MATROŠKA ⟨⟩ (/)

Specifications

Status of this document

This document is not the real format specification. It's a simple draft to work. (For a simplified diagram of the layout of a Matroska file, see the Diagram page. (../diagram/index.html)) But since it's quite complete it is used as a reference for the development of libmatroska. An alternate version of the specification can be found here (/files/matroska.pdf) (PDF doc maintained by Alexander Noé -- may be outdated).

A more accurate and in-depth for Matroska is being done via the IETF CELLAR group. EBML is also specified more officially this way. There is a github repo with the speciciations in progress for Matroska (https://github.com/Matroska-Org/matroska-specification) and EBML (https://github.com/Matroska-Org/ebml-specification). The official mailing list for CELLAR can be found on the IETF website (https://www.ietf.org/mailman/listinfo/cellar). Anything found there takes precedence over the specifications found in this page.

The table found below is now generated from the "source" of the Matroska specification. This XML file (https://github.com/Matroska-Org/foundation-source /blob/master/spectool/specdata.xml) is also used to generate the semantic data used in libmatroska and libmatroska2. We encourage anyone to use and monitor its changes so your code is spec-proof and always up to date.

Note that versions 1, 2 and 3 have been finalized. Version 4 is currently work in progress. There may be further additions to v4.

EBML principle

EBML is short for Extensible Binary Meta Language. EBML specifies a binary and octet (byte) aligned format inspired by the principle of XML. EBML itself is a generalized description of the technique of binary markup. Like XML, it is completely agnostic to any data that it might contain. Therein, the Matroska project is a specific implementation using the rules of EBML: It seeks to define a subset of the EBML language in the context of audio and video data (though it obviously isn't limited to this purpose). The format is made of 2 parts: the semantic and the syntax. The semantic specifies a number of IDs and their basic type and is not included in the data file/stream. There is a specific project dealing with EBML (http://ebml.sourceforge.net/) in more details and more recent updates.

Just like XML, the specific "tags" (IDs in EBML parlance) used in an EBML implementation are arbitrary. However, the semantic of EBML outlines general data types and ID's.

The known basic types are:

- Signed Integer - Big-endian, any size from 1 to 8 octets
- Unsigned Integer - Big-endian, any size from 1 to 8 octets
- Float - Big-endian, defined for 4 and 8 octets (32, 64 bits)
- String - Printable ASCII (0x20 to 0x7E), zero-padded when needed
- UTF-8 - Unicode string (http://www.unicode.org/), zero padded when needed (RFC 2279 (http://www.faqs.org/rfcs/rfc2279.html))
- Date - signed 8 octets integer in nanoseconds with 0 indicating the precise beginning of the millennium (at 2001-01-01T00:00:00,000000000 UTC)
- Master-Element - contains other EBML sub-elements of the next lower level
- Binary - not interpreted by the parser

As well as defining standard data types, EBML uses a system of Elements to make up an EBML "document." Elements incorporate an Element ID, a descriptor for the size of the element, and the binary data itself. Futher, Elements can be nested, or contain, Elements of a lower "level."

Element IDs (also called EBML IDs) are outlined as follows, beginning with the ID itself, followed by the Data Size, and then the non-interpreted Binary itself:

- Element ID coded with an UTF-8 like system :

```
bits, big-endian
1xxx xxxx                               - Class A IDs (2^7 -1 possible values) (base 0x8X)
01xx xxxx  xxxx xxxx                     - Class B IDs (2^14-1 possible values) (base 0x4X 0xXX)
001x xxxx  xxxx xxxx  xxxx xxxx          - Class C IDs (2^21-1 possible values) (base 0x2X 0xXX 0xXX)
0001 xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx - Class D IDs (2^28-1 possible values) (base 0x1X 0xXX 0xXX 0xXX)
```

  Some Notes:
    ○ The leading bits of the EBML IDs are used to identify the length of the ID. The number of leading 0's + 1 is the length of the ID in octets. We will refer to the leading bits as the Length Descriptor.
    ○ Any ID where all x's are composed entirely of 1's is a Reserved ID, thus the -1 in the definitions above.
    ○ The Reserved IDs (all x set to 1) are the only IDs that may change the Length Descriptor.

- Data size, in octets, is also coded with an UTF-8 like system :

```
bits, big-endian
1xxx xxxx                                                          - value 0 to  2^7-2
01xx xxxx  xxxx xxxx                                               - value 0 to 2^14-2
001x xxxx  xxxx xxxx  xxxx xxxx                                    - value 0 to 2^21-2
0001 xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx                         - value 0 to 2^28-2
0000 1xxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx              - value 0 to 2^35-2
0000 01xx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx   - value 0 to 2^42-2
0000 001x  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx            - value 0 to 2^49-2
0000 0001  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx - value 0 to 2^56-2
```

  Since modern computers do not easily deal with data coded in sizes greater than 64 bits, any larger Element Sizes are left undefined at the moment. Currently, the Element Size coding allows for an Element to grow to 72000 To, i.e. 7x10^16 octets or 72000 terabytes, which will be sufficient for the time being.

  There is only one reserved word for Element Size encoding, which is an Element Size encoded to all 1's. Such a coding indicates that the size of the Element is unknown, which is a special case that we believe will be useful for live streaming purposes. However, avoid using this reserved word unnecessarily, because it makes parsing slower and more difficult to implement.

- Data
    ○ Integers are stored in their standard big-endian form (no UTF-like encoding), only the size may differ from their usual form (24 or 40 bits for example).
    ○ The Signed Integer is just the big-endian representation trimmed from some 0x00 and 0xFF where they are not meaningful (sign). For example -2 can be coded as 0xFFFFFFFFFFFFFE or 0xFFFE or 0xFE and 5 can be coded as 0x000000000005 or 0x0005 or 0x05.

Elements semantic

A more detailed description of the column headers can be found in the Specification Notes (notes.html#Table_Columns).

If you are interested in WebM you can have a look at this page that describes what parts of Matroska it kept (http://www.webmproject.org/code/specs /container/).

- Element Name - The full name of the described element.
- L - Level - The level within an EBML tree that the element may occur at. + is for a recursive level (can be its own child). g: global element (can be found at any level)
- EBML ID - The Element ID displayed as octets.
- Ma - Mandatory - This element is mandatory in the file (abbreviated as »mand.«).
- Mu - Multiple - The element may appear multiple times within its parent element (abbreviated as »mult.«).
- Rng - Range - Valid range of values to store in the element.
- Default - The default value of the element.
- T - Element Type - The form of data the element contains. m: Master, u: unsigned int, i: signed integer, s: string, 8: UTF-8 string, b: binary, f: float, d: date
- 1 - The element is contained in Matroska version 1.
- 2 - The element is contained in Matroska version 2.
- 3 - The element is contained in Matroska version 3.
- 4 - The element is contained in Matroska version 4 (v4 is still work in progress; further additions are possible).
- W - All elements available for use in WebM.
- Description - A short description of the element's purpose.

The default values defined for the EBML header correspond to the values for a Matroska stream/file. When parsing the EBML header the default values are different, irrespective of the DocType defined.

- EBMLMaxIDLength is 4: IDs in the EBML header cannot be longer than 4 octets.
- EBMLMaxSizeLength is 4: Length of IDs in the EBML header cannot be longer than 4 octets.

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
EBMLMaxIDLength	1	[42][F2]	mand.	-		4	4	u (Unsigned Integer)						
EBMLMaxSizeLength	1	[42][F3]	mand.	-		1-8	8	u (Unsigned Integer)						

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
Segment													
Segment	0	[18][53][80][67]	mand.	-	-	-	m (Master Elements)	*	*	*	*	*	The Root... Top-Level... at Level 1... 1 Segmer...

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
Meta Seek Information													
SeekHead	1	[11][4D][9B][74]	-	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains... Top-Level...
Seek	2	[4D][BB]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains... Element.
SeekID	3	[53][AB]	mand.	-	-	-	b (Binary)	*	*	*	*	*	The binar... name.
SeekPosition	3	[53][AC]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*	*	The Segm...

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
Segment Information													
Info	1	[15][49][A9][66]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains... Segment.
SegmentUID	2	[73][A4]	-	-	not 0	-	b (Binary)	*	*	*			If the Seg... Segment...
SegmentFilename	2	[73][84]	-	-	-	-	8 (UTF-8)	*	*	*			A filenam...
PrevUID	2	[3C][B9][23]	-	-	-	-	b (Binary)	*	*	*	*		If the Seg... Segment... the PrevU... REQUIRE... PrevUID I... considere... Linked Se... be equal...
PrevFilename	2	[3C][83][AB]	-	-	-	-	8 (UTF-8)	*	*	*	*		Provision... display co... be consid... the previo...
NextUID	2	[3E][B9][23]	-	-	-	-	b (Binary)	*	*	*	*		If the Seg... Segment... the PrevU... REQUIRE... NextUID I... considere... Linked Se... be equal...
NextFilename	2	[3E][83][BB]	-	-	-	-	8 (UTF-8)	*	*	*	*		Provision... convenien... considere... Next Segr...
SegmentFamily	2	[44][44]	-	mult.	-	-	b (Binary)	*	*	*	*		If the Seg... Segment... Element i...
ChapterTranslate	2	[69][24]	-	mult.	-	-	m (Master Elements)	*	*	*	*		A tuple of... chapter c...
ChapterTranslateEditionUID	3	[69][FC]	-	mult.	-	-	u (Unsigned Integer)	*	*	*	*		Specify a... correspor... specified,... the Segm...
ChapterTranslateCodec	3	[69][BF]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*		The chapt... (https://v... /index.ht... 0 - Matros... 1 - DVD-r...
ChapterTranslateID	3	[69][A5]	mand.	-	-	-	b (Binary)	*	*	*	*		The binar... Segment... format de... ChapProc... (https://v... /chapters... /index.ht...
TimestampScale	2	[2A][D7][B1]	mand.	-	not 0	1000000	u (Unsigned Integer)	*	*	*	*		Timestam... (1.000.00... Segment...
Duration	2	[44][89]	-	-	> 0x0p+0	-	f (Float)	*	*	*	*	*	Duration... based on...
DateUTC	2	[44][61]	-	-	-	-	d (Date)	*	*	*	*		The date... created b... library.
Title	2	[7B][A9]	-	-	-	-	8 (UTF-8)	*	*	*	*		General n...
MuxingApp	2	[4D][80]	mand.	-	-	-	8 (UTF-8)	*	*	*	*		Include th... library fol...
WritingApp	2	[57][41]	mand.	-	-	-	8 (UTF-8)	*	*	*	*		Include th... followed b...

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
Cluster													
Cluster	1	[1F][43][B6][75]	-	mult.	-	-	m (Master Elements)	*	*	*	*	*	The Top-l... (monolith...
Timestamp	2	[E7]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*	*	Absolute... on Timest...
SilentTracks	2	[58][54]	-	-	-	-	m (Master Elements)	*	*	*	*		The list of... part of th... overlay tr... track to u...
SilentTrackNumber	3	[58][D7]	-	mult.	-	-	u (Unsigned Integer)	*	*	*	*		One of th... from now... later if no... Cluster.

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
Position	2	[A7]	-	-	-	-	u (Unsigned Integer)	*	*	*	*		The Segm Segment to resync streams.
PrevSize	2	[AB] [6]	-	-	-	-	u (Unsigned Integer)	*	*	*	*	*	Size of th be useful
SimpleBlock	2	[A3]	-	mult.	-	-	b (Binary)		*	*	*	*	Similar to /technical without a used to re feature is Structure /technical /index.ht
BlockGroup	2	[A0]	-	mult.	-	-	m (Master Elements)	*	*	*	*		Basic con single Blo Block.
Block	3	[A1]	mand.	-	-	-	b (Binary)	*	*	*	*	*	Block con rendered Cluster Ti (https://v /index.ht
BlockVirtual	3	[A2]	-	-	-	-	b (Binary)	*	*				A Block w the strea would be Virtual (h /technical
BlockAdditions	3	[75][A1]	-	-	-	-	m (Master Elements)	*	*	*	*		Contain a main one knowledg see and u
BlockMore	4	[A6]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*		Contain th paramete
BlockAddID	5	[EE]	mand.	-	not 0	1	u (Unsigned Integer)	*	*	*	*		An ID to i
BlockAdditional	5	[A5]	mand.	-	-	-	b (Binary)	*	*	*	*		Interprete the Block.
BlockDuration	3	[9B]	-	-	-	DefaultDuration	u (Unsigned Integer)	*	*	*	*	*	The durat Timestam mandator the track default va no Default to be the of this Blo Block in " This Elem Track (as available) track like
ReferencePriority	3	[FA]	mand.	-	-	0	u (Unsigned Integer)	*	*	*	*		This fram specified frame of t replace th frame is r
ReferenceBlock	3	[FB]	-	mult.	-	-	i (Signed Integer)	*	*	*	*	*	Timestam reference timestam attached
ReferenceVirtual	3	[FD]	-	-	-	-	i (Signed Integer)	*	*				The Segm would oth block.
CodecState	3	[A4]	-	-	-	-	b (Binary)		*	*	*		The new interpreta informatio by a seek
DiscardPadding	3	[75][A2]	-	-	-	-	i (Signed Integer)			*	*		Duration added to the Block beginning The durat calculated and SHOU
Slices	3	[8E]	-	-	-	-	m (Master Elements)	*	*	*	*		Contains
TimeSlice	4	[E8]	-	mult.	-	-	m (Master Elements)	*			*		Contains data cont interpret playback.
LaceNumber	5	[CC]	-	-	-	0	u (Unsigned Integer)	*			*		The rever lace (0 is last, etc). Element i
FrameNumber	5	[CD]	-	-	-	0	u (Unsigned Integer)						The numb this lace v generate Block/Fra
BlockAdditionID	5	[CB]	-	-	-	0	u (Unsigned Integer)						The ID of the main
Delay	5	[CE]	-	-	-	0	u (Unsigned Integer)						The (scale
SliceDuration	5	[CF]	-	-	-	0	u (Unsigned Integer)						The (scale Element.
ReferenceFrame	3	[C8]	-	-	-	-	m (Master Elements)						DivX trick (http://la
ReferenceOffset	4	[C9]	mand.	-	-	-	u (Unsigned Integer)						DivX trick (http://la
ReferenceTimestamp	4	[CA]	mand.	-	-	-	u (Unsigned Integer)						DivX trick (http://la
EncryptedBlock	2	[AF]	-	mult.	-	-	b (Binary)						Similar to (https://v /index.ht inside the and/or sig Structure /technical /index.ht

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	

Track

| Tracks | 1 | [16][54] [AE][6B] | - | mult. | - | - | m (Master Elements) | * | * | * | * | * | A Top-Lev many trac |
| TrackEntry | 2 | [AE] | mand. | mult. | - | - | m (Master Elements) | * | * | * | * | * | Describes |

Element	Level	ID	Mand.	Mult.	Range	Default	Type						Description
TrackNumber	3	[D7]	mand.	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	The track Header (u encourag unlimited
TrackUID	3	[73][C5]	mand.	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	A unique SHOULD direct str file.
TrackType	3	[83]	mand.	-	1-254	-	u (Unsigned Integer)	*	*	*	*	*	A set of t 1 - video, 2 - audio, 3 - compl 16 - logo, 17 - subti 18 - butto 32 - contr
FlagEnabled	3	[B9]	mand.	-	0-1	1	u (Unsigned Integer)	*	*	*	*	*	Set if the
FlagDefault	3	[88]	mand.	-	0-1	1	u (Unsigned Integer)	*	*	*	*	*	Set if that SHOULD matches t
FlagForced	3	[55][AA]	mand.	-	0-1	0	u (Unsigned Integer)	*	*	*	*	*	Set if that playback. for a kind SHOULD matches t + forced between a the sam
FlagLacing	3	[9C]	mand.	-	0-1	1	u (Unsigned Integer)	*	*	*	*	*	Set if the lacing. (1
MinCache	3	[6D][E7]	mand.	-	-	0	u (Unsigned Integer)	*	*	*	*		The minir SHOULD If set to 0 system is
MaxCache	3	[6D][F8]	-	-	-	-	u (Unsigned Integer)	*	*	*	*		The maxi store refe frame. 0
DefaultDuration	3	[23][E3][83]	-	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	Number c Timestam Matroska (Simple)E
DefaultDecodedFieldDuration	3	[23][4E][7A]	-	-	not 0	-	u (Unsigned Integer)					*	The perio Timestam fields at t (see the r /technical /notes.ht
TrackTimestampScale	3	[23][31][4F]	mand.	-	> 0x0p+0	1.0	f (Float)	*	*	*			DEPRECA apply on in relation adjust vic differs).
TrackOffset	3	[53][7F]	-	-	-	0	i (Signed Integer)						A value to This can b offset of a
MaxBlockAdditionID	3	[55][EE]	mand.	-	-	0	u (Unsigned Integer)	*	*	*	*		The maxi (https://v /index.ht there is n (https://v /index.ht
Name	3	[53][6E]	-	-	-	-	8 (UTF-8)	*	*	*	*	*	A human-
Language	3	[22][B5][9C]	-	-	-	eng	s (String)	*	*	*	*	*	Specifies Matroska (https://v /index.ht MUST be Element i
LanguageIETF	3	[22][B5][9D]	-	-	-	-	s (String)					*	Specifies according /html/bcp Subtag R /assignm /language is used, t in the sar
CodecID	3	[86]	mand.	-	-	-	s (String)	*	*	*	*	*	An ID cor codec pag /technical more info
CodecPrivate	3	[63][A2]	-	-	-	-	b (Binary)	*	*	*	*	*	Private da
CodecName	3	[25][86][88]	-	-	-	-	8 (UTF-8)	*	*	*	*	*	A human- codec.
AttachmentLink	3	[74][46]	-	-	not 0	-	u (Unsigned Integer)	*	*	*			The UID c this codec
CodecSettings	3	[3A][96][97]	-	-	-	-	8 (UTF-8)						A string d used.
CodecInfoURL	3	[3B][40][40]	-	mult.	-	-	s (String)						A URL to used.
CodecDownloadURL	3	[26][B2][40]	-	mult.	-	-	s (String)						A URL to
CodecDecodeAll	3	[AA]	mand.	-	0-1	1	u (Unsigned Integer)	*	*	*	*		The codec data (1 bi
TrackOverlay	3	[6F][AB]	-	mult.	-	-	u (Unsigned Integer)	*	*	*	*		Specify th for the Tr That mea SilentTrac /technical the overla The order the first c used. If n second, e
CodecDelay	3	[56][AA]	-	-	-	0	u (Unsigned Integer)				*	*	CodecDel nanoseco subtracte order to g value SHC tracks wit in the sar
SeekPreRoll	3	[56][BB]	mand.	-	-	0	u (Unsigned Integer)				*	*	After a di duration i decoder N data is va
TrackTranslate	3	[66][24]	-	mult.	-	-	m (Master Elements)	*	*	*	*		The track Chapter C

Element	Lvl	ID	Mand	Mult	Range	Default	Type						Description
TrackTranslateEditionUID	4	[66][FC]	-	mult.	-	-	u (Unsigned Integer)	*	*	*	*		Specify a translatio means fo Segment.
TrackTranslateCodec	4	[66][BF]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*		The chapt (https://v /index.ht 0 - Matro 1 - DVD-r
TrackTranslateTrackID	4	[66][A5]	mand.	-	-	-	b (Binary)	*	*	*	*		The binar track in tl depends (https://v /index.ht
Video	3	[E0]	-	-	-	-	m (Master Elements)	*	*	*	*	*	Video set
FlagInterlaced	4	[9A]	mand.	-	0-2	0	u (Unsigned Integer)		*	*	*	*	A flag to progressiv to declare 0 - undet 1 - interla 2 - progre
FieldOrder	4	[9D]	mand.	-	0-14	2	u (Unsigned Integer)					*	Declare tl FlagInterl MUST be 0 - progre 1 - tff, 2 - undet 6 - bff, 9 - bff(sw 14 - tff(sv
StereoMode	4	[53][B8]	-	-	-	0	u (Unsigned Integer)			*	*	*	Stereo-3D more det Specificat (https://v /notes.ht 0 - mono 1 - side b 2 - top - l 3 - top - l 4 - check 5 - check 6 - row ir 7 - row ir 8 - colum 9 - colum 10 - anag 11 - side 12 - anag 13 - both is first), 14 - both is first)
AlphaMode	4	[53][C0]	-	-	-	0	u (Unsigned Integer)			*	*	*	Alpha Vid indicates could con
OldStereoMode	4	[53][B9]	-	-	-	-	u (Unsigned Integer)						DEPRECA StereoMo libmatros 0 - mono 1 - right 2 - left e 3 - both e
PixelWidth	4	[B0]	mand.	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	Width of l pixels.
PixelHeight	4	[BA]	mand.	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	Height of pixels.
PixelCropBottom	4	[54][AA]	-	-	-	0	u (Unsigned Integer)	*	*	*	*	*	The numb the botto
PixelCropTop	4	[54][BB]	-	-	-	0	u (Unsigned Integer)	*	*	*	*	*	The numb the top of
PixelCropLeft	4	[54][CC]	-	-	-	0	u (Unsigned Integer)	*	*	*	*	*	The numb the left of
PixelCropRight	4	[54][DD]	-	-	-	0	u (Unsigned Integer)	*	*	*	*	*	The numb the right
DisplayWidth	4	[54][B0]	-	-	not 0	PixelWidth - PixelCropLeft - Pi	u (Unsigned Integer)	*	*	*	*	*	Width of l Applies to (PixelCrop only valid (https://v /index.ht
DisplayHeight	4	[54][BA]	-	-	not 0	PixelHeight - PixelCropTop - Pi	u (Unsigned Integer)	*	*	*	*	*	Height of Applies to (PixelCrop only valid (https://v /index.ht
DisplayUnit	4	[54][B2]	-	-	-	0	u (Unsigned Integer)	*	*	*	*	*	How Disp interprete 0 - pixels 1 - centin 2 - inches 3 - displa 4 - unkno
AspectRatioType	4	[54][B3]	-	-	-	0	u (Unsigned Integer)	*	*	*	*	*	Specify tl aspect ra 0 - free re 1 - keep 2 - fixed
ColourSpace	4	[2E][B5][24]	-	-	-	-	b (Binary)	*	*	*	*		Specify tl Track's da similar in of AVI's E is MANDA CodecID l "V_UNCO
GammaValue	4	[2F][B5][23]	-	-	> 0x0p+0	-	f (Float)						Gamma V
FrameRate	4	[23][83][E3]	-	-	> 0x0p+0	-	f (Float)						Number c
Colour	4	[55][B0]	-	-	-	-	m (Master Elements)					*	Settings c
MatrixCoefficients	5	[55][B1]	-	-	-	2	u (Unsigned Integer)					*	The Matri derive lur green, an the value MatrixCoe of ISO/IE 0 - Identi 1 - ITU-R

									2 - unspe… 3 - reserv… 4 - US FC… 5 - ITU-R… 6 - SMPTI… 7 - SMPTI… 8 - YCoCg… 9 - BT202… 10 - BT20… 11 - SMP… 12 - Chro Luminanc… 13 - Chro… 14 - ITU-…
BitsPerChannel	5	[55][B2]	-	-	-	0	u (Unsigned Integer)	*	Number o… value of 0… is unspec…
ChromaSubsamplingHorz	5	[55][B3]	-	-	-	-	u (Unsigned Integer)	*	The amou… and Cb ch… removed … with 4:2:… ChromaS… 1.
ChromaSubsamplingVert	5	[55][B4]	-	-	-	-	u (Unsigned Integer)	*	The amou… and Cb ch… removed … with 4:2:… ChromaS… 1.
CbSubsamplingHorz	5	[55][B5]	-	-	-	-	u (Unsigned Integer)	*	The amou… channel f… horizonta… ChromaS… video with… ChromaS… 1 and Cb… to 1.
CbSubsamplingVert	5	[55][B6]	-	-	-	-	u (Unsigned Integer)	*	The amou… channel f… vertically. ChromaS…
ChromaSitingHorz	5	[55][B7]	-	-	-	0	u (Unsigned Integer)	*	How chro… 0 - unspe… 1 - left co… 2 - half
ChromaSitingVert	5	[55][B8]	-	-	-	0	u (Unsigned Integer)	*	How chro… 0 - unspe… 1 - top co… 2 - half
Range	5	[55][B9]	-	-	-	0	u (Unsigned Integer)	*	Clipping o… 0 - unspe… 1 - broad… 2 - full ra… 3 - define… MatrixCoe…
TransferCharacteristics	5	[55][BA]	-	-	-	2	u (Unsigned Integer)	*	The trans… For clarity… TransferC… Table 3 o… H.273. 0 - reserv… 1 - ITU-R… 2 - unspe… 3 - reserv… 4 - Gamm… 5 - Gamm… 6 - SMPTI… 7 - SMPTI… 8 - Linear… 9 - Log,… 10 - Log S… 11 - IEC 6… 12 - ITU-… Gamut,… 13 - IEC 6… 14 - ITU-… 15 - ITU-… 16 - ITU-… Quantizat… 17 - SMP… 18 - ARIB…
Primaries	5	[55][BB]	-	-	-	2	u (Unsigned Integer)	*	The colou… clarity, th… Primaries… ISO/IEC 2… 0 - reserv… 1 - ITU-R… 2 - unspe… 3 - reserv… 4 - ITU-R… 5 - ITU-R… 6 - ITU-R… 7 - SMPTI… 8 - FILM,… 9 - ITU-R… 10 - SMP… 11 - SMP… 12 - SMP… 22 - EBU… phosphor…
MaxCLL	5	[55][BC]	-	-	-	-	u (Unsigned Integer)	*	Maximum… (Maximur… per squar…
MaxFALL	5	[55][BD]	-	-	-	-	u (Unsigned Integer)	*	Maximum… (Maximur… candelas…
MasteringMetadata	5	[55][D0]	-	-	-	-	m (Master Elements)	*	SMPTE 20…
PrimaryRChromaticityX	6	[55][D1]	-	-	0-1	-	f (Float)	*	Red X chr… by CIE 19…
PrimaryRChromaticityY	6	[55][D2]	-	-	0-1	-	f (Float)	*	Red Y chr… CIE 1931…
PrimaryGChromaticityX	6	[55][D3]	-	-	0-1	-	f (Float)	*	Green X c… by CIE 19…
PrimaryGChromaticityY	6	[55][D4]	-	-	0-1	-	f (Float)	*	Green Y c… by CIE 19…
PrimaryBChromaticityX	6	[55][D5]	-	-	0-1	-	f (Float)	*	Blue X ch… by CIE 19…

Element	Level	ID	mand.	mult.	range	default	type						Description
PrimaryBChromaticityY	6	[55][D6]	-	-	0-1	-	f (Float)				*		Blue Y ch... by CIE 19...
WhitePointChromaticityX	6	[55][D7]	-	-	0-1	-	f (Float)				*		White X c... by CIE 19...
WhitePointChromaticityY	6	[55][D8]	-	-	0-1	-	f (Float)				*		White Y c... by CIE 19...
LuminanceMax	6	[55][D9]	-	-	>= 0x0p+0	-	f (Float)				*		Maximum... candelas...
LuminanceMin	6	[55][DA]	-	-	>= 0x0p+0	-	f (Float)				*		Minimum... candelas...
Projection	4	[76][70]	-	-	-	-	m (Master Elements)				*	*	Describes... to render...
ProjectionType	5	[76][71]	mand.	-	0-3	0	u (Unsigned Integer)				*	*	Describes... track. 0 - rectar... 1 - equire... 2 - cuben... 3 - mesh...
ProjectionPrivate	5	[76][72]	-	-	-	-	b (Binary)				*	*	Private da... projection... (Rectangu... be presen... (Equirecta... be presen... data that... ISOBMFF... ('equi'). F... (Cubemap... present a... that woul... Cubemap... Projection... element r... same bina... inside an... ('mshp').t... fields are... but the F... This is to... informatio... semantics... formats.
ProjectionPoseYaw	5	[76][73]	mand.	-	-	0.0	f (Float)				*	*	Specifies... projection... clockwise... up vector... before an... Projection... this field... degree ra...
ProjectionPosePitch	5	[76][74]	mand.	-	-	0.0	f (Float)				*	*	Specifies... projection... clockwise... right vect... after the... before the... value of t... degree ra...
ProjectionPoseRoll	5	[76][75]	mand.	-	-	0.0	f (Float)				*	*	Specifies... projection... clockwise... forward v... applied at... Projection... this field... degree ra...
Audio	3	[E1]	-	-	-	-	m (Master Elements)	*	*	*	*	*	Audio set...
SamplingFrequency	4	[B5]	mand.	-	> 0x0p+0	8000.0	f (Float)	*	*	*	*	*	Sampling...
OutputSamplingFrequency	4	[78][B5]	-	-	> 0x0p+0	SamplingFrequency	f (Float)	*	*	*	*	*	Real outp... for SBR t...
Channels	4	[9F]	mand.	-	not 0	1	u (Unsigned Integer)	*	*	*	*	*	Numbers...
ChannelPositions	4	[7D][7B]	-	-	-	-	b (Binary)						Table of h... successiv... (https://v... /index.ht...
BitDepth	4	[62][64]	-	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	Bits per s...
TrackOperation	3	[E2]	-	-	-	-	m (Master Elements)				*	*	Operation... tracks to... details lo... (https://v... /notes.ht... subject.
TrackCombinePlanes	4	[E3]	-	-	-	-	m (Master Elements)				*	*	Contains... that need... track
TrackPlane	5	[E4]	mand.	mult.	-	-	m (Master Elements)				*	*	Contains... be combi...
TrackPlaneUID	6	[E5]	mand.	-	not 0	-	u (Unsigned Integer)				*	*	The track... represent...
TrackPlaneType	6	[E6]	mand.	-	-	-	u (Unsigned Integer)				*	*	The kind... 0 - left ey... 1 - right e... 2 - backg...
TrackJoinBlocks	4	[E9]	-	-	-	-	m (Master Elements)				*	*	Contains... need to b... track
TrackJoinUID	5	[ED]	mand.	mult.	not 0	-	u (Unsigned Integer)				*	*	The track... blocks ar...
TrickTrackUID	3	[C0]	-	-	-	-	u (Unsigned Integer)						DivX trick... (http://la...
TrickTrackSegmentUID	3	[C1]	-	-	-	-	b (Binary)						DivX trick... (http://la...
TrickTrackFlag	3	[C6]	-	-	-	0	u (Unsigned Integer)						DivX trick... (http://la...
TrickMasterTrackUID	3	[C7]	-	-	-	-	u (Unsigned Integer)						DivX trick... (http://la...
TrickMasterTrackSegmentUID	3	[C4]	-	-	-	-	b (Binary)						DivX trick... (http://la...
ContentEncodings	3	[6D][80]	-	-	-	-	m (Master Elements)	*	*	*	*	*	Settings f... mechanis... encryptio...
ContentEncoding	4	[62][40]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Settings f... compress...

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
ContentEncodingOrder	5	[50][31]	mand.	-	-	0	u (Unsigned Integer)	*	*	*	*	*	Tells whe... during en... counting ... has to sta... it finds an... has to be ... ContentE... Segment.
ContentEncodingScope	5	[50][32]	mand.	-	not 0	1	u (Unsigned Integer)	*		*	*	*	A bit field... have bee... endian) c... 1 - All fra... data, 2 - The tr... 4 - The n... `Content... inside `C... `Content
ContentEncodingType	5	[50][33]	mand.	-	-	0	u (Unsigned Integer)	*		*	*	*	A value d... transform... 0 - Comp... 1 - Encryp
ContentCompression	5	[50][34]	-	-	-	-	m (Master Elements)	*		*	*	*	Settings ... This Elem... of Conten... otherwise... decompre... available
ContentCompAlgo	6	[42][54]	mand.	-	-	0	u (Unsigned Integer)	*		*	*	*	The comp... 0 - zlib, 1 - bzlib, 2 - lzo1x, 3 - Heade
ContentCompSettings	6	[42][55]	-	-	-	-	b (Binary)	*		*	*	*	Settings t... decompre... (`Content... were rem... frames of
ContentEncryption	5	[50][35]	mand.	-	-	-	m (Master Elements)	*		*	*	*	Settings ... This Elem... of `Conte... and MUST
ContentEncAlgo	6	[47][E1]	-	-	-	0	u (Unsigned Integer)	*		*	*	*	The encry... '0' means... encrypted... 0 - Not e... 1 - DES - 2 - Triple 3 - Twofis... 4 - Blowfi... 5 - AES -
ContentEncKeyID	6	[47][E2]	-	-	-	-	b (Binary)	*		*	*	*	For public... the public... with.
ContentEncAESSettings	6	[47][E7]	-	-	-	-	m (Master Elements)			*	*		Settings ... algorithm... this MUST
AESSettingsCipherMode	7	[47][E8]	mand.	-	-	-	u (Unsigned Integer)			*	*		The AES ... encryptio... 1 - AES-C... 2 - AES-C... SP 800-3
ContentSignature	6	[47][E3]	-	-	-	-	b (Binary)	*		*	*	*	A cryptog
ContentSigKeyID	6	[47][E4]	-	-	-	-	b (Binary)	*		*	*	*	This is th... was signe
ContentSigAlgo	6	[47][E5]	-	-	-	0	u (Unsigned Integer)	*		*	*	*	The algor... 0 - Not si... 1 - RSA
ContentSigHashAlgo	6	[47][E6]	-	-	-	0	u (Unsigned Integer)	*		*	*	*	The hash... 0 - Not si... 1 - SHA1... 1 - MD5

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
							Cueing Data						
Cues	1	[1C][53][BB][6B]	-	-	-	-	m (Master Elements)	*	*	*	*	*	A Top-Lev... access. A... This Elem... non "live" (https://... /streamin
CuePoint	2	[BB]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains ... point in th
CueTime	3	[B3]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*	*	Absolute ... Segment
CueTrackPositions	3	[B7]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contain p... correspon
CueTrack	4	[F7]	mand.	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	The track
CueClusterPosition	4	[F1]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*	*	The Segm... containing
CueRelativePosition	4	[F0]	-	-	-	-	u (Unsigned Integer)				*		The relati... the refere... with 0 be... an Eleme
CueDuration	4	[B2]	-	-	-	-	u (Unsigned Integer)				*		The durat... Segment ... DefaultDu... duration i... the cues.
CueBlockNumber	4	[53][78]	-	-	not 0	1	u (Unsigned Integer)	*	*	*	*	*	Number ... Cluster.
CueCodecState	4	[EA]	-	-	-	0	u (Unsigned Integer)		*	*	*		The Segm... correspon... means th... initial Tra
CueReference	4	[DB]	-	mult.	-	-	m (Master Elements)		*	*	*		The Clust... Blocks.
CueRefTime	5	[96]	mand.	-	-	-	u (Unsigned Integer)		*	*	*		Timestam
CueRefCluster	5	[97]	mand.	-	-	-	u (Unsigned Integer)						The Segm... containing
CueRefNumber	5	[53][5F]	-	-	not 0	1	u (Unsigned Integer)						Number ... in the spe

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
CueRefCodecState	5	[EB]	-	-	-	0	u (Unsigned Integer)						The Segm... correspor... means th... initial Tra...
Attachment													
Attachments	1	[19][41][A4][69]	-	-	-	-	m (Master Elements)	*	*	*	*		Contain a
AttachedFile	2	[61][A7]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*		An attach
FileDescription	3	[46][7E]	-	-	-	-	8 (UTF-8)	*	*	*	*		A human-... file.
FileName	3	[46][6E]	mand.	-	-	-	8 (UTF-8)	*	*	*	*		Filename
FileMimeType	3	[46][60]	mand.	-	-	-	s (String)	*	*	*	*		MIME typ
FileData	3	[46][5C]	mand.	-	-	-	b (Binary)	*	*	*	*		The data
FileUID	3	[46][AE]	mand.	-	not 0	-	u (Unsigned Integer)	*	*	*	*		Unique ID... as possib
FileReferral	3	[46][75]	-	-	-	-	b (Binary)						A binary ... to when t
FileUsedStartTime	3	[46][61]	-	-	-	-	u (Unsigned Integer)						DivX font (http://de /docs/div /World_F
FileUsedEndTime	3	[46][62]	-	-	-	-	u (Unsigned Integer)						DivX font (http://de /docs/div /World_F

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
Chapters													
Chapters	1	[10][43][A7][70]	-	-	-	-	m (Master Elements)	*	*	*	*	*	A system partition information Explanati /technical
EditionEntry	2	[45][B9]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains edition.
EditionUID	3	[45][BC]	-	-	not 0	-	u (Unsigned Integer)	*	*	*	*		A unique useful for
EditionFlagHidden	3	[45][BD]	mand.	-	0-1	0	u (Unsigned Integer)	*	*	*	*		If an editi be availab to Contro (https://v /chapters
EditionFlagDefault	3	[45][DB]	mand.	-	0-1	0	u (Unsigned Integer)	*	*	*	*		If a flag i used as tl
EditionFlagOrdered	3	[45][DD]	-	-	0-1	0	u (Unsigned Integer)	*	*	*	*		Specify if multiple t is enforce
ChapterAtom	3+	[B6]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains the chapt
ChapterUID	4	[73][C4]	mand.	-	not 0	-	u (Unsigned Integer)	*	*	*	*	*	A unique
ChapterStringUID	4	[56][54]	-	-	-	-	8 (UTF-8)		*	*	*	*	A unique Use for W (https://v cue-ident
ChapterTimeStart	4	[91]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*	*	Timestam scaled).
ChapterTimeEnd	4	[92]	-	-	-	-	u (Unsigned Integer)	*	*	*	*		Timestam (timestam
ChapterFlagHidden	4	[98]	mand.	-	0-1	0	u (Unsigned Integer)	*	*	*	*		If a chapt be availab to Contro (https://v /chapters
ChapterFlagEnabled	4	[45][98]	mand.	-	0-1	1	u (Unsigned Integer)	*	*	*	*		Specify w can be en When disa the conte TimeEnd (https://v /chapters
ChapterSegmentUID	4	[6E][67]	-	-	>0	-	b (Binary)	*	*	*	*		ChapterS ChapterS
ChapterSegmentEditionUID	4	[6E][BC]	-	-	not 0	-	u (Unsigned Integer)	*	*	*	*		The Editio linked in C ChapterS then no E used.
ChapterPhysicalEquiv	4	[63][C3]	-	-	-	-	u (Unsigned Integer)	*	*	*	*		Specify th ChapterA (50), see (https://v /index.ht
ChapterTrack	4	[8F]	-	-	-	-	m (Master Elements)	*	*	*	*		List of tra If this Ele apply
ChapterTrackNumber	5	[89]	mand.	mult.	not 0	-	u (Unsigned Integer)	*	*	*	*		UID of th In the abs this chapt deselect u Element i be applie
ChapterDisplay	4	[80]	-	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains chapter d
ChapString	5	[85]	mand.	-	-	-	8 (UTF-8)	*	*	*	*	*	Contains atom.
ChapLanguage	5	[43][7C]	mand.	mult.	-	eng	s (String)	*	*	*	*	*	The langu in the bib (https://v /php/Eng be ignore Element i ChapterD
ChapLanguageIETF	5	[43][7D]	-	-	-	-	s (String)				*		Specifies ChapStrin (https://t using the

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
ChapCountry	5	[43][7E]	-	mult.	-	-	s (String)	*	*	*	*		The count... same 2 o... (https://... This Elem... ChapLang... the same...
ChapProcess	4	[69][44]	-	mult.	-	-	m (Master Elements)	*	*	*	*		Contains... the Atom...
ChapProcessCodecID	5	[69][55]	mand.	-	-	0	u (Unsigned Integer)	*	*	*	*		Contains... processin... Matroska... value of 1... (https://... /chapters... used. Mor...
ChapProcessPrivate	5	[45][0D]	-	-	-	-	b (Binary)	*	*	*	*		Some opt... ChapProc... ChapProc... (https://... /chapters... level" equ...
ChapProcessCommand	5	[69][11]	-	mult.	-	-	m (Master Elements)	*	*	*	*		Contains... the Atom...
ChapProcessTime	6	[69][22]	mand.	-	-	-	u (Unsigned Integer)	*	*	*	*		Defines w... SHOULD... 0 - during... 1 - before... 2 - after p...
ChapProcessData	6	[69][33]	mand.	-	-	-	b (Binary)	*	*	*	*		Contains... data SHO... the ChapI... ChapProc... (https://... /chapters... correspor... command...

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
							Tagging						
Tags	1	[12][54] [C3][67]	-	mult.	-	-	m (Master Elements)	*	*	*	*	*	Element c... Tracks, E... the Segm... can be fo... (https://... /tagging/...
Tag	2	[73][73]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	A single r...
Targets	3	[63][C0]	mand.	-	-	-	m (Master Elements)	*	*	*	*	*	Specifies... metadata... to. If emp... describes...
TargetTypeValue	4	[68][CA]	-	-	-	50	u (Unsigned Integer)	*	*	*	*	*	A number... target. 70 - COLL... 60 - EDIT... SEASON /... 50 - ALBU... EPISODE... 40 - PART... 30 - TRAC... 20 - SUBT... SCENE,... 10 - SHOT...
TargetType	4	[63][CA]	-	-	-	-	s (String)	*	*	*	*	*	An inform... display th... "ALBUM",... etc (see T... (https://... /tagging/... COLLECTI... EDITION... ISSUE - I... VOLUME... OPUS - O... SEASON... SEQUEL -... ALBUM -... OPERA - O... CONCERT... MOVIE - I... EPISODE... PART - PA... SESSION... TRACK - T... SONG - S... CHAPTER... SUBTRAC... PART - PA... MOVEMEN... SCENE - S... SHOT - S...
TagTrackUID	4	[63][C5]	-	mult.	-	0	u (Unsigned Integer)	*	*	*	*	*	A unique... tags belo... level, the... Segment.
TagEditionUID	4	[63][C9]	-	mult.	-	0	u (Unsigned Integer)	*	*	*	*		A unique... the tags t... level, the... Segment.
TagChapterUID	4	[63][C4]	-	mult.	-	0	u (Unsigned Integer)	*	*	*	*		A unique... tags belo... level, the... Segment.
TagAttachmentUID	4	[63][C6]	-	mult.	-	0	u (Unsigned Integer)	*	*	*	*		A unique... the tags t... level, the... in the Seg...
SimpleTag	3+	[67][C8]	mand.	mult.	-	-	m (Master Elements)	*	*	*	*	*	Contains... target.
TagName	4	[45][A3]	mand.	-	-	-	8 (UTF-8)	*	*	*	*	*	The name... stored.

Element Name	L (Level)	EBML ID	Ma (Mandatory)	Mu (Multiple)	Rng (Range)	Default	T (Element Type)	1 (Version 1)	2 (Version 2)	3 (Version 3)	4 (Version 4)	W (WebM)	
TagLanguage	4	[44][7A]	mand.	-	-	und	s (String)	*	*	*	*	*	Specifies ... in the Ma... (https://w... /index.ht... MUST be ... Element i... Element.
TagLanguageIETF	4	[44][7B]	-	-	-		s (String)				*		Specifies ... TagString ... (https://t... using the ... (https://v... /language... subtag-re... then any ... the same ...
TagDefault	4	[44][84]	mand.	-	0-1	1	u (Unsigned Integer)	*	*	*	*	*	A boolean ... default/or... given tag ...
TagString	4	[44][87]	-	-	-		8 (UTF-8)	*	*	*	*	*	The value ...
TagBinary	4	[44][85]	-	-	-		b (Binary)	*	*	*	*	*	The value ... that this ... SimpleTa...

All top-levels elements (Segment and direct sub-elements) are coded on 4 octets, i.e. class D elements.

Appendix

Language Codes

Language codes can be either the 3 letters bibliographic ISO-639-2 (http://www.loc.gov/standards/iso639-2/php/English_list.php) form (like "fre" for french), or such a language code followed by a dash and a country code for specialities in languages (like "fre-ca" for Canadian French). Country codes are the same as used for internet domains (http://www.iana.org/cctld/cctld-whois.htm).

Physical Types

Each level can have different meanings for audio and video. The ORIGINAL_MEDIUM tag can be used to specify a string for ChapterPhysicalEquiv = 60. Here is the list of possible levels for both audio and video :

ChapterPhysicalEquiv	Audio	Video	Comment
70	SET / PACKAGE	SET / PACKAGE	the collection of different media
60	CD / 12" / 10" / 7" / TAPE / MINIDISC / DAT	DVD / VHS / LASERDISC	the physical medium like a CD or a DVD
50	SIDE	SIDE	when the original medium (LP/DVD) has different sides
40	-	LAYER	another physical level on DVDs
30	SESSION	SESSION	as found on CDs and DVDs
20	TRACK	-	as found on audio CDs
10	INDEX	-	the first logical level of the side/medium

Block Structure

Size = 1 + (1-8) + 4 + (4 + (4)) octets. So from 6 to 21 octets.

Bit 0 is the most significant bit.

Frames using references should be stored in "coding order". That means the references first and then the frames referencing them. A consequence is that timecodes may not be consecutive. But a frame with a past timecode must reference a frame already known, otherwise it's considered bad/void.

There can be many Blocks in a BlockGroup provided they all have the same timecode. It is used with different parts of a frame with different priorities.

Block Header		
Offset	**Player**	**Description**
0x00+	must	Track Number (Track Entry). It is coded in EBML like form (1 octet if the value is < 0x80, 2 if < 0x4000, etc) (most significant bits set to increase the range).
0x01+	must	Timecode (relative to Cluster timecode, signed int16)

Flags			
	Bit	**Player**	**Description**
0x03+ -	0-3	-	Reserved, set to 0
	4	-	Invisible, the codec should decode this frame but not display it
	5-6	must	Lacing • 00 : no lacing • 01 : Xiph lacing • 11 : EBML lacing • 10 : fixed-size lacing
	7	-	not used

Lace (when lacing bit is set)		
0x00	must	Number of frames in the lace-1 (uint8)
0x01 / 0xXX	must*	Lace-coded size of each frame of the lace, except for the last one (multiple uint8). *This is not used with Fixed-size lacing as it is calculated automatically from (total size of lace) / (number of frames in lace).

(possibly) Laced Data		
0x00	must	Consecutive laced frames

Lacing

Lacing is a mechanism to save space when storing data. It is typically used for small blocks of data (refered to as frames in matroska). There are 3 types of lacing : the Xiph one inspired by what is found in the Ogg container, the EBML one which is the same with sizes coded differently and the fixed-size one where the size is not coded. As an example is better than words...

Let's say you want to store 3 frames of the same track. The first frame is 800 octets long, the second is 500 octets long and the third is 1000 octets long. As these data are small, you can store them in a lace to save space. They will then be solved in the same block as follows:

Xiph lacing

- Block head (with lacing bits set to 01)
- Lacing head: Number of frames in the lace -1, i.e. 2 (the 800 and 500 octets one)
- Lacing sizes: only the 2 first ones will be coded, 800 gives 255;255;255;35, 500 gives 255;245. The size of the last frame is deduced from the total size of the Block.
- Data in frame 1
- Data in frame 2
- Data in frame 3

A frame with a size multiple of 255 is coded with a 0 at the end of the size, for example 765 is coded 255;255;255;0.

EBML lacing

In this case the size is not coded as blocks of 255 bytes, but as a difference with the previous size and this size is coded as in EBML. The first size in the lace is unsigned as in EBML. The others use a range shifting to get a sign on each value :

```
1xxx xxxx                                                        - value -(2^6-1) to  2^6-1

                                                                 (ie 0 to 2^7-2 minus 2^6-1, half of the range)

01xx xxxx  xxxx xxxx                                             - value -(2^13-1) to 2^13-1

001x xxxx  xxxx xxxx  xxxx xxxx                                  - value -(2^20-1) to 2^20-1

0001 xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx                       - value -(2^27-1) to 2^27-1

0000 1xxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx            - value -(2^34-1) to 2^34-1

0000 01xx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  - value -(2^41-1) to 2^41-1

0000 001x  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  xxxx xxxx  - value -(2^48-1) to 2^48-1
```

- Block head (with lacing bits set to 11)
- Lacing head: Number of frames in the lace -1, i.e. 2 (the 800 and 400 octets one)
- Lacing sizes: only the 2 first ones will be coded, 800 gives 0x320 0x4000 = 0x4320, 500 is coded as -300 : - 0x12C + 0x1FFF + 0x4000 = 0x5ED3. The size of the last frame is deduced from the total size of the Block.
- Data in frame 1
- Data in frame 2
- Data in frame 3

Fixed-size lacing

In this case only the number of frames in the lace is saved, the size of each frame is deduced from the total size of the Block. For example, for 3 frames of 800 octets each :

- Block head (with lacing bits set to 10)
- Lacing head: Number of frames in the lace -1, i.e. 2
- Data in frame 1
- Data in frame 2
- Data in frame 3

SimpleBlock Structure

The SimpleBlock is very inspired by the Block structure. The main differences are the added Keyframe flag and Discardable flag. Otherwise everything is the same.

Size = 1 + (1-8) + 4 + (4 + (4)) octets. So from 6 to 21 octets.

Bit 0 is the most significant bit.

Frames using references should be stored in "coding order". That means the references first and then the frames referencing them. A consequence is that timecodes may not be consecutive. But a frame with a past timecode must reference a frame already known, otherwise it's considered bad/void.

There can be many Blocks in a BlockGroup provided they all have the same timecode. It is used with different parts of a frame with different priorities.

SimpleBlock Header		
Offset	**Player**	**Description**
0x00+	must	Track Number (Track Entry). It is coded in EBML like form (1 octet if the value is < 0x80, 2 if < 0x4000, etc) (most significant bits set to increase the range).
0x01+	must	Timecode (relative to Cluster timecode, signed int16)
0x03+	-	*(see Flags table below)*

Flags			
Bit	**Player**	**Description**	
0	-	Keyframe, set when the Block contains only keyframes	
1-3	-	Reserved, set to 0	
4	-	Invisible, the codec should decode this frame but not display it	
5-6	must	Lacing • 00 : no lacing • 01 : Xiph lacing • 11 : EBML lacing • 10 : fixed-size lacing	
7	-	Discardable, the frames of the Block can be discarded during playing if needed	

Lace (when lacing bit is set)		
0x00	must	Number of frames in the lace-1 (uint8)
0x01 / 0xXX	must*	Lace-coded size of each frame of the lace, except for the last one (multiple uint8). *This is not used with Fixed-size lacing as it is calculated automatically from (total size of lace) / (number of frames in lace).

(possibly) Laced Data		
0x00	must	Consecutive laced frames

EncryptedBlock Structure

The EncryptedBlock is very inspired by the SimpleBlock structure. The main differences is that the raw data are Transformed. That means the data after the lacing definition (if present) have been processed put into the Block. The laced sizes apply on the decoded (Inverse Transform) data. This size of the Transformed data may not match the size of the initial chunk of data.

The other difference is that the number of frames in the lace are not saved if "no lacing" is specified (bits 5 and 6 set to 0).

The Transformation is specified by a TransformID in the Block (must be the same for all frames within the EncryptedBlock).

Size = 1 + (1-8) + 4 + (4 + (4)) octets. So from 6 to 21 octets.

Bit 0 is the most significant bit.

Frames using references should be stored in "coding order". That means the references first and then the frames referencing them. A consequence is that timecodes may not be consecutive. But a frame with a past timecode must reference a frame already known, otherwise it's considered bad/void.

There can be many Blocks in a BlockGroup provided they all have the same timecode. It is used with different parts of a frame with different priorities.

EncryptedBlock Header		
Offset	**Player**	**Description**
0x00+	must	Track Number (Track Entry). It is coded in EBML like form (1 octet if the value is < 0x80, 2 if < 0x4000, etc) (most significant bits set to increase the range).
0x01+	must	Timecode (relative to Cluster timecode, signed int16)
0x03+	-	*(see Flags table below)*

Flags			
Bit	**Player**	**Description**	
0	-	Keyframe, set when the Block contains only keyframes	
1-3	-	Reserved, set to 0	
4	-	Invisible, the codec should decode this frame but not display it	

| | 5-6 | must | Lacing

• 00 : no lacing
• 01 : Xiph lacing
• 11 : EBML lacing
• 10 : fixed-size lacing |
| | 7 | - | Discardable, the frames of the Block can be discarded during playing if needed |

Lace (when lacing bit is set)		
0x00	must*	Number of frames in the lace-1 (uint8) *Only available if bit 5 or bit 6 of the EncryptedBlock flag is set to one.
0x01 / 0xXX	must*	Lace-coded size of each frame of the lace, except for the last one (multiple uint8). *This is not used with Fixed-size lacing as it is calculated automatically from (total size of lace) / (number of frames in lace).

(possibly) Laced Data		
0x00	must	TransformID (EBML coded integer value). Value 0 = Null Transform
0x01+	must	Consecutive laced frames

Virtual Block

The data in matroska is stored in coding order. But that means if you seek to a particular point and a frame has been referenced far away, you won't know while playing and you might miss this frame (true for independent frames and overlapping of dependent frames). So the idea is to have a placeholder for the original frame in the timecode (display) order.

The structure is a scaled down version of the normal Block.

Virtual Block Header		
Offset	**Player**	**Description**
0x00+	must	Track Number (Track Entry). It is coded in EBML like form (1 octet if the value is < 0x80, 2 if < 0x4000, etc) (most significant bits set to increase the range).
0x01+	must	Timecode (relative to Cluster timecode, signed int16)
0x03+	-	**Flags** | **Bit**	**Player**	**Description**
7-0	-	Reserved, set to 0	

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