="required"/> </complexType>

5.7.2 Binary representation syntax

LanguageType {	Number of bits	Mnemonic
name	See ISO/IEC 10646[8]	UTF-8
preference		communicationPreferenceType
}		

5.7.3 Semantics

Name	Definition
LanguageType	Defines secondary communication skills for VerbalCommunication. In case it is not possible to use the preferred language (or the default language) defined for communicating with other avatar, these secondary languages will be applied.
name	String that specifies the name of the language (ex. en for English, es for Spanish…) according to the ISO 639 series which lists short codes for language names.
preference	Define the preference for using the language in verbal communication: voice or text.

5.8 communicationPreferenceType

5.8.1 XML representation syntax

Source	<simpleType name="communicationPreferenceType"> <restriction base="string"> <enumeration value="voice"/> <enumeration value="text"/> </restriction> </simpleType>

5.8.2 Binary representation syntax

communicationPreferenceType {	Number of bits	Mnemonic
communicationPreference	1	bslbf
}		

5.8.3 Semantics

Name	Definition
communicationPreferenceType	Defines the preferred level of communication of the avatar: voice or text. The binary representation of the type is defined as follows. (0: voice, 1: text)

5.9 communicationPreferenceLevelType

5.9.1 XML representation syntax

Source

```
<simpleType name="communicationPreferenceLevelType">
    <restriction base="string">
        <enumeration value="preferred"/>
        <enumeration value="enabled"/>
        <enumeration value="disabled"/>
    </restriction>
</simpleType>
```

5.9.2 Binary representation syntax

communicationPreferenceLevelType {	Number of bits	Mnemonic
communicationPreferenceLevel	2	bslbf
}		

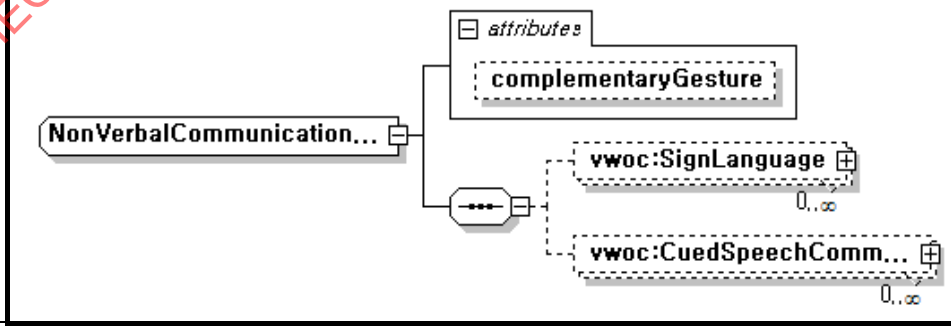
5.9.3 Semantics

Name	Definition
communicationPreferenceLevelType	Defined the level of preference for each language that the avatar can speak/understand. This level can be: preferred, enabled or disabled. The binary representation of the type is defined as follows. (0: preferred, 1: enabled, 2: disabled, or 3: reserved)

5.10 NonVerbalCommunicationType

5.10.1 XML representation syntax

Diagram



Source	<complexType name="NonVerbalCommunicationType"> <sequence> <element name="SignLanguage" type="vwoc:SignLanguageType" minOccurs="0" maxOccurs="unbounded"/> <element name="CuedSpeechCommunication" type="vwoc:SignLanguageType" minOccurs="0" maxOccurs="unbounded"/> </sequence> <attribute name="complementaryGesture" type="string" use="optional"/> </complexType>

5.10.2 Binary representation syntax

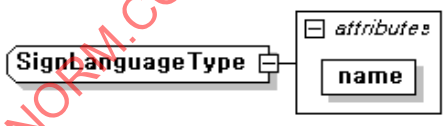
NonVerbalCommunicationType {	Number of bits	Mnemonic
SignLanguageFlag	1	bslbf
CuedSpeechCommunicationFlag	1	bslbf
complementaryGestureFlag	1	bslbf
if(SignLanguageFlag) {		
NumSignLanguage		vluimsbf5
for(k=0; k<NumSignLanguage; k++){		
SignLanguage[k]		SignLanguageType
}		
}		
if(CuedSpeechCommunicationFlag) {		
NumCuedSpeechCommunication		vluimsbf5
for(k=0; k< NumCuedSpeechCommunication; k++){		
CuedSpeechCommunication[k]		SignLanguageType
}		
}		
if(complementaryGestureFlag) {		
complementaryGesture	See ISO/IEC 10646[8]	UTF-8
}		
}		

5.10.3 Semantics

Name	Definition
NonVerbalCommunicationType	Specifies the avatar's non-verbal communication skills.
SignLanguageFlag	This field, which is only present in the binary representation, signals the presence of the SignLanguage elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
CuedSpeechCommunicationFlag	This field, which is only present in the binary representation, signals the presence of the CuedSpeechCommunication elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
complementaryGestureFlag	This field, which is only present in the binary representation, signals the presence of the complementaryGeature attribute. "1" means that the attribute shall be used. "0" means that the attribute shall not be used.
NumSingLanguage	This field, which is only present in the binary representation, specifies the number of SignLanguage elements contained in the SignLanguage.
SignLanguage	Defines the sign languages that the avatar is able to perform when used for OutputVerbalCommunication and interpret when used for InputVerbalCommunication.
NumCuedSpeechCommunication	This field, which is only present in the binary representation, specifies the number of CuedSpeechCommunication elements contained in the CuedSpeechCommunication.
CuedSpeechCommunication	Defines the cued speech communications that the avatar is able to perform when used for OutputVerbalCommunication and interpret when used for InputVerbalCommunication.
complementaryGesture	Defines if the avatar is able to perform complementary gesture during output verbal communication.

5.11 SignLanguageType

5.11.1 XML representation syntax

Diagram	
Source	<complexType name="SignLanguageType"> <attribute name="name" type="language" use="required"/> </complexType>

5.11.2 Binary representation syntax

SignLanguageType {	Number of bits	Mnemonic
name	See ISO/IEC 10646[8]	UTF-8
}		

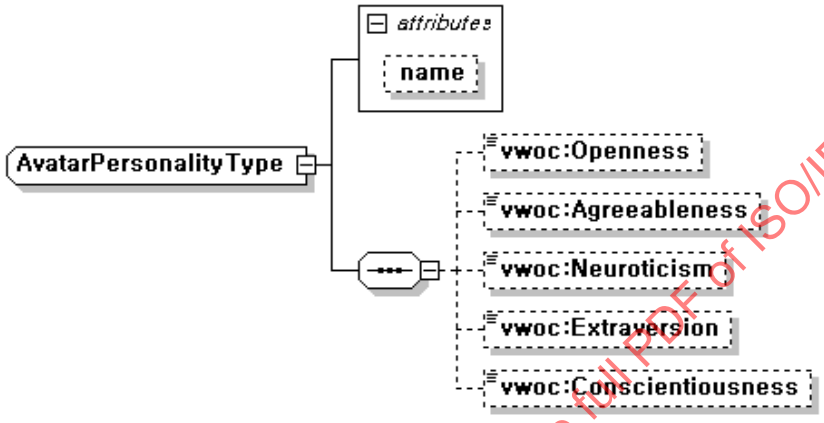
5.11.3 Semantics

Name	Definition
`SignLanguageType`	Defines secondary communication skills for `NonVerbalCommunication` (sign or cued communication). In case it is not possible to use the preferred language (or the default language), these secondary languages will be applied.
`name`	Specifies the name of the language (ex. en for English, es for Spanish…) according to the ISO 639 series which lists short codes for language names.

5.12 AvatarPersonalityType

5.12.1 XML representation syntax

Diagram



Source

```
<complexType name="AvatarPersonalityType">
    <sequence>
        <element name="Openness" type="mpeg7:minusOneToOneType" minOccurs="0"/>
        <element name="Agreeableness" type="mpeg7:minusOneToOneType" minOccurs="0"/>
        <element name="Neuroticism" type="mpeg7:minusOneToOneType" minOccurs="0"/>
        <element name="Extraversion" type="mpeg7:minusOneToOneType" minOccurs="0"/>
        <element name="Conscientiousness" type="mpeg7:minusOneToOneType" minOccurs="0"/>
    </sequence>
    <attribute name="name" type="string"/>
</complexType>
```

5.12.2 Binary representation syntax

AvatarPersonalityType{	Number of bits	Mnemonic
OpennessFlag	1	bslbf
AgreeablenessFlag	1	bslbf
NeuroticismFlag	1	bslbf
ExtraversionFlag	1	bslbf
ConscientiousnessFlag	1	bslbf
NameFlag	1	bslbf
if(OpennessFlag){		

AvatarPersonalityType{	Number of bits	Mnemonic
Openness	32	fsbf
}		
if(AgreeablenessFlag){		
Agreeableness	32	fsbf
}		
if(NeuroticismFlag){		
Neuroticism	32	fsbf
}		
if(ExtraversionFlag){		
Extraversion	32	fsbf
}		
if(ConscientiousnessFlag){		
Conscientiousness	32	fsbf
}		
if(NameFlag){		
name	See ISO/IEC 10646[8]	UTF-8
}		
}		

5.12.3 Semantics

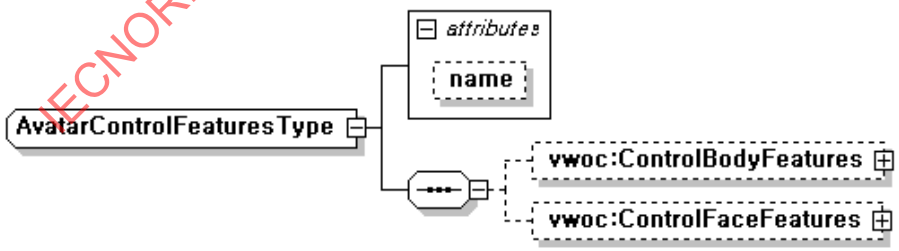
This tag[3] defines the personality of the avatar. This definition is based on the OCEAN model[1], consisting in a set of characteristics that personality is composed of. A combination of these characteristics is a specific personality. Therefore, an avatar contains a subtag for each attribute defined in OCEAN's model. They are: `openness`, `conscientiousness`, `extraversion`, `agreeableness` and `neuroticism`.

The purpose of this tag is to provide the possibility to define the avatar personality that is desired, and that the architecture of the virtual world can interpret as the inhabitant wishes. It would be able to adapt the avatar's verbal and non-verbal communication to this personality. Moreover, emotions and moods that could be provoked by virtual world events, avatar-avatar communication or the real time flow, will be modulated by this base personality.

Name	Definition
AvatarPersonalityType	A type that contains a set of descriptors defining the personality of the avatar.
OpennessFlag	This field, which is only present in the binary representation, signals the presence of the Openness element. "1" means that the element shall be used. "0" means that the element shall not be used.
AgreeablenessFlag	This field, which is only present in the binary representation, signals the presence of the Agreeableness element. "1" means that the element shall be used. "0" means that the element shall not be used.
NeuroticismFlag	This field, which is only present in the binary representation, signals the presence of the Neuroticism element. "1" means that the element shall be used. "0" means that the element shall not be used.
ExtraversionFlag	This field, which is only present in the binary representation, signals the presence of the Extraversion element. "1" means that the element shall be used. "0" means that the element shall not be used.
ConscientiousnessFlag	This field, which is only present in the binary representation, signals the presence of the Conscientiousness element. "1" means that the element shall be used. "0" means that the element shall not be used.
NameFlag	This field, which is only present in the binary representation, signals the presence of the name element. "1" means that the element shall be used. "0" means that the element shall not be used.
Openness	A value between -1 and 1 specifying the openness level of the personality
Agreeableness	A value between -1 and 1 specifying the agreeableness level of the personality
Neuroticism	A value between -1 and 1 specifying the neuroticism level of the personality
Extraversion	A value between -1 and 1 specifying the extraversion level of the personality
Conscientiousness	A value between -1 and 1 specifying the conscientiousness level of the personality
name	A string value that specifies the name of personality.

5.13 AvatarControlFeaturesType

5.13.1 XML representation syntax

Diagram	
Source	<complexType name="AvatarControlFeaturesType"> <sequence> <element name="ControlBodyFeatures" type="vwoc:ControlBodyFeaturesType" minOccurs="0"/> <element name="ControlFaceFeatures" type="vwoc:ControlFaceFeaturesType" minOccurs="0"/> </sequence> <attribute name="name" type="string"/> </complexType>

5.13.2 Binary representation syntax

AvatarControlFeaturesType {	Number of bits	Mnemonic
ControlBodyFeaturesFlag	1	bslbf
ControlFaceFeaturesFlag	1	bslbf
if(ControlBodyFeaturesFlag){		
ControlBodyFeatures		ControlBodyFeaturesType
}		
if(ControlFaceFeaturesFlag){		
ControlFaceFeatures		ControlFaceFeaturesType
}		
if(NameFlag){		
name	See ISO/IEC 10646[8]	UTF-8
}		
}		

5.13.3 Semantics

Name	Description
AvatarControlFeaturesType	A type that contains a set of descriptors defining possible place-holders for sensors on body skeleton and face feature points.
ControlBodyFeaturesFlag	This field, which is only present in the binary representation, signals the presence of the ControlBodyFeatures element. "1" means that the element shall be used. "0" means that the element shall not be used.
ControlFaceFeaturesFlag	This field, which is only present in the binary representation, signals the presence of the ControlFaceFeatures element. "1" means that the element shall be used. "0" means that the element shall not be used.
NameFlag	This field, which is only present in the binary representation, signals the presence of the name element. "1" means that the element shall be used. "0" means that the element shall not be used.
ControlBodyFeatures	Set of elements that control moves of the body (bones)
ControlFaceFeatures	Set of elements that control moves of the face
name	A string value that specifies the name of control features.

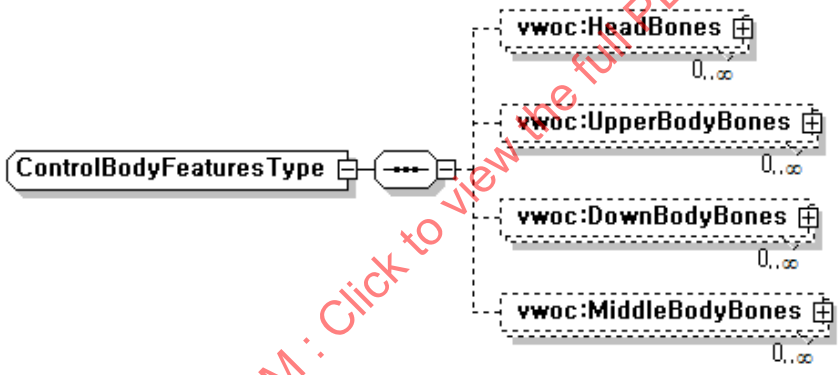
5.13.4 Examples

This example shows the description of controlling body and face features with the following semantics. The features control is given and works as a container.

```
<vwoc:ControlFeatures>
   <vwoc:ControlBodyFeatures>
      <vwoc:HeadBones name="urn:mpeg:mpeg-v:01-VWOC-HeadBonesCS-NS:skull"
alias="Head"/>
      …
   </vwoc:ControlBodyFeatures>
   <vwoc:ControlFaceFeatures>
      <vwoc:HeadOutline>
         …
      </vwoc:HeadOutline>
      …
   </vwoc:ControlFaceFeatures>
</vwoc:ControlFeatures>
```

5.14 ControlBodyFeaturesType

5.14.1 XML representation syntax

Diagram	
Source	<complexType name="ControlBodyFeaturesType"> <sequence> <element name="HeadBones" type="vwoc:ControlBodyFeaturesDescriptionType" minOccurs="0" maxOccurs="unbounded"/> <element name="UpperBodyBones" type="vwoc:ControlBodyFeaturesDescriptionType" minOccurs="0" maxOccurs="unbounded"/> <element name="DownBodyBones" type="vwoc:ControlBodyFeaturesDescriptionType" minOccurs="0" maxOccurs="unbounded"/> <element name="MiddleBodyBones" type="vwoc:ControlBodyFeaturesDescriptionType" minOccurs="0" maxOccurs="unbounded"/> </sequence> </complexType>

5.14.2 Binary representation syntax

ControlBodyFeaturesType{	Number of bits	Mnemonic
HeadBonesFlag	1	bslbf
UpperBodyBonesFlag	1	bslbf
DownBodyBonesFlag	1	bslbf
MiddleBodyBonesFlag	1	bslbf
if(HeadBonesFlag){		
NumHeadBones		vluimsbf5
for(k=0; k<HeadBones; k++){		
HeadBones[k]		ControlBodyFeaturesDescriptionType
}		
}		
if(UpperBodyBonesFlag){		
NumUpperBodyBones		vluimsbf5
for(k=0; k<NumUpperBodyBones; k++){		
UpperBodyBones[k]		ControlBodyFeaturesDescriptionType
}		
}		
if(DownBodyBonesFlag){		
NumDownBodyBones		vluimsbf5
for(k=0; k<NumDownBodyBones; k++){		
DownBodyBones[k]		ControlBodyFeaturesDescriptionType
}		
}		
if(MiddleBodyBonesFlag){		

ControlBodyFeaturesType{	Number of bits	Mnemonic
NumMiddleBodyBones		vluimsbf5
for(k=0; k<NumMiddleBodyBones; k++){		
MiddleBodyBones[k]		ControlBodyFeaturesDescriptionType
}		
}		
}		

5.14.3 Semantics

Name	**Description** (compare with human bones)
`ControlBodyFeaturesType`	A type that contains a set of descriptors defining possible place-holders for sensors on body skeleton.
`HeadBonesFlag`	This field, which is only present in the binary representation, signals the presence of the `HeadBones` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`UpperBodyBonesFlag`	This field, which is only present in the binary representation, signals the presence of the `UpperBodyBones` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`DownBodyBonesFlag`	This field, which is only present in the binary representation, signals the presence of the `DownBodyBones` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`MiddleBodyBonesFlag`	This field, which is only present in the binary representation, signals the presence of the `MiddleBodyBones` element. "1" means that the element shall be used. "0" means that the element shall not be used.
`NumHeadBones`	This field, which is only present in the binary representation, specifies the number of `HeadBones` elements contained in the `ControlBodyFeaturesType`.
`HeadBones`	Set of bones on the head: a list of the head bones is included in a classification scheme (CS) term that shall be using the `mpeg7:termReferenceType` defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the `HeadBonesCS` defined in ISO/IEC 23005-6: —, A.2.12.1. The binary representation of the `HeadBonesCS` is also defined in the same Annex.

Name	Description
`cervicalVertebrae7`	cervical vertebrae 7
`cervicalVertebrae6`	cervical vertebrae 6
`cervicalVertebrae5`	cervical vertebrae 5
`cervicalVertebrae4`	cervical vertebrae 4
`cervicalVertebrae3`	cervical vertebrae 3
`cervicalVertebrae2`	cervical vertebrae 2
`cervicalVertebrae1`	cervical vertebrae 1
`skull`	skull
`lEyelid`	left eyelid

<table>
<tr><th>Name</th><th>Description (compare with human bones)</th></tr>
<tr><td></td><td>
<table>
<tr><td>rEyelid</td><td>right eyelid</td></tr>
<tr><td>lEyeball</td><td>left eyeball</td></tr>
<tr><td>rEyeball</td><td>right eyeball</td></tr>
<tr><td>lEyebrow</td><td>left eyebrow</td></tr>
<tr><td>rEyebrow</td><td>right eyebrow</td></tr>
<tr><td>jaw</td><td>jaw</td></tr>
</table>
</td></tr>
<tr><td>NumUpperBodyBones</td><td>This field, which is only present in the binary representation, specifies the number of UpperBodyBones elements contained in the ControlBodyFeaturesType.</td></tr>
<tr><td>UpperBodyBones</td><td>Set of bones on the upper part of the body, mainly arms and hands bones: a list of the upper body bones is included in a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the UpperBodyBonesCS defined in ISO/IEC 23005-6: —, A.2.12.2. The binary representation of the UpperBodyBonesCS is also defined in the same Annex.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>lClavicle</td><td>left clavicle</td></tr>
<tr><td>lScapulae</td><td>left scapulae</td></tr>
<tr><td>lHumerus</td><td>left humerus</td></tr>
<tr><td>lRadius</td><td>left radius</td></tr>
<tr><td>lWrist</td><td>left wrist</td></tr>
<tr><td>lHand</td><td>left hand</td></tr>
<tr><td>lThumb</td><td>left thumb metacarpal</td></tr>
<tr><td>lPhalanges1</td><td>left phalanges1</td></tr>
<tr><td>lThumb2</td><td>left thumb</td></tr>
<tr><td>lPhalanges2</td><td>left phalanges2</td></tr>
<tr><td>lIndex</td><td>left index metacarpal</td></tr>
<tr><td>lPhalanges3</td><td>left phalanges3</td></tr>
<tr><td>lPhalanges4</td><td>left phalanges4</td></tr>
<tr><td>lPhalanges5</td><td>left phalanges5</td></tr>
<tr><td>lMiddle</td><td>left middle metacarpal</td></tr>
<tr><td>lPhalanges6</td><td>left phalanges6</td></tr>
<tr><td>lPhalanges7</td><td>left phalanges7</td></tr>
<tr><td>lPhalanges8</td><td>left phalanges8</td></tr>
<tr><td>lRing</td><td>left ring metacarpal</td></tr>
<tr><td>lPhalanges9</td><td>left phalanges9</td></tr>
<tr><td>lPhalanges10</td><td>left phalanges10</td></tr>
<tr><td>lPhalanges11</td><td>left phalanges11</td></tr>
<tr><td>lPinky</td><td>left pinky metacarpal</td></tr>
<tr><td>lPhalanges12</td><td>left phalanges12</td></tr>
<tr><td>lPhalanges13</td><td>left phalanges13</td></tr>
<tr><td>lPhalanges14</td><td>left phalanges14</td></tr>
<tr><td>rClavicle</td><td>right clavicle</td></tr>
<tr><td>rScapulae</td><td>right scapulae</td></tr>
<tr><td>rHumerus</td><td>right humerus</td></tr>
<tr><td>rRadius</td><td>right radius</td></tr>
<tr><td>rWrist</td><td>right wrist</td></tr>
<tr><td>rHand</td><td>right hand</td></tr>
<tr><td>rThumb</td><td>right thumb metacarpal</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Name</th><th>Description (compare with human bones)</th></tr>
<tr><td></td><td>
<table>
<tr><td>rPhalanges1</td><td>right phalanges1</td></tr>
<tr><td>rThumb2</td><td>right thumb</td></tr>
<tr><td>rPhalanges2</td><td>right phalanges2</td></tr>
<tr><td>rIndex</td><td>right index metacarpal</td></tr>
<tr><td>rPhalanges3</td><td>right phalanges3</td></tr>
<tr><td>rPhalanges4</td><td>right phalanges4</td></tr>
<tr><td>rPhalanges5</td><td>right phalanges5</td></tr>
<tr><td>rMiddle</td><td>right middle metacarpal</td></tr>
<tr><td>rPhalanges6</td><td>right phalanges6</td></tr>
<tr><td>rPhalanges7</td><td>right phalanges7</td></tr>
<tr><td>rPhalanges8</td><td>right phalanges8</td></tr>
<tr><td>rRing</td><td>right ring metacarpal</td></tr>
<tr><td>rPhalanges9</td><td>right phalanges9</td></tr>
<tr><td>rPhalanges10</td><td>right phalanges10</td></tr>
<tr><td>rPhalanges11</td><td>right phalanges11</td></tr>
<tr><td>rPinky</td><td>right pinky metacarpal</td></tr>
<tr><td>rPhalanges12</td><td>right phalanges12</td></tr>
<tr><td>rPhalanges13</td><td>right phalanges13</td></tr>
<tr><td>rPhalanges14</td><td>right phalanges14</td></tr>
</table>
</td></tr>
<tr><td>NumDownBodyBones</td><td>This field, which is only present in the binary representation, specifies the number of DownBodyBones elements contained in the ControlBodyFeaturesType.</td></tr>
<tr><td>DownBodyBones</td><td>Set of bones on the down part of the body, mainly legs and foot bones: a list of the down body bones is included in a classification scheme (CS) term that shall be using the mpeg7:termReferenceType defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the DownBodyBonesCS defined in ISO/IEC 23005-6: —, A.2.12.3. The binary representation of the DownBodyBonesCS is also defined in the same Annex.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>lFemur</td><td>left femur</td></tr>
<tr><td>lPatella</td><td>left patella (knee bone)</td></tr>
<tr><td>lTibia</td><td>left tibia (femur in front)</td></tr>
<tr><td>lFibulae</td><td>left fibulae</td></tr>
<tr><td>lTarsals1</td><td>left tarsals1</td></tr>
<tr><td>lTarsals2</td><td>left tarsals2 (7 are all)</td></tr>
<tr><td>lMetaTarsals</td><td>left metatarsals (5) (foot parts)</td></tr>
<tr><td>lPhalanges</td><td>left phalanges (1 - 14) (foot parts)</td></tr>
<tr><td>rFemur</td><td>right femur</td></tr>
<tr><td>rPatella</td><td>right patella (knee bone)</td></tr>
<tr><td>rTibia</td><td>right tibia (femur in front)</td></tr>
<tr><td>rFibulae</td><td>right fibulae</td></tr>
<tr><td>rTarsals1</td><td>right tarsals1 (parts of ankle)</td></tr>
<tr><td>rTarsals2</td><td>right tarsals2 (7 are all)</td></tr>
<tr><td>rMetaTarsals</td><td>right metatarsals (5) (foot parts)</td></tr>
<tr><td>rPhalanges</td><td>right phalanges (1 - 14) (foot parts)</td></tr>
</table>
</td></tr>
<tr><td>NumMiddleBodyBones</td><td>This field, which is only present in the binary representation, specifies the number of MiddleBodyBones elements contained in the ControlBodyFeaturesType.</td></tr>
<tr><td>MiddleBodyBones</td><td>Set of bones on the middle part of the body, torso: a list of the middle body</td></tr>
</table>

Name	**Description** (compare with human bones)
	bones is included in a classification scheme (CS) term that shall be using the `mpeg7:termReferenceType` defined in ISO/IEC 15938-5:2003, 7.6. A CS that may be used for this purpose is the `MiddleBodyBonesCS` defined in ISO/IEC 23005-6: —, A.2.12.4. The binary representation of the `MiddleBodyBonesCS` is also defined in the same Annex.

Name	Description
`sacrum`	sacrum
`pelvis`	pelvis
`lumbarVertebrae5`	lumbar vertebrae 5
`lumbarVertebrae4`	lumbar vertebrae 4
`lumbarVertebrae3`	lumbar vertebrae 3
`lumbarVertebrae2`	lumbar vertebrae 2
`lumbarVertebrae1`	lumbar vertebrae 1
`thoracicVertebrae12`	thoracic vertebrae 12
`thoracicVertebrae11`	thoracic vertebrae 11
`thoracicVertebrae10`	thoracic vertebrae 10
`thoracicVertebrae9`	thoracic vertebrae 9
`thoracicVertebrae8`	thoracic vertebrae 8
`thoracicVertebrae7`	thoracic vertebrae 7
`thoracicVertebrae6`	thoracic vertebrae 6
`thoracicVertebrae5`	thoracic vertebrae 5
`thoracicVertebrae4`	thoracic vertebrae 4
`thoracicVertebrae3`	thoracic vertebrae 3
`thoracicVertebrae2`	thoracic vertebrae 2
`thoracicVertebrae1`	thoracic vertebrae 1

5.14.4 Examples

This example shows the description of controlling body features with the following semantics. The body features control maps the user defined body feature points to the placeholders. The following set of the feature points are mapped to the placeholders defined in the semantics.

Name of Placeholder	User defined features
sacrum	Hip
pelvis	Abdomen
lFemur	LThigh
lTibia (femur in front)	LShin
lFibulae	LFoot
rFemur	RThigh
rTibia (femur in front)	RShin
rFibulae	RFoot
thoracicVertebrae1	Chest
cervicalVertebrae1	Neck
skull	Head
lClavicle	LCollar
lHumerus	LShldr
lRadius	LForeArm
lHand	LHand
rClavicle	RCollar
rHumerus	RShldr

rRadius	RForeArm
rHand	RHand

```
<vwoc:ControlFeatures>
   <vwoc:ControlBodyFeatures>
     <vwoc:HeadBones name="urn:mpeg:mpeg-v:01-VWOC-HeadBonesCS-NS:skull"
alias="Head"/>
     <vwoc:HeadBones name="urn:mpeg:mpeg-v:01-VWOC-HeadBonesCS-
NS:cervicalVerbae1" alias="Neck"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:lClavicle" alias="LCollar"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:lHumerus" alias="LShldr"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:lRadius" alias="LForeArm"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:lHand" alias="LHand"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:rClavicle" alias="RCollar"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:rHumerus" alias="RShldr"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:rRadius" alias="RForeArm"/>
     <vwoc:UpperBodyBones name="urn:mpeg:mpeg-v:01-VWOC-UpperBodyBonesCS-
NS:rHand" alias="RHand"/>
     <vwoc:DownBodyBones name="urn:mpeg:mpeg-v:01-VWOC-DownBodyBonesCS-
NS:lFemur" alias="LThigh"/>
     <vwoc:DownBodyBones name="urn:mpeg:mpeg-v:01-VWOC-DownBodyBonesCS-
NS:lTibia" alias="LShin"/>
     <vwoc:DownBodyBones name="urn:mpeg:mpeg-v:01-VWOC-DownBodyBonesCS-
NS:lFibulae" alias="LFoot"/>
     <vwoc:DownBodyBones name="urn:mpeg:mpeg-v:01-VWOC-DownBodyBonesCS-
NS:rFemur" alias="RThigh"/>
     <vwoc:DownBodyBones name="urn:mpeg:mpeg-v:01-VWOC-DownBodyBonesCS-
NS:rTibia" alias="RShin"/>
     <vwoc:DownBodyBones name="urn:mpeg:mpeg-v:01-VWOC-DownBodyBonesCS-
NS:rFibulae" alias="RFoot"/>
     <vwoc:MiddleBodyBones name="urn:mpeg:mpeg-v:01-VWOC-MiddleBodyBonesCS-
NS:sacrum" alias="Hip"/>
     <vwoc:MiddleBodyBones name="urn:mpeg:mpeg-v:01-VWOC-MiddleBodyBonesCS-
NS:pelvis" alias="Abdomen"/>
     <vwoc:MiddleBodyBones name="urn:mpeg:mpeg-v:01-VWOC-MiddleBodyBonesCS-
NS:thoracicVertebrae1" alias="Chest"/>
   </vwoc:ControlBodyFeatures>
</vwoc:ControlFeatures>
```


5.15 ControlBodyFeaturesDescriptionType

5.15.1 XML representation syntax

Diagram	
Source	<complexType name="ControlBodyFeaturesDescriptionType"> <attribute name="name" type="mpeg7:termReferenceType" use="required"/>

```
        <attribute name="alias" type="string" use="required"/>
</complexType>
```

5.15.2 Binary representation syntax

ControlBodyFeaturesDescriptionType {	Number of bits	Mnemonic
TypeOfBodyFeature	3	bslbf
name	8	Number of bits are defined by the type of body feature as a reference to classification scheme
alias	See ISO/IEC 10646[8]	UTF-8
}		

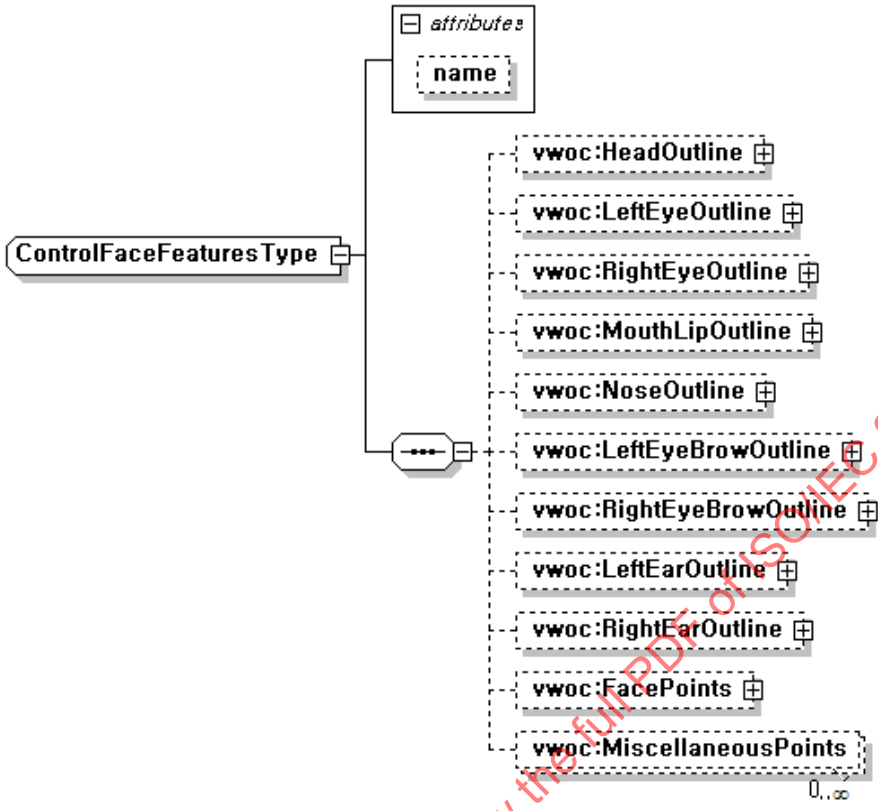
5.15.3 Semantics

Name	Definition
`ControlBodyFeaturesDescriptionType`	A type that contains the name and its alias of a body feature.
`TypeOfBodyFeature`	This field, which is only present in the binary representation, describes a type of body features as one of the classification schemes (CSs). The CSs that may be used for this purpose is defined in ISO/IEC 23005-6: —, A.2.12.
`name`	Describes a type of body features as a reference to classification scheme (CS) term that shall be using the `mpeg7:termReferenceType` defined in ISO/IEC 15938-5:2003, 7.6. The CSs that may be used for this purpose is defined in ISO/IEC 23005-6: —, A.2.12.
`alias`	Describes the name of a specific body feature type.

Type of Body Feature	Binary representation for sensor type (3 bits)
`HeadBonesCS`	000
`UpperBodyBonesCS`	001
`DownBodyBonesCS`	010
`MiddleBodyBonesCS`	011
`Reserved`	100-111

5.16 ControlFaceFeaturesType

5.16.1 XML representation syntax

Diagram	
Source	<complexType name="ControlFaceFeaturesType"> <sequence> <element name="HeadOutline" type="vwoc:OutlineType" minOccurs="0"/> <element name="LeftEyeOutline" type="vwoc:OutlineType" minOccurs="0"/> <element name="RightEyeOutline" type="vwoc:OutlineType" minOccurs="0"/> <element name="MouthLipOutline" type="vwoc:OutlineType" minOccurs="0"/> <element name="NoseOutline" type="vwoc:OutlineType" minOccurs="0"/> <element name="LeftEyeBrowOutline" type="vwoc:Outline4PointsType" minOccurs="0"/> <element name="RightEyeBrowOutline" type="vwoc:Outline4PointsType" minOccurs="0"/> <element name="LeftEarOutline" type="vwoc:Outline4PointsType" minOccurs="0"/> <element name="RightEarOutline" type="vwoc:Outline4PointsType" minOccurs="0"/> <element name="FacePoints" type="vwoc:OutlineType" minOccurs="0"/> <element name="MiscellaneousPoints" type="vwoc:PointType" minOccurs="0" maxOccurs="unbounded"/> </sequence> <attribute name="name" type="string"/> </complexType>

5.16.2 Binary representation syntax

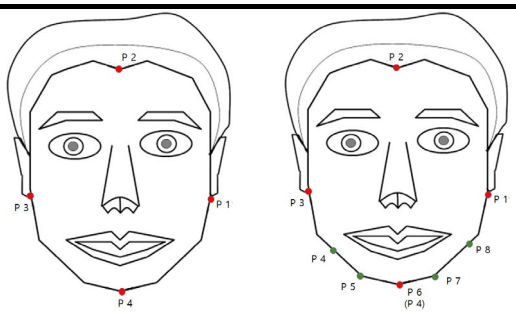
ControlFaceFeaturesType {	Number of bits	Mnemonic
HeadOutlineFlag	1	bslbf
LeftEyeOutlineFlag	1	bslbf
RightEyeOutlineFlag	1	bslbf
MouthLipOutlineFlag	1	bslbf
NoseOutlineFlag	1	bslbf
LeftEyeBrowOutlineFlag	1	bslbf
RightEyeBrowOutlineFlag	1	bslbf
LeftEarOutlineFlag	1	bslbf
RightEarOutlineFlag	1	bslbf
FacePointsFlag	1	bslbf
MiscellaneousPointsFlag	1	bslbf
NameFlag	1	bslbf
if(HeadOutlineFlag){		
HeadOutline		OutlineType
}		
if(LeftEyeOutlineFlag){		
LeftEyeOutline		OutlineType
}		
if(RightEyeOutlineFlag){		
RightEyeOutline		OutlineType
}		
if(MouthLipOutlineFlag){		
MouthLipOutline		OutlineType
}		
if(NoseOutlineFlag){		

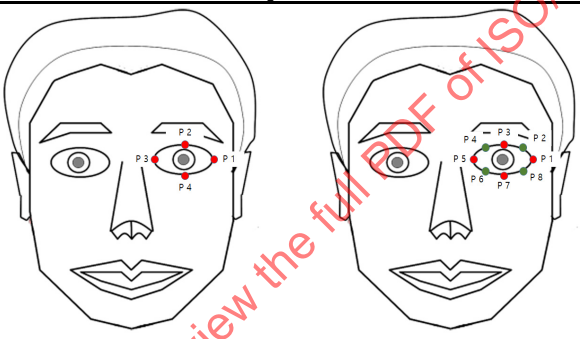
ControlFaceFeaturesType {	Number of bits	Mnemonic
NoseOutline		OutlineType
}		
if(LeftEyeBrowOutlineFlag){		
LeftEyeBrowOutline		Outline4PointsType
}		
if(RightEyeBrowOutlineFlag){		
RightEyeBrowOutline		Outline4PointsType
}		
if(LeftEarOutlineFlag){		
LeftEarOutline		Outline4PointsType
}		
if(RightEarOutlineFlag){		
RightEarOutline		Outline4PointsType
}		
if(FacePointsFlag){		
FacePoints		OutlineType
}		
if(MiscellaneousPointsFlag){		
LoopMiscellaneousPoints		vluimsbf5
for(k=0;k< LoopMiscellaneousPoints;k++){		
MiscellaneousPoints[k]		PointType
}		
}		
if(NameFlag){		
name	See ISO/IEC 10646[8]	UTF-8
}		

ControlFaceFeaturesType {	Number of bits	Mnemonic
}		

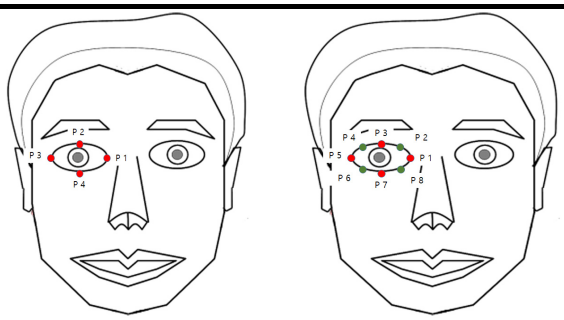
5.16.3 Semantics

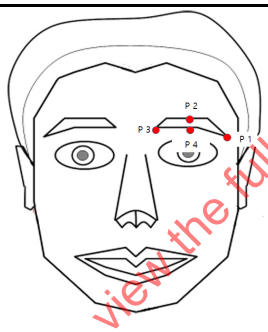
Name	Description
ControlFaceFeaturesType	A type that contains the name and its alias of a face feature.
HeadOutlineFlag	This field, which is only present in the binary representation, signals the presence of the HeadOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
LeftEyeOutlineFlag	This field, which is only present in the binary representation, signals the presence of the LeftEyeOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
RightEyeOutlineFlag	This field, which is only present in the binary representation, signals the presence of the RightEyeOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
MouthLipOutlineFlag	This field, which is only present in the binary representation, signals the presence of the MouthLipOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
NoseOutlineFlag	This field, which is only present in the binary representation, signals the presence of the NoseOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
LeftEyeBrowOutlineFlag	This field, which is only present in the binary representation, signals the presence of the LeftEyeBrowOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
RightEyeBrowOutlineFlag	This field, which is only present in the binary representation, signals the presence of the RightEyeBrowOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
LeftEarOutlineFlag	This field, which is only present in the binary representation, signals the presence of the LeftEarOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
RightEarOutlineFlag	This field, which is only present in the binary representation, signals the presence of the RightEarOutline element. "1" means that the element shall be used. "0" means that the element shall not be used.
FacePointsFlag	This field, which is only present in the binary representation, signals the presence of the FacePoints element. "1" means that the element shall be used. "0" means that the element shall not be used.
MiscellaneousPointsFlag	This field, which is only present in the binary representation, signals the presence of the MiscellaneousPoints element. "1" means that the element shall be used. "0" means that the element shall not be used.
NameFlag	This field, which is only present in the binary representation, signals the presence of the Name attribute. "1" means that the element shall be used. "0" means that the element shall not be used.

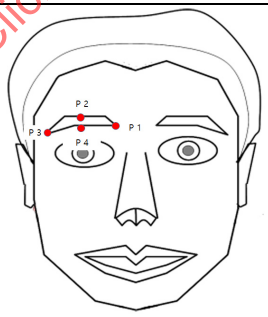
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>HeadOutline</td><td>


Describes the outline of the head. The red dots in figure on the left hand side represent the points forming the basic outline. The additional 4 green points and the red dots on the right hand side in the above figure form the high resolution outline of the head.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Outline4points</td><td>Describes a basic outline of the head</td></tr>
<tr><td>Outline8points</td><td>Describes the extended outline of the head for the higher resolution outline of the head with 8 points.</td></tr>
</table>
</td></tr>
<tr><td>LeftEyeOutline</td><td>


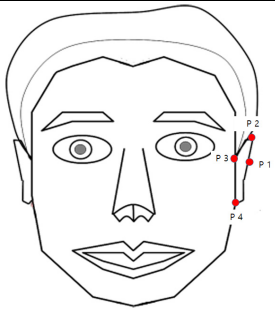
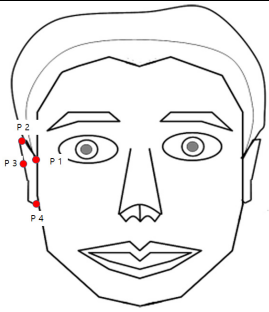
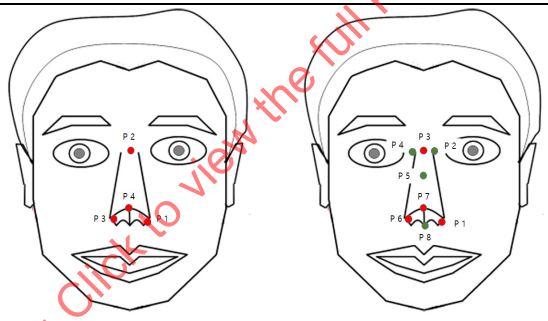
Describes the outline of the left eye. The red dots in figure on the left hand side represent the points forming the basic outline. The additional 4 green points and the red dots in the above figure on the right hand side form the high resolution outline.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Outline4points</td><td>Describes a basic outline of the left eye</td></tr>
<tr><td>Outline8points</td><td>Describes the extended outline of the left for the higher resolution outline of the head with 8 points.</td></tr>
</table>
</td></tr>
</table>

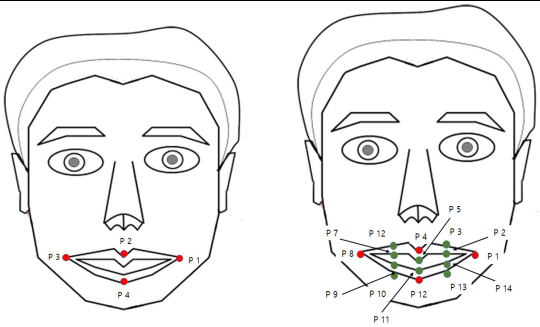
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>RightEyeOutline</td><td> 

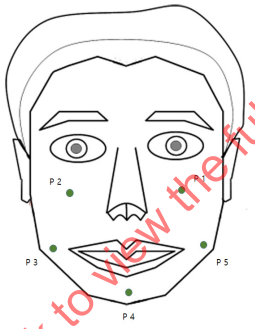
Describes the outline of the right eye. The red dots in figure on the left hand side represent the points forming the basic outline. The additional 4 green points and the red dots in the above figure on the right hand side form the high resolution outline.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Outline4points</td><td>Describes a basic outline of the right eye</td></tr>
<tr><td>Outline8points</td><td>Describes the extended outline of the left for the higher resolution outline of the head with 8 points.</td></tr>
</table></td></tr>
<tr><td>LeftEyeBrowOutline</td><td> 

Describes the outline of the left eyebrow</td></tr>
<tr><td>RightEyeBrowOutline</td><td> 

Describes the outline of the right eyebrow</td></tr>
</table>

Name	Description
LeftEarOutline	 Describes the outline of the left ear
RightEarOutline	 Describes the outline of the right ear
NoseOutline	 Describes the basic outline of the nose. The red dots represent the points forming the basic outline. The red dots in figure on the left hand side represent the points forming the basic outline. The additional 4 green points and the red dots in the above figure on the right hand side form the high resolution outline. **Name** — **Description** Outline4points — Describes a basic outline of the nose Outline8points — Describes the extended outline of the left for the higher resolution outline of the nose with 8 points.

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>MouthLipOutline</td><td> 

Describes the outline of the mouth lips. The red dots represent the points forming the basic outline. The red dots in figure on the left hand side represent the points forming the basic outline. The additional 10 green points and the red dots in the above figure on the right hand side form the high resolution outline.
<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Outline4points</td><td>Describes a basic outline of the mouth lips</td></tr>
<tr><td>Outline14points</td><td>Describes the extended outline of the left for the higher resolution outline of the head with 14 points.</td></tr>
</table></td></tr>
<tr><td>FacePoints</td><td> 

The green dots form a high resolution facial expression.</td></tr>
<tr><td>LoopMiscellaneousPoints</td><td>This field, which is only present in the binary representation, specifies the number of miscellaneous points.</td></tr>
<tr><td>MiscellaneousPoints</td><td>Describes any arbitrary feature points which can be placed and defined for an advanced facial feature control.</td></tr>
<tr><td>name</td><td>The name of the face control configuration</td></tr>
<tr><td>PointType</td><td>An astract type providing root for two different point types, which are LogicalPointType and Physical3DPointType for specifying a feature point for face feature control.</td></tr>
</table>

5.16.4 Examples

This example shows the description of controlling face features with the following semantics. The face features control maps the user defined face feature points to the placeholders. The following set of the feature points are mapped to the placeholders defined in the semantics.

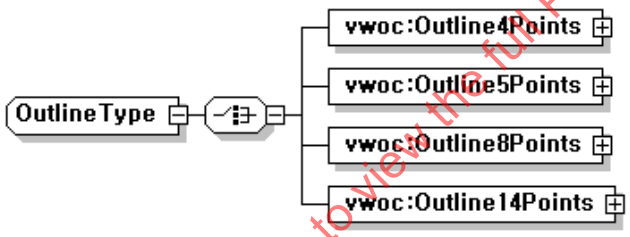
Name of Placeholder		User defined features	
HeadOutline	Point1	Head	HeadLeft
	Point2		HeadTop
	Point3		HeadRight
	Point4		HeadDown
LeftEyeOutline	Point1	Leye	LeyeLeft
	Point2		LeyeTop
	Point3		LeyeRight
	Point4		LeyeDown
RightEyeOutline	Point1	Reye	ReyeLeft
	Point2		ReyeTop
	Point3		ReyeRight
	Point4		ReyeDown
MouthLipOutline	Point1	Lips	LipsLeft
	Point2		LipsTop
	Point3		LipsRight
	Point4		LipsDown
NoseOutline	Point1	Nose	NoseLeft
	Point2		NoseTop
	Point3		NoseRight
	Point4		NoseDown

```
<vwoc:ControlFaceFeatures name="LogicalPointBasedFace">
   <vwoc:HeadOutline>
      <vwoc:Outline4Points>
         <vwoc:Point1 xsi:type="vwoc:LogicalPointType" name="HeadLeft"/>
         <vwoc:Point2 xsi:type="vwoc:LogicalPointType" name="HeadTop"/>
         <vwoc:Point3 xsi:type="vwoc:LogicalPointType" name="HeadRight"/>
         <vwoc:Point4 xsi:type="vwoc:LogicalPointType" name="HeadDown"/>
      </vwoc:Outline4Points>
   </vwoc:HeadOutline>
   <vwoc:LeftEyeOutline>
      <vwoc:Outline4Points>
         <vwoc:Point1 xsi:type="vwoc:LogicalPointType" name="LeyeLeft"/>
         <vwoc:Point2 xsi:type="vwoc:LogicalPointType" name="LeyeTop"/>
         <vwoc:Point3 xsi:type="vwoc:LogicalPointType" name="LeyeRight"/>
         <vwoc:Point4 xsi:type="vwoc:LogicalPointType" name="LeyeDown"/>
      </vwoc:Outline4Points>
   </vwoc:LeftEyeOutline>
   <vwoc:RightEyeOutline>
      <vwoc:Outline4Points>
         <vwoc:Point1 xsi:type="vwoc:LogicalPointType" name="ReyeLeft"/>
         <vwoc:Point2 xsi:type="vwoc:LogicalPointType" name="ReyeTop"/>
         <vwoc:Point3 xsi:type="vwoc:LogicalPointType" name="ReyeRight"/>
         <vwoc:Point4 xsi:type="vwoc:LogicalPointType" name="ReyeDown"/>
      </vwoc:Outline4Points>
```

```
    </vwoc:RightEyeOutline>
    <vwoc:MouthLipOutline>
       <vwoc:Outline4Points>
          <vwoc:Point1 xsi:type="vwoc:LogicalPointType" name="LipsLeft"/>
          <vwoc:Point2 xsi:type="vwoc:LogicalPointType" name="LipsTop"/>
          <vwoc:Point3 xsi:type="vwoc:LogicalPointType" name="LipsRight"/>
          <vwoc:Point4 xsi:type="vwoc:LogicalPointType" name="LipsDown"/>
       </vwoc:Outline4Points>
    </vwoc:MouthLipOutline>
    <vwoc:NoseOutline>
       <vwoc:Outline4Points>
          <vwoc:Point1 xsi:type="vwoc:LogicalPointType" name="NoseLeft"/>
          <vwoc:Point2 xsi:type="vwoc:LogicalPointType" name="NoseTop"/>
          <vwoc:Point3 xsi:type="vwoc:LogicalPointType" name="NoseRight"/>
          <vwoc:Point4 xsi:type="vwoc:LogicalPointType" name="NoseDown"/>
       </vwoc:Outline4Points>
    </vwoc:NoseOutline>
</vwoc:ControlFaceFeatures>
```

5.17 OutlineType

5.17.1 XML representation syntax

Diagram	
Source	<complexType name="OutlineType"> <choice> <element name="Outline4Points" type="vwoc:Outline4PointsType"/> <element name="Outline5Points" type="vwoc:Outline5PointsType"/> <element name="Outline8Points" type="vwoc:Outline8PointsType"/> <element name="Outline14Points" type="vwoc:Outline14PointsType"/> </choice> </complexType>

5.17.2 Binary representation syntax

OutlineType {	Number of bits	Mnemonic
OutlineTypeSelect	3	bslbf
if(OutlineTypeSelect ==0){		
Outline4Points		Outline4PointsType
}else if(OutlineTypeSelect ==1){		
Outline5Points		Outline5PointsType

}else if(OutlineTypeSelect ==2){		
Outline8Points		Outline8PointsType
}else if(OutlineTypeSelect ==3){		
Outline14Points		Outline14PointsType
}		
}		

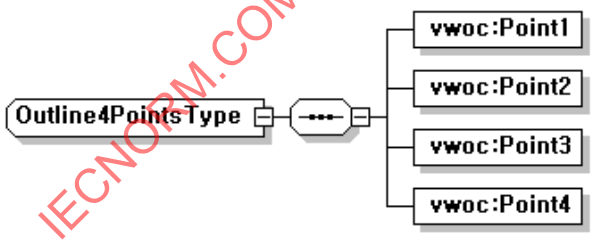
5.17.3 Semantics

The OutlineType contains 4 different types of outline dependent upon the number of points forming the outline.

Name	Description
OutlineType	A type that describes the outline of each facial feature.
OutlineTypeSelect	This field, which is only present in the binary representation, determines the outline type with the number of points. (0: Outline4Points, 1:Outline5Points, 2: Outline8Points, 3: Outline14Points, 4-7: reserved)
Outline4Points	The outline with 4 points
Outline5Points	The outline with 5 points
Outline8Points	The outline with 8 points
Outline14Points	The outline with 14 points

5.18 Outline4PointsType

5.18.1 XML representation syntax

Diagram	
Source	<complexType name="Outline4PointsType"> <sequence> <element name="Point1" type="vwoc:PointType"/> <element name="Point2" type="vwoc:PointType"/> <element name="Point3" type="vwoc:PointType"/> <element name="Point4" type="vwoc:PointType"/> </sequence> </complexType>

5.18.2 Binary representation syntax

Outline4PointsType{	Number of bits	Mnemonic
Point1		PointType
Point2		PointType
Point3		PointType
Point4		PointType
}		

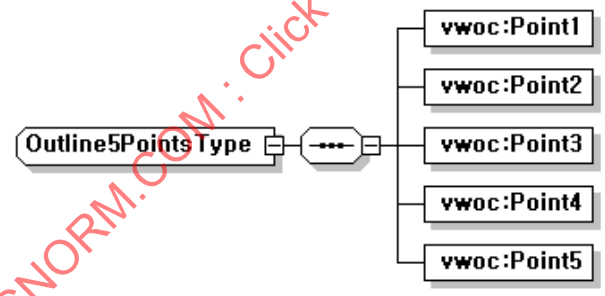
5.18.3 Semantics

The points are numbered from the leftmost point by the counter-clockwise. For example, if there are 4 points at the left, top, right, bottom of the outline, they are Point1, Point2, Point3, Point4, respectively.

Name	Description
Outline4PointsType	A type that describes the outline of each facial feature with four points.
Point1	The 1st point of the outline
Point2	The 2nd point of the outline
Point3	The 3rd point of the outline
Point4	The 4th point of the outline

5.19 Outline5PointsType

5.19.1 XML representation syntax

Diagram	
Source	<complexType name="Outline5PointsType"> <sequence> <element name="Point1" type="vwoc:PointType"/> <element name="Point2" type="vwoc:PointType"/> <element name="Point3" type="vwoc:PointType"/> <element name="Point4" type="vwoc:PointType"/> <element name="Point5" type="vwoc:PointType"/> </sequence> </complexType>

5.19.2 Binary representation syntax

Outline5PointsType{	Number of bits	Mnemonic
Point1		PointType
Point2		PointType
Point3		PointType
Point4		PointType
Point5		PointType
}		

5.19.3 Semantics

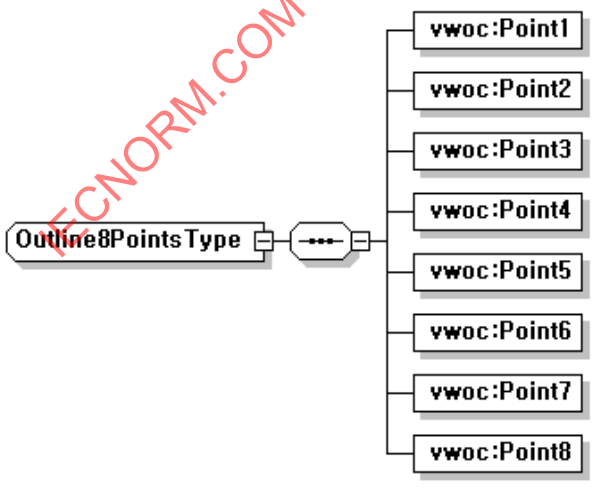
The points are numbered from the leftmost point by the counter-clockwise. For the details, refer to the figure of FacePoints in 5.16.2.

Name	Description
`Outline5PointsType`	A type that describes the outline of each facial feature with five points.
`Point1`	The 1st point of the outline
`Point2`	The 2nd point of the outline
`Point3`	The 3rd point of the outline
`Point4`	The 4th point of the outline
`Point5`	The 5th point of the outline

5.20 Outline8PointsType

5.20.1 XML representation syntax

Diagram



Source

```
<complexType name="Outline8PointsType">
    <sequence>
        <element name="Point1" type="vwoc:PointType"/>
        <element name="Point2" type="vwoc:PointType"/>
        <element name="Point3" type="vwoc:PointType"/>
        <element name="Point4" type="vwoc:PointType"/>
```

```
            <element name="Point5" type="vwoc:PointType"/>
            <element name="Point6" type="vwoc:PointType"/>
            <element name="Point7" type="vwoc:PointType"/>
            <element name="Point8" type="vwoc:PointType"/>
        </sequence>
    </complexType>
```

5.20.2 Binary representation syntax

Outline8PointsType{	Number of bits	Mnemonic
Point1		PointType
Point2		PointType
Point3		PointType
Point4		PointType
Point5		PointType
Point6		PointType
Point7		PointType
Point8		PointType
}		

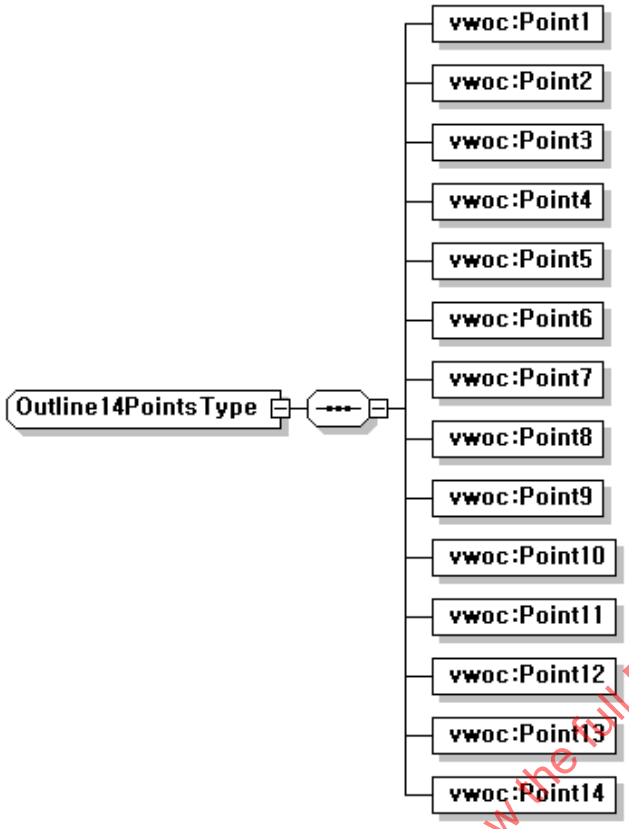
5.20.3 Semantics

The points are numbered from the leftmost point by the counter-clockwise. For the details, refer to the figure of LeftEye in 5.3.5.7.2.

Name	Description
`Outline8PointsType`	A type that describes the outline of each facial feature with 8 points.
`Point1`	The 1st point of the outline
`Point2`	The 2nd point of the outline
`Point3`	The 3rd point of the outline
`Point4`	The 4th point of the outline
`Point5`	The 5th point of the outline
`Point6`	The 6th point of the outline
`Point7`	The 7th point of the outline
`Point8`	The 8th point of the outline

5.21 Outline14PointsType

5.21.1 XML representation syntax

Diagram	
Source	<complexType name="Outline14PointsType"> <sequence> <element name="Point1" type="vwoc:PointType"/> <element name="Point2" type="vwoc:PointType"/> <element name="Point3" type="vwoc:PointType"/> <element name="Point4" type="vwoc:PointType"/> <element name="Point5" type="vwoc:PointType"/> <element name="Point6" type="vwoc:PointType"/> <element name="Point7" type="vwoc:PointType"/> <element name="Point8" type="vwoc:PointType"/> <element name="Point9" type="vwoc:PointType"/> <element name="Point10" type="vwoc:PointType"/> <element name="Point11" type="vwoc:PointType"/> <element name="Point12" type="vwoc:PointType"/> <element name="Point13" type="vwoc:PointType"/> <element name="Point14" type="vwoc:PointType"/> </sequence> </complexType>

5.21.2 Binary representation syntax

Outline14PointsType{	Number of bits	Mnemonic
Point1		PointType
Point2		PointType
Point3		PointType
Point4		PointType
Point5		PointType
Point6		PointType
Point7		PointType
Point8		PointType
Point9		PointType
Point10		PointType
Point11		PointType
Point12		PointType
Point13		PointType
Point14		PointType
}		

5.21.3 Semantics

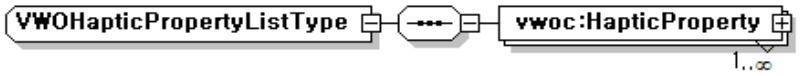
The points are numbered from the leftmost point by the counter-clockwise. For the details, refer to the figure of MouthLips in 5.3.5.7.2.

Name	Description
`Outline14PointsType`	A type that describes the outline of each facial feature with fourteen points.
`Point1`	The 1st point of the outline
`Point2`	The 2nd point of the outline
`Point3`	The 3rd point of the outline
`Point4`	The 4th point of the outline
`Point5`	The 5th point of the outline
`Point6`	The 6th point of the outline
`Point7`	The 7th point of the outline
`Point8`	The 8th point of the outline
`Point9`	The 9th point of the outline
`Point10`	The 10th point of the outline
`Point11`	The 11th point of the outline

Name	Description
Point12	The 12th point of the outline
Point13	The 13th point of the outline
Point14	The 14th point of the outline

5.22 VWOHapticPropertyListType

5.22.1 XML representation syntax

Diagram	
Source	<complexType name="VWOHapticPropertyListType"> <sequence> <element name="HapticProperty" type="vwoc:VWOHapticPropertyType" maxOccurs="unbounded"/> </sequence> </complexType>

5.22.2 Binary representation syntax

VWOHapticPropertyListType {	Number of bits	Mnemonic
NumVWOHapticPropertyType		vluimsbf5
for(k=0; k< NumVWOHapticPropertyType; k++){		
HapticProperty[k]		VWOHapticPropertyType
}		
}		

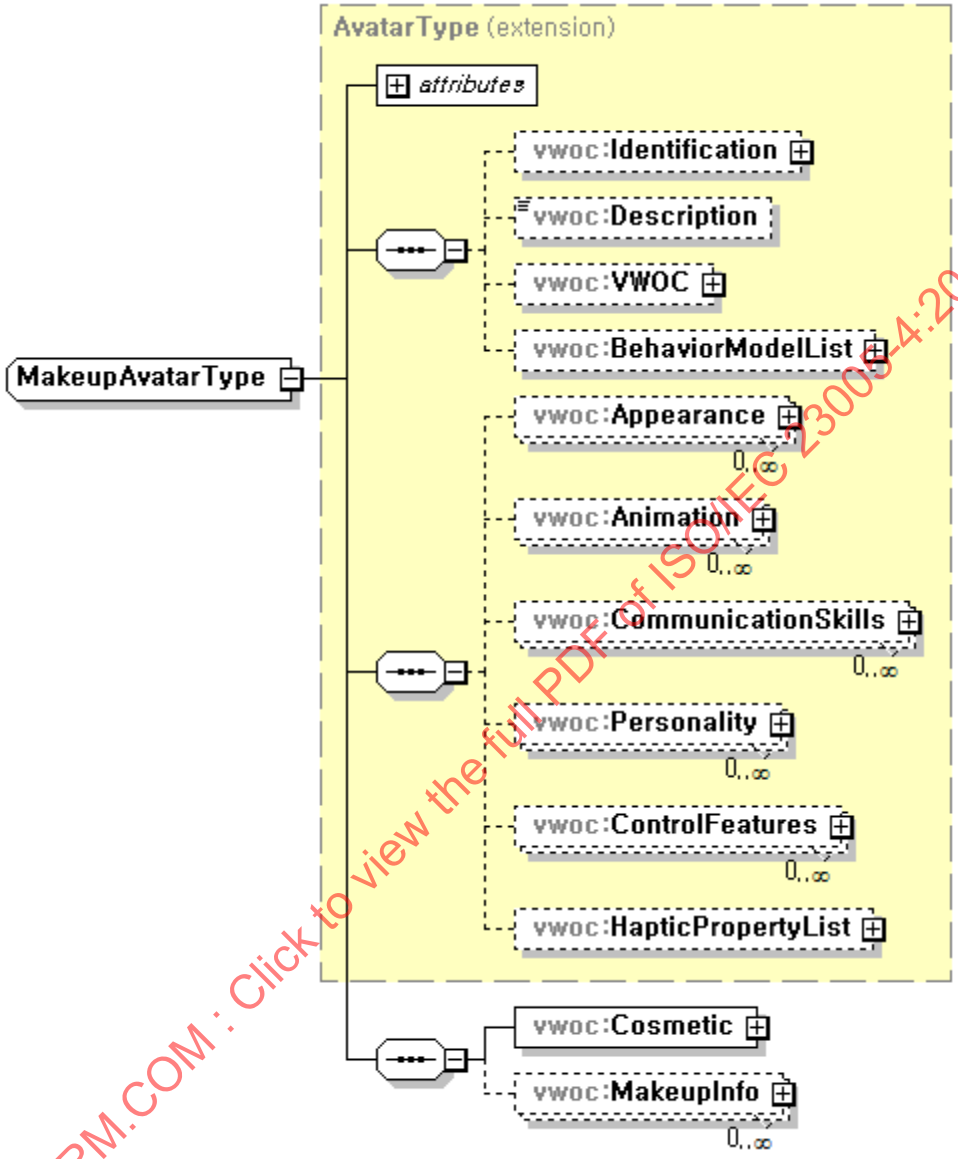
5.22.3 Semantics

Name	Definition
VWOHaptic PropertyListType	Wrapper element type which allows multiple occurrences of the haptic properties associated to the virtual world object.
NumVWOHapticProperty Type	This field, which is only present in the binary representation, specifies the number of haptic property information contained in the haptic property list type.
HapticProperty	This element contains a set of high level descriptors of the haptic properties defined in the VWOHapticPropertyType of the virtual world object.

5.23 MakeupAvatarType

5.23.1 XML representation syntax

Diagram



Source

```
<complexType name="MakeupAvatarType">
        <complexContent>
                <extension base="vwoc:AvatarType">
                        <sequence>
                                <element name="Cosmetic" type="vwoc:CosmeticType"/>
                                <element name="MakeupInfo" type="vwoc:MakeupInfoType" minOccurs="0"
maxOccurs="unbounded"/>
                        </sequence>
                </extension>
        </complexContent>
</complexType>
```

5.23.2 Binary representation syntax

MakeupAvatarType {	Number of bits	Mnemonic
Avatar		AvatarType
MakeupInfoFlag	1	bslbf
Cosmetic		CosmeticType
if(MakeupInfoFlag) {		
numOfMakeupInfo		vluimsbf5
for(k=0;k<numOfMakeupInfo;k++) {		
MakeupInfo[k]		MakeupInfoType
}		
}		
}		

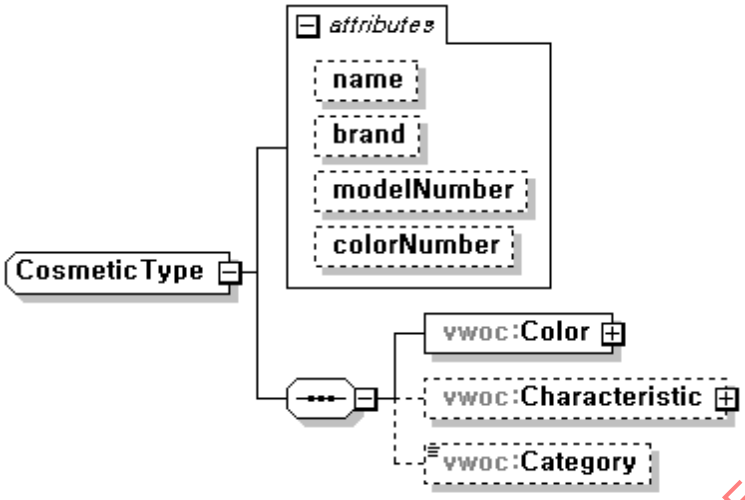
5.23.3 Semantics

Name	Definition
`MakeupAvatarType`	Tool for describing a makeup avatar. This type is extended from the Avatar Type
`Cosmetic`	Describes cosmetic information.
`MakeupInfo`	Describes the makeup information of the makeup avatar.
`Avatar`	Contains the base type defined by `AvatarType`.
`MakeupInfoFlag`	This field, which is only present in the binary representation, signals the presence of the `MakeupInfo` elements. "1" means that the elements shall be used. "0" means that the elements shall not be used.
`numOfMakeupInfo`	This field, which is only present in the binary representation, specifies the number of `MakeupInfo` information contained in the makeup information for avatar.

5.24 CosmeticType

5.24.1 XML representation syntax

Diagram



Source

```
<complexType name="CosmeticType">
      <sequence>
            <element name="Color" type="vwoc:CosmeticSpectrumType"/>
            <element name="Characteristic" type="vwoc:CosmeticCharacteristicType" minOccurs="0"/>
            <element name="Category" type="mpeg7:termReferenceType" minOccurs="0"/>
      </sequence>
      <attribute name="name" type="string" use="optional"/>
      <attribute name="brand" type="string" use="optional"/>
      <attribute name="modelNumber" type="string" use="optional"/>
      <attribute name="colorNumber" type="string" use="optional"/>
</complexType>

<complexType name="CosmeticSpectrumType">
      <sequence>
            <choice>
                  <element name="Spectra" type="mpeg7:DoubleMatrixType"/>
                  <element name="SpectraURI" type="anyURI"/>
            </choice>
            <element name="CosmeticSpectrumTransformationModel" type="vwoc:PolynomialType"/>
      </sequence>
</complexType>

<complexType name="PolynomialType">
      <sequence>
            <element name="Monomial" type= "vwoc:MonomialType" maxOccurs ="unbounded" />
      </sequence>
</complexType>

<complexType name="MonomialType">
      <sequence>
            <element name="Variable" type= "vwoc:VariableType" minOccurs="0" maxOccurs ="unbounded" />
      </sequence>
      <attribute name="coefficient" type="double" use="optional"/>
</complexType>

<complexType name="VariableType">
      <attribute name="literal" type="string" use="required"/>
      <attribute name="exponent" type="positiveInteger" use="optional"/>
</complexType>

<complexType name="CosmeticCharacteristicType">
      <attribute name="form" type="vwoc:cosmeticFormType" use="optional"/>
```

```
        <attribute name="glossProperty" type="vwoc:glossPropertyType" use="optional"/>
        <attribute name="pearl" type="boolean" use="optional"/>
        <attribute name="transmittancy" type="double" use="optional"/>
</complexType>

<simpleType name="cosmeticFormType">
        <restriction base="string">
                <enumeration value ="Solid"/>
                <enumeration value ="Powder"/>
                <enumeration value ="Liquid"/>
                <enumeration value ="Cream"/>
                <enumeration value ="Gel"/>
        </restriction>
</simpleType>

<simpleType name="glossPropertyType">
        <restriction base="string">
                <enumeration value ="Glossy"/>
                <enumeration value ="Matt"/>
        </restriction>
</simpleType>
```

5.24.2 Binary representation

CosmeticType {	**Number of bits**	**Mnemonic**
CharacteristicFlag	1	bslbf
CategoryFlag	1	bslbf
nameFlag	1	bslbf
brandFlag	1	bslbf
modelNumberFlag	1	bslbf
colorNumberFlag	1	bslbf
Color		CosmeticSpectrumType
if(CharacteristicFlag) {		
Characteristic		CosmeticCharacteristicType
}		
if(CategoryFlag) {		
Category	5	bslbf
}		
if(nameFlag) {		
name	See ISO/IEC 10646[8]	UTF-8

CosmeticType {	Number of bits	Mnemonic
}		
if(brandFlag) {		
brand	See ISO/IEC 10646[8]	UTF-8
}		
if(modelNumberFlag) {		
modelNumber	See ISO/IEC 10646[8]	UTF-8
}		
if(colorNumberFlag) {		
colorNumber	See ISO/IEC 10646[8]	UTF-8
}		
}		
CosmeticSpectrumType {		
SpectraChoice	1	bslbf
if(SpectraChoice == 0) {		
heightSize		vluimsbf5
widthSize		vluimsbf5
dimensionSize	9	uimsbf
for(i=0;i<heightSize;i++) {		
for(k=0;k<widthSize;k++) {		
for(m=0;m<dimensionSize;m++) {		
Spectra[i][k][m]	32	fsfb
}		
}		

CosmeticType {	Number of bits	Mnemonic
}		
}		
else {		
SpectraURI	See ISO/IEC 10646[8]	UTF-8
}		
CosmeticSpectrumTransformationModel		PolynomialType
}		
PolynomialType {		
numOfMonomial		vluimsbf5
for(i=0;i<numOfMonomial;i++) {		
Monomial[i]		MonomialType
}		
}		
MonomialType {		
VariableFlag	1	bslbf
coefficientFlag	1	bslbf
if(VariableFlag) {		
numOfVariable		vluimsbf5
for(i=0;i<numOfVariable;i++) {		
Variable[i]		VariableType
}		
}		
if(coefficientFlag) {		
coefficient	32	fsfb

CosmeticType {	**Number of bits**	**Mnemonic**
}		
}		
VariableType {		
exponentFlag	1	bslbf
literal	See ISO/IEC 10646[8]	UTF-8
if(exponentFlag) {		
exponent		vluimsbf5
}		
}		
CosmeticCharacteristicType {		
formFlag	1	bslbf
glossPropertyFlag	1	bslbf
pearlFlag	1	bslbf
transmittancyFlag	1	bslbf
if(formFlag) {		
form	3	bslbf
}		
if(glossPropertyFlag) {		
glossProperty	1	Bslbf
}		
if(pearlFlag) {		
pearl	1	bslbf
}		

CosmeticType {	Number of bits	Mnemonic
if(transmittancyFlag) {		
transmittancy	32	fsfb
}		
}		

5.24.3 Semantics

Name	Definition
CosmeticType	Tool for describing cosmetics.
Color	Describes color information of cosmetics.
Characteristic	Describes characteristic information of cosmetics.
Category	describes kinds of cosmetics as a reference to a classification scheme term that shall be using the mpeg7:termreferencetype defined in iso/iec 15938-5:2003, 7.6. the cs that may be used for this purpose is the cosmetictypecs defined in a.6.

name	binary representation (5 bits)	description
foundation	1	foundation type cosmetics
concealer	2	concealer type cosmetics
powder	3	powder type cosmetics
eyebrow	4	eyebrow type cosmetics
eyeshadow	5	eyeshadow type cosmetics
eyeliner	6	eyeliner type cosmetics
blusher	7	blusher type cosmetics
highlight	8	highlight type cosmetics
shading	9	shading type cosmetics
lipliner	10	lipliner type cosmetics
lipstick	11	lipstick type cosmetics

Name	Definition
	<table><tr><td>lipgloss</td><td>12</td><td>lipgloss type cosmetics</td></tr><tr><td>mascara</td><td>13</td><td>mascara type cosmetics</td></tr><tr><td></td><td>0,14-31</td><td>reserved</td></tr></table>
Name	Describes the name of cosmetics.
Brand	Describes the brand of cosmetics.
modelNumber	Describes the model number of cosmetics.
colorNumber	Describes the color number of cosmetics.
CharacteristicFlag	This field, which is only present in the binary representation, signals the presence of Characteristic value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
CategoryFlag	This field, which is only present in the binary representation, signals the presence of Category value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
nameFlag	This field, which is only present in the binary representation, signals the presence of name value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
brandFlag	This field, which is only present in the binary representation, signals the presence of brand value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
modelNumberFlag	This field, which is only present in the binary representation, signals the presence of modelNumber value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
colorNumberFlag	This field, which is only present in the binary representation, signals the presence of colorNumber value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
CosmeticSpectrumType	Tool for describing colour of cosmetics in the spectrum data. This type includes a spectrum data and a spectrum transformation model.

Name	Definition
Spectra	Describes the spectrum data as a form of a matrix. The spectrum data is represented by an image size (i.e., a height and a width) and a spectrum dimension. The maximum size of the spectrum dimension is 301 since this covers a visible spectrum range between 400nm and 700nm for every 1nm. The spectrum dimension can be subsampled linearly. For example, if the sampling rate is every 10nm, the spectrum dimension becomes 31. Henceforth, the spectrum data can be represented by a three-dimensional matrix that the size is *height x width x spectrum dimension*. A spectrum data (i.e., one pixel colour) can be represented by a three dimension matrix with size of *1 x 1 x spectrum dimension*.
SpectraURI	Describes a URI that stores the spectrum data.
CosmeticSpectrumTransformationModel	A transformation model (e.g., equations) between a skin color spectrum and a cosmetic color spectrum.
SpectraChoice	This field, which is only present in the binary representation, describes which spectrum data shall be used. "0" means that the Spectra type shall be used, "1" means that the SpectraURI type shall be used
heightSize	Describes a height that the spectrum data.
widthSize	Describes a width that the spectrum data.
dimensionSize	Describes a dimension of spectrum that the spectrum data.
PolynomialType	Tool for describing a polynomial equation.
Monomial	Describes monomial equations, which constitute a polynomial equation.
numOfMonomial	This field, which is only present in the binary representation, specifies the number of Monomial information contained in the makeup information for avatar.
MonomialType	Tool for describing a monomial equation.
Variable	Describes variables of the monomial equation.
coefficient	Describes coefficients of the monomial equation. If the variable is not defined, this coefficient becomes a constant.
VariableFlag	This field, which is only present in the binary representation, signals the presence of Variable value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
coefficientFlag	This field, which is only present in the binary representation, signals the presence of coefficient value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.

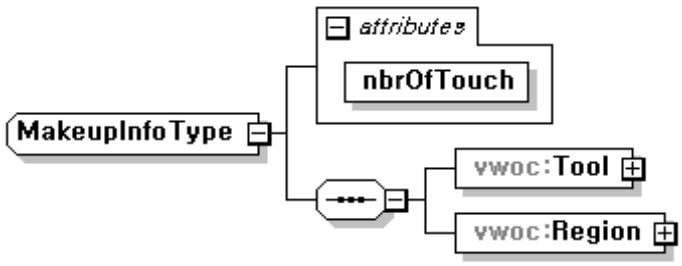
<table>
<tr><th>Name</th><th>Definition</th></tr>
<tr><td>numOfVariable</td><td>This field, which is only present in the binary representation, specifies the number of Variable information contained in the makeup information for avatar.</td></tr>
<tr><td>VariableType</td><td>Tool for describing a variable.</td></tr>
<tr><td>exponent</td><td>Describes an exponent of the variable.</td></tr>
<tr><td>exponentFlag</td><td>This field, which is only present in the binary representation, signals the presence of exponent value attribute. A value of “1” means the attribute shall be used and “0” means the attribute shall not be used.</td></tr>
<tr><td>literal</td><td>This field specifies the literal of Variable.</td></tr>
<tr><td>CosmeticCharacteristicType</td><td>Tool for describing the characteristic information of cosmetics.</td></tr>
<tr><td>form</td><td>Describes the forms of cosmetics.</td></tr>
<tr><td>glossProperty</td><td>Describe glossiness of cosmetics.</td></tr>
<tr><td>pearl</td><td>Describe the existence of pearl component.</td></tr>
<tr><td>transmittancy</td><td>Describe the transmittance of cosmetics.</td></tr>
<tr><td>formFlag</td><td>This field, which is only present in the binary representation, signals the presence of form value attribute. A value of “1” means the attribute shall be used and “0” means the attribute shall not be used.</td></tr>
<tr><td>glossPropertyFlag</td><td>This field, which is only present in the binary representation, signals the presence of glossProperty value attribute. A value of “1” means the attribute shall be used and “0” means the attribute shall not be used.</td></tr>
<tr><td>pearlFlag</td><td>This field, which is only present in the binary representation, signals the presence of pearl value attribute. A value of “1” means the attribute shall be used and “0” means the attribute shall not be used.</td></tr>
<tr><td>transmittancyFlag</td><td>This field, which is only present in the binary representation, signals the presence of transmittancy value attribute. A value of “1” means the attribute shall be used and “0” means the attribute shall not be used.</td></tr>
<tr><td>cosmeticFormType</td><td>Tool for describing the forms of cosmetics. The form of cosmetics is one of solid, powder, liquid, cream, and gel.

In the binary description, the following mapping table is used.
<table>
<tr><th>cosmeticFormType</th><th>Sementics</th></tr>
<tr><td>000</td><td>solid</td></tr>
<tr><td>001</td><td>powder</td></tr>
<tr><td>010</td><td>liquid</td></tr>
<tr><td>011</td><td>cream</td></tr>
<tr><td>100</td><td>gel</td></tr>
</table>
</td></tr>
</table>

Name	Definition
glossPropertyType	Tool for describing the glossiness of cosmetics. The glossiness is either glossy or matt. In the binary description, the following mapping table is used. **glossPropertyType** / **Sementics** 0 / glossy 1 / matt

5.25 MakeupInfoType

5.25.1 XML representation syntax

Diagram	
Source	<complexType name="MakeupInfoType"> <sequence> <element name="Tool" type="vwoc:MakeupToolType"/> <element name="Region" type="vwoc:MakeupRegionType"/> </sequence> <attribute name="nbrOfTouch" type="positiveInteger" use="required"/> </complexType>

5.25.2 Binary Representation

MakeupInfoType {	Number of bits	Mnemonic
Tool		MakeupToolType
Region		MakeupRegionType
nbrOfTouch		vluimsbf5
}		

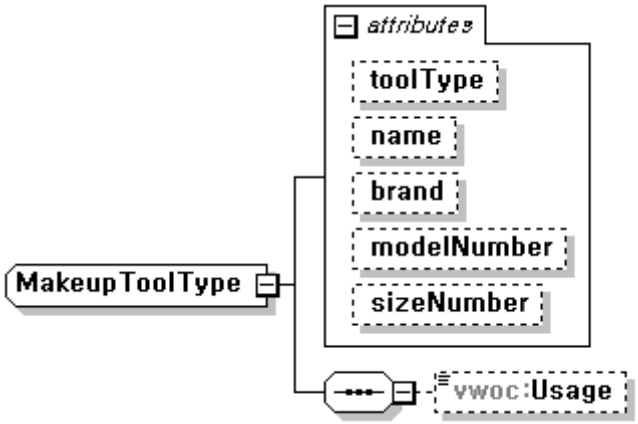
5.25.3 Semantics

Name	Definition
MakeupInfoType	Tool for describing makeup information.
Tool	Describes makeup tools.
Region	Describes makeup regions of a face.
nbrOfTouch	Describes a number of makeup touches.

5.26 MakeupToolType

5.26.1 XML representation syntax

Diagram



Source

```
<complexType name="MakeupToolType">
    <sequence>
        <element name="Usage" type="mpeg7:termReferenceType" minOccurs="0"/>
    </sequence>
    <attribute name="toolType" type="vwoc:cosmeticToolType" use="optional"/>
    <attribute name="name" type="string" use="optional"/>
    <attribute name="brand" type="string" use="optional"/>
    <attribute name="modelNumber" type="string" use="optional"/>
    <attribute name="sizeNumber" type="string" use="optional"/>
</complexType>

<simpleType name="cosmeticToolType">
    <restriction base="string">
        <enumeration value="Brush"/>
        <enumeration value="Sponge"/>
        <enumeration value="PowderPuff"/>
        <enumeration value="Pen"/>
    </restriction>
</simpleType>
```

5.26.2 Binary representation

MakeupToolType {	Number of bits	Mnemonic
UsageFlag	1	bslbf
toolTypeFlag	1	bslbf
nameFlag	1	bslbf
brandFlag	1	bslbf
modelNumberFlag	1	bslbf
sizeNumberFlag	1	bslbf
if(UsageFlag) {		
Usage	5	bslbf

MakeupToolType {	Number of bits	Mnemonic
}		
if(toolTypeFlag) {		
toolType	2	bslbf
}		
if(nameFlag) {		
name	See ISO/IEC 10646[8]	UTF-8
}		
if(brandFlag) {		
brand	See ISO/IEC 10646[8]	UTF-8
}		
if(modelNumberFlag) {		
modelNumber	See ISO/IEC 10646[8]	UTF-8
}		
if(sizeNumberFlag) {		
sizeNumber	See ISO/IEC 10646[8]	UTF-8
}		
}		

5.26.3 Semantics

Name	Definition
`MakeupToolType`	Tool for describing makeup tool information.
`Usage`	Describe the purpose of a makeup tool as a reference to a classification scheme term that shall be using the `mpeg7:termReferenceType` defined in ISO/IEC 15938-5:2003, 7.6. The CS that may be used for this purpose is the `CosmeticTypeCS` defined in A.6.

Name	Binary representation	Description

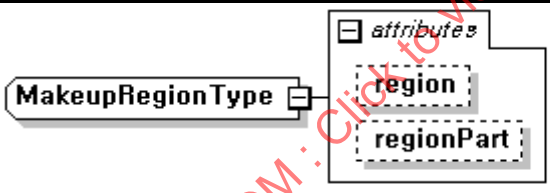
<table>
<tr><th>Name</th><th>Definition</th></tr>
<tr><td></td><td>
<table>
<tr><th></th><th>(5 bits)</th><th></th></tr>
<tr><td>foundation</td><td>1</td><td>usage for foundation</td></tr>
<tr><td>concealer</td><td>2</td><td>usage for concealer</td></tr>
<tr><td>powder</td><td>3</td><td>usage for powder</td></tr>
<tr><td>eyebrow</td><td>4</td><td>usage for eyebrow</td></tr>
<tr><td>eyeshadow</td><td>5</td><td>usage for eyeshadow</td></tr>
<tr><td>eyeliner</td><td>6</td><td>usage for eyeliner</td></tr>
<tr><td>blusher</td><td>7</td><td>usage for blusher</td></tr>
<tr><td>highlight</td><td>8</td><td>usage for highlight</td></tr>
<tr><td>shading</td><td>9</td><td>usage for shading</td></tr>
<tr><td>lipliner</td><td>10</td><td>usage for lipliner</td></tr>
<tr><td>lipstick</td><td>11</td><td>usage for lipstick</td></tr>
<tr><td>lipgloss</td><td>12</td><td>usage for lipgloss</td></tr>
<tr><td>mascara</td><td>13</td><td>usage for mascara</td></tr>
<tr><td></td><td>0,14-31</td><td>reserved</td></tr>
</table>
</td></tr>
<tr><td>toolType</td><td>Describe the type of a makeup tool.</td></tr>
<tr><td>name</td><td>Describe the name of a makeup tool.</td></tr>
<tr><td>brand</td><td>Describe the brand of a makeup tool.</td></tr>
<tr><td>modelNumber</td><td>Describe the model number of a makeup tool.</td></tr>
<tr><td>sizeNumber</td><td>Describe the size number of a makeup tool.</td></tr>
<tr><td>cosmeticToolType</td><td>Tool for describing the type of a makeup tool. The type is one of brush, sponge, powder puff, and pen.

In the binary description, the following mapping table is used.
<table>
<tr><th>cosmeticToolType</th><th>Sementics</th></tr>
<tr><td>00</td><td>brush</td></tr>
<tr><td>01</td><td>sponge</td></tr>
<tr><td>10</td><td>powder puff</td></tr>
<tr><td>11</td><td>pen</td></tr>
</table>
</td></tr>
</table>

Name	Definition
UsageFlag	This field, which is only present in the binary representation, signals the presence of Usage value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
toolTypeFlag	This field, which is only present in the binary representation, signals the presence of name toolType attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
nameFlag	This field, which is only present in the binary representation, signals the presence of name value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
brandFlag	This field, which is only present in the binary representation, signals the presence of brand value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
modelNumberFlag	This field, which is only present in the binary representation, signals the presence of modelNumber value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.
sizeNumberFlag	This field, which is only present in the binary representation, signals the presence of sizeNumber value attribute. A value of "1" means the attribute shall be used and "0" means the attribute shall not be used.

5.27 MakeupRegionType

5.27.1 XML representation syntax

Diagram	
Source	<complexType name="MakeupRegionType"> <attribute name="region" type="vwoc:makeupRegionType" use="optional"/> <attribute name="regionNumber" type="vwoc:unsigned4Vector" use="optional"/> </complexType> <simpleType name="makeupRegionType"> <restriction base="string"> <enumeration value ="All"/> <enumeration value ="Lips"/> <enumeration value ="Eyebrow"/> <enumeration value ="Periocular"/> <enumeration value ="Cheek"/> <enumeration value ="Highlight"/> <enumeration value ="Shadow"/> <enumeration value ="Shading"/> </restriction> </simpleType> <simpleType name="unsigned4Vector"> <list itemType="mpeg7:unsigned4"/> </simpleType>

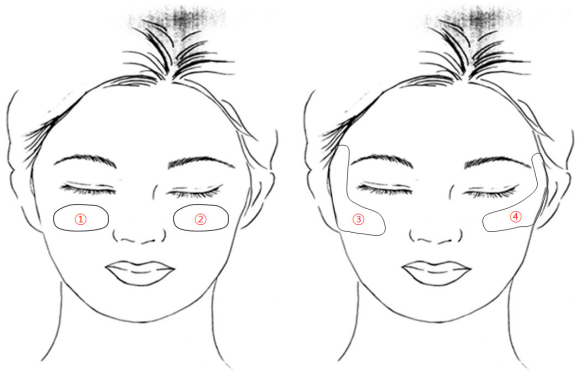
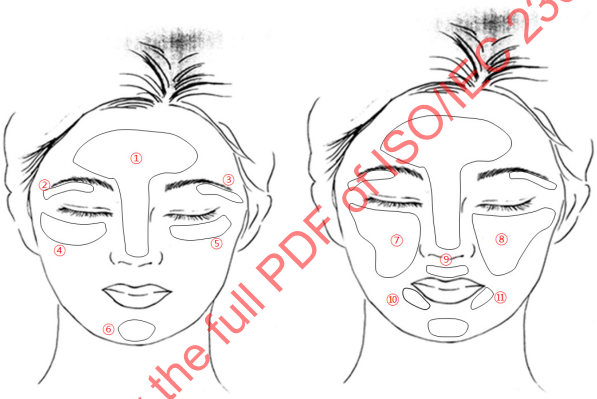
5.27.2 Binary representation

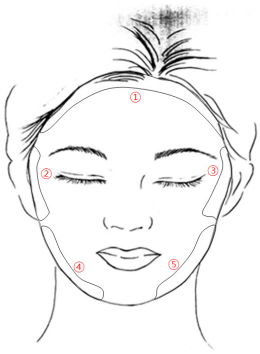
MakeupRegionType {	Number of bits	Mnemonic
regionFlag	1	bslbf
regionNumberFlag	1	bslbf
if(regionFlag) {		
Region	4	bslbf
}		
if(regionNumberFlag) {		
numOfRegionNumber		vluimsbf5
for(k=0;k<numOfRegionNumber;k++) {		
regionNumber[k]	4	uimsbf
}		
}		
}		

5.27.3 Semantics

Name	Definition
`MakeupRegionType`	Tool for describing the region information of a makeup.
`Region`	Describes the region of a makeup.
`regionNumber`	Specifies the detailed location of a makeup in a region. The detailed location is represented by a number as explained in the following table. Multiple region parts can be assigned simultaneously.

All	0: all
Lips	0: all, 1: upper lip, 2: lower lip
Eyebrow	0: all, 1: right eyebrow, 2: left eyebrow
Periocular	0: all, 1: right periocular, 2: left periocular

	Cheek	0: all, 	
	Highlight	0: all, 	
	Shadow	0: all, 	

<table>
<tr><td></td><td>Shading</td><td>0: all,
  </td></tr>
<tr><td>makeupRegionType</td><td colspan="2">Tool for describing the makeup regions. The makeup region is one of all, lips, eyebrow, periocular, cheek, highlight, shadow, and shading.

In the binary description, the following mapping table is used.

<table><tr><th>makeupRegionType</th><th>Sementics</th></tr><tr><td>0000</td><td>all</td></tr><tr><td>0001</td><td>lips</td></tr><tr><td>0010</td><td>eyebrow</td></tr><tr><td>0011</td><td>periocular</td></tr><tr><td>0100</td><td>cheek</td></tr><tr><td>0101</td><td>highlight</td></tr><tr><td>0110</td><td>shadow</td></tr><tr><td>0111</td><td>shading</td></tr><tr><td>1000 - 1111</td><td>reserved</td></tr></table></td></tr>
<tr><td>regionFlag</td><td colspan="2">This field, which is only present in the binary representation, signals the presence of region value attribute. A value of “1” means the attribute shall be used and “0” means the attribute shall not be used.</td></tr>
<tr><td>regionNumberFlag</td><td colspan="2">This field, which is only present in the binary representation, signals the presence of regionNumber value attribute. A value of “1” means the attribute shall be used and “0” means the attribute shall not be used.</td></tr>
<tr><td>numOfRegionNumber</td><td colspan="2">This field, which is only present in the binary representation, specifies the number of regionNumber attribute values.</td></tr>
</table>

5.27.4 Examples

This example shows the description of makeup virtual object with the following semantics. The list of avatar contains one makeup avatar. The makeup avatar has the gender “female”, the id “MakeupAvatar001”, and information of cosmtics and makeup. The costemtics has the name “Prorance Finish Water Gloe-skinfinish”, the brand “Prorance”, the color number “M11 Shine Pink”, the model number “P24036587”, and information of the cosmetic colors and their characteristics. The cosmetic colors have the spectra URI “http://www.etri.re.kr/makeupAvatar/cosmeticSpectrum/sample003.spt” and the cosmetic spectrum transformation model. The cosmetic spectrum transformation model is a polynomial equation of “$2.1x^2+1.5xy^2+3.7$”. The cosmetic characteristics have a “Solid” form, a pearl, glossy, and a transmittancy value of “0.1”. The makeup method has two of the number of make touch and includes information of the makeup tools and the makeup regions. The makeup tool has a name

"Bobbi Brown Blush Brush" and a brand "Bobbi Brown", a tool type "Brush", the size number "M2", the model number "B02351269", and the usage of "urn:mpeg:mpeg-v:01-VWOC-CosmeticCategoryCS-NS:Blusher". The makeup region is "Cheek" and the region numbers in the "Cheek" are one and two.

```
<vwoc:VWOCInfo>
  <vwoc:AvatarList>
    <vwoc:Avatar xsi:type="vwoc:MakeupAvatarType" gender="female"
id="MakeupAvatar001">
     <vwoc:Cosmetic name="Prorance Finish Water Gloe-skinfinish" brand="Prorance"
colorNumber="M11 Shine Pink" modelNumber="P24036587">
       <vwoc:Color>
         <vwoc:SpectraURI>
           http://www.etri.re.kr/makeupAvatar/cosmeticSpectrum/sample003.spt
         </vwoc:SpectraURI>
         <!-- polynomial => 2.1x^2 + 1.5xy^2 + 3.7 -->
         <vwoc:CosmeticSpectrumTransformationModel>
           <vwoc:Monomial coefficient="2.1">
             <vwoc:Variable literal="x" exponent="2"/>
           </vwoc:Monomial>
           <vwoc:Monomial coefficient="1.5">
             <vwoc:Variable literal="x" exponent="1"/>
             <vwoc:Variable literal="y" exponent="2"/>
           </vwoc:Monomial>
           <vwoc:Monomial coefficient="3.7"/>
         </vwoc:CosmeticSpectrumTransformationModel>
       </vwoc:Color>
       <vwoc:Characteristic form="Solid" pearl="true" glossProperty="Glossy"
transmittancy="0.1"/>
       <vwoc:Category>urn:mpeg:mpeg-v:01-VWOC-CosmeticCategoryCS-
NS:Blusher</vwoc:Category>
     </vwoc:Cosmetic>
     <vwoc:MakeupInfo nbrOfTouch="2">
       <vwoc:Tool name="Bobbi Brown Blush Brush" brand="Bobbi Brown"
toolType="Brush" sizeNumber="M2" modelNumber="B02351269">
         <vwoc:Usage>urn:mpeg:mpeg-v:01-VWOC-CosmeticCategoryCS-
NS:Blusher</vwoc:Usage>
       </vwoc:Tool>
       <vwoc:Region region="Cheek" regionNumber="1 2"/>
     </vwoc:MakeupInfo>
    </vwoc:Avatar>
  </vwoc:AvatarList>
</vwoc:VWOCInfo>
```

6 Virtual object metadata

6.1 General

Virtual object metadata as a (visual) representation of virtual objects inside the environment serves the following purposes:

— characterizes various kinds of objects within the VE;

— provides an interaction between virtual object and avatar;

— provides an interaction with the VE.

The "virtual object" element is composed of following type of data with the extension of the base type of a virtual object.

— **Appearance**: contains the high-level description of the appearance and may refer a media containing the exact geometry, texture and haptic properties.

— **Animation**: contains the description of a set of animation sequences that the object is able to perform and may refer to several medias containing the exact (geometric transformations and deformations) animation parameters.

— **HapticProperty**: contains the description of the haptic property of the virtual object.

— **Virtual object components**: contains the list of the virtual objects which are concatenated to the virtual object as components.

6.2 VirtualObjectType

6.2.1 XML representation syntax

Diagram