Dolby Atmos Master ADM Profile v1.0

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Confidential information

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Introduction to this documentation

This documentation provides detailed information about the Dolby Atmos master Audio Definition Model (ADM) profile. It is intended primarily for application developers who wish to implement support for Audio Definition Model Broadcast Wave Format (ADM BWF) *.wav* files in a manner that enables interoperability with Dolby tools and other industry tools.

1.1 About the Dolby Atmos master ADM profile

This topic describes the Dolby Atmos master ADM profile, which is based on the ITU-R BS.2076 *Audio Definition Model (ADM)* specification to carry Dolby Atmos content.

Object-based audio provides greater flexibility to create, transmit, and present content. Through the use of objects, an immersive and/or personalized experience can be provided. Each object is an audio signal plus its associated object audio metadata that contains individually-assigned object properties, content description, or interactivity limitations for personalization. The object properties more explicitly specify how the content creator intends the audio content to be rendered to loudspeakers. The storage, interchange, and transmission formats for object-based audio and its metadata can vary to satisfy different requirements for each application.

ITU-R BS.2076 *Audio Definition Model (ADM)* specifies a metadata model to ensure compatibility for content production and program exchange systems that support object-based audio and its metadata. Content utilizing ADM can serve as input to new types of content production, emission, and content distribution services for object-based audio. To preserve artistic intent and interoperability with established workflows, systems should be able to map or convert metadata to the ADM format from its own supported metadata format.

A Dolby Atmos master file format is used to carry audio and metadata for production and distribution. This program carries immersive (non-personalized) content for cinematic, home theater, and premium episodic applications. Dolby Atmos masters can be carried in ADM, yet not all of the ADM elements are required or utilized to do so. This documentation specifies a required subset of ADM to define a Dolby Atmos master ADM profile. The profile is intended to support easier use and implementation of ADM and ensure interoperability among ADM-capable systems ingesting or outputting Dolby Atmos content.

1.2 About this documentation

This documentation specifies requirements, recommendations, and constraints for the Dolby Atmos ADM profile. The profile is defined as specific uses of ADM XML elements, attributes, and subelements.

This documentation:

- Specifies the presence of certain elements, attributes, and subelements and their values
- Identifies supported `typeDefinition` values
- Limits the number of audio tracks in the program
- Limits ranges of certain parameters

1.2.1 Compliance notation

This documentation uses common notations to denote compliance.

- “Must,” “shall,” and “will” denote mandatory provisions.
- “Should” denotes a provision that is recommended but not mandatory.
- “May” denotes an optional feature whose presence or absence does not preclude compliance.

1.2.2 Abbreviations

Refer to the glossary for abbreviations used in this documentation.

1.3 References

Other published documentation is essential to the understanding and application of this documentation.

Standards

- ITU-R BS.2076-0, *Audio Definition Model*
- ITU-R BS.2076-1, *Audio Definition Model*
- ITU-R BS.2388-0, *Usage Guidelines for the Audio Definition Model and Multichannel Audio Files*
- EBU Tech 3285 Supplement 6: *BWF - Dolby Metadata* (https://tech.ebu.ch/publications/tech3285s6)

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Profile requirements, recommendations, and constraints

This topic outlines the requirements, recommendations, and constraints of the Dolby Atmos master ADM profile.

2.1 General requirements

The profile contains mostly requirements on the individual XML elements in ADM, but there are additional general requirements that also apply.

- This profile adheres to ITU-R BS.2076-0. Although ITU-R BS.2076-1 is currently in force, BS.2076-0 was in force at the time this profile was defined.
- A Dolby Atmos master ADM file shall contain a maximum of 128 total channels of audio and associated metadata. The channels can be a combination of beds (`typeDefinition`="`DirectSpeakers`") and/or objects (`typeDefinition`="`Objects`"), with the exception that there shall be a maximum of 118 objects. Given these restrictions and others (see the table for `audioBlockFormat` attribute requirements and constraints), two variables, `MAX_CHANNEL_COUNT` and `MAX_ELEMENT_COUNT` are used in this documentation. `MAX_CHANNEL_COUNT` is equal to 128 for the maximum number of total channels, and `MAX_ELEMENT_COUNT` is equal to 123 for the maximum number of XML element instances to account for the combination of 118 maximum number of `Objects` type and the maximum of five allowable sets (stereo pairs) of `DirectSpeakers` type (see the table for `audioBlockFormat` attribute requirements and constraints) to reach the 128 total channel limitation.
- Many element and attribute values in ADM are free-form strings that can be arbitrarily long. This profile does not require that strings be limited to a certain number of characters. However, systems that ingest Dolby Atmos master ADM files should handle these strings appropriately for their application, for example, ignore if rendering, or truncate if displaying in a user interface.
- There are limits on the number of times an ADM XML element can be present, as listed in this table.

Table 1: Element count restrictions

XML element	Maximum count
`audioProgramme`	1
`audioContent`	`MAX_ELEMENT_COUNT`
`audioObject`	`MAX_ELEMENT_COUNT`
`audioPackFormat`	`MAX_ELEMENT_COUNT`
`audioChannelFormat`	`MAX_CHANNEL_COUNT`
`audioStreamFormat`	`MAX_CHANNEL_COUNT`
`audioTrackFormat`	`MAX_CHANNEL_COUNT`
`audioTrackUID`	`MAX_CHANNEL_COUNT`

- ADM XML elements, attributes, and subelements recommended not to be used or indicated as optional may be omitted. If present, these elements and related attribute values are ignored by Dolby tools.

Related information

audioBlockFormat requirements and constraints on page 9

2.2 audioTrackFormat requirements and constraints

This topic describes requirements for attributes and subelements of the `audioTrackFormat` element.

Although optional in some situations in ITU-R BS.2076-1, this profile requires the presence of the `audioTrackFormat` element.

Table 2: audioTrackFormat attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
audioTrackFormatID	This attribute shall be either AT_0001xxxx_01 or AT_0003xxxx_01, where xxxx is a unique hex value in range [0x1001,0xFFFF], which is identical to the corresponding audioStreamFormat.	Required
audioTrackFormatName	See *General requirements*.	Required
formatLabel	This label shall be 0001.	Required
formatDefinition	This definition shall be PCM.	Required

Table 3: audioTrackFormat subelement requirements and constraints

Attribute	Requirement/constraint	Quantity
audioStreamFormatIDRef	This subelement shall match the audioStreamFormatID of the corresponding audioStreamFormat.	1

Related information

General requirements on page 6

2.3 audioStreamFormat requirements and constraints

This topic describes requirements for attributes and subelements of the audioStreamFormat element.

Table 4: audioStreamFormat attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
audioStreamFormatID	This attribute shall be either AS_0001xxxx or AS_0003xxxx, where xxxx is a unique hex value in range [0x1001,0xFFFF], which is identical to the corresponding audioChannelFormatID.	Required
audioStreamFormatName	See *General requirements*.	Required
formatLabel	The label shall be 0001.	Required
formatDefinition	The definition shall be PCM.	Required

Table 5: audioStreamFormat subelement requirements and constraints

Subelement	Requirement/constraint	Quantity
audioChannelFormatIDRef	This subelement shall match the audioChannelFormatID of the corresponding audioChannelFormat.	1
audioPackFormatIDRef	This subelement shall match the audioPackFormatID of the corresponding audioPackFormat.	1
audioTrackFormatIDRef	This subelement shall match the auditrackFormatID of the corresponding audioTrackFormat.	1

Although ITU-R BS.2076-0 implies that audioChannelFormat and audioPackFormat identification references within the audioStreamFormat element be mutually exclusive, Dolby Atmos master ADM files contain both audioChannelFormat and audioPackFormat identification references.

Related information

General requirements on page 6

2.4 audioChannelFormat requirements and constraints

This topic describes requirements for attributes and subelements of the `audioChannelFormat` element.

Table 6: `audioChannelFormat` attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
`audioChannelFormatName`	See *General requirements*. See also the table for `audioChannelFormat` attribute values for `DirectSpeakers` type.	Required
`audioChannelFormatID`	This attribute shall be either `AC_0001xxxx` for `DirectSpeakers` types or `AC_0003xxxx` for `Objects` type, where `xxxx` is a unique hex value in range [`0x1001`,`0xFFFF`], which is identical to the corresponding `audioStreamFormatID`.	Required
`typeLabel`	The label shall be either `0001` or `0003`.	Required
`typeDefinition`	The definition shall be either `DirectSpeakers` or `Objects`.	Required

Table 7: `audioChannelFormat` subelement requirements and constraints

Subelement	Requirement/constraint	Quantity
`audioBlockFormat`	This subelement shall be present.	1 (for type `DirectSpeakers`) 1 or more (for type `Objects`)
`frequency`	This subelement should not be used.	0

In addition to the requirements for attributes and subelements of the `audioChannelFormat` element:

- A Dolby Atmos master ADM file shall use only a set of custom `audioChannelFormat` instances for `DirectSpeakers` type.
- `audioChannelFormat` elements of type `DirectSpeakers` shall use only the attribute settings/values listed in this table.

Table 8: audioChannelFormat attribute values for DirectSpeakers type

Channel assignment	audioChannelFormatID	audioChannelFormatName
Left (L)	The channel ID shall be AC_0001xxxx, where xxxx is a unique hex value in range [0x1001,0xFFFF].	RoomCentricLeft
Right (R)		RoomCentricRight
Center (C)		RoomCentricCenter
Low-Frequency Effects (LFE)		RoomCentricLFE
Left Side Surround (Lss)		RoomCentricLeftSideSurround
Right Side Surround (Rss)		RoomCentricRightSideSurround
Left Rear Surround (Lrs)		RoomCentricLeftRearSurround
Right Rear Surround (Rrs)		RoomCentricRightRearSurround
Left Top Surround (Lts)		RoomCentricLeftTopSurround
Right Top Surround (Rts)		RoomCentricRightTopSurround
Left Surround (Ls)		RoomCentricLeftSurround
Right Surround (Rs)		RoomCentricRightSurround

- The DirectSpeakers type audioChannelFormat elements can be present only in certain configuration sets. See *audioPackFormat requirements and constraints.*

Related information

General requirements on page 6
audioPackFormat requirements and constraints on page 13

2.5 audioBlockFormat requirements and constraints

This topic describes requirements for attributes and subelements of the audioBlockFormat element.

Table 9: audioBlockFormat attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
audioBlockFormatID	This attribute shall be AB_0001xxxx_nnnnnnnn or AB_0003xxxx_nnnnnnnn, where xxxx is a unique hex value matching the parent audioChannelFormat value, and nnnnnnnn is also a unique counting hex value starting at 00000001. nnnnnnnn shall have a single static value of 00000001 for blocks of DirectSpeakers type.	Required
rtime	This attribute shall not be used for DirectSpeakers type. This attribute shall be present for Objects type.	Present depending on typeDefinition
duration	This attribute shall not be used for DirectSpeakers type. This attribute shall be present for Objects type.	Present depending on typeDefinition

Dolby Atmos master ADM files utilize custom `audioChannelFormat` elements for `DirectSpeakers` type. Only specific `audioBlockFormat` values are allowed, as listed in this table.

Table 10: `audioBlockFormat` `DirectSpeakers` subelement values

Channel assignment	**speakerLabel**	**position.coordinate=**		
		"X"	**"Y"**	**"Z"**
Left (L)	RC_L	-1	1	0
Right (R)	RC_R	1	1	0
Center (C)	RC_C	0	1	0
Low-Frequency Effects (LFE)	RC_LFE	-1	1	-1
Left Side Surround (Lss)	RC_Lss	-1	0	0
Right Side Surround (Rss)	RC_Rss	1	0	0
Left Rear Surround (Lrs)	RC_Lrs	-1	-1	0
Right Rear Surround (Rrs)	RC_Rrs	1	-1	0
Left Top Surround (Lts)	RC_Lts	-1	0	1
Right Top Surround (Rts)	RC_Rts	1	0	1
Left Surround (Ls)	RC_Ls	-1	-0.36397	0
Right Surround (Rs)	RC_Rs	1	-0.36397	0

The `screenEdgeLock` attribute of the `position` subelement shall not be used for `DirectSpeakers` type.

Table 11: `audioBlockFormat` `Objects` type subelement requirements and constraints

Subelement	**Attribute**	**Requirement/constraint**	**Quantity**
`cartesian`		This subelement shall have a value of `1`.	1
`gain`		This subelement may be omitted. If present, the object is inactive and will have a gain value of `0.0`.	0 or 1
`importance`		This subelement may be omitted. If present, the object is inactive and will have an importance value of `0`.	0 or 1
`position`	`coordinate="X"`	The `X` and `Y` coordinate position shall have a value in `[-1,1]`.	1
	`coordinate="Y"`		1
	`coordinate="Z"`	The `Z` coordinate position shall have a value in `[-1,1]`. When the Z coordinate position value is 0, the position subelement with `coordinate="Z"` attribute may have a value of 0 or may not be present. Accordingly, when this attribute is not present, the Z-coordinate shall have a value of `0.0`.	0 or 1
	`screenEdgeLock`	This attribute shall not be used.	0
`width`		If used, all three size subelements shall be present and shall have identical values in `[0, 1]`.	0 or 1
`depth`			
`height`			

Table 11: audioBlockFormat Objects type subelement requirements and constraints (continued)

Subelement	Attribute	Requirement/constraint	Quantity
diffuse		If this subelement is present, it shall have a value of either 0 or 1.	0 or 1
channelLock	maxDistance	If this subelement is present, the maxDistance attribute shall not be used.	0 or 1
objectDivergence	azimuthRange	This subelement shall not be used.	0
	positionRange		
jumpPosition	interpolationLength	This subelement shall have a value of 1. The interpolationLength attribute shall have value equivalent to 0 samples (for the first audioBlock), or 250 samples (for all subsequent audioBlock instances), at the sampling frequency of the associated audio. See *Use of jumpPosition and interpolationLength* for additional information.	1
zoneExclusion		This subelement may or may not be present. If present, the zone subelement can take on only values as described in *Zone exclusions*.	0 or 1
screenRef		This subelement shall not be present.	0

The gain and importance audioBlockFormat subelements are present only when an object is inactive. An inactive object signifies that the associated audio PCM for an object is silent. The values of gain and importance when an object is inactive—0.0 and 0 respectively—signify that the object does not contribute or matter to the final rendered output for that block.

Related information

Use of jumpPosition and interpolationLength on page 11

2.5.1 Use of jumpPosition and interpolationLength

The Dolby Atmos master ADM profile uses the jumpPosition element and interpolationLength attribute in a compliant, but different, way than what is specified in ITU-R BS.2076-0.

The Dolby Atmos master ADM profile makes assumptions about how metadata is interpreted and rendered. Specifically, there is an assumption that a renderer applies metadata sampling and position smoothing to the object metadata prior to panning. With this assumption, the Dolby Atmos master ADM profile treats audioBlockFormat instances as a series of discrete metadata events, as opposed to interpolated block-to-block metadata transitions. As a result, as described in the table for audioBlockFormat Objects type subelement and constraints, static values for the jumpPosition element and its interpolationLength attribute are used, where the event occurs at the beginning of the audioBlockFormat regardless of its interpolationLength value. Based on the application, keep in mind these considerations:

- When writing a BWAV ADM file adhering to the Dolby Atmos master ADM profile, time varying positions should be sampled. For example, when exporting timeline automation in a DAW to an ADM file, use all the existing metadata breakpoints in the automation lines and also sample the automation lines. The sampling period should be less than 20 milliseconds (such as 10 milliseconds). Sampling is optional during sections where the metadata state remains unchanged, however the last event prior to a state change, a knee point, should be retained and exported. Sampled points very close (<2 ms) to a breakpoint can optionally be discarded. The existing metadata breakpoints and the sampled metadata should be converted to audioBlockFormat instances.

- As previously mentioned, when rendering, the assumption is that positional metadata is sampled and smoothed. Also, it is expected that speaker gains are interpolated between processing blocks during rendering.
- When importing a Dolby Atmos master ADM file, for example in a DAW when importing ADM `audioBlockFormat` instances as visual automation lines in a timeline, positional events for a given object should be interpreted as linear interpolations (that is, linked with straight lines) if and only if the events are less than 30 milliseconds apart. Otherwise, events should be interpreted as described by the ADM XML syntax—a short ramp (based on the `interpolationLength` value), followed by a hold, similar to a staircase change.

2.5.2 Zone exclusions

When zone exclusions are present, one of five basic zones and/or the elevation `zone` can be used.

A single basic `zone` and the optional elevation `zone` are combined to form a single `zoneExclusion` instance. If neither a basic `zone` nor the elevation `zone` is present, then the `zoneExclusion` subelement is also not present.

This table includes the available basic zone sets.

Table 12: Basic `zone` subelement attribute values

Zone description	zone attribute values						zone value (string)
	minX	**maxX**	**minY**	**maxY**	**minZ**	**maxZ**	
Back zone disabled	−1	1	−1	−0.41934	−0.499	0.499	ZM1
Side zone disabled	−1	−0.75806	−0.41934	0.83871	−0.499	0.499	ZM2L
	0.75806	1	−0.41934	0.83871	−0.499	0.499	ZM2R
Center-back zone enabled	−1	−0.16129	0.5	1	−0.499	0.499	ZM3L
	−1	−0.51611	−0.707	0.49999	−0.499	0.499	ZM3Lss
	0.16129	1	0.5	1	−0.499	0.499	ZM3R
	0.51611	1	−0.707	0.49999	−0.499	0.499	ZM3Rss
Screen zone enabled	−1	1	−1	0.83871	−0.499	0.499	ZM4
Surround zone enabled	−1	1	0.5	1	−0.499	0.499	ZM5

In addition to the available basic zones, when a zone exclusion is present, the elevation exclusion zone listed in this table can also be present.

Table 13: Elevation `zone` subelement attribute values

Zone description	zone attribute values						zone value (string)
	minX	**maxX**	**minY**	**maxY**	**minZ**	**maxZ**	
Elevation (ceiling/floor) disabled	−1	1	−1	1	−1	−0.4995	ZB
	−1	1	−1	1	0.4995	1	ZT

2.6 audioPackFormat requirements and constraints

This topic describes requirements for attributes and subelements of the audioPackFormat element.

Table 14: audioPackFormat attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
audioPackFormatID	This attribute shall be either AP_0001xxxx or AP_0003xxxx, where xxxx is a unique hex value in range [0x1001,0xFFFF].	Required
audioPackFormatName	See *General requirements*.	Required
typeLabel	This attribute shall be either 0001 or 0003.	Required
typeDefinition	This attribute shall be either DirectSpeakers or Objects.	Required
importance	This attribute may be omitted.	Optional

Table 15: audioPackFormat subelement requirements and constraints

Subelement	Requirement/constraint	Quantity
audioChannelFormatIDRef	This subelement shall match the audioChannelFormatID of the corresponding audioChannelFormat.	1 to 10 (for type DirectSpeakers) 1 (for type Objects)
audioPackFormatIDRef	This subelement shall not be used.	0
absoluteDistance	This subelement shall not be used.	0

The audioPackFormat element groups one or more audioChannelFormats. Within a Dolby Atmos master ADM file, only certain channel configuration sets shall be used, with each set having a specific ordering of channels, as listed in this table.

Table 16: Allowed channel configuration sets and channel ordering

Channel configuration set	Channel order (by channel assignment abbreviation)
2.0	L, R
3.0	L, R, C
5.0	L, R, C, Ls, Rs
5.1	L, R, C, LFE, Ls, Rs
7.0	L, R, C, Lss, Rss, Lrs, Rrs
7.1	L, R, C, LFE, Lss, Rss, Lrs, Rrs
7.0.2	L, R, C, Lss, Rss, Lrs, Rrs, Lts, Rts
7.1.2	L, R, C, LFE, Lss, Rss, Lrs, Rrs, Lts, Rts

Related information

General requirements on page 6
audioChannelFormat requirements and constraints on page 8

2.7 audioObject requirements and constraints

This topic describes requirements for attributes and subelements of the `audioObject` element.

Table 17: `audioObject` attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
`audioObjectID`	This attribute shall be `AO_xxxx`, where `xxxx` is a unique hex value in range [`0x1001`,`0x1080`] for `DirectSpeakers` type, and in range [`0x100b`,`0x1080`] for `Objects` type. `audioObjectID` values are not contiguous. If an `audioObject` represents `DirectSpeakers` type, then the `audioObjectID` prohibits other contiguous values from being used depending on the number of tracks referenced. If an `audioObjectID` has a value of `OID`, and represents `T` number of tracks, then `audioObjectID` values in range [`OID+1`, `OID+T-1`] are prohibited from being used. For example, if the `audioObjectID` value is `0x1006`, and that `audioObject` refers to six tracks (such as 5.1), then the values `0x1007-0x100b` are prohibited from being used and the next useable `audioObjectID` value will be `0x100c`.	Required
`audioObjectName`	See *General requirements*. Also, see the table for default name values.	Required
`start`[a]	This attribute value shall be set to `00:00:00.00000`.	Required
`duration`	This attribute shall have a value that matches the length of the entire program to the difference between the `start` and `end` attribute of the `audioProgramme` element.	Required
`dialogue`	This attribute may be omitted.	Optional
`importance`	This attribute may be omitted.	Optional
`interact`	This attribute may be omitted. If present, the value shall be `0`.	Optional
`disableDucking`	This attribute may be omitted. If present, the value shall be `1`.	Optional

a Some Dolby Atmos master ADM files utilize `startTime` as the attribute name. For more information, see the table for known issues with Dolby Atmos Master ADM files, based on URN.

Table 18: `audioObject` subelement requirements and constraints

Subelement	Requirement/constraint	Quantity
`audioPackFormatIDRef`	This subelement shall correspond to the `audioPackFormatID` of the associated `audioPackFormat`. This subelement can have at most one instance.	1
`audioObjectIDRef`	This subelement shall not be present.	0
`audioComplementaryObjectIDRef`	This subelement shall not be present.	0
`audioTrackUIDRef`	This subelement shall match the `UID` of a corresponding `audioTrackUID` element.	1 to 10 (for type `DirectSpeakers`) 1 (for type `Objects`)
`audioObjectInteraction`	This subelement shall not be present.	0

Related information

General requirements on page 6
Default name values on page 22

Known issues on page 18

2.8 audioContent requirements and constraints

This topic describes requirements for attributes and subelements of the audioContent element.

Table 19: audioContent attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
audioContentID	This attribute shall be ACO_xxxx, where xxxx is a hex value in range [0x1001,0xFFFF].	Required
audioContentName	See *General requirements*. Also, see the table for default name values.	Required
audioContentLanguage	This attribute may be omitted. However, if present, the language should utilize a code defined in ISO 639-2.	Optional

Table 20: audioContent subelement requirements and constraints

Subelement	Attribute	Requirement/constraint	Quantity
audioObjectIDRef		This subelement shall match the audioObjectID of a corresponding audioObject.	1 to MAX_ELEMENT_COUNT
loudnessMetadata		This subelement may be omitted.	0 or 1
dialogue	mixedContentKind	This subelement shall have value 2. The mixedContentKind attribute shall have value 0.	1

Note: The dialogue subelement and its attribute values within the audioContent element are present only to comply with certain ADM XML schema constraints. This metadata should not be considered accurate.

Related information

General requirements on page 6
Default name values on page 22

2.9 audioProgramme requirements and constraints

This topic describes requirements for attributes and subelements of the audioProgramme element.

Table 21: audioProgramme attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
audioProgrammeID	This attribute shall be APR_1001.	Required
audioProgrammeName	See *General requirements*.	Required
audioProgrammeLanguage	This attribute may be omitted. If present, the language should utilize a code defined in ISO 639-2.	Optional
start	The difference between the start and end attributes must match the duration of the of the associated audio file.	Required
end		Required
maxDuckingDepth	This attribute shall not be present.	Optional

Table 22: audioProgramme subelement requirements and constraints

Subelement	Requirement/constraint	Quantity
audioContentIDRef	This subelement shall match the audioContentID of a corresponding audioContent element.	1 to MAX_ELEMENT_COUNT
loudnessMetadata	This subelement may be omitted.	0 or 1
audioProgrammeReferenceScreen	This subelement may be omitted. If present, only the screenWidth subelement and its associated attribute, X shall be used. All other related elements and attributes shall not be present.	0 or 1

Related information

General requirements on page 6

2.10 audioTrackUID requirements and constraints

This topic describes requirements for attributes and subelements of the audioTrackUID element.

Table 23: audioTrackUID attribute requirements and constraints

Attribute	Requirement/constraint	Presence required
UID	This attribute shall be ATU_nnnnnnnn, where nnnnnnnn is a unique hex value in range [0x00000001,0xFFFFFFFF].	Required
sampleRate	The sample rate shall have a value of 48000, corresponding to the sampling frequency of the associated audio.	Required
bitDepth	The bit depth shall correspond to the bit depth of the associated audio.	Required

Table 24: audioTrackUID subelement requirements and constraints

Subelement	Requirement/constraint	Quantity
audioMXFLookUp	This subelement shall not be present.	0
audioTrackFormatIDRef	This subelement shall match the audioTrackFormatID of the corresponding audioTrackFormat.	1
audioPackFormatIDRef	This subelement shall match the audioPackFormatID of the corresponding audioPackFormat.	1

3

ADM versions and differences in Dolby Atmos masters

The Dolby Atmos master ADM profile complies with ITU.R.BS.2076-0. This version has been superseded by ITU.R.BS.2076-1, which is in force. Caution must be taken to ensure that differences between the two ADM versions do not cause a system to incorrectly reject a Dolby Atmos master ADM file.

- Known issues

3.1 Known issues

In addition to differences between ADM specification versions, there are several known issues with Dolby Atmos master ADM files. These issues can be determined by the Uniform Resource Name (URN) indicated in the ADM XML. Dolby Atmos master ADM files can use two URN namespaces: ebuCore_2014, and ebuCore_2016.

Table 25: Known issues with Dolby Atmos Master ADM files, based on URN

Issue	URN namespace in Dolby Atmos masters	
	ebuCore_2014	**ebuCore_2016**
Presence of `typeDefinition` attribute	This attribute is incorrectly present in the `audioTrackFormat` and `audioStreamFormat` elements.	This attribute is present only in the appropriate elements.
Presence of `typeLabel` attribute	This attribute is incorrectly present in the `audioTrackFormat`, `audioStreamFormat`, `audioProgramme`, `audioContent`, and `audioTrackUID` elements.	This attribute is present only in the appropriate elements.
`start`/`startTime` [a] attribute of `audioObject` element	This attribute is specified as `startTime`.	This attribute is specified as `start`.
Conforms to relevant schema definition	XML documentation utilizing this namespace is not guaranteed to conform to the associated schema.	XML documentation utilizing this namespace conforms to the associated schema.

a BS.2076-0 uses `startTime` in several prose-style descriptions, but actual tables use `start`.

4

Additional chunks (Dolby Audio metadata chunk)

In addition to carrying object audio metadata via the ADM chunk, Dolby Atmos master files contain the Dolby Audio metadata chunk in the encapsulating BWF file.

The Dolby Audio metadata chunk contains additional metadata segments with relevant information about the content creation tools, the program, and encoder configuration for downstream processing. The Dolby Audio metadata chunk adheres to the specification defined in EBU Tech 3285 Supplement 6: *BWF - Dolby Metadata*.

5

Dolby Atmos master content organization and element names

Dolby Atmos master ADM files utilize content organization structures to specify the name of certain ADM elements. When a name is not present, default names are given.

5.1 Dolby Atmos master content organization

Dolby Atmos masters utilize bed instance records and object records as organizational constructs to identify content and object types present in a program.

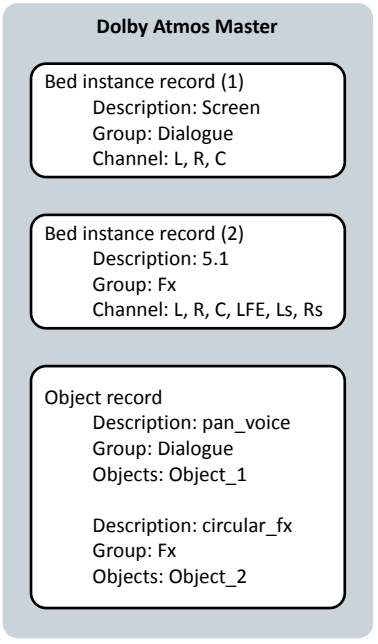
Each bed instance record identifies a set of one or more beds (that is, content with a `typeDefinition`="`DirectSpeakers`"). The object record identifies how the objects (that is, content with a `typeDefinition`="`Objects`") are organized. The records may contain:

- A description for each bed instance or object
- A group name to associate different bed instances and objects into groups

The Dolby Atmos master ADM profile attempts to maintain the content organization by using the bed and objects records to dictate the organizational structure within ADM. The concepts of descriptions and groups correspond to the `audioObject` and `audioContent` ADM elements, respectively. These relationships are used to specify the `audioObjectName` and `audioContentName` attribute values.

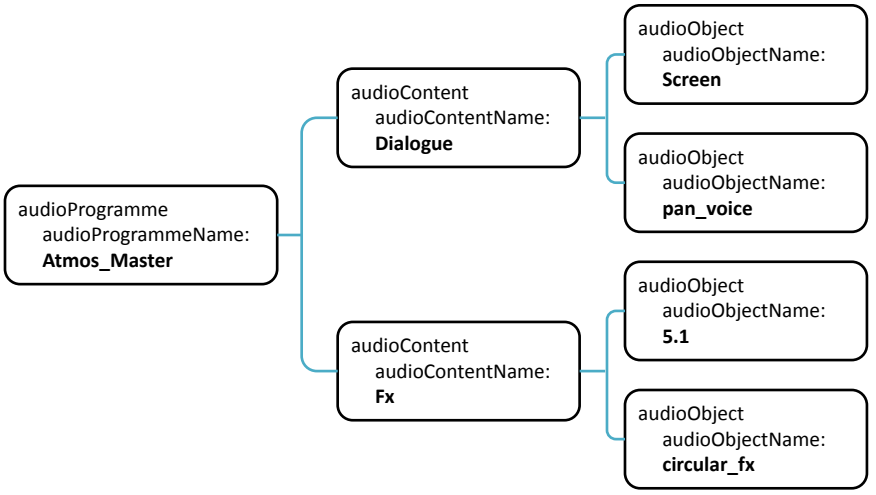
This figure shows an example Dolby Atmos master program with two bed instance records and an object record.

Figure 1: Example Dolby Atmos master content structure



This figure shows the ADM content structure corresponding to the Dolby Atmos master records.

Figure 2: Example Dolby Atmos master ADM content structure



Note that:

- Bed instance and object record description text is used as the `audioObjectName` attribute value.
- Bed instance and object record group name text is used as the `audioContentName` attribute value.

Systems that ingest Dolby Atmos master ADM BWF files should try to preserve the content organization by reusing the `audioContentName` and `audioObjectName` attribute values when presenting the organizational structure of the content to the user.

Related information

Default name values on page 22

5.2 Default name values

Default name attribute values can be used in a Dolby Atmos master ADM file. The name attributes can indicate content organization (as described in *Dolby Atmos master content organization*), or have no meaning at all.

In certain cases, the bed instance record or object record may not include a description or be part of a content group. In situations where the description or group names are missing, special name attribute values are used.

This table indicates the default `audioContent` and `audioObject` name attributes and values, per use case.

Table 26: Default name values

Attribute	Value	Use case
`audioContentName`	`Atmos_Master_Content`	When a bed instance or object record is not part of a group and therefore has no corresponding group name.
`audioObjectName`	`Atmos_Bed_M`	When a bed instance does not have a description. `M` is a number in [`1`,`128`]. It is recommended that `M` be a unique value. `M` does not need to be contiguous.
`audioObjectName`	`Atmos_Obj_N`	When an object record does not have a description. `N` is a number in [`10`,`128`]. It is recommended that `N` be a unique value. `N` does not need to be contiguous.

Default name values are also used for the `audioProgramme`, `audioPackFormat`, `audioChannelFormat` (for `Objects` type), `audioStreamFormat`, and `audioTrackFormat` elements. However, unlike `audioContent` and `audioObject` names, these values are used simply to populate the attribute when a

custom name value is not used. These name values do not represent any organizational structure and are therefore not meaningful.

Glossary

ADM
Audio Definition Model. A metadata model specified in ITU.R.BS.2076 that describes channel-, object-, or scene-based audio file formats.

ADM BWF
Audio Definition Model Broadcast Wave Format.

BWF
Broadcast Wave Format. An extension of the Microsoft Waveform Audio Format (WAV) file format to include metadata important to broadcast applications. This format is specified in EBU Tech 3285.

DAW
Digital audio workstation. An electronic device or computer software application used to record, edit, and produce audio files.

PCM
Pulse code modulation. A method that is used to convert analog signals into digital, binary, coded pulses by sampling the analog signal, quantizing each sample independently, and converting the resulting quantized values into a digital signal.

XML
EXtensible Markup Language.