INTERNATIONAL STANDARD

ISO/IEC
14496-16

Information technology — Coding of audio-visual objects

Part 16:
Animation Framework eXtension (AFX)

AMENDMENT 3: 3D Multiresolution profile

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Technologies de l'information — Codage des objets audiovisuels

Partie 16: Extension du cadre d'animation (AFX)

AMENDEMENT 3: Profil multirésolution en 3D

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Amendment 3 to ISO/IEC 14496-16:2006 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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AMENDMENT 3: 3D Multiresolution profile

After 7.2.1, add the following new subclause:

7.2.2   MPEG-4 Basic AFX Graphics Profiles and Levels

7.2.2.1   List of tools/functionalities

The Basic AFX Graphics Profile represents a collection of nodes to allow progressive and adaptive transmission over networks of large 3D environments and / or complexe 3D shapes. It includes the following nodes : Appearance, Background, Color, Coordinate, DirectionalLight, ElevationGrid, IndexedFaceSet, IndexedLineSet, Material, PointLight, Shape, SpotLight, TextureCoordinate, TextureTransform, ProceduralTexture (V.5), SBVCAnimation, SBVCSkinnedModel, SBBone, SBSegment, SubdivisionSurfaces, WaveletSubdivisionSurfaces and FootPrint.

7.2.2.2   Comparison with existing profiles

The Basic AFX Scene Graph profile represents a collection of nodes to allow progressive and adaptive transmission over networks of large 3D environments and / or complexe 3D shapes

The existing 'X3D' profile does not provide compression tools.

7.2.2.3   Basic AFX Graphics Profile @ Level 1 and 2 Definition

In Table AMD3.1, definitions for level 1 of the 3D Multiresolution Graphics profile are given.

Table AMD3.1 – Level 1 & 2 of Basic AFX Graphics profile

Node	Maximum values for content related parameters	
	Level 1	**Level 2**
Appearance	Ignore *TextureTransform*.	Full features supported.
Color	2^{16} colors*	2^{32} colors*
Coordinate	2^{16} points*	2^{32} points*
DirectionalLight	Not scoped by parent *Group* or *Transform*.	Scoped by parent *Group* or *Transform*.
IndexedFaceSet	Only triangle face supported. A given *coordIndex* is not repeated in a face. Ignore *set_colorIndex*. Ignore *set_normalIndex*.	Full features supported.
IndexedLineSet	Ignore *set_colorIndex*. Ignore *set_coordIndex*.	Full features supported.
Material	Ignore *AmbientIntensity*. Ignore *Shininess*. Ignore *SpecularColor*.	Full features supported.
PointLight	Ignore *radius*. Ignore Linear attenuation.	Full features supported.
Shape	Full features support.	Full features supported.
SpotLight	Ignore *beamWidth*. Ignore *radius*. Ignore Linear attenuation.	Full features supported.
TextureCoordinate	2^{16} coordinates*	2^{32} coordinates*
WaveletSubdivision Surfaces	12 bitplanes per coordinate 4 levels of subdivision	24 bitplanes per coordinates 10 levels of subdivision
FootPrint	Full features supported.	Full features supported.

* indicates maximum vector size.

Table AMD3.2 specifies further restriction to the fields of the nodes listed in Table AMD3.1. These Tables can be used for both the Profile and the Level definitions.

Table AMD3.2 – Functionality limitation and minimum system requirement

Node	Restrictions (Maximum values)
All lights	8 simultaneous lights.
Names for DEF/field	50 utf8 octets.
All *url* fields	10 URLs. URN's ignored. Support relative URLs where relevant.
SFBool	Full support.
SFColor	Full support.
SFFloat	Full support.
SFImage	256 width. 256 height.
SFInt32	Full support.
SFNode	Full support.
SFRotation	Full support.
SFString	30,000 utf8 octets.
SFTime	Full support.
SFVec2f	15,000 values.
SFVec3d	15,000 values.
SFVec3f	15,000 values.
MFColor	15,000 values.
MFFloat	1,000 values.
MFInt32	20,000 values.
MFNode	500 values.
MFRotation	1,000 values.
MFString	30,000 utf8 octets per string, 10 strings.
MFVec2f	15,000 values.
MFVec3d	15,000 values.
MFVec3f	15,000 values.

Add the following new subclause after 7.3.1:

7.3.2 MPEG-4 Basic AFX Scene Graph Profile and Levels

7.3.2.1 List of tools/functionalities

The Basic AFX Scene Graph profile represents a collection of nodes to allow progressive and adaptive transmission over networks of large 3D environments and / or complexe 3D shapes. It contains the same set of nodes as the X3D Scene Graph Profile, plus the Bitwrapper node.

7.3.2.2 Comparison with existing profiles

The Basic AFX Scene Graph profile represents a collection of nodes to allow progressive and adaptive transmission over networks of large 3D environments and / or complexe 3D shapes

The existing 'X3D' profile does not provide compression tools.

7.3.2.3 Basic AFX Scene Graph Profile @ Level 1 Definition

In Table AMD3.3, definitions for level 1 of the Basic AFX Scene Graph profile are given.

Table AMD3.3 – Level 1 of Basic AFX Scene Graph profile

Node	Maximum values for content related parameters	
	Level 1	Level 2
CoordinateInterpolator	Full features supported.	Full features supported.
Group	Ignore *AddChildren*, Ignore *removeChildren*	Full features supported.
NavigationInfo	Ignore *AvatarSize,* Ignore *speed,* Ignore *type,* Ignore *visibilityLimit*	Full features supported.
OrientationInterpolator	Full features supported.	Full features supported.
PositionInterpolator	Full features supported.	Full features supported.
ScalarInterpolator	Full features supported.	Full features supported.
TouchSensor	Full features supported.	Full features supported.
Transform	Ignore *AddChildren*, Ignore *removeChildren*	Full features supported.

Viewpoint	Ignore *FieldOfView*, Ignore *description*	Full features supported.
WorldInfo	Full features supported.	Full features supported.
QuantizationParameter	Full features supported.	Full features supported.
Scene Updates	Full features supported.	Full features supported.
ROUTE	Full features supported.	Full features supported.

Table AMD3.4 specifies other aspects of functionality that are supported by this profile. Note that general items refer only to those specific nodes listed in Table AMD3.3.

Table AMD3.4 – Functionality Limitations and Minimum System Requirements

Node	Minimum System Support
All groups	500 children. Ignore *bboxCenter* and *bboxSize*.
All interpolators	1000 key-value pairs.
Names for DEF/field	50 utf8 octets.
All *url* fields	10 URLs. URN's ignored. Support relative URLs where relevant.
SFBool	Full support.
SFFloat	Full support.
SFImage	256 width. 256 height.
SFInt32	Full support.
SFNode	Full support.
SFRotation	Full support.
SFString	30,000 utf8 octets.
SFTime	Full support.
SFVec2f	15,000 values.
SFVec3d	15,000 values.
SFVec3f	15,000 values.
MFFloat	1,000 values.
MFInt32	20,000 values.
MFNode	500 values.