

EBU – TECH 3350



EBU-TT Part 1 Subtitling format definition

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Conformance Notation

This document contains both normative text and informative text.

All text is normative except for that in the Introduction, Examples, any section explicitly labelled as 'Informative' or individual paragraphs which start with 'Note:'.

Normative text describes indispensable or mandatory elements. It contains the conformance keywords 'shall', 'should' or 'may', defined as follows:

- 'Shall' and 'shall not': Indicate requirements to be followed strictly and from which no deviation is permitted in order to conform to the document.
- 'Should' and 'should not': Indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others.
OR indicate that a certain course of action is preferred but not necessarily required.
OR indicate that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.
- 'May' and 'need not': Indicate a course of action permissible within the limits of the document.

Default identifies mandatory (in phrases containing "shall") or recommended (in phrases containing "should") presets that can, optionally, be overwritten by user action or supplemented with other options in advanced applications. Mandatory defaults must be supported. The support of recommended defaults is preferred, but not necessarily required.

Informative text is potentially helpful to the user, but it is not indispensable and it does not affect the normative text. Informative text does not contain any conformance keywords.

A conformant implementation is one which includes all mandatory provisions ('shall') and, if implemented, all recommended provisions ('should') as described. A conformant implementation need not implement optional provisions ('may') and need not implement them as described.

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Contents

Status of this document (Informative).....	7
Scope (Informative)	9
Definition of terms	9
1. Introduction	10
1.1 Background	10
1.2 EBU-TT as exchange format	10
1.3 Relation to other specifications	11
2. Generic constraints	11
2.1 Namespaces.....	11
2.2 Extensibility	12
2.3 Initial values.....	13
2.4 Compatibility with TTML timing model	13
2.5 Unicode support	13
2.6 White space handling.....	13
3. Document Structure	13
3.1 Head.....	18
3.1.1 Metadata in tt:head.....	18
3.1.1.1 Document metadata	19
3.1.1.2 Binary Data Tunnelling	27
3.1.1.3 TTML metadata elements.....	28
3.1.2 Styling in tt:head	28
3.1.2.1 Style.....	28
3.1.3 Layout in tt:head.....	33
3.1.3.1 Region	34
3.2 Body	36
3.2.1 Div	37
3.2.1.1 Paragraph.....	38
3.2.1.1.1 Span.....	41
4. Datatypes.....	43
4.1 ebuttdt:cellResolutionType	43
4.2 ebuttdt:colorType.....	44
4.3 ebuttdt:extentType.....	44
4.4 ebuttdt:fontFamilyType	44
4.5 ebuttdt:fontSizeType.....	45
4.6 ebuttdt:framerateMultiplierType	45

4.7	ebuttdt:lengthType.....	45
4.8	ebuttdt:lineHeightType.....	45
4.9	ebuttdt:originType	45
4.10	ebuttdt:paddingType.....	46
4.11	ebuttdt:smpteTimingType	46
4.12	ebuttdt:mediaTimingType	46
5.	Bibliography.....	47
	Annex A: Use of ebutts:multiRowAlign	49
	Annex B: Support of the STL GSI Block in EBU-TT	53
	Annex C: Initial Values of TTML and EBU-TT attributes.....	55
	Annex D: Index of elements, attributes and types.....	57

Status of this document (Informative)

This document is a stable document and may be used as reference material or cited from another document.

This document is the first part of a series of EBU-TT (EBU Timed Text) documents. The full list of planned EBU-TT documents is given below.

Part 1: EBU-TT Subtitling format definition

Introduction to EBU-TT and definition of the XML based format.

Part 2: STL (Tech 3264) Mapping to EBU-TT

How EBU-TT provides backwards compatibility with EBU STL.

Part 3: Live subtitling

How to use EBU-TT for the production of live subtitles.

Part 4: Annotation

How EBU-TT can be used in future scenarios for ‘authoring of intent’.

Part 5: User Guide

General guide (‘How to use EBU-TT’).

XML Schema (Informative)

An example of an XML Schema (ebu-tt-v1.0-xml-schema.zip) will be available for free download from the following web page - <http://tech.ebu.ch/ebu-tt>.

Editor’s note: Exceptionally, for consistency throughout this document the American English spellings ‘color’ and ‘center’ have been used.

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EBU-TT Part 1 Subtitling Format Definition

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Scope (Informative)

Subtitles are created, edited, exchanged and archived in many different ways. At one extreme subtitles may be closely linked to the video, e.g. as burned-in (so-called open, or forced) subtitles in the video, at the other extreme they may be loosely coupled to the audio/video essence (e.g. stored on an external storage medium and associated with the video at the moment of playout/viewing).

The aim of this publication is to specify an XML based archiving and interchange format for subtitles as follow-up to the currently widely used EBU STL format (EBU Tech 3264) [1]. The EBU has developed a recommendation on transport of subtitles using MXF in an IT-Based Television Production Environment (EBU R 133) [2] and has been investigating implementations that are in use today. Harmonization is needed to obtain predictable and reliable results when interchanging subtitle files and when integrating new products into TV production environments.

Definition of terms

Captions and subtitles

The term “captions” describes on screen text for use by deaf and hard of hearing audiences. Captions include indications of the speakers and relevant sound effects.

The term “subtitles” describes on screen text for translation purposes.

For easier reading only the term “subtitles” is used in this specification as the EBU-TT file representation for captions and subtitles is identical.

In this specification the term “captions” may be used interchangeably for the term “subtitles” (except where noted).

Active video

The term “active video” (known alias: Production Aperture) refers to the portion of the video signal that is used to carry picture information, as specified in SMPTE ST 2016-1:2009 Chapter 4 [10].

Active image

The term “active image” refers to the portion of the video picture area that is being utilized for programme content, as specified in SMPTE ST 2016-1:2009 Chapter 4. The active image excludes letter-box bars and pillar-box bars.

1. Introduction

1.1 Background

The introduction of higher resolution television formats (HDTV), user demands for improved presentation, the switch to file-based production workflows and the multiplication of web-based distribution mechanisms, require a new XML based subtitling format that can retain its timing characteristics during the creation and transport of subtitles.

The introduction of HDTV has created new expectations, including displaying subtitles in different and more user-friendly ways. This recommendation aims to support these new requirements.

To enhance the quality of the subtitler’s work more efficient automation processes are needed, allowing a subtitler to add value to the subtitles by using his contextual knowledge, cultural awareness and special skills.

Reliable exchange mechanisms are especially important for the creation of subtitles, which often takes place in external production houses or at home using a wide variety of different platforms and applications.

1.2 EBU-TT as exchange format

EBU-TT is intended as general purpose exchange format for subtitles and supports Unicode characters. As an exchange format EBU-TT intrinsically also is an archiving format (see Figure 1).

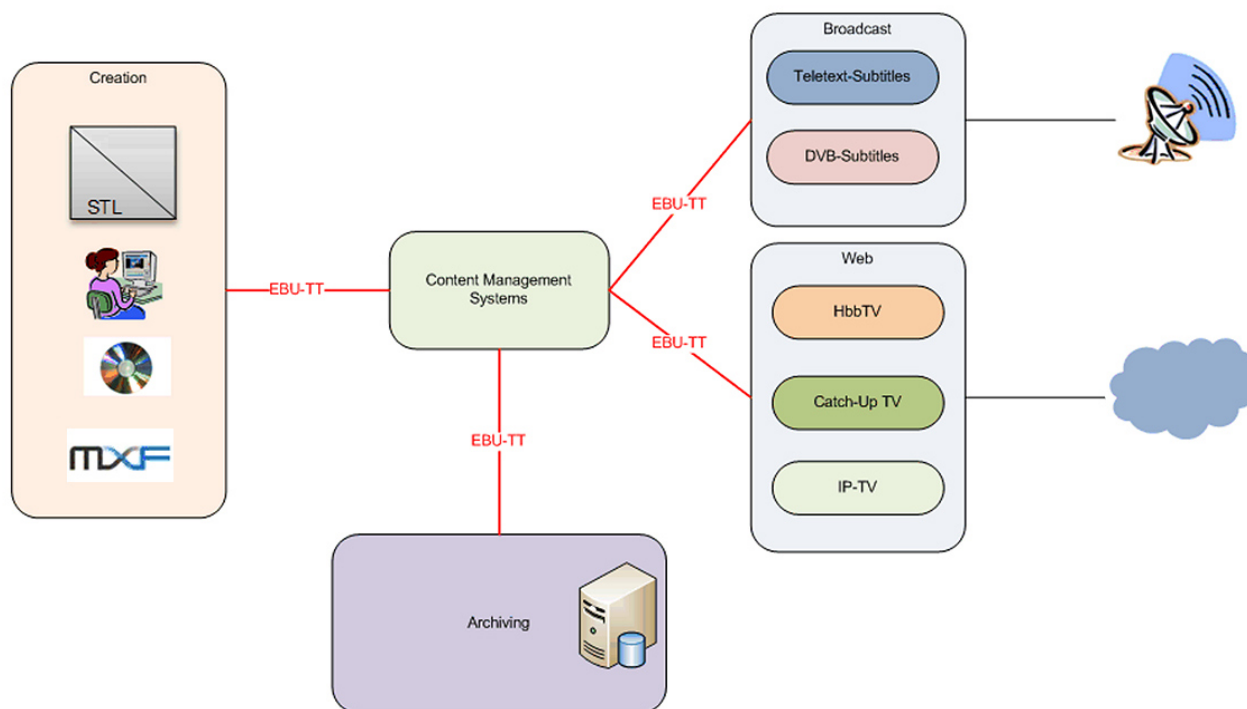


Figure 1: Subtitle workflow with EBU-TT

1.3 Relation to other specifications

EBU-TT uses a subset of the vocabulary provided by the W3C Timed Text Markup Language (TTML) 1.0 [3]. This W3C standard was formerly known as “Timed Text (TT) Authoring Format 1.0 - Distribution Format Exchange Profile (DFXP)”.

The EBU-TT format is intended to constrain the features provided by TTML, especially to make EBU-TT more suitable for the use with broadcast video and web video applications.

Valid EBU-TT documents are, by definition of the W3C TTML Specification, valid W3C TTML documents. Note however that it is possible to construct valid W3C TTML documents that are not valid EBU-TT documents.

Like the EBU-TT specification, the SMPTE Standard ST 2052-1:2010 (SMPTE-TT) [4] is derived from TTML too. Valid EBU-TT documents are, by the definition of the SMPTE-Standard, valid SMPTE-TT documents but it is possible to construct valid SMPTE-TT documents that are not valid EBU-TT documents.

2. Generic constraints

The EBU-TT format defines constraints for an XML document instance. A valid EBU-TT XML document has to comply with the generic constraints in § 2 and the document structure defined in § 3.

Note: To facilitate the implementation of EBU-TT, a W3C XML Schema (in the following XML Schema) is published together with the EBU-TT specification.

Although all efforts have been made to ensure that the XML Schema reflects the generic constraints and that the document structure detailed in this specification is as good as it can be, it is informative, not normative. This is not an error in design but a result of the limitation of XML Schema 1.0 in the expression of XML document constraints. Because of this limitation the automatic validation with an EBU-TT XML Schema can produce ‘false positive validations’, which means that an XML document can validate against the EBU-TT XML Schema even if it does not comply with a certain constraint or constraints in the EBU-TT specification.

One example of a constraint that cannot be expressed in an XML Schema is the dependency between a value that uses a pixel-based length expression and the requirement to use the `tts:extent` attribute on the `tt:tt` root element (see `tts:extent` (attribute) in § 3).

2.1 Namespaces

The following external namespaces from the W3C TTML specification shall be used for the TTML elements and attributes in EBU-TT:

Name	Prefix	Value
TT	tt:	http://www.w3.org/ns/ttml
TT Parameter	ttp:	http://www.w3.org/ns/ttml#parameter
TT Style	tts:	http://www.w3.org/ns/ttml#styling
TT Metadata	ttm:	http://www.w3.org/ns/ttml#metadata

The following namespaces shall be used for the assignment of XML Schema datatypes:

Name	Prefix	Value
XML Schema	xs:	http://www.w3.org/2001/XMLSchema

The following namespaces shall be used for the EBU-TT specific vocabulary:

Name	Prefix	Value
EBU-TT Metadata	ebuttm:	urn:ebu:tt:metadata
EBU-TT Styling	ebutts:	urn:ebu:tt:style
EBU-TT Datatypes	ebuttdt:	urn:ebu:tt:datatypes

Note: Although any prefix can be used to bind the namespaces in an XML document the use of the prefixes listed above is recommended.

If attributes in this document are defined without prefix they are not in any namespace.

2.2 Extensibility

The following EBU-TT elements may contain zero or one `tt:metadata` child element(s):

- `tt:head`
- `tt:styling`
- `tt:style`
- `tt:layout`
- `tt:region`
- `tt:body`
- `tt:div`
- `tt:p`
- `tt:span`
- `tt:br`

If an element has a `tt:metadata` as child element, `tt:metadata` shall appear before all other child elements that are defined for this element by EBU-TT (see § 3 “Document Structure”).

Every `tt:metadata` element may be extended by zero or more elements as children. These elements, their attributes and their XML Content shall not be in a namespace defined by the W3C TTML specification or in a namespace defined in the EBU-TT specification.

Exceptions to this rule are as follows:

- 1) `tt:metadata` as child element of `tt:head` shall have one `ebuttm:documentMetadata` element
- 2) `tt:metadata` as child element of `tt:head` may have zero or more `ebuttm:binaryData` elements.
- 3) `tt:metadata` as child element of `tt:head` may have zero or more `ttm:agent` elements.
- 4) any `tt:metadata` element may have zero or one `ttm:title` element(s) and/or zero or one `ttm:desc` element(s).

2.3 Initial values

TTML defines initial values for certain attributes that act as fallback values in case a value cannot be computed from a specified value in the document.

Note: One example is the attribute `tts:textAlignment`. If an EBU-TT document does not specify the text-alignment for a subtitle text then the initial value shall be “center”.

For most of the attributes in EBU-TT, the initial values from TTML are adopted. In case EBU-TT overwrites the initial value of a certain attribute, it is highlighted in the description of the corresponding attribute in § 3 “Document Structure”.

For completeness, all initial values that are used by EBU-TT are listed in Annex C “Initial Values of TTML and EBU-TT attributes”.

Note: To clarify the intention of the author of an EBU-TT document it is recommended that attributes and their values be explicitly specified rather than relying on their initial values.

2.4 Compatibility with TTML timing model

With the constraints defined in EBU-TT the time containers `tt:body` and `tt:div` have, according to the TTML event based timing model, no specified duration. However, in EBU-TT the time expressions in the `begin` and `end` attributes of their children elements (`tt:p` and `tt:span`) may nonetheless activate and deactivate the enclosed subtitle content.

2.5 Unicode support

EBU-TT processing and transformation engines should support Unicode characters and the Unicode bidirectional algorithm (UAX9) [6].

2.6 White space handling

To indicate the authors’ intent in the use of white space (spaces, tabs, and blank lines) the `xml:space` attribute may be added to a `tt:tt`, `tt:p` or `tt:span` element.

In accordance with the W3C XML 1.0 Specification [7], the value “default” signals that the default white-space processing modes of the processing application are acceptable for this element; the value “preserve” indicates the intent that applications preserve all the white space.

This declared intent is considered to apply to all elements within the content of the element where it is specified, unless overridden with another instance of the `xml:space` attribute.

3. Document Structure

The order of content in this specification of the EBU-TT format follows the structure of an EBU-TT document instance. The levels within this specification document reflect the nested structure of an EBU-TT document.

The formal definition of how the EBU-TT specification uses EBU-TT-, TTML- and XML- vocabulary is presented in tabular form. When using this specification, the definition of the use of an element or attribute shall be interpreted relative to the position in the document instance.

Example:

The definition of the use of the `xml:id` attribute in § 3.1.2.1 “Style” specifies only the use of the `xml:id` attribute on the `tt:style` element.

Definitions used within this specification:

Type: Constraints of the Information structure of an XML element or XML attribute. The type can be further constrained through Enumerations and normative text in the description.

Enumeration: Enumerated values that shall be used for certain elements or attributes of type `xs:string`.

Cardinality: How often an element or attribute may be used inside the corresponding parent element. If the lower bound is greater than 0 (e.g. “1..1” or “1..*”) the element or attribute is mandatory at this position of the document structure. If the lower bound is equal to 0 (e.g. “0..1” or “0..*”) the element or attribute is optional at this position of the document structure.

Every EBU-TT document instance shall start with the `tt:tt` element. In XML terms this element is the root element of the document.

tt:tt (element)

Type	Element content
Cardinality	1..1
Description	Root element.

The following attributes may be specified on the `tt:tt` element.

To indicate the authors’ intent in the use of white space (spaces, tabs, and blank lines) the `xml:space` attribute may be added.

xml:space (attribute)

Type	<code>xs:string</code>
Enumeration	“default” “preserve”
Cardinality	0..1
Description	Indicates the author’s intent in the handling of white space within the content of the EBU-TT document.

EBU-TT uses the following parameters from TTML to give information on how the timing information in an EBU-TT document should be interpreted. If present, these attributes shall be specified on the `tt:tt` element.

ttp:timeBase (attribute)

Type	xs:string
Enumeration	“smpte” “media”
Cardinality	1..1
Description	<p>The timebase defines the time coordinate system for all time expressions in EBU-TT.</p> <p>If the timebase is “smpte” time expressions of <code>begin</code> and <code>end</code> attributes of the subtitle content shall be interpreted in the time coordinate system of SMPTE 12M-1-2008 and shall be of type <code>ebuttdt:smpteTimingType</code>.</p> <p>Additionally if the timebase is “smpte” the attributes <code>ttp:markerMode</code> and <code>ttp:dropMode</code> shall be specified on the <code>tt:element</code>.</p> <p>If the timebase is “media” then all time expressions of <code>begin</code> and <code>end</code> attributes of the subtitle content shall denote a coordinate on the time line of a media object and shall be of type <code>ebuttdt:mediaTimingType</code>.</p> <p>Note: The timebase “media” is intended to use the playtime of the associated video as reference.</p>

ttp:frameRate (attribute)

Type	xs:positiveInteger
Cardinality	0..1
Description	<p>The frame rate used to interpret time expressions of type <code>ebuttdt:smpteTimingType</code>. The frame rate applies to the entire document instance.</p> <p>If the timebase is “smpte” the <code>ttp:frameRate</code> shall be specified.</p> <p>Sample Value: “25”</p>

ttp:frameRateMultiplier (attribute)

Type	ebuttdt:frameRateMultiplierType
Cardinality	0..1
Description	<p>Multiplier that shall be applied to the frame rate specified by a <code>ttp:frameRate</code> attribute in order to compute the effective frame rate. If the frame rate is a whole number of frames per second the value for the <code>ttp:frameRateMultiplier</code> attribute shall be “1 1”.</p> <p>If the timebase is “smpte” the <code>ttp:frameRateMultiplier</code> shall be specified.</p> <p><u>Example:</u></p> <p>The frame rate multiplier used for synchronizing with video objects at 30 frames per second is nominally 1000:1001.</p> <p>The value for the <code>ttp:frameRateMultiplier</code> attribute would accordingly be “1000 1001”.</p>

ttp:markerMode (attribute)

Type	xs:string
Enumeration	“discontinuous”
Cardinality	0..1
Description	<p>If the timebase is “smpte” <code>ttp:markerMode</code> shall be specified and shall have the value “discontinuous”. The value “discontinuous” implies that this EBU-TT document is using the marker mode of operation and no assumption may be made regarding linearity or monotonicity of time coordinates.</p> <p>Note: The value “discontinuous” does not necessarily imply non-linearities in the timeline of the associated video. It is meant as a reminder that, in general, time expressions must be understood as markers and that there are no guarantees that calculations of duration and intervals between markers based on the timecode values alone are correct.</p>

ttp:dropMode (attribute)

Type	xs:string
Enumeration	"nonDrop" "dropNTSC" "dropPAL"
Cardinality	0..1
Description	<p><code>ttp:dropMode</code> specifies constraints on the interpretation and use of frame counts that correspond with time expressions of type <code>ebuttdt:smpteTimingType</code>. The attribute shall be specified when the value of the <code>ttp:timebase</code> attribute is "smpte".</p> <p>When the timebase is "smpte" and the calculation of the framerate from the <code>ttp:frameRate</code> and <code>ttp:frameRateMultiplier</code> results in an integer framerate then <code>ttp:dropMode</code> shall always be "nonDrop".</p> <p>The semantics of the values "nonDrop", "dropNTSC" and "dropPAL" are defined in the W3C Timed Text Markup Language (TTML) 1.0 [3].</p>

If an EBU-TT document instance uses the 'cell' measurement unit (e.g. as part of a `tts:fontSize` attribute value) then the `ttp:cellResolution` attribute shall be specified on the `tt:tt` element.

ttp:cellResolution (attribute)

Type	<code>ebuttdt:cellResolutionType</code>
Cardinality	0..1
Description	<p>Expresses a virtual visual grid composed of horizontal and vertical cells. This grid divides the active video (see "Definition of terms") in rows and columns. The first value defines the number of columns and the second value defines the number of rows.</p> <p>In contrast to TTML the initial value of this attribute shall not be "32 15", but "40 24" (in accordance with ETS 300 706) [8].</p> <p>Note: The resulting grid is intended for the purpose of measuring length and expressing coordinates. It does not imply a "pigeonhole" grid where one character is placed into one cell. This is possible but would require the use of a monospaced font and a font size that exactly matches the cell size.</p>

If an EBU-TT document instance uses the ‘pixel’ measurement unit (e.g. as part of a `tts:fontsize` attribute value) then the `tts:extent` attribute shall be specified on the `tt:tt` element.

tts:extent (attribute)

Type	<code>ebuttdt:extentType</code>
Cardinality	0..1
Description	Defines the width and height of the active video (see “Definition of terms”) the subtitles were authored for. Only length expressions in pixels shall be used. Sample Value: “1280px 720px”

To identify the language that the subtitles are prepared for, the `xml:lang` attribute shall be specified on the `tt:tt` element.

xml:lang (attribute)

Type	<code>xs:language</code> ""
Cardinality	1..1
STL mapping	Language Code (LC)
Description	The language for which the EBU-TT document is prepared. The empty string may be used to indicate that no language information is available. The <code>xml:lang</code> attribute shall be used as defined in XML 1.0 § 2.12, “Language Identification” [7]. Sample Values: “en”, “en-US” or “de”.

3.1 Head

The head section of an EBU-TT document carries information needed by a subtitling device to correctly present or render the contained subtitles. Specific layout and styling information shall be placed in the head of an EBU-TT document. The subtitle blocks in the body reference this information.

Furthermore, the head section shall contain metadata information.

tt:head (element)

Type	Element content
Cardinality	1..1
Description	Container element that groups styling, layout and metadata information.

3.1.1 Metadata in tt:head

The `tt:metadata` element inside the `tt:head` element is used as a generic container for metadata information that applies to the whole document.

The content model defined in this section shall apply only to the use of the `tt:metadata` element inside the `tt:head` element.

tt:metadata (element)

Type	Element content
Cardinality	1..1
Description	Generic metadata container.

3.1.1.1 Document metadata

The `ebuttm:documentMetadata` element is used for EBU-TT specific metadata that applies to the whole EBU-TT document. The `ebuttm:documentMetadata` element and all the children elements of `ebuttm:documentMetadata` defined in this section shall be used only in the head section of an EBU-TT document.

ebuttm:documentMetadata (element)

Type	Element content
Cardinality	1..1
Description	Container of the EBU-TT metadata.

As children of the `ebuttm:documentMetadata` element, the following new metadata elements are defined by EBU-TT:

ebuttm:documentEbuttVersion (element)

Type	<code>xs:string</code>
Enumeration	"v1.0"
Cardinality	1..1
Description	The version of the EBU-TT standard used by the document instance.

ebuttm:documentIdentifier (element)

Type	<code>xs:string</code>
Cardinality	0..1
Description	Identifier for an EBU-TT document that may be used as external reference to an EBU-TT document. The format of the identifier may be an URI.

ebuttm:documentOriginatingSystem (element)

Type	xs:string
Cardinality	0..1
Description	Software and version used to create the EBU-TT document.

ebuttm:documentCopyright (element)

Type	xs:string
Cardinality	0..1
Description	The copyright of the document. Sample Value: "© EBU 2011"

ebuttm:documentReadingSpeed (element)

Type	xs:positiveInteger
Cardinality	0..1
Description	The intended reading speed for the subtitles in words per minute.

ebuttm:documentTargetAspectRatio (element)

Type	xs:string
Cardinality	0..1
Description	The aspect ratio of the video the EBU-TT document was authored for, in width by height. Sample Value: "4:3"

ebuttm:documentTargetActiveFormatDescriptor (element)

Type	xs:string
Cardinality	0..1
Description	The code for the Active Format Descriptor (AFD) that specifies the active image in the active video (see "Definition of terms"). The code shall be one of the AFD codes specified in SMPTE ST 2016-1:2009 "Format for Active Format Description and Bar Data" Table 1. [10] If the AFD code is specified the <code>ebuttm:documentTargetAspectRatio</code> element shall be specified and shall have the value "4:3" or "16:9". Sample Value: "0010" for full frame 16:9 image.

ebuttm:documentIntendedTargetBarData (element)

Type	xs:string
Cardinality	0..1
Description	When an <code>ebuttm:documentTargetActiveFormatDescriptor</code> element is used in an EBU-TT document, an <code>ebuttm:documentIntendedTargetBarData</code> element may be used whenever the AFD alone is insufficient to describe the extent of the image (i.e. AFD values 0000 and 0100). The Bar Data shall be specified in accordance with SMPTE ST 2016-1:2009 “Format for Active Format Description and Bar Data” Table 3.

The `ebuttm:documentIntendedTargetBarData` element shall have the `position` attribute.

position (attribute)

Type	xs:string
Enumeration	“topBottom” “leftRight”
Cardinality	1..1
Description	<p>Bar Data shall be defined in pairs, either top and bottom bars or left and right bars, but not both pairs at once. Bars may be unequal in size. One bar of a pair may be zero width or height.</p> <p>If the <code>position</code> attribute has the value “topBottom” then the <code>ebuttm:documentIntendedTargetBarData</code> element shall also contain the <code>lineNumberEndOfTopBar</code> and <code>lineNumberStartOfBottomBar</code> attributes.</p> <p>If the <code>position</code> attribute has the value “leftRight” then the <code>ebuttm:documentIntendedTargetBarData</code> element shall also contain the <code>pixelNumberEndOfLeftBar</code> and <code>pixelNumberStartOfRightBar</code> attributes.</p>

The `ebuttm:documentIntendedTargetBarData` element may have the following attributes.

lineNumberEndOfTopBar (attribute)

Type	xs:nonNegativeInteger
Cardinality	0..1
Description	Last line of a horizontal letter-box bar area at the top of the reconstructed frame. Designation of line numbers shall be based on the video standards and information specified in accordance with SMPTE ST 2016-1:2009. All <code>Bar_Data</code> values shall be stated in values appropriate to a progressive frame system.

lineNumberStartOfBottomBar (attribute)

Type	xs:nonNegativeInteger
Cardinality	0..1
Description	First line of a horizontal letter-box bar area at the bottom of the reconstructed frame. Designation of line numbers shall be based on the video standards and information specified in accordance with SMPTE ST 2016-1:2009. All Bar Data values shall be stated in values appropriate to a progressive frame system.

pixelNumberEndOfLeftBar (attribute)

Type	xs:nonNegativeInteger
Cardinality	0..1
Description	Last horizontal luminance sample of a vertical pillar-box bar area at the left side of the reconstructed frame. Pixels shall be numbered from zero, starting with the leftmost pixel, based on the video standards and information specified in accordance with SMPTE ST 2016-1:2009.

pixelNumberStartOfRightBar (attribute)

Type	xs:nonNegativeInteger
Cardinality	0..1
Description	First horizontal luminance sample of a vertical pillar-box bar area at the right side of the reconstructed frame. Pixels shall be numbered from zero, starting with the leftmost pixel, based on the video standards and information specified in accordance with SMPTE ST 2016-1:2009.

ebuttm:documentIntendedTargetFormat (element)

Type	xs:string
Cardinality	0..1
Description	<p>Indicates the subtitle format an author had in mind when authoring an EBU-TT document or transforming another format to an EBU-TT document.</p> <p>The value may be the text form of a term in a classification scheme. This representation is also referred to as “label”.</p> <p>Sample Value: “WSTTeletextSubtitles” or “DVBSubtitles”</p>

The `ebuttm:documentIntendedTargetFormat` element may have a `link` attribute to reference a term in a classification scheme.

link (attribute)

Type	xs:anyURI
Cardinality	0..1
Description	Reference to a term in a classification scheme.

The following metadata elements support the information that is present in the GSI block of the EBU-STL specification (EBU Tech 3264). EBU-TT has adopted the semantics from EBU Tech 3264.

ebuttm:documentOriginalProgrammeTitle (element)

Type	xs:string
Cardinality	0..1
STL mapping	Original Programme Title (OPT)
Description	The programme title in the original language.

ebuttm:documentOriginalEpisodeTitle (element)

Type	xs:string
Cardinality	0..1
STL mapping	Original Episode Title (OET)
Description	The title of the episode of the programme in the original language.

ebuttm:documentTranslatedProgrammeTitle (element)

Type	xs:string
Cardinality	0..1
STL mapping	Translated Programme Title (TPT)
Description	The programme title in the local language.

ebuttm:documentTranslatedEpisodeTitle (element)

Type	xs:string
Cardinality	0..1
STL mapping	Translated Episode Title (TET)
Description	The title of the episode of the programme in the local language.

ebuttm:documentTranslatorsName (element)

Type	xs:string
Multiplicity	0..1
STL mapping	Translator's Name (TN)
Description	Name of the translator.

ebuttm:documentTranslatorsContactDetails (element)

Type	xs:string
Cardinality	0..1
STL mapping	Translator's Contact Details (TCD)
Description	The translator's contact details.

ebuttm:documentSubtitleListReferenceCode (element)

Type	xs:string
Cardinality	0..1
STL mapping	Subtitle List Reference Code (SLR)
Description	Free-format character string which may be used to provide an additional reference for the subtitle list. Note: This attribute is provided to support conversion of STL subtitle files and to retain the metadata from the GSI block.

ebuttm:documentCreationDate (element)

Type	xs:date
Cardinality	0..1
STL mapping	Creation Date (CD)
Description	The date of creation of the EBU-TT document. Sample Value: "2012-06-30"

ebuttm:documentRevisionDate (element)

Type	xs:date
Cardinality	0..1
STL mapping	Revision Date (RD)
Description	The date of the most-recent modifications to the EBU-TT document.

ebuttm:documentRevisionNumber (element)

Type	xs:nonNegativeInteger
Cardinality	0..1
STL mapping	Revision Number (RN)
Description	The revision number of the EBU-TT document may be used to specify a particular version of the subtitle list.

ebuttm:documentTotalNumberOfSubtitles (element)

Type	xs:nonNegativeInteger
Cardinality	0..1
STL mapping	Total Number of Subtitles (TNS)
Description	The number of subtitles.

ebuttm:documentMaximumNumberOfDisplayableCharacterInAnyRow (element)

Type	xs:nonNegativeInteger
Cardinality	0..1
STL mapping	Maximum Number of Displayable Characters in any text row (MNC)
Description	Maximum number of characters in any row.

ebuttm:documentStartOfProgramme (element)

Type	ebuttdt:smpteTimingType
Cardinality	0..1
STL mapping	Timecode: Start-of-Programme (TCP)
Description	<p>The time code of the first frame of the recorded video signal which is intended for transmission.</p> <p>Note: When the referenced start timecode of the video material the subtitles were authored for is greater than 00:00:00:00 (e.g. 10:00:00:00) it is recommended to specify the attribute ebuttm:documentStartOfProgramme.</p>

ebuttm:documentCountryOfOrigin (element)

Type	xs:string
Cardinality	0..1
STL mapping	Country of Origin (CO)
Description	<p>The country of origin of the subtitle list.</p> <p>The ebuttm:documentCountryOfOrigin element shall not be used as a substitute for the xml:lang attribute of the tt:tt element.</p> <p>Note: Although three letter country codes must be supported to be compatible with STL the use of two letter country codes is recommended. The use of ISO3166 country codes “Codes for the representation of names of countries and their subdivisions” [11] is also recommended.</p>

ebuttm:documentPublisher (element)

Type	xs:string
Cardinality	0..1
STL mapping	Publisher (PUB)
Description	Name of the publisher of the subtitle list.

ebuttm:documentEditorsName (element)

Type	xs:string
Cardinality	0..1
STL mapping	Editor's Name (EN)
Description	Name of the editor of the subtitle list.

ebuttm:documentEditorsContactDetails (element)

Type	xs:string
Cardinality	0..1
STL mapping	Editor's Contact Details (ECD)
Description	Information about the editor named in the metadata element ebuttm:documentEditorsName.

ebuttm:documentUserDefinedArea (element)

Type	xs:string
Cardinality	0..1
STL mapping	User-Defined Area (UDA)
Description	This field may be used to carry information about the programme or subtitle list, or other relevant details.

3.1.1.2 Binary Data Tunnelling

The `ebuttm:binaryData` element may be used to transport binary data of the input formats or associated documents used to generate an EBU-TT document.

Where a sequence of source documents has been used to generate an EBU-TT document, multiple `ebuttm:binaryData` elements should be in the same order as the sources were processed.

ebuttm:binaryData (element)

Type	xs:string
Cardinality	0..*
Description	Container for transporting binary data. The binary data is encoded in one text string.

The `ebuttm:binaryData` element shall have the following attributes:

textEncoding (attribute)

Type	xs:string
Enumeration	"BASE64"
Cardinality	1..1
Description	Text encoding of the binary data. The text-encoding shall have the value "BASE64".

binaryDataType (attribute)

Type	xs:string
Cardinality	1..1
Description	Internal format of the binary data. Any format that is not defined by this document or another EBU Specification shall be prefixed with “x-”. To indicate that the binary data sent in a document is an STL file, the value “EBU Tech 3264” shall be used.

The `ebuttm:binaryData` element may have the following attribute:

fileName (attribute)

Type	xs:string
Cardinality	0..1
Description	A filename that may be used to identify the original filename of the tunnelled binary data.

3.1.1.3 TTML metadata elements

As a child element of `tt:head`, the `tt:metadata` element may contain zero or more `ttm:agent` elements.

The semantics and the use of the `ttm:agent` element are defined in the W3C Timed Text Markup Language (TTML) 1.0 [3].

3.1.2 Styling in tt:head

The head section of an EBU-TT document shall contain one `tt:styling` element. The `tt:styling` element is the container for styling information. It shall contain at least one `tt:style` child element.

tt:styling (element)

Type	Element content
Cardinality	1..1
Description	Container for styling information.

3.1.2.1 Style

A `tt:style` element defines a set of style information through style attributes. The `tt:div`, `tt:p` and `tt:span` elements in the body section, that enclose subtitle content, shall only use references to these specific style definitions.

Note: EBU-TT uses referenced styling. EBU-TT does not use the direct specification of style attributes in the subtitle blocks (also known as inline styling).

tt:style (element)

Type	Element content
Cardinality	1..*
Description	Set of style information.

The `tt:style` element shall have an *ID* that is unique in the entire document instance. This *ID* is used by subtitle blocks and regions to reference the style element.

xml:id (attribute)

Type	<code>xs:ID</code>
Cardinality	1..1
Description	<i>ID</i> of a <code>tt:style</code> element that is used by other elements for reference.

Note: The XML attribute `xml:id` (type `xs:ID`) is not only used by the `tt:style` element, but also by the `tt:region`, `tt:div`, `tt:p` and `tt:span` elements. By definition, a value of type `xs:ID` must be unique in the entire document. (See the W3C Specification Extensible Markup Language (XML) 1.0 and XML Schema Part 2: Datatypes [9]).

This means, for example, that a `tt:style` element and a `tt:region` element must not have the same `xml:id` attribute value (e.g. “id1”).

To “inherit” style information the `tt:style` element may itself reference one or more other `tt:style` elements. To reference these elements, the *ID* values of the referenced `tt:style` elements should be listed in the `style` attribute.

style (attribute)

Type	<code>xs:IDREFS</code>
Cardinality	0..1
Description	<i>ID(s)</i> of other style element(s). Style information from the referenced styles shall be inherited. If multiple styles are referenced the <i>IDs</i> shall be delimited by space characters (e.g. “styleId1 styleId2 styleId3”).

Style information is set using attribute values of the `tt:style` element.

Note: The style attributes used in EBU-TT are a limited subset of the TTML 1.0 W3C recommendation. An EBU-TT processor is not required to support TTML style attributes that are not used in the EBU-TT specification.

Style attributes that are not used in EBU-TT are amongst others `tts:display`, `tts:opacity`, `tts:visibility`, `tts:textOutline` and `tts:zIndex`.

In addition to the TTML style attributes listed below, EBU-TT also defines style attributes for the `tt:region` element (see § 3.1.3.1 “Region”). The style attributes of the `tt:style` element as well as the style attributes of the `tt:region` element shall only appear inside the parent element they are defined for. This means that a style attribute that is defined for the `tt:style` element

shall not appear in a `tt:region` element and vice versa. The only exception from this rule is the `tts:padding` attribute. `tts:padding` may appear both in the `tt:style` and `tt:region` element.

EBU-TT supports the following style information attributes in the `tt:style` element.

tts:direction (attribute)

Type	<code>xs:string</code>
Enumeration	“ltr” “rtl”
Cardinality	0..1
Description	<p>Directionality if bi-directional text is used.</p> <p>Note: Bi-directional text is text containing text in both text directions, right-to-left (“rtl”) and left-to-right (“ltr”).</p> <p>The Arabic and Hebrew scripts, notably, are written in a form known as right-to-left (“rtl”), in which writing begins at the right-hand side of a page and concludes at the left-hand side. This is different from the left-to-right (“ltr”) direction used by most languages in the world.</p>

tts:fontFamily (attribute)

Type	<code>ebuttdt:fontFamilyType</code>
Cardinality	0..1
Description	Font-family from which glyphs are selected.

tts:fontSize (attribute)

Type	<code>ebuttdt:fontSizeType</code>
Cardinality	0..1
Description	<p>The font-size of a glyph.</p> <p>In contrast to TTML, the initial value of <code>tts:fontSize</code> shall not be “1c”, but “1c 2c”.</p>

tts:lineHeight (attribute)

Type	<code>ebuttdt:lineHeightType</code>
Cardinality	0..1
Description	<p>Inter-baseline separation between line areas.</p> <p>If the value is "normal" then the line height shall be the same as the largest font size that applies to any descendent element.</p>

tts:textAlign (attribute)

Type	xs:string
Enumeration	“left” “center” “right” “start” “end”
Cardinality	0..1
Description	<p>Alignment of inline areas in a containing block.</p> <p>The alignment values “start” and “end” depend on the writing direction of the text which may be specified on a <code>tt:region</code> element with the attribute <code>tts:writingMode</code>.</p> <p>In contrast to TTML the initial value of <code>tts:textAlign</code> shall not be “start”, but “center”.</p> <p><u>Example:</u></p> <p>In a left-to-right inline writing direction “start” has the same meaning as “left” alignment while in the top-to-bottom inline writing direction the alignment value “start” expresses “top-alignment”.</p>

tts:color (attribute)

Type	ebuttdt:colorType
Cardinality	0..1
Description	<p>Foreground color of an area.</p> <p>Note: In TTML the initial value for <code>tts:color</code> is implementation dependent. In addition, EBU-TT recommends that in the absence of end-user preference information, a conformant presentation processor uses white or yellow.</p>

tts:backgroundColor (attribute)

Type	ebuttdt:colorType
Cardinality	0..1
Description	Background color of a region, a block area generated by a <code>tt:p</code> element or an inline area generated by a <code>tt:span</code> element.

tts:fontStyle (attribute)

Type	xs:string
Enumeration	“normal” “italic”
Cardinality	0..1
Description	Font style that applies to glyphs.

tts:fontWeight (attribute)

Type	xs:string
Enumeration	“normal” “bold”
Cardinality	0..1
Description	Font weight that applies to glyphs.

tts:textDecoration (attribute)

Type	xs:string
Enumeration	“none” “underline”
Cardinality	0..1
Description	Whether a glyph is underlined.

tts:unicodeBidi (attribute)

Type	xs:string
Enumeration	“normal” “embed” “bidiOverride”
Cardinality	0..1
Description	Directional embedding or override according to the Unicode bidirectional algorithm. (see [6])

tts:padding (attribute)

Type	ebuttdt:paddingType
Cardinality	0..1
Description	<p>Padding (or inset) space on all sides of a block area generated by a <code>tt:p</code> element or an inline area generated by a <code>tt:span</code> element.</p> <p>The padding property shall not be inherited. To apply padding to <code>tt:p</code> and <code>tt:span</code> elements, a <code>tt:style</code> element shall be referenced by <code>tt:p</code> or <code>tt:span</code>.</p> <p>Note: As the padding property cannot be inherited it applies only to a <code>tt:p</code> or a <code>tt:span</code> element if these element directly reference a style set with a corresponding padding attribute.</p> <p>The application of padding to the <code>tt:p</code> and <code>tt:span</code> elements is different to TTML, where padding applies just to the <code>tt:region</code>. So although this difference does not create any syntatic incompatibilities TTML processors may ignore the application of padding to <code>tt:p</code> and <code>tt:span</code> elements.</p>

In addition to the style attributes from TTML the new style attribute `ebutts:multiRowAlign` is defined by EBU-TT. The `ebutts:multiRowAlign` attribute defines how multiple ‘rows’ of inline areas are aligned within a containing block area. See Annex A for a detailed description of how the attribute can be used.

ebutts:multiRowAlign (attribute)

Type	<code>xs:string</code>
Enumeration	“start” “center” “end” “auto”
Cardinality	0..1
Description	Alignment of multiple ‘rows’ of inline areas within a containing block area.

Note: Although the TTML styling attributes `tts:wrapOption`, `tts:showBackground` and `tts:overflow` are not part of the EBU-TT specification, some clarification is needed as to how a processor ought to handle the presentation characteristics that are targeted by these attributes.

The `tts:wrapOption` attribute is used in TTML to specify whether or not automatic line wrapping (breaking) applies. In TTML the initial value for `tts:wrapOption` is “wrap”. This means that, by default, automatic line wrapping must be applied. In contrast to TTML, EBU-TT recommends that an EBU-TT processor does not rely upon automatic line wrapping by default. If line wrapping is required, an explicit line break ought to be inserted by using the `tt:br` element.

The `tts:overflow` attribute is used in TTML to specify if text in a region area must be clipped if it overflows the extent of the region. The initial value in TTML for `tts:overflow` is “hidden”. In contrast to TTML, EBU-TT recommends that an EBU-TT processor presents as much active content as possible even if the bounds of the region are exceeded.

The `tts:showBackground` attribute is used in TTML to specify when the background color of a region is present. The initial value of `tts:showBackground` is “always”. In contrast to TTML, EBU-TT recommends that an EBU-TT processor only presents the background color while active content is present in a region. This recommended default behaviour is expressed in TTML when `tts:showBackground` has the value “whenActive”.

3.1.3 Layout in `tt:head`

The EBU-TT head section shall contain one `tt:layout` element. The `tt:layout` element is a container element for layout information and shall contain at least one `tt:region` child element.

tt:layout (element)

Type	Element content
Cardinality	1..1
Description	Container for region elements.

3.1.3.1 Region

A `tt:region` element defines a space or an area in which subtitle content is to be placed. It specifies a set of layout information through attributes. To apply this layout information, `tt:div` and `tt:p` elements may reference a region.

tt:region (element)

Type	Element content
Cardinality	1..*
Description	Defines a space or area for the display of subtitle content.

The `tt:region` element shall have an *ID* that is unique in the entire document instance. It is used by subtitle blocks (`tt:div` element or `tt:p` element) to refer to a particular layout.

xml:id (attribute)

Type	<code>xs:ID</code>
Cardinality	1..1
Description	<i>ID</i> of a region. This <i>ID</i> is used by <code>tt:div</code> and <code>tt:p</code> elements to reference a region. Layout and style information of the referenced region shall be applied to these elements.

The position and size of the region shall be set through the attributes `tts:extent` and `tts:origin`. The reference for `tts:extent` and `tts:origin` shall be the active video (see “Definition of terms”). If the region exceeds the boundary of the active video the display of the region shall be clipped accordingly.

Note: The term “root container region” in TTML defines a region that establishes a coordinate system into which content regions are placed. In EBU-TT the root container region is the active video (see “Definition of terms”).

tts:origin (attribute)

Type	ebuttdt:originType
Cardinality	1..1
Description	<p>The x and y coordinates of the top left corner of a region with respect to the active video the document was authored for. The (0, 0) coordinate shall be assumed to be the top left corner of the active video.</p> <p>Values in percentage shall be relative to the width and height of the active video.</p> <p>Example: With <code>tts:origin="20% 80%"</code> the top left corner of the region is shifted 20% of the active video width to the right and 80% of the active video height to the bottom.</p>

tts:extent (attribute)

Type	ebuttdt:extentType
Cardinality	1..1
Description	<p>Width and height of a region area. Values in percentage shall be relative to the width and height of the active video.</p> <p>Example: With <code>tts:extent="100% 20%"</code> the width of the region is 100% of the width of the active video and the height of the region is 20% of the height of the active video.</p>

The `tt:region` element may also be used to apply style information to subtitles presented in this region. Therefore the `tt:region` element may reference zero or more `tt:style` elements from the styling section. The *IDs* of the referenced `tt:style` elements are specified in the `style` attribute of the `tt:region` element.

style (attribute)

Type	xs:IDREFS
Cardinality	0..1
Description	<p><i>ID(s)</i> of one or more style element(s). The style information shall be applied to <code>tt:div</code> or <code>tt:p</code> elements that reference the region.</p> <p>If multiple styles are referenced the <i>IDs</i> shall be delimited by space characters (e.g. "styleId1 styleId2 styleId3").</p>

The `tt:region` element may also specify some layout-specific style information:

tts:displayAlign (attribute)

Type	xs:string
Enumeration	“before” “center” “after”
Cardinality	0..1
Description	<p>Alignment in the block progression direction.</p> <p>In contrast to TTML, the initial value of <code>tts:displayAlign</code> shall not be “before”, but “after”.</p> <p>Note: In the writing mode “Left to Right Top to Bottom” this would result in the vertical alignment of lines of text.</p> <p>The value “before” would result in “top” alignment and the value “after” would result in “bottom” alignment.</p>

tts:padding (attribute)

Type	ebuttdt:paddingType
Cardinality	0..1
Description	Padding (or inset) space on all sides of a region area.

tts:writingMode (attribute)

Type	xs:string
Enumeration	“lrtb” “rltb” “tbrl” “tblr” “lr” “rl” “tb”
Cardinality	0..1
Description	<p>Writing mode of subtitle content.</p> <ul style="list-style-type: none"> • “lrtb”: “Left to Right Top to Bottom” • “rltb”: “Right to Left Top to Bottom” • “tbrl”: “Top to Bottom Right to Left” • “tblr”: “Top to Bottom Left to Right” • “lr”: Shorthand for “Left to Right Top to Bottom” • “rl”: Shorthand for “Right to Left Top to Bottom” • “tb”: Shorthand for “Top to Bottom Right to Left”

3.2 Body

The body section of an EBU-TT document carries the content of the subtitle and the timing information. Styling and layout shall be applied through references to specific `tt:style` and `tt:region` elements in the header section.

The `tt:body` element shall be the container for subtitle and timing information.

tt:body (element)

Type	Element content
Cardinality	1..1
Description	Container for subtitle and timing information.

Subtitle content shall be contained within the following elements of the body-section:

- `tt:p` (logical paragraph)
- `tt:span` (inline element to apply local style information or metadata)

Timing information shall be set using the following attributes:

- `begin`
- `end`

Timing information shall be specified on the `tt:p` element and may be specified on a `tt:span` element.

The `tt:body` element may have the attributes `ttm:role` and `ttm:agent`.

The semantics and the use of the `ttm:role` and `ttm:agent` attributes are defined in the W3C Timed Text Markup Language (TTML) 1.0 [3].

3.2.1 Div

The `tt:div` element shall be a logical container of textual content. A `tt:div` element may contain `tt:div` children elements to create a nested structure of `tt:div` elements.

tt:div (element)

Type	Element content
Cardinality	1..*
Description	Container for textual content.

xml:id (attribute)

Type	xs:ID
Cardinality	0..1
Description	<i>ID</i> of a <code>tt:div</code> element that may be used by an external application.

To apply layout- and style-information the `tt:div` element may reference a `tt:region` element using a `region` attribute.

region (attribute)

Type	xs:IDREF
Cardinality	0..1
Description	Application of layout and style information through reference of a region.

To apply style information a `tt:div` element may also reference a `tt:style` element directly with a `style` attribute.

style (attribute)

Type	xs:IDREFS
Cardinality	0..1
Description	<i>ID(s)</i> of one or more style element(s). The style information shall be applied to the enclosed content of the <code>tt:div</code> element. If multiple styles are referenced the <i>IDs</i> shall be delimited by space characters (e.g. “styleId1 styleId2 styleId3”).

The `tt:div` element may have the attributes `ttm:role` and `ttm:agent`.

The semantics and the use of the `ttm:role` and `ttm:agent` attributes are defined in the W3C Timed Text Markup Language (TTML) 1.0 [3].

3.2.1.1 Paragraph

A `tt:p` element shall represent a logical paragraph. The `tt:p` element may have textual content and zero or more `tt:span` elements.

tt:p (element)

Type	Mixed content.
Cardinality	1..*
Description	Logical paragraph.

The `tt:p` element shall have an *ID* that is unique in the entire document. This *ID* shall represent the unique *ID* of a subtitle. No meaningful subtitle sequence should be inferred from the value of

this *ID*.

Note: Typically this *ID* will be a monotonically (logically) increasing value through the EBU-TT document (e.g. sub1, sub2, sub3 or sub1, sub2, sub2a, sub2b, sub3).

xml:id (attribute)

Type	xs:ID
Cardinality	1..1
Description	Unique <i>ID</i> of a subtitle.

To indicate the authors intention of the use of white space (spaces, tabs, and blank lines) the `xml:space` attribute may be added.

xml:space (attribute)

Type	xs:string
Enumeration	“default” “preserve”
Cardinality	0..1
Description	Indicates the author’s intention of white space handling within the content of the <code>tt:p</code> element.

To overwrite the language identification of the enclosed subtitle content the `xml:lang` attribute may be specified on the `tt:p` element.

xml:lang (attribute)

Type	xs:language ""
Cardinality	0..1
Description	Language identifier that overwrites the language identification of the enclosed subtitle content. The empty string maybe used to indicate that no language information is available. The <code>xml:lang</code> attribute shall be used as defined in XML 1.0 §2.12, Language Identification [7]. Sample Values: “en”, “en-US” or “de”.

To apply layout and style information the `tt:p` element may reference a `tt:region` element using a `region` attribute.

region (attribute)

Type	xs:IDREF
Cardinality	0..1
Description	Application of layout information through reference of a region.

To apply style information a `tt:p` element may reference a `tt:style` element directly with a `style` attribute.

style (attribute)

Type	<code>xs:IDREFS</code>
Cardinality	0..1
Description	<i>ID(s)</i> of one or more style element(s). The style information shall be applied to the enclosed content of the <code>tt:p</code> element. If multiple styles are referenced the <i>IDs</i> shall be delimited by space characters (e.g. “styleId1 styleId2 styleId3”).

The timing information of a `tt:p` element is set through the attributes `begin` and `end`.

begin (attribute)

Type	<code>ebuttdt:smpteTimingType</code> <code>ebuttdt:mediaTimingType</code>
Cardinality	1..1
Description	Start point of a temporal interval associated with a <code>tt:p</code> element. If the timebase is “smpte” the type shall be <code>ebuttdt:smpteTimingType</code> . If the timebase is “media” the type shall be <code>ebuttdt:mediaTimingType</code> . If the timebase is “media” the time expression should be the offset from a syncbase of “00:00:00.0”.

end (attribute)

Type	<code>ebuttdt:smpteTimingType</code> <code>ebuttdt:mediaTimingType</code>
Cardinality	1..1
Description	End point of a temporal interval associated with a <code>tt:p</code> element. If the timebase is “smpte” the type shall be <code>ebuttdt:smpteTimingType</code> . If the timebase is “media” the type shall be <code>ebuttdt:mediaTimingType</code> . If the timebase is “media” the time expression should be the offset from a syncbase of “00:00:00.0”.

The `tt:p` element may have the attributes `ttm:role` and `ttm:agent`.

The semantics and the use of the `ttm:role` and `ttm:agent` attributes are defined in the W3C Timed Text Markup Language (TTML) 1.0 [3].

A `tt:br` element may be used to insert a forced line break.

tt:br (element)

Type	Element content
Cardinality	0..1
Description	Forced line break.

The `tt:br` element may have the TTML attribute `ttm:role`.

The semantics and the use of the `ttm:role` attribute is defined in W3C Timed Text Markup Language (TTML) 1.0 [3].

3.2.1.1.1 Span

The `tt:p` element may have zero or more `tt:span` element(s). The `tt:span` element may be used to apply style information to the enclosed textual content. This style information is added to or overwrites style information from the currently active context.

A `tt:span` element may also have other `tt:span` elements as children (nested spans).

tt:span (element)

Type	Mixed content.
Cardinality	0..*
Description	Inline element to allow the application of local style information, annotation or metadata.

xml:id (attribute)

Type	<code>xs:ID</code>
Cardinality	0..1
Description	<i>ID</i> of a <code>tt:span</code> element that may be used by an external application.

To indicate the author's intent in the use of white space (spaces, tabs, and blank lines) the `xml:space` attribute may be added to the `tt:span` element.

xml:space (attribute)

Type	<code>xs:string</code>
Enumeration	"default" "preserve"
Cardinality	0..1
Description	Indicates the authors' intention for white space handling within the content of the <code>tt:span</code> element.

To overwrite the language identification of the enclosed subtitle content the `xml:lang` attribute may be specified in the `tt:span` element.

xml:lang (attribute)

Type	<code>xs:language</code> ""
Cardinality	0..1
Description	Language identifier that overwrites the language identification of the enclosed subtitle content. The empty string maybe used to indicate that no language information is available. The <code>xml:lang</code> attribute shall be used as defined in XML 1.0 §2.12, Language Identification [7]. Sample Values: "en", "en-US" or "de".

To apply style information the `tt:span` element may reference style elements in the styling section of the document through the `tt:style` attribute.

style (attribute)

Type	<code>xs:IDREFS</code>
Cardinality	0..1
Description	<i>ID(s)</i> of one or more style element(s). The style information shall be applied to the enclosed content of the <code>tt:span</code> element. If multiple styles are referenced the <i>IDs</i> shall be delimited by space characters (e.g. "styleId1 styleId2 styleId3").

Timing information may be applied in a `tt:span` element through the attributes `begin` and `end`.

Note: Although it is not restricted by this specification, it is anticipated that the `begin` and `end` timecode values for a `tt:span` element will logically fall inside the timecode values defined by a parent `tt:p` element.

begin (attribute)

Type	<code>ebuttdt:smpteTimingType</code> <code>ebuttdt:mediaTimingType</code>
Cardinality	0..1
Description	Start point of a temporal interval associated with a <code>tt:span</code> element. If the value of <code>ttp:timebase</code> is "smpte" the type shall be <code>ebuttdt:smpteTimingType</code> . If the timebase is "media" the type shall be <code>ebuttdt:mediaTimingType</code> and the value shall express the offset to the begin time of the parent element.

end (attribute)

Type	<code>ebuttdt:smpteTimingType</code> <code>ebuttdt:mediaTimingType</code>
Cardinality	0..1
Description	<p>End point of a temporal interval associated with a <code>tt:span</code> element.</p> <p>If the value of <code>ttp:timebase</code> is “smpte” the type shall be <code>ebuttdt:smpteTimingType</code>.</p> <p>If the timebase is “media” the type shall be <code>ebuttdt:mediaTimingType</code> and the value shall express the offset to the begin time of the parent element.</p>

The `tt:span` element may have the attributes `ttm:role` and `ttm:agent`.

The semantics and the use of the `ttm:role` and `ttm:agent` attributes are defined in the W3C Timed Text Markup Language (TTML) 1.0 [3].

A `tt:br` element may be used to insert a forced line break.

tt:br (element)

Type	Element content
Cardinality	0..1
Description	Forced line break.

The `tt:br` element may have the attribute `ttm:role`.

The semantics and the use of the `ttm:role` is defined in the W3C Timed Text Markup Language (TTML) 1.0 [3].

4. Datatypes

EBU-TT defines specific datatypes to restrict the content of attributes or textual Element content.

Note: If a datatype is applied to an attribute or element that was taken from TTML the restriction of the datatype is equal to the definition in TTML or it is a further restriction of the content as defined in TTML. Therefore all values that conform to the EBU-TT datatypes also conform to the values allowed in TTML. However it is possible that a value conforms to the TTML definitions but does not conform to the EBU-TT datatypes.

4.1 *ebuttdt:cellResolutionType*

The content shall be constrained to two numbers of type `xs:positiveInteger` delimited by a space. The first value shall define the number of columns and the second value shall define the number of rows.

4.2 *ebuttdt:colorType*

Note: The constraints are the same as those defined by the <color> expression in TTML.

The content shall be constrained to a named color string, a RGB color triple, RGBA color tuple, a hex notated RGB color triple or a hex notated RGBA color tuple.

Although different formats may be used in an EBU-TT document the value should be expressed in RGB or RGBA.

Named colors shall be:

- “transparent”
- “black”
- “silver”
- “gray”
- “white”
- “maroon”
- “red”
- “purple”
- “fuchsia”
- “magenta”
- “green”
- “lime”
- “olive”
- “yellow”
- “navy”
- “blue”
- “teal”
- “aqua”
- “cyan”

Note: The color black can, for example, be expressed as:

- “black” (named color)
- “rgb(0, 0, 0)” (RGB color triple)
- “rgba(0, 0, 0, 255)” (RGBA color tuple)
- “#000000” (RGB color triple in hex notation)
- “#000000FF” (RGBA color tuple in hex notation)

4.3 *ebuttdt:extentType*

The content shall be constrained to two values of type *ebuttdt:lengthType* delimited by a space. The first value shall express the width and the second value the height.

4.4 *ebuttdt:fontFamilyType*

Note: The constraints of the *ebuttdt:fontFamilyType* are the same as the constraints defined by the TTML style value expressions <familyName> and <genericFamilyName>.

The content shall be constrained to one or more font family- and/or generic family-names.

Any name may be used for a font family name (e.g. “Arial” or “Verdana”).

Generic family names shall be:

- “default”
- “monospace”
- “sanserif”
- “serif”
- “monospaceSansSerif”
- “monospaceSerif”
- “proportionalSansSerif”
- “proportionalSerif”
- “monospace”

The typographic characteristics of the generic family name “default” may be implementation dependent; however the default generic font family should be mapped to a monospaced, sans-serif font.

4.5 *ebuttdt:fontSizeType*

The content is constrained to one or two non-negative values of type `ebuttdt:lengthType`.

If a single value is specified, then this length applies equally to horizontal and vertical scaling of a glyph's square; if two values are specified, then the first expresses the horizontal scaling and the second expresses vertical scaling.

Note: Use of independent horizontal and vertical font sizes is expected to be used with cell based metrics in order to denote fonts that are two rows in height and one column in width.

4.6 *ebuttdt:framerateMultiplierType*

The content shall be constrained to two numbers of type `xs:positiveInteger` delimited by a space. The value shall represent a fraction. The first number shall be the numerator and the second number shall be the denominator.

4.7 *ebuttdt:lengthType*

Note: The `ebuttdt:lengthType` of TTML is equal to the `<length>` expression defined in TTML except that the measurement parameter *em* is not allowed.

The content shall be constrained to a number of type `xs:decimal` appended either by the percentage sign “%” or the measurement units “px” (for video pixel) or “c” (for cell).

If an EBU-TT document instance uses the ‘cell’ measurement unit (e.g. as part of a `tts:fontSize` attribute value) then the `ttp:cellResolution` attribute shall be specified on the `tt:tt` element.

If an EBU-TT document instance uses the ‘pixel’ measurement unit (e.g. as part of a `tts:fontSize` attribute value) then the `tts:extent` attribute of the `tt:tt` element shall be specified.

4.8 *ebuttdt:lineHeightType*

The value shall be the string “normal” or shall be a non-negative value of type `ebuttdt:lengthType`.

4.9 *ebuttdt:originType*

The content shall be constrained to two values of type `ebuttdt:lengthType` delimited by a space. The first value shall express a x-coordinate and the second value a y-coordinate.

4.10 *ebuttdt:paddingType*

The content shall be constrained to one or four values of type `ebuttdt:lengthType` delimited by a space. If four values are specified, the first value shall apply to the “before” edges, the second value to the “end” edges, the third value to the “after” edges and the fourth value to the “start” edges of an area. If only one value is specified the value shall apply to all four edges of an area.

4.11 *ebuttdt:smpteTimingType*

A value of type `ebuttdt:smpteTimingType` shall conform to the time coordinate defined by SMPTE 12M-1-2008 [5] and shall have the format:

hh:mm:ss:ff

Where *hh* is hours, *mm* is minutes, *ss* is seconds and *ff* is frames.

4.12 *ebuttdt:mediaTimingType*

The value of type `ebuttdt:mediaTimingType` shall be a **Full-Clock-value** or a **Timecount-value**.

A **Full-Clock-value** shall have the format *hh:mm:ss* followed by an optional *fraction*.

A *fraction* shall have a leading "." followed by a non-negative integer.

Examples for Full-Clock-values

- 02:30:03 = 2 hours, 30 minutes and 3 seconds
- 01:00:10.25 = 1 hour, 10 seconds and 250 milliseconds

A **Timecount value** shall have the format:

Timecount followed by an optional *fraction* and a *symbol for the time metric*.

A *Timecount* shall be a non-negative integer.

A *fraction* shall have a leading "." followed by a non-negative integer.

A *symbol for time metric* shall be one of the following:

- "h" for hours
- "m" for minutes
- "s" for seconds
- "ms" for milliseconds

Examples for Timecount values:

3.2h = 3.2 hours = 3 hours and 12 minutes
 45m = 45 minutes
 30s = 30 seconds
 5ms = 5 milliseconds

“frame” and “tick” based metrics shall not be used in a time expression of `ebuttdt:mediaTimingType`.

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Annex A: Use of `ebutts:multiRowAlign`

The `ebutts:multiRowAlign` attribute may be used to specify a style property that defines how multiple ‘rows’ of inline are aligned within a containing block area. This attribute acts as a ‘modifier’ to the action defined by the `tts:textAlign` attribute value, whether that value is explicitly or implicitly defined. This attribute effectively creates additional alignment points for multiple rows of text, thus it has no effect if only a single row of text is present.

This modifier acts as follows: For multiple ‘rows’ of inline blocks, 3 additional multi-row alignment points (“start”, “center”, “end”) are created by the rendered dimensions of the longest row within the `p` element. ‘Rows’ that are shorter than the longest row shall be each aligned against the longest row using the multi-row alignment point identified by the `ebutts:multiRowAlign` attribute value. The longest ‘row’ shall always be aligned within the region in accordance with the value of the `tts:textAlign` attribute.

Note: The combination of `tts:textAlign="start"` with `ebutts:multiRowAlign="start"` acts identically to the use of `tts:textAlign="start"` without the `ebutts:multiRowAlign` attribute.

Or more simply, if the `ebutts:multiRowAlign` attribute has the same value as `tts:textAlign`, the `ebutts:multiRowAlign` attribute has no effect.

If the term “auto” is used the basic behaviour of `tts:textAlign` is maintained unmodified (i.e. the presentation is as if `ebutts:multiRowAlign` would have the same computed value as `tts:textAlign`).

The use of `tts:textAlign` together with `ebutts:multiRowAlign` provides for combinations of text alignment as tabled below, where the highlighted combinations may be specified by the use of just the `tts:textAlign` attribute from the W3C TTML specification.

tts:textAlign	ebutts:multiRowAlign	Presentation
“start”	“start”	Start justified text. All ‘rows’ are aligned at start.
“start”	“center”	The longest ‘row’ is start aligned. Shorter ‘rows’ are center aligned against the center alignment point created by the longest ‘row’.
“start”	“end”	The longest ‘row’ is start aligned. Shorter ‘rows’ are end aligned against the end alignment point created by the longest ‘row’.
“left”	“start”	The longest ‘row’ is left aligned. Shorter ‘rows’ are start aligned against the start alignment point created by the longest ‘row’.
“left”	“center”	The longest ‘row’ is left aligned. Shorter ‘rows’ are center aligned against the center alignment point created by the longest ‘row’.
“left”	“end”	The longest ‘row’ is left aligned. Shorter ‘rows’ are end aligned against the end alignment point created by the longest ‘row’.
“center”	“start”	The longest ‘row’ is center aligned. Shorter ‘rows’ are start aligned against the start alignment point created by the longest ‘row’.
“center”	“center”	Center justified text. All ‘rows’ are individually center aligned.
“center”	“end”	The longest ‘row’ is center aligned. Shorter ‘rows’ are end aligned against the end alignment point created by the longest ‘row’.
“right”	“start”	The longest ‘row’ is right aligned. Shorter ‘rows’ are start aligned against the start alignment point created by the longest ‘row’.
“right”	“center”	The longest ‘row’ is right aligned. Shorter ‘rows’ are center aligned against the center alignment point created by the longest ‘row’.
“right”	“end”	The longest ‘row’ is right aligned. Shorter ‘rows’ are end aligned against the end alignment point created by the longest ‘row’.
“end”	“start”	The longest ‘row’ is end aligned. Shorter ‘rows’ are start aligned against the start alignment point created by the longest ‘row’.
“end”	“center”	The longest ‘row’ is end aligned. Shorter ‘rows’ are center aligned against the center alignment point created by the longest ‘row’.
“end”	“end”	End justified text. All ‘rows’ are aligned at end.

If a specified value of this attribute is not supported, then a presentation processor shall interpret the attribute as if the attribute has the value “auto” (i.e. the basic behaviour of `tts:textAlign` is maintained unmodified).

The `ebutts:multiRowAlign` style is illustrated by the following example.

```

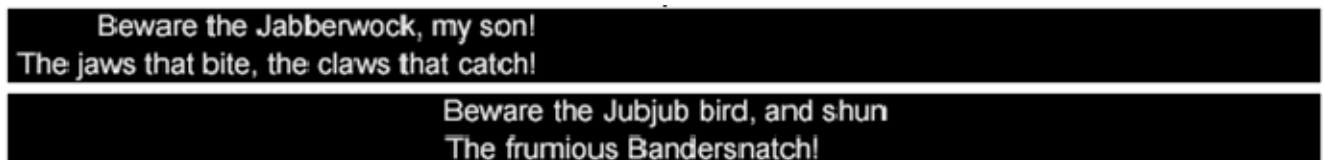
...
<tt:styling>
  <tt:style xml:id="baseStyle" tts:backgroundColor="black" tts:color="white" />
  <tt:style xml:id="startEnd" tts:textAlign="start" ebutts:multiRowAlign="end" />
  <tt:style xml:id="centerStart" tts:textAlign="center" ebutts:multiRowAlign="start" />
</tt:styling>

<tt:layout>
  <tt:region xml:id="regionTop" tts:extent="355px 43px" tts:origin="0px 0px" />
  <tt:region xml:id="regionBottom" tts:extent="355px 43px" tts:origin="0px 47px" />
</tt:layout>

...
<tt:div style="baseStyle">
...
  <tt:p xml:id="subtitle1" region="regionTop" style="startEnd" begin="00:00:00:00" end="00:00:03:00">
    Beware the Jabberwock, my son!<tt:br />
    The jaws that bite, the claws that catch!
  </tt:p>
  <tt:p xml:id=" subtitle2" region=" regionBottom" style="centerStart" begin="00:00:00:00"
    end="00:00:03:00">
    Beware the Jubjub bird, and shun<tt:br />
    The frumious Bandersnatch!
  </tt:p>
...
</tt:div>

```

Produces:



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Annex B: Support of the STL GSI Block in EBU-TT

The following characters are used to indicate if an element or attribute was defined for the STL information in EBU-TT:

- No element or attribute defined
- X Supported (Element or attribute defined for the STL Information)

STL Information	Mnemonic	EBU-TT Support
Code Page Number	CPN	-
Disk Format Code	DFC	-
Display Standard Code	DSC	-
Character Code Table Number	CCT	-
Language Code	LC	X
Original Programme Title	OPT	X
Original Episode Title	OET	X
Translated Programme Title	TPT	X
Translated Episode Title	TET	X
Translator's Name	TN	X
Translator's Contact Details	TCD	X
Subtitle List Reference Code	SLR	X
Creation Date	CD	X
Revision Date	RD	X
Revision Number	RN	X
Total Number of Text Timing Information (TTI) blocks	TNB	-
Total Number of Subtitles	TNS	X
Total Number of Subtitle Groups	TNG	-
Maximum Number of Displayable Character in any text row	MNC	X
Maximum Number of Displayable Rows	MNR	-
Time Code: Status	TCS	-
Time Code: Start-of-Programme	TCP	X
Time Code: First In-Cue	TCF	-
Total Numbers of Disks	TND	-
Disk Sequence Number	DSN	-
Country of Origin	CO	X
Publisher	PUB	X
Editor's Name	EN	X
Editor's Contact Details	ECD	X
User-Defined Area	UDA	X

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Annex C: Initial Values of TTML and EBU-TT attributes

The following table lists the TTML attributes where EBU-TT adopts the TTML initial values:

Attribute Name	TTML Initial Value
tts:backgroundColor	“transparent”
tts:direction	“ltr”
tts:fontFamily	“default”
tts:fontStyle	“normal”
tts:fontWeight	“normal”
tts:lineHeight	“normal”
tts:padding	“0px”
tts:textDecoration	“none”
tts:unicodeBidi	“normal”
tts:writingMode	“lrbt”

The following table lists the TTML attributes where EBU-TT overwrites the TTML initial values:

Attribute Name	TTML Initial Value	EBU-TT Initial Value
ttp:cellResolution	“32 15”	“40 24”
tts:color	Implementation dependent.	Implementation dependent. Note: It is recommended in the absence of end-user preference information that a conformant presentation processor uses white or yellow.
tts:fontSize	“1c”	“1c 2c” (The semantics of the unit of measure c [cell] are defined by the attribute ttp:cellResolution parameter. The semantics of two values for tts:fontSize are defined in § 4.7 “fontSizeType”).
tts:displayAlign	“before”	“after”
tts:textAlign	“start”	“center”

Note: Some attributes in EBU-TT are mandatory or have to be explicitly specified whenever they apply (e.g. ttp:dropMode is mandatory when timebase is “smpte”). As the initial value of these attributes never applies, they are not listed in this section.

The following table lists the initial values of the attribute defined in the EBU-TT Style namespace.

Attribute Name	EBU-TT Initial Value
ebutts:multiRowAlign	“auto”

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Annex D: Index of elements, attributes and types

begin (attribute)	40, 42	ebuttm:documentUserDefinedArea (element)	27
ebuttdt:cellResolutionType	17, 43	ebutts:multiRowAlign (attribute)	33, 49
ebuttdt:colorType	31, 44	end (attribute)	40, 43
ebuttdt:extentType	18, 35, 44	region (attribute)	38, 39
ebuttdt:fontFamilyType	30, 44	style (attribute)	29, 35, 38, 40, 42
ebuttdt:fontSizeType	30, 45	tt:body (element)	37
ebuttdt:framerateMultiplierType	16, 45	tt:br (element)	41, 43
ebuttdt:lengthType	44, 45, 46	tt:div (element)	37
ebuttdt:lineHeightType	30, 45	tt:head (element)	18
ebuttdt:mediaTimingType	40, 42, 43, 46	tt:layout (element)	34
ebuttdt:originType	35, 45	tt:metadata (element)	12, 19
ebuttdt:paddingType	32, 36, 46	tt:p (element)	38
ebuttdt:smpTeTimingType	26, 40, 42, 43, 46	tt:region (element)	34
ebuttm:binaryData (element)	27	tt:span (element)	41
ebuttm:documentCopyright (element)	20	tt:style (element)	29
ebuttm:documentCountryOfOrigin (element)	26	tt:styling (element)	28
ebuttm:documentCreationDate (element)	24	tt:tt (element)	14
ebuttm:documentEbutttVersion (element)	19	ttp:cellResolution (attribute)	17
ebuttm:documentEditorsContactDetails (element)	27	ttp:dropMode (attribute)	17
ebuttm:documentEditorsName (element)	26	ttp:frameRate (attribute)	15
ebuttm:documentIdentifier (element)	19	ttp:frameRateMultiplier (attribute)	16
ebuttm:documentIntendedTargetBarData (element)	21	ttp:markerMode (attribute)	16
ebuttm:documentIntendedTargetFormat (element)	22	ttp:timeBase (attribute)	15
ebuttm:documentMaximumNumberOfDisplayableCharacterIn AnyRow (element)	25	tts:backgroundColor (attribute)	31
ebuttm:documentMetadata (element)	19	tts:color (attribute)	31
ebuttm:documentOriginalEpisodeTitle (element)	23	tts:direction (attribute)	30
ebuttm:documentOriginalProgrammeTitle (element)	23	tts:displayAlign (attribute)	36
ebuttm:documentOriginatingSystem (element)	20	tts:extent (attribute)	18, 35
ebuttm:documentPublisher (element)	26	tts:fontFamily (attribute)	30
ebuttm:documentReadingSpeed (element)	20	tts:fontSize (attribute)	30
ebuttm:documentRevisionDate (element)	25	tts:fontStyle (attribute)	31
ebuttm:documentRevisionNumber (element)	25	tts:fontWeight (attribute)	32
ebuttm:documentStartOfProgramme (element)	26	tts:lineHeight (attribute)	30
ebuttm:documentSubtitleListReferenceCode (element)	24	tts:origin (attribute)	35
ebuttm:documentTargetActiveFormatDescriptor (element)	20	tts:padding (attribute)	32, 36
ebuttm:documentTargetAspectRatio (element)	20	tts:textAlign (attribute)	31
ebuttm:documentTotalNumberOfSubtitles (element)	25	tts:textDecoration (attribute)	32
ebuttm:documentTranslatedEpisodeTitle (element)	23	tts:unicodeBidi (attribute)	32
ebuttm:documentTranslatedProgrammeTitle (element)	23	tts:writingMode (attribute)	36
ebuttm:documentTranslatorsContactDetails (element)	24	xml:id (attribute)	29, 34, 38, 39, 41
ebuttm:documentTranslatorsName (element)	24	xml:lang (attribute)	18, 39, 42
		xml:space (attribute)	14, 39, 41